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Knowledge Regarding Lithium Therapy among Care Givers of Mentally Ill Patients

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Abstract

Lithium has several less common but important metabolic adverse effects. Prevention and avoidance of risk factors are essential key to the management of lithium toxicity. Patient and the family education about early warning signs of all adverse effects and the need for immediate intervention regarding lithium therapy in clinical setting is unavoidable.

Aims: To determine the level of knowledge on lithium therapy among caregivers of mentally ill patient and find out the association between knowledge level and selected demographic variables

Method: Descriptive design was adopted. Sampling technique used was convenience and 60 subjects were selected.

Results: The study results showed that among the care givers, 55% had average knowledge, 38% had poor knowledge and only 7% had good knowledge regarding lithium therapy and there was a significant association between caregivers sex ($p=0.007$) and knowledge level, i.e. the females were having better knowledge than males. A significant association was found between education and knowledge ($p=0.02$) which revealed that those with higher education had better knowledge. An association between socio economic status ($p=0.007$) with knowledge regarding lithium therapy was also found. As majority of the caregivers were from middle socio economic status, the association found may be due to that.

Conclusion: The study result highlights the need for patients and care givers to be given ample information about lithium prior to commencement of treatment and an energizer educational program during lithium therapy.

Keywords: Knowledge, Lithium therapy, Care givers, Mental illness.

Introduction

Bipolar disorder is a very serious-but highly treatable brain disease¹. Bipolar disorder ranks among the top 10 causes of disability in developed countries worldwide. In other words, at any one time as many as 51 million

people worldwide suffer from bipolar disorder². Bipolar disorder affects about 60 million people worldwide. It typically consists of both manic and depressive episodes separated by periods of normal mood. People who have manic attacks but do not experience depressive episodes are also classified as having bipolar disorder. Effective treatments are available for the treatment of the acute phase of bipolar disorder and the prevention of relapse. These are medicines that stabilize mood³. Bipolar disorder is treated with three main classes of medication: mood stabilizers, antipsychotics, and, sometimes controversial, antidepressants. Typically, treatment entails a combination of at least one mood-stabilizing drug and/or atypical antipsychotic, plus

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psychotherapy. The most widely used drugs for the treatment of bipolar disorder include lithium carbonate and valproic acid.^{4,5} Lithium carbonate can be remarkably effective in reducing mania. Lithium may also prevent recurrence of depression and credited for reducing suicides in depressive phases of the disease. Patients who take lithium carbonate are often noncompliant because of adverse effects, including hand tremor, diarrhea, vomiting, weight gain and decreased thyroid function.^{6,7} Knowledge about a drug and its effects may play an important role in establishing compliance because health beliefs are based, at least in part, on information.⁸ Many specialized lithium outpatient clinics therefore provide information brochures to patients.⁹ Factors affecting the long-term outcome of lithium prophylaxis are not completely understood, but compliance with treatment is probably an important predictor of outcome, as well as the occurrence and intensity of adverse drug reactions.¹⁰

The lithium toxicity and other side effects are very common among patients who are receiving lithium carbonate, because of the lack of knowledge of caregivers and patient regarding lithium therapy. However, evidence for an association between patients' knowledge about lithium treatment and subsequent behavior is sparse because there have been very few studies done¹¹. So through the assessment we can determine their

knowledge level and adequate information can be given which will prevent the complications and helps in early identification of side effects¹². So there is an imminent need for the assessing the level of knowledge of patient and caregivers regarding lithium therapy.

Materials and Method

A Quantitative research approach with descriptive design was adopted to assess the knowledge level of caregivers regarding lithium therapy. The setting of the study was a Psychiatric Department of a tertiary care hospital Kochi. Sixty caregivers of mentally ill. On lithium therapy were selected as sample. The data was collected by using self structured questionnaire for the assessment of knowledge level of lithium therapy among caregivers of mentally ill patients. The reliability of the tool was 0.7, using split half method. The data collection period was from December 19th 2016 to January 22nd 2017. Ethical clearance was obtained from the institutional Ethical Committee and written permission was obtained from the HOD of psychiatric department. Before taking interview with the subjects, the researcher obtained an informed consent from the participants after clearly explaining the purpose of the study. Pearson chi square was used to analyze the association between the knowledge level and selected demographic.

Results

Section 1 Sample Characteristics.

Table 1: Distribution of subjects based on socio demographic characteristics

variables.

Serial no	Demographic Variables	Frequency (f)	Percentage (%)
1	Age in years		
	18-25 years	3	5
	26-35years	6	10
	36-45years	9	15
	45-64years	39	65
	>65years	3	5
2	Gender		

Cont... Table 1: Distribution of subjects based on socio demographic characteristics n=60

	Male	22	37
	Female	38	63
3	Education		
	Primary	24	40
	Higher secondary	21	35
	Graduate	11	19
	Postgraduate	2	3
	Professional	2	3
4	Socio economic status		
	Low	5	8
	Middle	55	92
5	Relationship with patient		
	Parents	35	58
	Wife/Husband	12	20
	Sibling	7	12
	Other	6	10
6	Length of stay with patient		
	<1year	1	2
	1-2years	3	5
	2-5years	0	0
	>5years	56	93
7	Duration of lithium therapy		
	<1year	9	15
	1-2years	14	23
	2-5years	19	32
	>5years	18	30

Table 1 depicts that 65% of the subjects were between the age group of 45-64 years and 63% were females. Majority of them were having primary education (40%). Most of them belongs to middle class family (92%). Majority of the care givers were their parents (58%) and length of stay with patient was >

5 years (93%). Only 15% of patients were receiving lithium therapy for less than one year .Around 93% were staying with the patient for >5years .Around 30% of patients with mental illness were receiving lithium for more than 5 years

SECTION: 2 KNOWLEDGE OF CAREGIVERS OF MENTALLY ILL REGARDING LITHIUM THERAPY

n=60

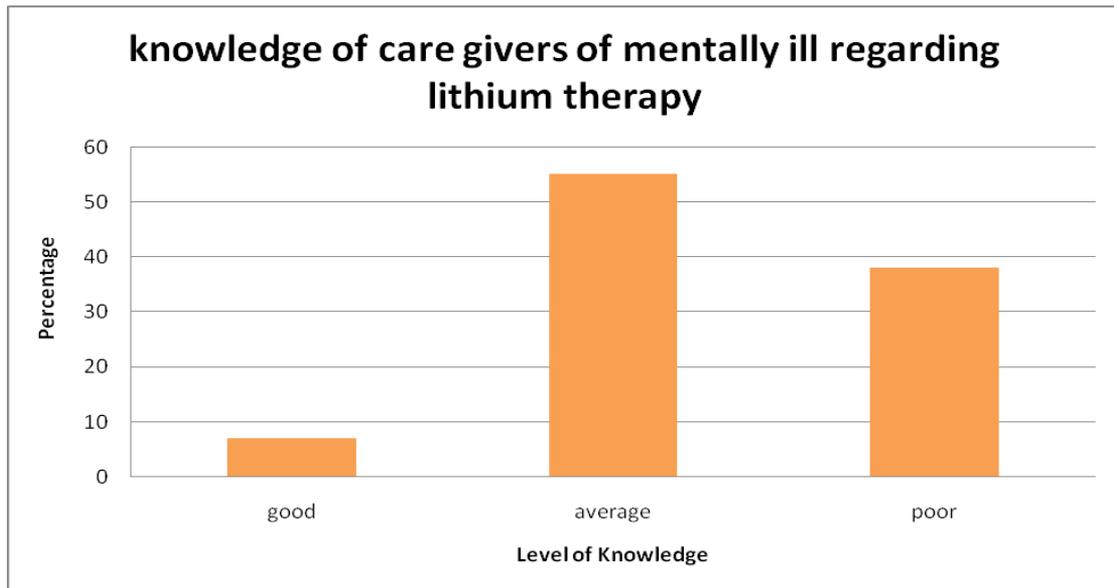


Figure 1 : Distribution of subjects based on knowledge regarding lithium therapy

The figure 1 shows that 38% of the subjects were having poor knowledge, and 55% were having average knowledge and only 7% were having good knowledge regarding lithium therapy.

DISTRIBUTION OF KNOWLEDGE BASED ON THE COMPONENTS

n=60

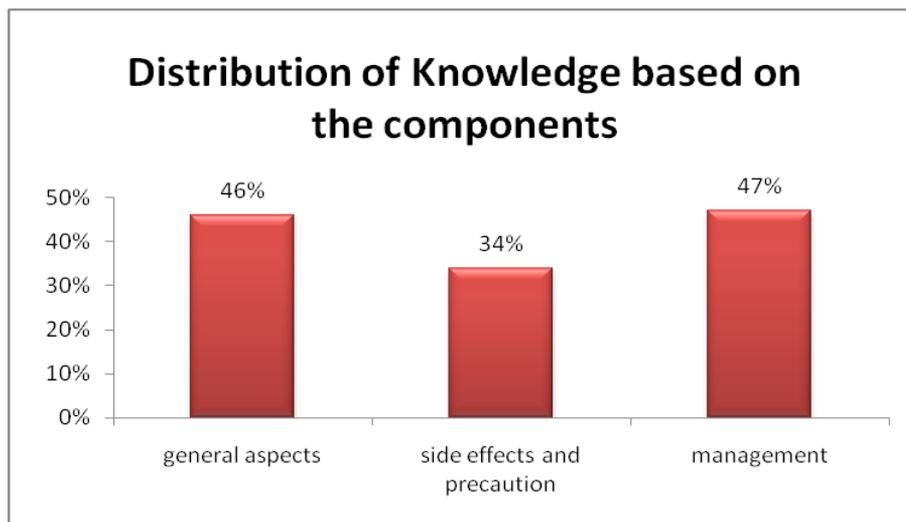


Figure 2: Distribution of knowledge based on the components

The above figure depicts the mean score percentage of the three components of the knowledge on lithium therapy. Of the three components of knowledge on lithium therapy, the mean score percentage was relatively high in the knowledge on general aspects of lithium

therapy (46%) and management of lithium toxicity (47%). The knowledge on side effects and precaution on lithium therapy was the low scored component with a mean score of 34% .

SECTION 4: ASSOCIATION BETWEEN LEVEL OF KNOWLEDGE AND SELECTED DEMOGRAPHIC VARIABLES

Table 2: Association between level of knowledge and selected demographic variables

n=60

Serial no	Demographic variables	Knowledge regarding lithium therapy			X ²	df	P value
		Poor <12	Average 12-18	Good >19			
1	Sex Male Female	14	7	1	9.430**	2	0.007
		9	26	3			
2	Education primary higher secondary & above	21	23	2	5.241*	2	0.023
		2	10	2			
3	Socio economic status low middle	5	0	0	8.775**	2	0.007
		18	33	4			

The table 2 shows that there was a significant association between caregivers sex ($X^2=9.43, p=0.007$) education ($X^2=5.241, p=0.02$) and socio economic status ($X^2=8.775, p=0.007$) with knowledge regarding lithium therapy and there is no association between other demographic variables ($p>0.05$).

Discussion

The lithium toxicity and other side effects are very common among patients who are receiving lithium carbonate, because of the lack of knowledge of caregivers regarding the care of patient receiving lithium carbonate. The result showed that among the care givers 55% having average knowledge, 38% having poor knowledge and only 7% had good knowledge regarding lithium therapy. The researcher couldn't trace any studies regarding the knowledge level of care givers and most of the studies were done among patients. Walter Enudi, Brian Lawler and Henry

P.O'Connel¹³ was conducted a study to examine the elderly patients knowledge about lithium therapy in an old age Psychiatry Department, Ireland. The finding of the study showed that elderly patients have poor knowledge regarding lithium therapy and there was no significant relation between knowledge level and patient characteristics (age, education, diagnosis and duration of lithium therapy). Another survey of 50 Chinese patients on maintenance lithium therapy revealed that their medical knowledge about lithium treatment, as measured by a "Lithium

Questionnaire," was very limited.¹⁴ In this study, results showed a significant association between caregivers sex, education and socio economic status with knowledge regarding lithium therapy. A similar study conducted by Walter Enudi, Brian Lawler and Henry P.O'Connel¹³ among the elderly patients in an old age Psychiatry Department in Ireland showed there was no significant relation between knowledge level and patient characteristics (age, education, diagnosis and duration of lithium therapy). The present study was conducted among care givers, may be due to that the association with some of the demographic variables were found. Family influence the patients' medication adherence in several ways¹⁴. After this study the researchers provided a booklet on lithium therapy to the caregivers for improving their knowledge regarding lithium therapy. This study results highlights the need for educating the patients on lithium therapy prior to commencement of treatment.

Conflict of Interest: Nil

Compliance with ethical standard: This study was initiated after obtain permission from the Institution.

Source of Funding: Nil

Informed Consent: Informed consent was obtained from all individual participants included in this study.

Conclusion

Lithium remains a fundamental tool for the treatment of bipolar disorders and it has been used over 50 years. Knowledge about a drug and its effects may play an important role in establishing compliance. This study results highlight the need for patients to be given comprehensive information about lithium prior to commencement of treatment and a refresher educational program during lithium therapy.

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Histopathological Spectrum of Kidney Lesions at Autopsy

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Abstract

Kidney Diseases are known to present late in the course only after a significant portion of the renal tissue has been damaged before being evident clinically.

The study of renal pathology in the medico legal autopsies reflects the prevalence of silent renal pathologies in the general population.

The renal pathologies detected at autopsy was grouped according to the age & histopathological type into various categories & compared with the other similar studies.

Keywords: Autopsy, Renal

The autopsy examination is sought for a variety of reasons, including augmentation of medical knowledge, clarification of cause of death for medico-legal reasons, and the disclosure of hereditary and infectious disease that might have a valuable bearing on the survivors.

Renal diseases are responsible for a great deal of morbidity. The increased prevalence of kidney diseases is the consequence of an accumulation of risk factors such as hypertension, diabetes, dyslipidaemia and obesity. Pathological examination of the renal tissue at autopsy throws a light on the histopathologic changes in the general population & might provide useful information for preventing renal diseases that tend to be asymptomatic and often go undiagnosed. (1,2)

The aim of the present study was to analyze the varied spectrum of renal lesions detected on the medico legal autopsies.

Materials and Method

A retrospective study from January 2013 to December 2017 was carried out to study the histopathology of renal lesions in the medico-legal autopsies received in the department of pathology. 100 cases of well preserved renal medico legal autopsies were included in our study. The data pertaining to age, gender and clinical findings were recorded from deceased is post mortem papers. A thorough gross examination including weight, measurements and gross morphology were recorded and then tissue was fixed in 10% formalin. The formalin fixed tissues were sampled; each sample included the cortico-medullary region then was further processed by automatic processor. The three micrometer thick sections were obtained from paraffin embedded tissue samples and were histochemically stained with haematoxylin and eosin. The special stains periodic acid Schiff reagent and silver methanamine were done as and when required.

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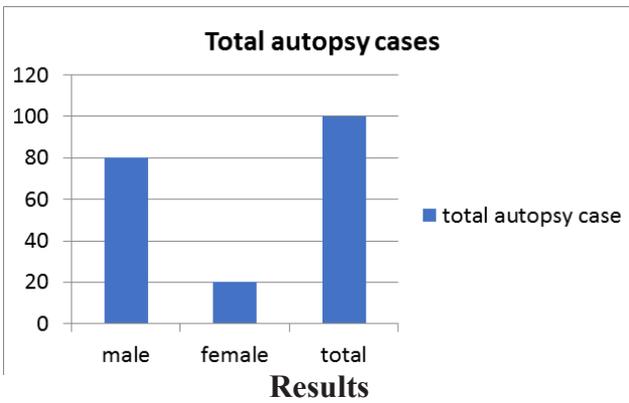


Figure 1: Male & Female distribution of studied cases

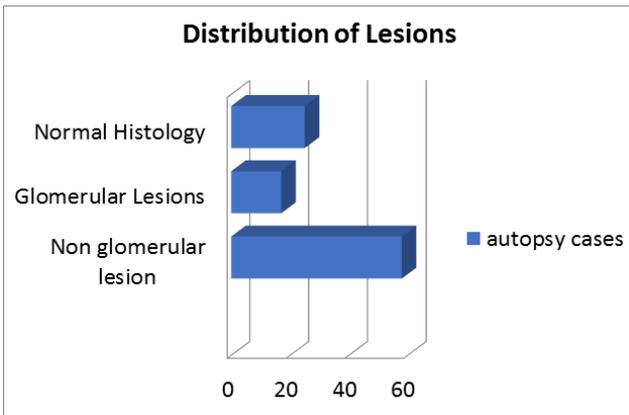


Figure 2: Distribution of Lesions on Histology

Table 1: Male & Female Distribution of the lesions

LESIONS	AGE			
	0-20	20-40	40-60	60-80
Focal glomerular lesion	4	2	3	1
Segmental glomerular	0	1	1	1
Nodular glomerular	0	0	2	0
Mesengium proliferation	0	0	1	0
Basement membranethickining	0	0	0	1
Acute tubular necrosis	7	4	7	10
Chronic pyelonephritis	0	1	3	3
Tubular pyelonephritis	0	1	2	2
Renal arteriosclerosis	2	1	3	4
Renal cell carcinoma	0	0	0	1
Normal morphology	10	4	1	10
Total	23	14	23	33

Table 2 : Age Distribution of the Lesions

Histopathological findings	Numbers	Male	Female
Glomerular lesions	17	13	4
1.focal glomerular lesion	10	8	2
2.Segmental glomerular	3	2	1
3.nodular glomerular	2	1	1
4.mesengium proliferation	1	1	
5.basement membrane thickening	1	1	
tubular and interstitial	40	32	8
1.acute tubular necrosis	28	24	3
2.chronic pyelonephritis	7	5	2
3.tubular pyelonephritis	5	3	2
Vascular lesions	17	14	3
1.renal arteriosclerosis	10	8	1
Neoplasm			
1.renal cell carcinoma	1	1	
Normal Histology	25	17	8
Total	100	74	26

Results & Discussion

The distribution of renal lesions varies with age, gender, nutritional and genetic factors.

Out of the total 100 autopsies studied, 80 cases were male, while 20 were female (Figure 1)

25% of the total number of cases studied had a normal morphology and histology. 75% of the cases had a renal pathology. The histopathologic findings in these cases revealed the presence of non glomerular lesions in 58% and glomerular lesions 17% cases. (Figure 2)

This was in concordance with study conducted by Usta et al (3) where 23 out of 55 cases exhibited almost normal histology & 22 cases had at least one immune deposition. We observed glomerular sclerosis in 17 cases of which 10 cases exhibited global focal glomerular sclerosis, 3 cases had segmental glomerular sclerosis, 2 cases of nodular glomerular sclerosis, 1 case had moderate to severe degree of mesangial cellular proliferation and 1 case of basement membrane thickening

Usta et al (3) in their work observed focal global sclerosis in eleven cases, followed by three case of mesangial proliferation and one case of basement membrane thickening.

Monga et al (4) observed 69% cases with renal pathology in a similar study.

The male & female distribution of the lesions according to histology was analysed (Table 1).

10 of the cases studied exhibited renal arteriosclerosis which is seen to have an association with cardiovascular diseases.(2)

Tubular and interstitial changes were observed in 40 cases of which 28 had acute tubular necrosis. This might be attributed to death due to intake of toxic substance, drugs over dose and snake bite. Renal tuberculosis and chronic pyelonephritis were observed in 5 & 7 cases respectively.

Estawood JB in their work observed 14% of cases of genital urinary tuberculosis.. In another study Rastogi P et al observed 73 cases of sudden deaths due to respiratory system involvement. Of all sudden respiratory deaths 45 cases were specifically assigned to tuberculosis. Males were predominantly affected (86.67%) & a majority of deaths were reported in the 5th decade of life.(33.33%) (4,5,6)

1% cases of renal cell carcinoma were observed during our study. Shah VB et al. (7)and Sapna P et al.(8) in their respective autopsy studies revealed 5 cases and 4 cases of incidental renal masses & classified into various categories byKozłowska J & Okon K .(9)

The lesions were further classified into various categories according to age & histology of the various lesions.(Table 2).

Renal lesions specifically non glomerular lesions were more common in 60 to 80 years of age whereas glomerular lesions were more common in 0 to 20 years of age.

Conclusion

The autopsy study of renal pathology reflects the spectrum of renal diseases which remain asymptomatic clinically, thus reflecting the prevalence of asymptomatic kidney disease in the general population. It reveals hazardous effects of therapies and drugs administered and lastly often reveal cause of death. The present study on renal autopsies showed non glomerular lesions outnumbered in comparison to the glomerular lesions.

However the study provides a statistical analysis of the morphological spectrum of various renal lesions in an autopsy study & might not reflect the actual incidence of renal lesions in the healthy population.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: The study involved an analysis of data from the medicolegal autopsies. The study does not involve any intervention or experiment on the human or animal subjects.

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Mobile Phone Dependence and Sleep Quality among Undergraduate Students

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Abstract

Aim of the Study:- The study is intended to determine the correlation between mobile phone dependence and sleep quality among undergraduate students of Kerala, India.

Material and Method:- A descriptive study conducted among 280 undergraduate students of Maharaja's College, Kerala, India. The study samples were selected using cluster sampling method. Participant's information like age, gender, family type, phone type, duration of use per day and years of mobile phone usage were collected using demographic questionnaire. The Mobile phone Dependency of the samples were collected using MPD(Mobile Phone Dependence) questionnaire. PSQI questionnaire administered to assess the sleep quality among samples. Using Pearson's correlation the relationship between the two variables found.

Result:- Mobile phone dependence was found in 74(26.4%) of samples. 67(23.7%) of samples having poor sleep quality. Among the 74 undergraduate students with mobile phone dependence 27(36.5%) are having poor quality of sleep. There is a moderate positive correlation ($r = 0.347$) persists between mobile phone dependence and quality of sleep among undergraduate students.

Conclusion:- Mobile Phone Dependence has been found to be an emerging public health problem. There is need to recognize early the growing trends and negative consequences of inappropriate mobile phone use in young users so as to prevent a major public health issues.

Keywords :- Smart phone use, Poor sleep, adolescents

Introduction

In this era of electronic advancement, it has been seen that tremendous growth in the use of the mobile phones in India. These have turned out to be inevitable in society and are regarded as a communication technology revolution¹. The mobile phones are available to the people before teenage itself. The majority of the

users are in the age group of 15 to 25 years. And this technology brought the world closer to them by giving more means of communication like calling or texting. In addition to communication a variety of features like games, internet, books, music social medias like whatsapp, facebook and different apps are used by people².

However, the mobile phone provided many advantages to mankind, it has been creating a lot of problems in daily life. Specially the adolescents making dangers like using mobile phones while driving. It has been observed that people sending text messages while talking to someone else. The use of mobile phones has reduced the face to face communication. The students are using mobile phones for playing games, sending messages, calling even when the class is in progress. The

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mobile phones are used at places like hospitals, judicial courts, petrol pumps where their use is banned. The provision of the additional features like internet, music, radio, etc. may be resulting in excessive use of mobile phones. Some people are using the mobile phones so excessively that it assumes the form of addiction¹.

The mobile phones are receiving and transferring the data in the air through electromagnetic radiation. Thus the device give off harmful radiations which are available everywhere and their existence cannot be felt. These radiations also penetrate in the body and they affect the cell structure and the DNA. The different types of radiations are being used for connecting the mobile phone devices with each other and each type of radiation having own frequency and wavelength. These devices give off harmful radiations which can contribute too many harmful diseases such as Brain Tumor, Male Infertility, and Ear -Hearing Impairment, effect on the foetus, Alzheimer's disease, Parkinson's disease, asthma, Heart trouble, insomnia, high blood pressure, **leukaemia**, birth defects, Immune system, cancer cases, cataracts formation in eye tissue, DNA damage, and neurological problem and rheumatoid arthritis. Radiations are also causes of some symptoms which are headache, sleep disruption and tiredness².

Sleep is vitally important to the growth, behavior, emotional development, and cognitive functioning of adolescents³. Children may develop behavior problems due to sleep deficiencies which may interfere with learning⁴. Changes in sleep quality or duration may also have a significant impact on hormone release, cardiovascular activity and glucose regulation and may have an overall impact on morbidity⁵. Sleep deprivation can lead to mental stress and finally ends up with cardiovascular, respiratory, and hormonal problems⁶. Therefore, due to the ever-expanding use of electronic media, and the vital importance of sleep, it is important to examine the relationship between the two for the health of our children, adolescents, and society.

The present study is intended to assess the prevalence of Mobile Phone Dependence and quality of sleep among undergraduate students in selected colleges of Kochi.

The main objectives of the study are to 1). Estimate the prevalence of Mobile Phone Dependence (MPD) among undergraduate students. 2). Identify the quality

of sleep among undergraduate students and to 3). Find out correlation between the level of Mobile Phone Dependence and quality of sleep among undergraduate students.

Materials and Method

Quantitative research approach with non experimental descriptive design was used to conduct the study. Two hundred and eighty undergraduate students of Maharaja's College Ernakulam, Kerala, India were selected using cluster sampling method⁷. The period of data collection was from 15.01.2018 to 20.01.2018. Permission from Institutional Ethics Committee was obtained. After obtaining permission from the respective college principal and class coordinators, eight classes were selected using lottery method. All students of these classes were screened such as undergraduate students who were using mobile phone for the last one year and who were available during data collection are included in the study and students taking sleep inducing medicines were excluded from the study. After obtaining informed consent, they were asked to complete a semi structured questionnaire to assess the level of Mobile Phone Dependence. It is a 20 items questionnaire consist of items with bi-nominal (yes/no) response to provide information about pattern of mobile use. Out of the 20 items, 14 items covered the six criterion for ICD-10 dependence syndrome (one question for intense desire, four questions for impaired control, three questions for withdrawal, one question for tolerance, four questions for decreased pleasure and one question for harmful use). Accordingly, participants who fulfilled three or more of the criteria for dependence (as per ICD-10) were rated as having mobile phone dependence. Thereafter a Pittsburgh Sleep Quality Index (PSQI) was used to assess the sleep quality among samples. It contains 19 self-rated question and 5 question rated by the bed partner or room mate (if present). Only self rated questions are included in the scoring. The 19 self rated items are combined to form 7 "component" scores, each of which has a range of 0-3 points. In all cases, a score of "0" indicate no difficulty and "3" indicates severe difficulty. The seven component scores are then added to yield one 'global' score, with range of 0-21 points, '0' indicating no difficulty and '21' indicating severe difficulty in all areas. And students who got score above "5" are considered to have poor quality sleep. The data were analyzed using both descriptive and inferential statistics.

Findings

The socio-demographic variables of samples described in table.1.

Table 1:-Distribution of subjects based on socio demographic variables. n=280

Sl. No.	Demographic variable	Freq-uceny (f)	Percent-age(%)
1	Age in years		
	17-19	176	62.86
	20-22	104	37.14
2.	Gender		
	Male	62	22.1
	Female	218	77.9
3	Year of study		
	First year	63	22.5
	Second year	135	48.2
	Third year	82	29.3
4	Branch of study		
	BSC Zoology	58	20.7
	BSC Physics	35	12.5
	BSC Chemistry	35	12.5
	BA Philosophy	29	10.4
	BA Malayalam	27	9.6
	BA Hindi	44	15.7
	BSC Botany	44	15.7
	BA Sanskrit	8	2.9
5	Family type		
	Single parent	17	6.1
	Nuclear	237	84.6
	Extended	26	9.3
6	Type of mobile phone		
	Smart phone	252	90
	Non -smart phone	28	10
7	Medical problem		
	Allergy	1	0.4
	Asthma	1	0.4
	Migraine	1	0.4
	Breathing difficulty	1	0.4
	Ovarian cyst	1	0.4
	Vision problem	1	0.4
	Nil	276	97.6
8	Intake of sleep inducing Medicines		
	No	280	100
9	Recently experiencing any stressful events in life		
	No	280	100

Mobile phone dependence

The prevalence of undergraduates based on mobile phone dependence is shown in figure.1.It shows that 74(26.4%) students are having mobile phone dependence and 206(73.6%) are not having problems of dependence.

Figure 2. reveals that (35%) of undergraduates experiences decreased pleasure without mobile phone. Among 280 samples, (34.6%)having intense desire to use mobile phone. They (29.6%) experiences impaired control while using mobile phone. Samples(26.4%) exhibit withdrawal symptoms. Undergraduates (26.8%) shows decreased tolerance without mobile phone.

Quality of sleep among undergraduate students.

This section deals with the quality of sleep among undergraduate students.

Table 2: Percentage distribution of subjects based on the quality of sleep n=280

Sl.No.	Quality of sleep	Frequency (f)	Percentage (%)
1.	Poor sleep	67	23.9
2.	Good sleep	213	76.0

Table 2 shows that out of 280 undergraduate students 74 are having mobile phone dependence, in that 74 undergraduate students with mobile phone dependence 27(36.5%)are having poor quality of sleep.

Table 3: Correlation between mobile phone dependence and quality of sleep.

n=280

Data Variables	Correlation Coefficient(r)
Mobile phone dependence Quality of sleep	0.348**

** . Correlation is significant at the 0.01 level

Table 3.shows that there is a moderate positive correlation persists between mobile phone dependence and poor quality of sleep among undergraduate students.

Discussion

Prevalence of mobile phone dependence among undergraduate students.

The present study shows that 74(26.4%) students are having mobile phone dependence and 206(73.6%) are not having problems of dependence. This is strongly supported by a cross-sectional study conducted by Shaunak A Ajankya et al, in secondary section of English-medium schools at Navi Mumbai in 2015. The result suggest that Mobile Phone Dependence was found in 31.33% of students⁸.

Quality of sleep among undergraduate students.

The present study shows that 67(23.9%) of the students are suffering from poor sleep. Among these who is having mobile phone dependence are suffering from poor sleep quality. Results are consistent with a study conducted by Xiang-Long Xu et al to assess the influence of social media on sleep quality among under graduate students in School of Public Health and Management, Chongqing Medical University, China among 1,444 (72.97%) females and 535 (27.03%) males. The study results shows that undergraduates who spent 0.5 to 2 hours before bedtime or above per day on social media were more likely to have poor sleep quality. More than half of undergraduates who use social media experience poor sleep quality⁹.

Correlation between the level of mobile phone dependence and quality of sleep.

Mahesh D. Kurugodiyavar et al conducted a study on Impact of smart phone use on quality of sleep among medical students in 2017. A cross-sectional study on sample of 240 undergraduate medical students KIMS, Hubballi showed that Out of 240 subjects 117 (48.75%) were poor sleepers & 123 (51.25%) were good sleepers according to PSQI global sleep score. There was positive correlation between SAS score & PSQI score. Gender & SAS score were the significant predictors of global PSQI score. This study concludes that in medical students smart phone addiction affects sleep quality significantly and males are particularly more at risk of having poor sleep quality due to excessive smart phone use¹⁰.

The present study shows that there is a positive correlation ($r=0.348$, significant at the 0.01 level) with

mobile phone dependence and poor quality of sleep.

Conclusion

Mobile phones play an important role in our daily life. The main purpose of the mobile phone is communication. But nowadays they are used for other purposes and young generation become developing addictive behaviour. Present study shows there is a positive correlation between the mobile phone dependence and poor sleep pattern. Good sleep is necessary for a healthy living.

Conflict of Interest: There is no conflict of interest present.

Ethical Clearance: Research proposal was presented before Institutional Thesis Review Committee and Ethical Committee clearance was obtained. Informed consent was obtained from the participants.

Source of Funding: The source of funding is self.

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Virtopsy: The Emerging Trend in Forensic Medicine

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Abstract

Virtopsy is a word combining virtual and autopsy, which employs modern imaging or radiological techniques for the purpose of autopsy and to determine the cause of death. It is being followed in some of the developed and developing countries around the world. The use of this technique against traditional post mortem examination has been debated on various occasions. Advantages and disadvantages of virtopsy have been discussed here. Since virtual autopsy is non-invasive technique it is socially acceptable and boon for countries where dissection of the dead body is forbidden for religious reasons. Even with all modern radiological techniques, virtual autopsy has certain drawbacks, hence considered as incomplete autopsy. In conclusion virtopsy can be regarded as an adjuvant but not a replacement to standard complete invasive post mortem examination.

Key words: *Virtopsy, post-mortem, judicial validity*

Introduction

Virtopsy is the other name for virtual autopsy. The term virtual is derived from Latin word *virtus* which means useful, efficient or good and term autopsy is derived from Greek word *autopsia* meaning to see for oneself. To eliminate subjectivity, the term virtual and autopsy are merged to create the term *Virtopsy*.¹

Virtual autopsy is a non invasive technique of examination of dead bodies to determine the cause of death and give opinion regarding the deceased.² It uses the combination of computed tomography, magnetic resonance imaging, photogrammetry and 3D optical measuring techniques for examination of the dead body. Two dimensional and three dimensional imaging is done with multi slice CT and the images are studied. Observation of cranial sinuses by Martin and Arroio in 1896 using post mortem radiological technique has laid the foundation for virtopsy. One of the first documented virtual autopsies was conducted at department of neuroradiology, university hospital Mainz, Germany

in 1980 where 105 specimens of stillborn and live born babies were studied.³

Techniques used in virtopsy:

- **3D photogrammetry :** Body surface scanning is done with 3D photogrammetry which can detect wounds and objects in the body.
- **MSCT-MRI:** Multi slice computed tomography and magnetic resonance imaging is used for high quality images with use of datasets that have been reconstructed at close inter slice spacing to obtain isotopic volume elements. CT images give information about morbid anatomical findings and MRI demonstrates soft tissue injury and organ trauma.
- **MR Spectroscopy:** It can help in measurement of metabolites formed due to decomposition which can determine post mortem interval.
- **CT Fluoroscopy:** With help of CT-fluoroscopy image guided biopsy can be obtained for histopathological examination and chemical analysis.⁴
- **Positron Emission tomography:** This technique uses isotopes to determine data on blood flow and metabolic process.

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- **Micro CT and MRI:** It is used for finer anatomical details.⁵

Data fusion of all the above mentioned techniques will help in virtual autopsy.

Discussion

Virtual autopsy is being successfully followed in some of the developed countries as a technique replacing traditional autopsy or to aid in regular autopsy. Here are some of the advantages and disadvantages in using this technique.

Advantages of virtopsy:

- It is a non invasive technique.
- It is less time consuming.
- Technique is superior to conventional autopsy for pneumothorax, emphysema and embolism ⁶
- No risk of infection while dealing with HIV and Hepatitis infected bodies.
- High acceptance among relatives of the deceased as it is non invasive.
- Data can be stored and accessed at a later date for second opinion.
- Helpful in identifying the pathway of firearm injuries without destruction of evidence.

Disadvantages of virtopsy:

- High cost of operation.
- Non availability of equipment in remote places.
- Non availability of expertise in remote areas.
- Inability to visualise colour changes in organs and soft tissues.
- Inability to test the consistency of internal organs.
- Smell of the tissues cannot be appreciated.
- Inferior to conventional autopsy in detection of fat embolism.
- Collection of evidence in case of firearm injuries is not possible.

- Collection of organs for histopathological examination is difficult.
- Collection of organs and it's content for chemical analysis is difficult.⁷
- Difficult to differentiate antemortem and post mortem injuries.
- Rigor Mortis and Livor mortis which are helpful in determining time since death cannot be appreciated.
- Bioethical issue related to digital image transferring is another hurdle.
- It has no judicial validity.

Virtopsy can be employed as an aid to standard autopsies for broad and systemic examination as it is non-invasive, less time consuming, no risk of infection, observer independent documentation of evidence and data stored can be obtained for second opinion at any time in future. It has certain drawbacks like cost, availability of expertise and equipment, collection of organs for pathological examination and chemical analysis is difficult, evidence collection in medico legal cases is a major hindrance for its usage. The technique is not accepted by court in most of the countries.

The scientific study detailing the results of comparing post mortem CT scanning with conventional autopsy was conducted by a team in Israel and their conclusion was that single CT scan method was not as useful as combination of both traditional autopsy and CT scan.⁸

Virtual autopsy is being followed in Switzerland, Malaysia, Japan, Sweden, Germany and they are in the process of getting judicial validity. In India virtopsy is still in infant stage or nonexistent. Radiological examination is done only in cases of firearm injuries. Non availability of equipment in places where post mortem is done and non acceptance by courts a major concern. Trials and research data is required to validate this technique and to replace conventional autopsy.

Conclusion

Virtual autopsy is an emerging trend in Forensic Medicine and is a new concept definitely here to stay. It is a non invasive technique hence has high social acceptance and is boon for countries where dissection

of the dead body is forbidden for religious reasons. Even with all modern radiological techniques virtual autopsy has certain drawbacks hence can be considered as incomplete autopsy. Conventional autopsy is invasive with detailed external and internal examination of the dead body and has judicial validity in most of the countries. It remains gold standard for post mortem examination in medico legal cases. In conclusion virtopsy can be regarded as an adjuvant but not a replacement to standard complete invasive post mortem examination.

Conflict of Interest : Nil

Source of Funding: Self

Ethical Clearance: Obtained

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Stature Estimation by Measuring Percutaneous Length of Ulna in Indian Population

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Abstract

Stature estimation from the skeletal remains play an immense role in establishing identity in decomposed and mutilated bodies by the medico legal experts. The objective of this study to derive regression equations to estimate stature from percutaneous ulna length among both south and north Indian males and females. The study was conducted at Sri Devaraj Urs Medical College, Kolar among south and north Indian males and females in the age group Of 18-25 yrs. Stature, length of ulna on both sides were measured in standard position. Statistical analysis done using SPSS 20. In our study we found that south Indians are taller than north Indians. Percutaneous ulna is longer among south Indian males and females compared to north Indian males and females. A positive correlation was found between stature and percutaneous ulna among both south and north Indian males and females. Race and gender specific regression equations were observed between stature and length of ulna which helps the medico legal expert in identification of the decomposed and mutilated bodies.

Key words: Stature, ulna, south and north Indians, correlation coefficient, regression equation.

Introduction

Identification is the determination of the individuality of a person based on certain physical characteristics. The primary characteristics of identification are age, sex and stature.¹ In mutilated bodies or in skeleton remains; an utmost challenge to anatomists, forensic experts is to identify the individuality. Many factors are taken into consideration for establishing the identity in these cases, amongst which height or stature of the person is one important entity.² Prediction of stature plays an important role in the identification required by the investigating team. The stature prediction occupies relatively a central position both in the anthropological research and in the identification necessitated by the medical jurisprudence or by the medico-legal experts.³ Stature can be estimated from skeleton. The body segments considered for the estimation of stature are

foot, hand, upper limb, length of forearm with hand, head length, head height, distance between sternal notch and pubic symphysis are few to name. ⁴

Stature estimation from long bones length offers an important contribution to identification of unknown remains, as there exists an important relationship between different body parts dimensions and stature, particularly bone lengths.⁵ However, stature varies with race, age, sex, heredity, climate and nutritional status. Therefore, any study pertaining to stature estimation need to be a population and sex specific study.³

In circumstances where only mutilated leg or forearm portions are available of a deceased person, then it becomes a challenge to formulate the accurate regression models for estimation of height. Accurate results are derived using regression formula measuring long bones.⁶ Ulna is the medial bone of the forearm in supination and its upper and lower ends are subcutaneous and thereby can be easily marked out percutaneously. Also, its length can be of advantageous when lower limb is deformed along with deformity of trunk or

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when the upper limb is the only body part available for stature estimation.⁷ Factors, such as race, gender, and nutrition, determine the height of an individual. Hence, a population and gender specific formula are necessary for estimating the height of an individual.⁸ since the stature/height of the individual varies according to the race, there is a paucity of literature regarding the differences in the regression formula among south Indians and north Indians. Thus, the aim of this study is to find the correlation between the forearm length and height of both males and females among south and north Indians and to derive regression equations for estimation of the height. This will enable doctors, anthropologists, anatomist, and in forensic sciences to establish stature of an individual in mutilated bodies especially when most of the body parts are damaged.

Objectives:

1. To determine percutaneous right and left ulnar length using standard vernier caliper in south Indians and north Indians
2. To determine body height by using stadiometer in both north Indians and south Indians
3. To correlate percutaneous length of right and left ulna with the body height

Material and Method

Study design: observational cross sectional study

Sample size calculation:

For an infinite population size with 50% hypothesized frequency (p) and Confidence limit 95% sample size of 323 is obtained.

Inclusion criteria:

1. The age of the subjects will be from 18 to 25 years
2. The subjects who are healthy without any skeletal deformity.
3. Region of origin. (The division of subjects into South and North Indians was based on their region of origin and taking into account other zonal divisions of India (Srinivasan, 2002).

Exclusion criteria:

1. Individuals with bony deformities
2. previous history of long bone fractures will be excluded

The subjects who fulfill the inclusion criteria will be included in the study. Informed consent will be obtained from all participants prior to questionnaire distribution. The data will be collected by self-administering the questionnaire to the students which consist of two parts. First part recorded the demographic information including age, gender, region of origin and education. The Second part will be Anthropometric measurements like height and percutaneous ulna length will be recorded from the each subject. Height will be measured by stature meter fixed to the wall. The height will be measured without shoes bare feet. The subject will be made to stand against the wall and directed to hold himself erect without unusual stretching. The arms hang loosely by the body. The heels, sacral region and the upper part of the back touched the wall, neck stiff, chin slightly drawn in and eyes looking straightforward. The stature meter will be pulled on the top of the head with sufficient impact to feel the resistance of the bone but without undue pressure downward. The measurement is read from the stature measure. Ulna length will be measured as the straight distance between the most proximal point of the olecranon process to the most distal point of the styloid process in the supinated forearm. Ulna length will be measured with the subject sitting and forearm placed on the table flexed at 90 at the elbow. Measurements will be taken using dividing calipers in such a manner that the two ends of the caliper will be brought to touch proximal point of olecranon process and the distal point of styloid process. The opening of caliper will be measured on a separate scale. Undue pressure will avoid while taking measurement. Measurements will be taken during fixed timings of the day between 2 and 4pm to avoid diurnal variation. All measurements will be taken by the same observer and with the same instrument to avoid any technical or inter -observer error and to maintain reproducibility. Both height and lengths of right and left ulna will be measured separately and will be noted in centimeters. The data thus obtained will be tabulated separately according to gender and region of origin and will be analyzed statistically.

Statistical Analysis:

The statistical package for the SPSS version 20 was used for statistical analysis. The data were presented as a mean ± standard deviation. Independent t test was applied to compare the stature, length of right and left ulna among south Indian and north Indian males and females. Pearson’s correlation test was done to determine the relationship between stature and length of right and left ulna. Simple linear regression analysis was done to determine the effect of length of ulna on stature in both north Indian and south Indian males and females.

Results

This is a cross-sectional observational study done to estimate the stature using percutaneous ulna length. Total 328 sample is collected, out of which 164 are south Indians and 164 are north Indians.

Table No:1 Shows significant increase in mean values of right (t = p<0.021) and left ulna (t=p<0.002) south Indian males compared to south Indian females.

Table No:2 Shows significant increase in mean values of right (t = p<0.001) and left ulna (t= p<0.001) north Indian females compared to north Indian females.

Table No:3 Shows there is a significant positive

Table No1: Independent t test comparing stature, length of right and left ulna between South Indian males and south Indian females.

Parameters	South Indian males (n=83)	South Indian females (n=81)	P value
Age	20.07±1.033	19.98±1.04	0.63
Height (cm)	175.48±6.07	159.6±6.7	0.266
Right ulna length	27.45±1.19	24.92±1.19	0.021
Left ulna length	27.39±1.13	24.74±1.21	0.002

Table No 2: Independent t test comparing stature, length of right and left ulna between north Indian males and north Indian females

Parameters	North Indian males (n=80)	North Indian females (n=80)	P value
Age	20.41±1.30	20.04±0.99	0.708
Height (cm)	174.4±6.31	159.4±6.2	0.830
Right ulna length	26.99±1.33	24.27±1.28	0.001
Left ulna length	26.79±1.3	24.07±1.28	0.001

correlation between the stature and length of right and left ulna among both south and north Indian females.

Table No:4 Shows there is a significant positive correlation between the stature and length of right and left ulna among both south and north Indian males.

Table No:5 South Indian females the Length of right ulna had a significant effect on stature with the predictor accounting for 56% variance in stature (p<0.001) and left ulna had significant effect on stature with the predictor accounting for 58 % variance in stature.

In north Indian females the Length of right ulna had a significant effect on stature with the predictor accounting for 36% variance in stature (p<0.001) and left ulna had significant effect on stature with the predictor accounting for 33 % variance in stature (p<0.001).

Table No6: In south Indian males the Length of right ulna had a significant effect on stature with the predictor accounting for 48% variance in stature (p<0.001) and left ulna had significant effect on stature with the predictor accounting for 59 % variance in stature (p<0.001). In north Indian males the Length of right ulna had a significant effect on stature with the predictor accounting for 34% variance in stature (p<0.001) and left ulna had significant effect on stature with the predictor accounting for 36 % variance in stature (p<0.001).

Table No 3: Pearson's correlation between stature and length of the ulna among South and North Indian Females

South and North Indian Females	Right ulna		Left ulna	
	R value	P value	R value	P value
South Indian females	0.745**	0.001	0.759**	0.001
North Indian females	0.599**	0.001	0.589**	0.001

Table No: 4 Pearson's Correlation between stature and length of the ulna among South and North Indian males

South and North Indian males	Right ulna		Left ulna	
	R value	P value	R value	P value
South Indian males	0.691**	0.001	0.763**	0.001
North Indian males	0.589**	0.001	0.600	0.001

Table No 4: Shows there is a significant positive correlation between the stature and length of right and left ulna among both south and north Indian males.

Table No 5: Regression equation of Height with Right Ulna and Left Ulna among South Indian and North Indians Females

South Indian females	R ²	P value	North Indian Females	R ²	P value
$Y_{RUL} = 55.41 + 4.182(RUL) + 0.421$	0.555	0.001	$Y_{RUL} = 89.514 + 2.87(RUL) + 0.436$	0.359	0.001
$Y_{LUL} = 55.79 + 4.19(LUL) + 0.405$	0.576	0.001	$Y_{LUL} = 91.16 + 2.83(LUL) + 0.443$	0.336	0.001

Table No 6: Regression equation of Height with Right Ulna and Left Ulna among South Indian and North Indians males

South Indian males	R ²	P value	North Indian males	R ²	P value
$Y_{RUL} = 79.3 + 3.5(RUL) + 0.407$	0.478	0.001	$Y_{RUL} = 99.2 + 2.78(RUL) + 0.433$	0.347	0.001
$Y_{LUL} = 64.0 + 4.06(LUL) + 0.383$	0.582	0.001	$Y_{LUL} = 97.6 + 2.8(LUL) + 0.432$	0.360	0.001

Discussion

The present study was conducted to determine the stature using percutaneous ulna length among young adults. This study was carried out in 328 young south and north Indian individuals whose age was matched. Stature was matched between south and north Indian females. But there is significant difference in stature

between south Indian females and males. Similarly stature was matched between south and north Indian males but there is a significant difference between north Indian males and females. In this study south Indians are comparatively taller than north Indians in the both sexes. This study is consistent with the other studies which also showed differences in stature among males and females.^{9,10,11} This suggests that there is genetic

difference between male and female and hence formula for one sex cannot be applied for other while estimating stature from percutaneous ulna length. Even though the stature is comparable between the south Indians and north Indians males and females the formula for one sex cannot be used for estimating the stature.¹

Interestingly, even though stature is comparable between south and north females, the percutaneous measurements of right and left ulna show significant differences.

In the present study, percutaneous right and left ulna length is more among south and north Indian males compared to south and north Indian females. The percutaneous ulna length is significantly more among south Indian males compared to north Indian males, similarly the ulna length is more among south Indian females compared to north Indian females.

Pearson's correlation was used to predict the significant relationship between the height and length of ulna of the subjects. In this study, the coefficient correlation (r) was 0.745 (right ulna) and 0.759 (left ulna) among south Indian females; 0.599 (right ulna) and 0.589 (left ulna) in north Indian females. This value of r shows a positive correlation. This indicates a very high significant ($P < 0.001$) relation between the length of the ulna and the height among south and north Indian females. Similarly, among south Indian males correlation coefficient of right ulna was 0.691 and left ulna 0.763, 0.589 right ulna and 0.600 left ulna among north Indian males. This is in consistent with Mondal et al who also observed the correlation between right and left ulna with the stature among males and females.¹² Hence, confirming this study's observation that length of ulna bone can give a correct estimation of height because of a very high significant relation between the length of ulna and height. Our findings correlate with Bamne et al findings where they studied in 200 subjects (100 men, 100 women) and concluded that anthropometric measurement of ulna can estimate stature of a person with great accuracy.¹³

The simple regression analysis was done to know the strength of the relation between length of ulna and height. In this study, it was 4.182 (right ulna) and 4.19 (left ulna) among South Indian females; 2.87 (right ulna) and 2.83 (left ulna) in north Indian females. Among south Indian males; 3.5 (Right ulna) and 4.06

(Left ulna) and in north Indian males 2.78 (Right ulna) and 2.8 (left ulna) respectively.

The regression equation obtained is different among gender as well as among the race. Since the body dimensions may be different in different parts of India. There may be inter-racial and inter-geographical differences in body dimensions and thus differ in their relation to stature. Stature estimation formulas differ from one race to another.¹⁴ Hence in this study different regression equation are derived for the north and south Indians gender wise separately.

In this study, the regression equations derived for south and north Indian population will help in estimating the height of an individual from the length of ulna bone. This equation will serve as an alternative for prediction of height, which can be used for nutritional assessment in bedridden patients, old patients, or patients with skeletal deformity. It can also used in forensic medicine to predict the stature of decomposed bodies, mutilated bodies to establish the identity of an individual.³

Since this study is done among young adults, the age also affects the stature so age specific regression equations can be used. The regression formula derived in this study will be of immense practical use in the clinical practice and in medico-legal, anthropological and archeological studies, where the total height of a subject can be calculated if the ulnar length is known.

Ethical Clearance: After taking Institutional ethical committee clearance the data was collected from undergraduate medical students in Sri Devaraj Urs medical college, Kolar. The study population consists of both males and females in the age group of 18-25years.

Source of Funding: Self

Conflict of Interest: Nil

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Assessment of Standards in Issuing Cause of Death Certificate before and after Educational Intervention

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Abstract

Death is a fact which everyone should acknowledge some or the other day, and one of its most important aspects is its certification. Mortality statistics form an integral part of the vital data of a country. Almost every physician has to fill at least one death certificate in his/her career. However, teaching the precise wording and formulation of causes of death is not usually included either in undergraduate or in postgraduate medical education.^[3] Consequently, inaccuracies in the completion of death certificates may lead to biased estimation of several epidemiological parameters. After explaining the objectives of the study, a real case scenario was given and the participants were asked to fill the details in the MCCD. Then a lecture is given about filling up MCCD. After this a different case scenario is given to them. Only 2 death certificates (2.5%) were free from all errors and complete. Atleast 1 major error occurred in 51 (63.75%) cases, the most common was wrong sequencing of causal events (60%). Unrelated causal events stated as related only in 6 (7.5%) cases. Atleast 1 minor error were found in 78 (97.5%) certificates. The most common minor error was not mentioning the duration of illness, which occurred in 68 (85%) cases. This study reflects inadequate practice, training and lack of awareness about importance of medical certificate of cause of death, carelessness and negligence on the part of attending doctors. All doctors should realize that Medical Certificate of Cause of Death is an important scientific tool and has far reaching impact (on international health).

Key words: Medical Certificate of Cause of Death, Major errors, Minor errors, Underlying cause

Introduction

Death is a fact which everyone should acknowledge some or the other day, and one of its most important aspects is its certification. Mortality statistics form an integral part of the vital data of a country. Understanding population growth and providing a demographic perspective for health planning and policy formulation, the death certification data is useful to public health planners, administrators, medical professionals and research workers. The size and geographical distribution of deaths in relation to prevalence of diseases,

evaluation of risks of deaths from various causes at different ages, the medical implications of combination of the conditions resulting in death, proportion of deaths occurring in hospitals are a crucial aspect of interest to many professionals. Public health executives, therefore depend heavily on analysis of causes of death for vital statistical data, for formulating National and State health care Policies and Programs.^[1]

The standard cause of death certificate in India follows the recommendations of World Health Organization and the causes of death are classified according to the International Classification of Diseases (ICD).^[2] The Medical Certificate of Cause of Death [MCCD] (Form 4 for Institutional deaths and 4A for Non-institutional deaths - Registration of Births and Death Act) is as per the ICD-10 format.^[2]

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The cause of death is determined by the certifying physician and entered in two parts in the form. Part 1 records a sequence of conditions beginning with the immediate cause of death (the final disease or condition resulting in death) on line (a) which is due to the antecedent condition recorded on line (b), which is due to the underlying cause of death (the disease or injury that initiated events resulting in death) on line (c). However, if the sequences of event comprise more than three stages, extra line may be made as (d). In part 2, other significant conditions contributing to death, but not resulting in the underlying cause, must be entered. Normally the condition in the lowest line of Part I is taken as the underlying cause of death and used for statistical analysis of mortality by ICD-10. [2] It is the responsibility of the treating physician to issue MCCD in the correct manner and as per the prevailing rules and regulations.[1] Almost every physician has to fill at least one death certificate in his/her career. However, teaching the precise wording and formulation of causes of death is not usually included either in undergraduate or in postgraduate medical education. [3] Consequently, inaccuracies in the completion of death certificates may lead to biased estimation of several epidemiological parameters [4,5]

Aims and Objectives

1. To assess the completeness and accuracy in filling up of MCCD amongst doctors of various departments in a teaching hospital before and after educational intervention
2. To plan remedial actions for improving filling up of MCCD certificates

Materials and Method

- Study Design: Cross sectional study.
- Study Area: Teaching hospital in Mathuranthakam taluk, Kanchipuram district. Tamilnadu
- Subjects: Teaching faculty, post-graduates, junior residents and interns (who have completed medicine and surgery postings) attending the CME conducted on 4th August, 2017 (n=80)
- Inclusion Criteria: All those who have enrolled for the CME and willing to participate.
- Study methodology: After explaining the objectives of the study, a real case scenario was given and the participants were asked to fill the details in the MCCD. Then a lecture is given about filling up MCCD. After this a different case scenario is given to them. Data gathered from the certificates were gathered and the appropriateness and accuracy of the sequence of events leading to death and whether or not the stated causes of death were related to each other was entered. The errors were classified into major and minor errors (Table 1)

TABLE-1

Major errors	Minor errors
<ul style="list-style-type: none"> • Wrong sequence of causal events • Unrelated causal events stated as related 	<ul style="list-style-type: none"> • Duration of illness not mentioned • Mechanism of death with underlying cause • Use of abbreviations

Results

TABLE-2

Major errors	Pre-intervention		Post-intervention	
	Frequency (n)	%	Frequency (n)	%
Wrong sequence of causal events	48	60	3	3.75
Unrelated causal events stated as related	6	7.5	0	0
Atleast 1 major error	51	63.75	3	3.75

TABLE-3

Minor errors	Pre-intervention		Post-intervention	
	Frequency (n)	%	Frequency (n)	%
Duration of illness not mentioned	68	85	0	0
Mechanism of death with underlying cause	66	82.5	1	1.25
Use of abbreviations	18	22.5	0	0
Atleast 1 minor error	78	97.5	1	1.25

Table 2 & 3 presents frequency of error types. Only 2 death certificates (2.5%) were free from all errors and complete. Atleast 1 major error occurred in 51 (63.75%) cases, the most common was wrong sequencing of causal events (60%). Unrelated causal events stated as related only in 6 (7.5%) cases. Atleast 1 minor error were found in 78 (97.5%) certificates. The most common minor error was not mentioning the duration of illness, which occurred in 68 (85%) cases. Mechanism of death like cardio-respiratory arrest, respiratory failure and heart failure was written as immediate cause of death and followed by legitimate causes of death in 66 cases (82.5%). Abbreviations were used in 18 (22.5%) cases.

Discussion

In our study, underlying cause of death could be ascertained and coded according to ICD-10 from the information provided in cause of death section in most (90%) cases. In 6 (7.5%) cases, it was coded with difficulty and attending physician's assistance was required. Only in 2 (2.5%) cases, it could not be coded. A study conducted by Amul B. Patel^[6] reported that in only 7.5% cases, the cause of death could be coded with difficulty requiring the attending physician's assistance and the rest of 92.5% cases it was easily coded according to ICD-10 from the information provided in cause of death section.

Our study reported more major errors 60% when compared to other studies^[6,7,8,9] where it ranged from 38-57.5%. **Wrong sequence of causal events** was (60%) which contributed to more than 90% of major errors was similar (55%) in the study by Amul B. Patel et al^[6] and more than double of other studies (24-28%)^[7,8,10]. **Unrelated causal events stated as related** (Competing causes of death) was reported only in 6 (7.5%) cases, again was similar (5%) in the study by Amul B. Patel et

al^[6] and less than of other studies (24-28%)^[7,8,10]

At least one minor error was found in 97.5% death certificates in this study, whereas studies 6,7,8,9 reported minor error rates from 78% to 100%. Absence of time interval is the most prevalent minor error in our study which is the same as other studies^[6,7,8,9]. In majority (82.5%) of cases, mechanisms of death (i.e., cardio-respiratory arrest, respiratory failure and heart failure) were entered as the immediate cause of death. Similar prevalence was found in two other studies.^[6,11] However, in many other studies,^[7,9,10] this type of minor error ranges from 13%-22% cases. Abbreviations were used in 18 (22.5%) cases, other studies reported 11%-32.5%.^[6,7,8,10]

In our study, there is a significant improvement in filling up MCCD following a simple educational intervention. The % of major errors decreased from 63.75% to 3.75% and minor error from 97.5% to 1.25%. Similar observations are seen in the studies^[10, 12, 13]

Conclusion

This study showed avoidable errors in all death certificates. It reflects inadequate practice, training and lack of awareness about importance of medical certificate of cause of death, carelessness and negligence on the part of attending doctors. Although death certification is included in the curriculum for undergraduate medical course, it has little practical application at that time (II MBBS). Introduction of formal training session in the curriculum especially for interns and post graduate students, and hands on training every six months for the faculty are some strategies that can be adopted. Mere educational intervention will not suffice. Regular auditing of MCCD should be done followed by discussion with the certifying doctor. All doctors should realize that Medical Certificate of Cause of Death is an

important scientific tool and has far reaching impact (on international health).

Conflict of Interest – NIL

Source of Funding – NIL

Statement of Human and Animal Rights: No human right and animal right is violated in this study.

No ethical violation is done

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A Retrospective Study of Snake Bites in Tirupati Region

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Abstract

Background : Snake bite is an important occupational and rural hazard because India has always been a land of poisonous snakes. In south India common poisonous snakes are Russell's viper, Cobra, Krait, Saw scaled viper. It is a fact that despite of significant morbidity and mortality. The objective of the present study was undertaken with the objectives of assessing poisonous snake bites in and around Tirupati region.

Method : This is a Retrospective study of snake bites victims from January 2005 to January 2010 in SVIMS Tirupati.

Result : A total of 105 cases were studied in SVIMS Tirupati during 5 years. Out of these 87 (82.9 %) poisonous snakes, 18 (17.1 %) Nonpoisonous snakes. More than 90 % of the Snake Bite cases were between age group 10 and 59 years. Males are more affected than the females. Males constituted 78.1 %, Females 21.9 %. The study shows snake bites 96.2 % from rural area, where as 3.8 % Urban area. Delay in Hospitalization is associated with poor prognosis and increased mortality rate due to complications. In our study there was no mortality among 105 snake bite cases (PSB, NPSB) mainly because of prompt treatment.

Conclusion: The present study clearly shows that there are no cases of mortality mainly because of prompt treatment. To prevent snake bite in rural areas and agriculture workers must be educated in the prophylactic measures and facilitates for prompt and adequate treatment in all the hospitals to prevent high morbidity and mortality.

Keywords: Snake bite, poisonous snakes, non poisonous snakes.

Introduction

Snake bite is a major public problem in rural areas of India. Snake bite is recognized as a tropical disease by World Health Organization. In India every year, around 200,000 people are bitten by snakes, of which 35,000-50,000 succumb to death due to poisonous snakes⁵. There are about 52 species of poisonous Snakes in India¹ of these 4 major poisonous species are Cobra or NajaNaja, Krait or Bungarus caeruleus, Russell's viper, saw-scaled viper³.

Materials and Method

The present study is conducted from January 2005 to January 2010 in Sri Venkateswara Institute of Medical Sciences (SVIMS), Tirupati. The total number of 72737 in Patients were admitted during the 5 years. The total number of 1000 poison cases are admitted during the 5 years, in the medical wards. During this period 105 cases of snake bite were studied among the medical admissions. This constituted 10.5% of all poison cases admitted during this period. The total number of hospital admissions during this period was 72,737. Based on this, the incidence of snake bite was observed to be 144 Per 1,00,000 patients.

This period formed the material for this present study. Even though some cases have come from Tirupati city proper, majority of the patients are from the nearby rural areas. The patients were studied at the time of

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admission to the wards and followed up in the hospital until recovery or death.

The inclusion criteria

1. All patients with history of bites having positive and significant signs and symptoms due to poisonous creatures like snakes, scorpions, bees and insects.

2. At the time of admission inquiry is made about the type of snake, site of bite, time of bite, interval between bite and medical aid and the manner of snake bite.

3. The presence of two definite puncture wounds with progressive swelling and tenderness with persistent bleeding was taken as poisonous bite, whereas inverted ‘U’ shaped or multiple teeth marks with mild non-progressive swelling confined to the site of bite with minimum bleeding which stopped on its own were considered to be due to non-poisonous snake bite.

4. The presence of pain, numbness, tenderness, neuroparalytic, haematotoxic signs and symptoms were also considered for differentiation poisonous and non-poisonous snake bites.

Observations

Total incidence (Table No. 1) :

Out of 1000 cases of poisoning admitted in medical wards of Sri Venkateswara Institute of Medical Sciences (SVIMS), Tirupati, during 25th January 2005 to 24th January 2010, the total number of poisoning cases due to snake bite and insect bites were 144. This constituted 14.4% of the total cases studied.

Incidence of type of snake bite :

Total 105 snakes constituted 82.9% of poisonous snake bites cases, 17.1% where as non poisonous snake bites.

Age incidence in snake bite (Table No.2) :

The present study shows that the maximum number of patients were in the age group between 30 and 59 is 67.6% more than 90% of the cases were between the age group 10 and 59 years.

Decline of the incidence of snake bites was noticed after 60 years of age.

Sex incidence (Table No.3) :

Our study shows that males are more affected than the females. The males constituted 78.1% of total snake bite cases whereas in females it was 21.9%. The maximum number of male victims were in the age group between 50 and 59 years where as in females it was 30 and 39.

d) Site of Bite (Table No.4) :

The maximum number of bites occurred in lower limb 78%. In upper limb 4.76% while in non-specific site 17.14%.

e) Occupational Incidence (Table No.5) :

The present study shows more than 80% of the victims were agricultural farmers, labourers and house wives who work in fields. The remaining 13% were students and 7.16% belong to other sections of population.

f) Urban and Rural incidence (Table No.6):

The present study shows that 96.2% of patients are from rural areas where as 3.8% of them are from urban areas.

Manner of Snakebite :

All the reported cases of snake bite during the present study are accidental in nature involving more number of male victims.

Mortality (Table No.7) :

There was no mortality among the 105 reported cases of snake bite (PSB, NPSB) mainly because of prompt treatment as per observation made during the study period.

Table No.1 : Incidence of type of snake bite

Snakebites	No of patients	Percentage
PSB	87	82.9
NPSB	18	17.1
Total	105	100.0

Table No. 2: Age incidence in snake bite

Age (Years)	No of patients	Percentage
0-9 years	0	0
10 - 19 years	11	10.5
20 - 29 years	15	14.3
30 - 39 years	23	21.9
40 - 49 years	23	21.9
50 - 59 years	25	23.8
60 - 69 years	5	4.8
70 - 79 years	3	2.9
Total	105	100.0

Table No. 3: Sex incidence

AGE (Years)	No. of patients			
	Male	%	Female	%
0 - 9 years	0	0	0	0
10 - 19 years	7	8.53	4	17.39
20 - 29 years	13	15.85	2	8.69
30 - 39 years	16	19.51	7	30.43
40 - 49 years	18	21.95	5	21.73
50 - 59 years	22	26.82	3	13.04
60 - 69 years	4	4.87	1	4.34
70 - 79 years	2	2.43	1	4.34
Total	82	100	23	100

Table No. 4: Site of bite

Site of bite	No. of patients	Percentage
Non-Specific (Unknown)	18	17.14
Left Foot	24	8.6
Left Leg	12	1.9
Right Foot	25	4.8
Right Leg	21	1.0
Right Fore Arm	2	1.9
Right Hand	1	1.0
Right Index Finger	1	1.0
Right Thumb	1	1.0
Total	105	100.0

Table No. 5: Occupational incidence

Occupation	Frequency	Percentage
Agricultural	36	34.3
Govt. Servant	3	2.9
House wife	15	14.3
Labour	33	31.4
Private servant	1	1.0
Self Employee	2	1.9
Student	13	12.4
T.T.D Employment	1	1.0
Unemployed	1	1.0
Total	105	100.0

Table No. 6: Urban and Rural incidence

Area incidence	Frequency	Percentage
Rural	101	96.2
Urban	4	3.8
Total	105	100.0

Table No.7 : Mortality

Mortality	Frequency	Percentage
Recovered	105	100.0

Discussion

A similar study during 1970-1974 was conducted by Banerjee and Siddiqui (1976) in Safdarjang Hospital, New Delhi. Their hospital incidence was observed to be 133 per 100,000 patients. A higher incidence in our study may be due to vast agricultural lands in and around the city of Tirupati where farming is the main occupation.

In our study it was found that 82.9% of the total bites were poisonous, while the remaining 17.1% were non poisonous. Observations were made by Banerjee. R.N. et al (1974) in Safdarjang Hospital, New Delhi was poisonous snake bites 24.28% were non poisonous snake bites 75.72%. Sawai et al (1974) also has made similar observations. The incidence of type of snake bite may vary in different regions of the country according to the prevalent species of snake.

a. Age incidence :

The present study shows that the maximum number of patients were in the age group between 30 and 49 years (43.8%). This shows higher incidence of snake bites among young people. A similar observations were made in Safdarjang Hospital, New Delhi where in the incidence of snake bites in the age group between 20 and 39 years was 59.96%. Decline in the incidence of snake bites after 60 years of age was observed in the present study as well as in other studies. This may be due to less active involvement in agricultural field.

b. Sex Incidence :

In our study males are more affected than the females. The males constituted 78% of total snake bite bases where as in females it was 22%. The maximum number of male victims was observed in the age group between 50 and 59 years (27%). Where as in females it was 30.43% in the age group 30 and 39 years.

In a similar study in Safdarjang Hospital, New Delhi, 82.22% of males were the victims of snake bite where as 17.78% were females. In their study, the male victims were in the age group of 20 and 39 years amounting to 72.97% where as in females it was 43.75% in the same age group. The higher incidence among males shows that snake bites are more common in the active section of the population.

c. Site of bite :

Our study shows the number of bites 17.14% nonspecific. In the lower extremities 78% while in the upper extremities it was 4.76%. This suggests that the site of bite was predominantly determined by accidental or inadvertent contact of the reptiles during the activities. Similar observations were made by Sawai et al (1969) and others.

d. Occupational incidence :

Our study shows the greater incidence of snake bites was among farmers and labourers and house wives (80%). They constitute the high risk group because of their outdoor activities with exposure to the dwelling of the reptiles. Similar observation was made by Banerjee et al (1974) in Safdarjang Hospital, New Delhi.

e. Urban and Rural incidence :

The present study shows higher incidence of snake-bites among victims from rural areas indicating the habitat of the snakes and working pattern in the rural areas. Similar observations were made in a study at Safdarjang Hospital, New Delhi.

f. Manner of snake bite:

All the examined cases of snake bite in our study were accidental in nature involving more number of male victims.

No reported cases are available for homicidal or suicidal poisoning due to snake bites in India.

g. Mortality rate:

There was no mortality among the cases in our study mainly because of prompt treatment as per observation made during the study period.

Sawai et al⁶ (1969) however, observed the over all mortality due to snake bite in India is 0.1 per 1,00,000 population in Uttar Pradesh, 2.1 in Maharashtra and 1.3 in Kerala.

Conclusion

The present study clearly shows that there are no cases of mortality mainly because of prompt treatment. To prevent snake bite in rural areas and agriculture workers must be educated in the prophylactic measures and facilitates for prompt and adequate treatment in all the hospitals to prevent high morbidity and mortality.

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Conflict of Interest : Non declared.

Ethical Approval: The study was approved by the Institutional Ethics Committee.

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Knowledge and Perceptions Regarding Medico-legal Postmortem Examination among the Arts and Commerce Stream Students of Mangalore, India

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Abstract

Background: Medico legal post-mortem examinations for all unnatural deaths are conducted as a part of essential investigation in India. A significant number of people in India and other countries still object to the post-mortem examination. Post mortem examination to a great extent is influenced by perception and knowledge of people, hence the study was undertaken to explore knowledge and perceptions. **Objectives:** To analyse the knowledge and perception regarding the postmortem examination among arts and commerce stream students of Mangalore. To create awareness about the importance of post mortem examination. **Method:** This is a descriptive cross-sectional questionnaire based exploratory study conducted in Mangalore, Karnataka, India. 196 participants between ages 18 to 25 years were included. Responses were obtained from the study participants through open ended questionnaires. **Results:** Majority of (94.4%) participants understand that post-mortem examination is done to find cause of death. One hundred seventy-nine (91.3%) participants understood that post-mortem examination is conducted by doctor. Twenty-six (13%) participants believe that post-mortem alters the life after death while 21% were unsure about postmortem alters the life after death. **Conclusion:** Majority of the participants have fair knowledge regarding post-mortem examination, about one third participants believe that post-mortem interferes life after death and were that unsure how it alters life after death. There is still scope of improvement regarding knowledge of post-mortem examination in many participants. Their positive perception about medico legal post mortem examination will helps to establish a proper medico legal system in India.

Keyword: Medico legal autopsy, knowledge of post-mortem, perceptions of post-mortem.

Introduction

Background: Autopsy means external examination of the corpse, dissection of body cavities and examination of fluid.^{1,2,3,4,5} Even though autopsies are on the rise, there is still lot of resistance to post mortem examination. Many people still object and view the practice as a desecration of the dead body.²

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According to section 174CrPC medico legal autopsy is conducted in India as “*the police officer for any other reason considers it expedient so to do, he shall. subject to such rules as the State Government may prescribe in this behalf, forward the body, with a view to its being examined, to the nearest Civil Surgeon, or other qualified medical man appointed in this behalf by the State Government, if the state of the weather and the distance admit of its being so forwarded without risk of such putrefaction on the road as would render such examination useless.*”⁶

In all unnatural deaths, Medico legal post-mortem examinations are conducted as a part of essential investigation. Forensic doctors encounter resistance for post-mortem examination, this study is undertaking

to explore the knowledge and perception of arts and commerce students and to analyse persuade resistance for post mortem examination.⁷

Some other reasons for declining Post-mortem examination in the world as well as in India are fear of litigation, shortage of forensic pathologist, uncooperative attitudes of health care professionals.^{7,8,9,10,11} In India, by law, medico legal post-mortem examination is done without consent of relatives, in such a situation, the reaction of relatives can shift, from acceptance to protest.^{12,13} The reason for post mortem examination has been to find out cause of death, clinical quality control, restorative evaluating and in medical education.¹⁴ Death itself has strong emotional association to religions, beliefs and customs, especially in a large country like India.²

Methodology

This is a descriptive cross-sectional questionnaire based exploratory study conducted in Mangalore, Karnataka, India. Questionnaire was externally validated by two subject experts. After obtaining institutional ethical clearance study was conducted and data were collected from the study area. The study was conducted between October 2017 to November 2017. 196 participants between ages 18 to 25 years were included. Responses were obtained from the study participants through close ended 15 items questionnaires. Briefing was done about Medico legal post mortem examination after collecting the questionnaires. The data was analysed using SPSS version 20.0 software. Chi – square test was applied.

Result

In the present study, out of the 196 participants, 70 (35.7%) were males and 126 (64.3%) were females. The mean age of study participants was 21.42 years with standard deviation 1.032. There is a significant difference noted on various views among the students. Majority of (97.4%) the participants understood that post-mortem examination means examination of dead body. One hundred eighty-five (94.4%) participants answered that post-mortem examination is done to find cause of death. One hundred seventy nine (91.3%) participants answered that post-mortem examination is conducted by doctor. There were 49.5% participants who understood that medico legal post-mortem examination was done in case of unnatural death. Majority of (40%)

participants understood that the organs are removed for further investigation depending upon the case. There were forty three (21.9%) participants who answered that organs are not removed for investigation at the time of post-mortem examination. One thirds of the participants answered that eye can be removed from the body for transplantation soon after death. Regarding the transplantation of organ from the cadavers, 44.9% responded in negative. In a question regarding the possibility of the deceased being identified after the post-mortem examination, majority of the (74.0%) participants agree that person can be identified after post mortem examination. More than half of participants (56.6%) said that buried bodies can be taken out for post mortem examination. Majority of the (68.4%) participants agreed that post mortem examination should be done on request by relatives on all unnatural deaths. One hundred forty-two (72.4%) participants do not think that soul of a dead person is disturbed by post mortem examination. Majority of the (60.2%) participants don't think post-mortem examination interferes with the cycle of rebirth, some of the (18.4%) participants not sure post mortem examination interferes with the cycle of rebirth. There were 53.1% participants don't think cultural beliefs can come in the way of post mortem examination. Majority of the (64.8%) participants don't believe post mortem alters life after death and some of the (13.3%) participants believe that post mortem alters life after death.

Discussion

In the present study participants were students of Arts and Commerce stream of Mangalore. Some participants have knowledge about local customs, beliefs, and practices which help to sensitize and empathize with families. Although there can be no alternate procedure for postmortem examination, trying to understand the apprehension, empathize can be a trust-building exercise. In the present study, results did not indicate that Arts and Commerce stream students significantly differed in their knowledge and perceptions about medico legal postmortem examination. Few participants answered that identification of the person may not possible after post-mortem examination but the majority of the participant believe that identification of the person is possible after a post-mortem examination. Half of the participant believes that the organ taken for investigation cannot be transplanted to any other living person. Around 40% of the participants answered that

organ removed for investigation depends upon the case; in year 2015 Pawar MN conducted a study in which he found that 37.1% participants understood that organ is taken out for further investigation. In present study and studies done by others in both studies one third of the participants believed that organ taken during autopsy sending for further investigation. The majority of the participants (66%) were of the belief that legal investigations without a forensic autopsy are not enough to determine the cause of death. Twenty-one percent were not comfortable, because of religious reasons, with the performance of an autopsy and 72% thought that a post-mortem examination should be done only after the consent was attained from the deceased's relatives. Understanding the worries of a person toward this procedure highlights the importance of awareness programmes with the goal of correcting knowledge, perceptions and relieving worries. Awareness campaigns through media could be a good source of relaying correct information regarding this topic. The similar opinions were also obtained by D.M. Al-Saifa et al, in his study it was found that 50% of the participants don't believe postmortem examination ends with visible disfigurement, 72% of the participant believes that postmortem examination should be done only after having consent from the relative of the family. In this study, it was found that only 17.3% participant believes that the consent of relatives is required for postmortem examination. In year 2014 Singh VP conducted a study at Ludhiana which showed that 90% of part II students and 85% intern knew that medico legal autopsy is must in all unnatural sudden and suspicious death, but in present study half of the participants had the same opinion. Results indicate that there is adequate knowledge, perception, and awareness regarding post-mortem examination considering that participants belong to arts and commerce student's stream when compared to other studies by different authors (Singh VP et al, Al-Saifa DM et al, Rathinam RD et al, Madadin SM et al).

Conclusion

The present study showed that there is adequate knowledge about medico legal post-mortem examination among arts and commerce stream of students between 18 to 25 age group of Mangalore, India. Participants were aware of nuances of post-mortem examination and when it is carried out. Some were not sure about cultural beliefs that can come in the way of post mortem examination and a few believed that the postmortem

interferes or disturbs the soul, and cycle of rebirth. Participants were given basic knowledge about post mortem examination and the purpose for which it is done. Majority of the participants were having good knowledge regarding post-mortem examination but still there is scope for improvement. Participants need to locate postmortem examination in the larger context of justice which at this point seems to be lacking. Their positive perception about medico legal post mortem examination will help to overcome resistance for postmortem examination where it is crucial towards delivering justice.

Conflict of Interest: There is no conflict of interest with this study.

Ethical approval: Institutional ethical committee (centre of ethics) approval has been obtained (Reference no-YEC/2017/247 dated 11/10/2017)

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An Analytical Study of Death due to Hanging

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Abstract

Hanging is said to be one of the commonest methods of committing suicides. It is also seen as accidental and homicidal death. The present study is mainly done to know the importance of hanging among all unnatural deaths which are subjected to Post-mortem examination in the Mahatma Gandhi Memorial Hospital, Warangal mortuary during the period between January 2012 and March 2013. Magnitude of hanging deaths was decreased to 4.27% of total Post-mortem examinations. Male to female ratio is 2.61 : 1.60% of total hanging deaths are seen in the age group of 21 – 40 years. 98% of total hanging deaths are Suicidal and rest of them are accidental. No homicidal hanging is seen in the present study. Reasons committing suicide were many. Social problems were outnumbering the physical and psychiatric problems.

Key words- hanging, suicide, ligature material.

Introduction

Death is an incidence in the human life, which cannot be avoided or postponed, but it is advanced in some people by adopting the unnatural means. Most of the times, a person who vexed in life and does not want to continue his life, will opt for deliberate self-harm or suicide. Suicide is a momentary decision, which depends on circumstances prevailing at that particular time. The victim will choose the method which is easily accessible and affordable to him.

Hanging is one method of committing suicide which is commonly seen among all suicidal deaths. The reason for this may be the ease of access to the ligature material. Hanging is that form of asphyxia which is caused by suspension of the body by a ligature which encircles the neck, the constricting force being the weight of the body¹. When the constricting force of the ligature causes compressing narrowing of laryngeal and tracheal lumen causing blockage of the airway that may leads to death². Most of the time Hanging to be suicidal

unless the circumstantial and other evidences are strong enough to rebut the presumption³.

In 5th Century Hanging was first introduced as a method of execution in Anglo-Saxon Britain. In 1196 William Fitz Osbert became the first person to hang at Tyburn (for sedition). In 1212 King John was reputed to have ordered the hanging of 28 young men and boys at Nottingham Castle. They were the sons of rebel Welsh chieftains whom he had taken hostage. WHO report says that suicide is 8th leading cause of death in 15-44 years persons in 2004⁴. In india in 2012 hanging was the second most common cause

Hanging incidences were in Indian scenario since ages. Hanging is rampant in around Warangal city also. It was found in earlier studies that the incidence of hanging is increasing. The sex ratio is also changing. It found necessary to make a study on these deaths occurring of hanging to know the present scenario and impact on the deceased family and society also.

Objectives

1. To find out the demographical distribution of death occurring due to Hanging
2. To analyse the deaths occurring due to Hanging in relation to the Manner of death according to Inquest, Complete or Partial hanging, Place

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of hanging, Ligature material, Post-mortem changes, Ligature mark characters, Changes in neck structures, Precipitating Cause of Death etc.

Material and Method

The present analytical study is made on those dead bodies who died of Hanging and are subjected to Post-mortem examinations at the mortuary of Mahatma Gandhi Memorial Hospital, Warangal by Department of Forensic Medicine, Kakatiya Medical College, Warangal during the period between January 2012 and March 2013.

Inclusion Criteria:

All Hanging deaths subjected to Post-mortem examination in the mortuary of Kakatiya Medical College, Warangal during the period between January 2012 and March 2013, registered in the Police Stations coming under the Jurisdiction of Department of Forensic Medicine, Kakatiya Medical College Warangal.

Exclusion criteria:

1. Unidentified dead bodies died of hanging are discarded.
2. Decomposed bodies are discarded as the post-mortem examination findings are not clear.
3. Exhumation bodies are not selected.
4. Spot post-mortem examinations (at scene of crime) are not selected.
5. Cause of Death which is given as "Pressure over neck" are not selected.

Data was collected from inquest, FIR, statement made by relatives and post mortem reports. collected data was analysed according to the objectives.

The present study appears to be the tip of an Iceberg; still a lot is to go, because of the lack of other investigation procedures at our end. However, an effort is made to compare the material evidence with the available literature.

Ethical Clearance- Institutional ethical clearance taken before stating the study.

Observations

The present study is made on the hanging deaths occurring in and around Warangal Municipal Corporation area, which are subjected to Post-mortem examination in the mortuary of Mahatma Gandhi Memorial Hospital, Warangal during the period of January 2012 – March 2013.

The following things are observed during the study period.

1. A total of 98 dead bodies subjected to Post-mortem examination were studied during the study period, where the Cause of Death was given as due to Hanging.
2. There is a male preponderance seen the deaths as 71 (72.4%) were male and 27 (27.6%) were females, i.e. coming for almost **2.63 :1** ratio
3. The frequency of deaths was showing the bell curve distribution occurring peak in the age groups of 21 to 30 years and 31 to 40 years age group, which accounted for 60% of total deaths. Deaths were occurring even in the late stages of life as after 61 years of life by hanging. The youngest to commit suicide in the present study was 15 years girl. And elderly person committed suicide was aged about 81 years male.
4. The distribution of deaths in the calendar year was not following any pattern, however more deaths were seen from June 2012 to August 2012, which were 26 and accounted for 26.6% of total deaths.
5. Most of the victims were from rural (49) background, followed by sub-urban residents (32). Urban residents (17) were also died in the present study.
6. Labourers from different setups died most frequently than others, death of whom tolled 46 numbers. 4 Old aged people who were not having any work were also included in the present study. 13 students, 13 house wives, 17 semiskilled professionals as mason workers and 5 professionals were seen in the present study.
7. Illiteracy once again prevailing in causing the deaths and accounted 49 deaths. Next victimised group was studied up to primary education they were 31.

- 7 persons completed secondary education and 11 graduates and professionals were also committed suicide by hanging.
8. Married persons were more involved and they were 63 and unmarried were 30, whereas widowed were 5.
 9. 96 of 98 deaths taken for the present study were died of suicidal attempts; whereas 2 persons were died of accidental manner. One of whom was hanged from a banner, other was from a wire.
 10. Low and middle socioeconomic strata people were involved almost equally and there score was 46 and 51 respectively. One male from software professional belonging to high socioeconomic strata was also seen in the present study.
 11. Most of the victims committed suicide either in the early morning i.e. from 5 am to 11 am (23); or the evening i.e. 3 pm to 7 pm (23); or in the late night hours i.e. 12 am to 5 am (24); whereas 17 persons committed during the afternoon hours i.e. from 11am to 3pm; and 11 persons died in the early night hours i.e. 7pm to 12 midnight.
 12. Most of the persons (79) preferred indoor i.e. within the closed room for committing suicide. Whereas 17 committed suicide in the outdoor i.e. either to a tree or other point of suspensions. Two accidental deaths also occurred in the outdoor.
 13. 67 of the total deaths were due to partial hangings and many of them had feet touching the ground. 31 were complete hangings.
 14. 62 persons chose soft and broad ligature material as saree, chunny or dhothi as ligature material. 36 persons chose soft flexible and narrow ligature material as plastic wires, electric cords and ropes.
 15. Ligature mark was prominent in almost all cases and was measurable. In 88 cases it left an abraded contusion. In 10 cases it made a groove, which was very much prominent.
 16. In 29 victims soft tissues of neck structures were injured and produced contusions in the strap muscles. In the rest of the victims there was no soft tissue injuries seen internally. In no case there were fractures of the neck structures were seen.

17. 18 of the total died because of physical illness, of which pain abdomen and incurable diseases were predominant. 31 persons died because of psychiatric illness, who suffering from various types of illness and were on treatment. 14 of them made unsuccessful attempts in the past. Social reasons as financial, failure in the examinations and failure in the love etc. took 47 lives. 2 persons died of accidental manner without any reason.
18. 6 people could have dare put a suicidal note at the scene of offence

Tab. No. 1 Sex, Age and Month wise Cross tabulation

Month	Sex	Age						Total
		11 - 20 years	21 - 30 years	31 - 40 years	41 - 50 years	51 - 60 years	More than 61 years	
January 2012	Male		0	6				6
	Female		1	0				1
February 2012	Male		1	2			2	5
	Female		1	0			1	2
March 2012	Male	0	1	2				3
	Female	2	0	0				2
April 2012	Male		2	1			1	4
	Female		0	1			0	1
May 2012	Male	0	2		1			3
	Female	1	2		0			3
June 2012	Male		2	2	1		1	6
	Female		0	0	2		0	2
July 2012	Male	0	1	3	2		0	6
	Female	1	1	1	0		1	4
August 2012	Male	4	2				1	7
	Female	0	1				0	1
September 2012	Male		1	1		1		3
	Female		2	1		0		3
October 2012	Male	1		4			2	7
	Female	1		0			0	1
November 2012	Male		1	1	0	2		4
	Female		0	0	1	0		1
December 2012	Male			2		1		3
January 2013	Male	0	1	1		1		3
	Female	1	0	0		0		1
February 2013	Male	0	1	1	1		1	4
	Female	1	2	0	0		0	3
March 2013	Male	1	3	2	1			7
	Female	1	1	0	0			2
Total	Male	6	18	28	6	5	8	71
	Female	8	11	3	3	0	2	27

Tab. No. 2 Ligature Material used

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid Soft and Broad	62	63.3	63.3	63.3
Soft and Narrow	36	36.7	36.7	100.0
Total	98	100.0	100.0	

Discussion

1. The number of Post-mortem examination conducted in the mortuary of Mahatma Gandhi Memorial Hospital, Warangal are increasing by date. It increases the work load on the working staff of the mortuary. As the number is increasing the attention span on each Post-mortem examination are automatically compromises.
2. The number of hanging deaths in the calendar year 2012 were 78, in comparison with old studies where they were 107 cases in 2006; 110 in 2007 109 in 2008. The incidence of hanging deaths is comparatively reducing the recent past.
3. Male / Female ratio came as 2.63 : 1 in the present study. In the earlier study it was found to be 2 : 1. This says that the tendency to commit suicide by means of hanging is decreasing in females, which is a good sign to the society.
4. The vulnerable age group found to be 21 to 40 years, in whom the total number of deaths was 60%, in comparison to the old study where it was only 47%. Deaths due to hanging are reduced in the age groups of 41 to 60 years. The percentage in more than 61 years as increased to 10%. This shows the neglect shown on to the elderly people by their children and the blood relatives in the recent past.
5. Deaths occurring in the urban areas because of hanging are reduced from 22% to 17% made in the present study. There is a decline in the suicidal deaths due to hanging in rural population from 54% to 50%. There is little increase in the suburban population from 24% to 32.7%.
6. Many of the victims were labourers who are working either in the agriculture or construction works. In the present study professionals including the software personal are involved.

7. Illiteracy once again proved be the ignorance about the continuation of the life even in the crisis. It tolled 50% of hanging deaths which in fact less than the previous study where it was 76%. Unfortunately in the present study even graduates, professionals were also involved in hanging up to 11.2%. This shows the lack of clear understanding on the life even by the educated persons.
8. Married women were victimised more than men even in the present study. But there are no deaths found in the divorced persons in the present study. Unmarried men were more died then unmarried women. It indicates the increasing problems arising in the married women.
9. Almost all cases are died of suicidal attempts except for 2 who died of accidental hanging. This once again reinforces to the statement that ‘all hangings are to be considered as Suicidal unless otherwise proved, beyond all reasonable doubts’.
10. The low socio economic status was blamed earlier for committing suicides by hanging. But in the present study the prevalence of hanging deaths is seen more in middle socio economic strata. Deaths in high socioeconomic strata are considerably reduced in the present study from 10% to 1%.
11. The times of committing hanging is almost going parallel to the previous studies, in which it was found late night, early morning and evening are the vulnerable moments, in comparison with the afternoon and early nights.
12. Indoor was chosen by 80% of people and that too in bolted room which was closed from inside in many cases. In about 20% people who chose outdoor, were hanged to a tree branches or poles.
13. Incomplete hanging was seen in many cases as in 68.4%. This may be because of the elasticity of the ligature material used, which made the body to touch the ground. Complete hangings were mostly seen in outdoors especially who hanged to the top branches of the trees. This finding is almost similar to the previous studies.
14. Soft and broad ligature material as, saree, chunny, dhoti were used in 63.3% cases, which is in contrast to the previous studies. Soft, flexible and narrow material like plastic rope, electric wires,

nawarpatti, coir rope were used in 36.7% cases. This clearly shows about the easily accessibility of the ligature material to the victims.

15. Ligature mark was prominent in all cases. There was no case with inconspicuous mark on the neck. It was making a groove in 10.2% cases. It shows the duration of suspension of the body from the point of suspension.
16. The friction made by the ligature material on the neck structures left no injuries in the internal structures in many cases. But it left contusions in 29.6% cases, which shows slow asphyxiation resulting in the convulsions and mobility between the material and the underlying structures.
17. It was the social causes which outstood of all reasons for committing the suicide, which included failure in the love, examinations, and poverty etc. It followed by the psychiatric reasons, which included illness, ego clashes. Some of them had previous failure attempts also. Physical illnesses included pain abdomen, incurable diseases etc. Of course these reasons may not correct. But for inquest purposes these are highlighted. Most of them once have the psychiatric ailments underlying.
18. 6 victims left suicidal note in the scene of offence stating that nobody is responsible for their death. This fact shows their determination for committing suicide.

Conclusion

1. Post-mortem examination work load on the Department of Forensic Medicine of Kakatiya Medical College, Warangal is increasing by date
2. Magnitude of Hanging deaths is decreased to 4.27% of total Post-mortem examinations
3. Male to female ratio is 2.61 : 1
4. 60% of total hanging deaths are seen in the age

group of 21 – 40 years

5. 98% of total hanging deaths are Suicidal and rest of them are accidental.
6. Indoor hangings are more than outdoor hangings
7. Partial hangings are common than complete hangings
8. Soft and broad ligature hangings are more common than other ligature materials
9. Ligature mark was limited to skin in many cases. However inner neck structures are also injured in some of the cases
10. Reasons committing suicide were many. Social problems were outnumbering the physical and psychiatric problems
11. Very few persons left suicidal notes at the time of their death

Conflict of Interest- Nil

Source of Funding- Self

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Motorcycle Helmet Use and its Correlates in Fatal Crashes

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Abstract

Introduction: In India, two wheeler accidents and deaths due to the over-speeding, rash driving, alcohol intoxication while driving on the road are a major public issue. Two – wheeler accidents contribute to a major chunk of road traffic accidents and hence this tantamounts to finding feasible solutions to reduce the number of accidents. **Aim:** This study was conducted to note and confirm the factors related to helmet usage and contumacious non-compliance with the use of helmet among two wheeler riders in fatal crashes. **Method:** The study population consisted of the patients who sought care and subjected to post-mortem examination during the period of three years from June 2010 to May 2013. Hospital records and police records also served as study tools. Post-mortem findings were then correlated with history and inquest report to analyze each case. **Results:** Out of total 303 study subjects, 191 (63.04%) involved motorcyclists. Out of them 55.5% were unhelmeted. Motorcyclists in the age group of 20-29 years were more involved more in road accidents compared to the people in elderly age groups due to non-compliance in usage of helmets. Similarly males were in higher number of not wearing helmets than females. Relative to motorcycle riders riding motorcycles with engine size ≤ 125 cc, those riding motorcycles >125 cc are less likely to be helmeted. Higher odds suggest, there is a diurnal variation involved in fatal crashes that is at night motorcyclists are less likely to wear helmets relative to those involved in broad daylight fatal crashes. **Conclusion:** Crashes involving motorcyclists frequently result in death. Majority of these deaths are preventable. The results of this study should have ramifications over law enforcement and policy making so that new programs in prevention of fatal crashes and actions are established to avoid these preventable deaths.

Key words- Developing Countries, Accidents, Trauma, Logistic model, Fatal, Helmet

Introduction

More than 10lakh people die of road traffic accidents per year worldwide, 85% of cases occur in developing and in under-developed countries.¹ Most of the victims are left with some kind of disability either physically, mentally or financially. There is a sharp up rise in

global burden by road traffic accidents and by 2020 it would be as the third leading cause of global diseases causing death.² Motorcycle is the most common type of vehicle on Indian roads. The number of motorcycles have increased due to its lower price and ease of travel in traffic.

Out of total crashes, 29% and 28% of crashes occurred on National Highways (NHs) during 2013 and 2014, which constitute 2% of total road network, but carries about 40% of traffic.^{3,4} Motorized two-wheeler accounted for 2nd highest in fatal crashes, i.e., 22% and 24% during 2013 and 2014 respectively. Apart from this,

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proportion of registration of motorcycles is increasing day by day in our country.⁵ China and India being the world's two most populous nations having 63% and 69% of all motorized two-wheelers.⁶

The most effective and immaculate measure for preventing head injuries in motorcycle users is wearing a helmet. The proportion of toll of death due to motorcycle fatalities are having a alarmingly increasing proportion of total traffic fatalities hence our attention turns to reducing the motorcycle fatalities by effective and simple measures. One major step in bringing down the motorcycle fatalities is by implementing the usage of helmets. Therefore this study is conducted to note and confirm the factors related to helmet usage and contumacious non-compliance with the use of helmet among two wheeler riders in fatal crashes.

Materials and Method

The present study was carried out among patients seeking care following road traffic accidents at a tertiary care teaching institution of Haryana. The study population consisted of patients who sought care and the deceased who were subjected for autopsy at the department of forensic medicine during the period of three years from June 2010 to May 2013. Hospital records and police records also served as study tools. Post-mortem findings were then correlated with history and inquest report to conclude the analysis of each case. All such cases were included in this study. Hospital records included the clinical data of time and cause of death of the patient, investigations, procedures and survival period.

For purpose of capturing data a proforma was designed. It was a self designed pretested semi-structured proforma which included the information on socio-demographic profile of cases, epidemiological data, details of circumstances leading to accident, type of injuries sustained, pattern of cranio-intracranial injuries, type of skull Fracture, anatomical location of fracture of skull vault, anatomical location fracture of base of skull and types of intracranial hemorrhages. For this study, time of the day was considered as follows. Day from 6 a.m. to 6:59 p.m. and night from 7 p.m.-5:59a.m.

The study adhered to the tenets of the Declaration of Helsinki for research in humans. Informed consent was obtained from relatives wherever necessary. Before the commencement of the study Permission of

Institutional ethics committee (IEC) was sought. All the questionnaires along with other relevant data were manually checked and were then coded for computer entry. Results were obtained after properly analyzing the compiled data using SPSS software version 21. The Chi-square test was used to test level of significance. Univariate analysis was done to find out correlates of helmet non-usage. Statistically significant was a two tailed $p < 0.05$

Results

Age wise distribution of cases: During the present study, a total of 639 medicolegal autopsies were conducted, out of which 303 cases (56.81%) were as a result of RTA. Out of total 303 cases due to RTA, 191 (63.04%) involved two-wheeler accidents. Among 191 motorcycle rider fatalities, 106 (55.5%) were unhelmeted. Out of total fatalities among unhelmeted motorcycle rider, majority (43.40%) was observed in 20-29 years of age group followed by 35.85% in aged less than 20 years. (Table 1)

Table 1. Age group of riders and use of helmets

Age group (years)	Fatalities in helmeted	Fatalities in unhelmeted	p-value
<20	23 (27.06%)	38 (35.85%)	0.007*
20-29	25 (29.41%)	46 (43.40%)	
30-39	20 (23.53%)	10 (9.43%)	
>40	17 (20.00%)	12 (11.32%)	
*Statistically significant $p < 0.05$			

Sex wise distribution of cases: Maximum (83.02%) fatalities in unhelmeted motorcycle rider were observed in males. Only 16.98% females succumbed to deaths who weren't wearing the helmet at the time of crash.

Distribution of cases according to engine size of motor cycle: Most (67.92%) of fatalities in unhelmeted motorcycle rider were observed in those riding motorcycle with bigger engine i.e. >125 cc. Remaining (32.08%) were riding the small engine motorcycles with ≤ 125 cc power. (Table 2)

Table 2. Engine size of motorcycle and use of helmets

Engine size	Fatalities in helmeted	Fatalities in unhelmeted	p-value
≤125 cc	30 (35.29%)	34 (32.08%)	0.639
>125 cc	55 (64.71%)	72 (67.92%)	

Distribution of cases according to timing of crash: Majority of the fatalities were reported at night (61.32%) in unhelmeted motorcycle rider. 38.68% were reported in the daytime among those not wearing the helmet at the time of crash. (Table 3)

Table 3. Timing of crash and use of helmets

Time of crash	Fatalities in helmeted	Fatalities in unhelmeted	p-value
Day	14 (16.47%)	41 (38.68%)	<0.001**
Night	71 (83.53%)	65 (61.32%)	
**Statistically highly significant p<0.001			

Distribution of cases as per timings: Nearly 60% of fatalities in unhelmeted motorcycle rider were reported at Saturday and Sundays i.e. weekends whereas remaining 40.57% were reported during weekdays among those not wearing the helmet at the time of crash. (Table 4)

Table 4 Fatalities by timings and helmet use

Timing week days	Fatalities in helmeted	Fatalities in unhelmeted	p-value
Weekday	50 (58.82%)	43 (40.57%)	0.012*
Weekend	35 (41.18%)	63 (59.43%)	
*Statistically significant p<0.05			

Distribution of cases as to fatalities by number of persons on bike: Out of total fatalities in unhelmeted motorcycle rider, majority (85.85%) was observed when more than 1 person was on the motorcycle. Only 14.15% was observed when single rider was on the motorcycle. (Table 5)

Table 5. Fatalities by number of persons on bike and use of helmets

Number of persons on motorcycle	Fatalities in helmeted	Fatalities in unhelmeted	p-value
1 rider	32 (37.65%)	15 (14.15%)	<0.001**
>1 Rider	53 (62.35%)	91 (85.85%)	
**Statistically highly significant p<0.001			

Distribution as to correlates of motor cycle non-helmet usage in fatal crashes: The odds ratios indicate that motorcycle riders involved in fatal crashes in the age group of 20-29 years are less likely to wear helmets

relative to those in higher age groups. Similarly, males are less likely to wear helmets as compared to females. Relative to motorcycle riders riding motorcycles with engine size ≤125 cc, those riding motorcycles >125cc

are less likely to be helmeted. Higher odds suggest that motorcycle riders involved in fatal crashes at night are less likely to wear helmets relative to those involved in daytime fatal crashes. (Table 6)

Table 6. Correlates of motorcycle non-helmet usage in fatal crashes

Variable		Odds ratio*	95% Confidence Interval	
Age group (years)	<20	1 (Ref.)		
	20-29	1.527	0.0961	2.418
	30-39	1.08	0.772	1.652
	>40	0.736	0.594	1.043
Gender	Female	1 (Ref.)		
	Male	2.68	1.039	7.704
Engine size	≤125 cc	1 (Ref.)		
	>125 cc	1.154	0.628	2.118
Time of crash	Day	1 (Ref.)		
	Night	3.18	1.6	6.5
Timing week days	Weekend	1 (Ref.)		
	Weekday	2.085	1.16	3.75
Number of persons on bike	1 Rider	1 (Ref.)		
	> Rider	3.63	1.81	7.49
*Univariate analysis				

Discussion

The absolute number motorcycles have increased not only in urban areas but also in rural areas. One reason for this could be the low purchase price for motorcycles and increase in purchase power. Therefore despite being considered unsafe, motorcycles are easier and cheap to run and maintain cars. Even bike taxis have been recently permitted to ease high intensity traffic- cluded areas like Gurugram. Even after many studies showing the gargantuan impact in mortality of motorcycle crashes, public health experts have avoided this issue, and the extent of deaths due to motorcycle accidents occur in our country remains unknown.

Prevalence of helmet usage of among motorcyclists varies differently across different countries, cities towns and regions. In this study it was observed that out of total 303 cases of RTA, 191 (63.04%) involved motorcyclists. Among 191 motorcycle rider fatalities, 106 (55.5%) were unhelmeted. On thorough literature review it was observed that there is lack of studies in which comparison is made regarding fatalities in helmeted and

unhelmeted group. A Spanish study observed 19.7% motorcycle drivers wearing helmets; this increased to 94.8% after enforcement of a local helmet law.⁷ Our findings confirm the results of another study from Vietnam.⁸ That study noted 30% average helmet use by motorcyclists. This is in contrast to another study from Indonesia.⁹ In that study, 89% motorcyclists in urban were found to be wearing helmets.

In a study of helmet use among motorcyclists in Ghana, a total of 14,467 motorcyclists made up of 11,360 riders and 3107 pillion riders were observed. Most observed riders (86.5%) and pillion riders (61.7%) were males. The overall prevalence of helmet use among the observed motorcyclists was 36.9%. Helmet use for riders was 45.8% whilst that for pillion riders was 3.7%.¹⁰ Females tend to comply more with road traffic regulations and adopt safer behavior than males and this could be the supporting fact for lesser female ratio in accidents.¹¹ Besides gender differences, helmet use among motorcyclists was also identified to be significantly higher during morning and evening periods i.e. day time when police presence is largely anticipated.

This finding concurs with results from other country studies.¹²

In our study maximum (83.02%) fatalities in unhelmeted motorcycle rider were observed in males. The odds ratios indicated that male motorcycle riders are less likely to wear helmets as compared to females. The result of this study is in agreement with previous study from Ghana. Based on logistic regression analysis, higher helmet wearing rates were found to be significantly associated with female gender.¹⁰

We found that most (67.92%) of fatalities in unhelmeted motorcycle rider were observed in those riding motorcycle with bigger engine i.e. >125 cc. Remaining (32.08%) were riding the small engine motorcycles with ≤125 cc power. On univariate analysis, odds ratio indicated that the relative to motorcycle riders riding motorcycles with engine size ≤125 cc, those riding motorcycles >125cc are less likely to be helmeted. U.S. department of transportation also analyzed motorcycle helmet use in fatal crashes. Pickrell TM et al estimated the impact that having an engine size greater than 1500 cc had on a rider's likelihood of helmet use, compared to riders in the reference category of engine size (0 to 500 cc). it was noted that engine size of greater than 1500 cc being helmeted was 72 percent higher than an rider with an engine size of 0 to 500 cc in a two-vehicle crash.¹³

On the basis of above discussion we can draw a conclusion that even having stringent measures like use of helmets, safety equipment and the practice of traffic safety most of these rules are largely ignored and not abided in India by motorcycle drivers, which is also the same pitiful scenario in many developing countries.¹⁴ It is essential to understand better the injuries, the causes leading to the accident and other important data in order to prevent and reduce all injuries, particularly the fatal ones.

Conclusion

The helmet usage percentage among motorcycle riders and pillion riders is low in the study area, even after strict enforcement of helmet legislation mandating helmet use by motorcyclists. The findings of our study should have ramifications over law enforcement and policy making so that new prevention programs and actions are established to avoid these preventable deaths. These can be expected to serve as a pilot study to

devise interventions aiming at prevention of head injury in motorcyclists.

Conflict of Interest: None.

Source of Funding: Nil

Ethical Clearance: Ethical clearance is obtained for Institutional ethical committee, SHKM Government Medical College, Haryana prior to the study.

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Early Detection of Stroke using Texture Analysis

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Abstract

Ischemic brain stroke has been normally examined through Computed tomography (CT) images to decide about the further treatment of the patient. However, in the acute phase, detection of the lesions may be difficult through regular visual analysis of CT images. This paper presents a method to distinguish normal tissue and affected areas by texture analysis of CT images. Five regions of interest (ROI) are selected from area that may be potentially affected by ischemic stroke, and Five from the unaffected area per image are selected for calculation of 22 texture parameters. All ROIs for each subject were classified by an expert radiologist. The ratio of all the texture features from both areas is analyzed, and finally this study suggests that texture analysis could be a useful tool to help neurologists in the early detection of ischemic stroke. The novelty of the method is that the algorithm is based on the ratio of only five texture features to classify the CT image. The preliminary results show that the accuracy of the algorithm is 93.3%.

Keywords: *Texture analysis; CT imaging; Ischemic stroke.*

Introduction

Many advanced methods and technological evolutions have made human life easy, particularly medical field. Many researchers across the globe have put great efforts to make early detection of diseases easy and comfortable to the patient getting examined. But it is seen that research on early detection of stroke has long been less because of its nature and major work is yet to be done in this field. Early detection of stroke may help the patient for better treatment and recovery. World Health organization defines stroke as a “neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours”. It is caused due to the reduced blood supply to the brain. It is one of the largest causes of death and third largest cause of death in U.S. As per the survey of World Health Organization 0.63 million people die of stroke in India alone¹. As an estimate 12% of strokes occur in the population aged below 40 years². Early detection

of stroke is very important because administration of medicine after three hours of occurrence of stroke is of no use. Very recently a few attempts have been made on early detection of stroke³ and computer aided detection of stroke⁴. Apart from some physical symptoms, manual analysis of CT and MRI images of brain are some of the general methods of detection of stroke. But because of nature of stroke sometimes it is very difficult to detect even for a well experienced physician. Many researchers have worked out for computer aided detection of stroke. Some of them are mentioned in next section.

Previous work

Even though history of stroke goes beyond centuries very less numbers of research works have been done in medical field in this regard. A method for classification of stroke using, logical operators was used⁵. The algorithm involves only convolutions and simple arithmetic in the various stages which allows faster implementations. A similar methodology using texture features was developed by Christodoulou *et.al.* for analysis and characterization of carotid plaque⁶. The method used KNN and statistical classifiers for classification. Many

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works have been done on accurate segmentation of stroke area^{7,8}. The original CT image of brain consists of many unwanted data, noise and sometimes they are misaligned. A method⁹ was proposed for pre-processing of such images to get rid of such problems. A wavelet based analysis of stroke was devised by Chawla *et.al.* which could classify all types of strokes¹⁰. Malone *et.al.* devised a new method to identify disease in lung using texture analysis¹¹. Even though the methods mentioned are effective for pre-processing, analysis and classification of different types of stroke, very less work has been done on texture analysis, which has been proved to be very good for analysis of medical images. An effort in this way is expected to give proving results in this regard.

Materials and Methodology

In the present study digital CT images in JPEG format are used for analysis. CT images are obtained from Radiology department of Rajindra hospital, Patiala. An 8-bit greyscale images of size 512x512 are obtained from Siemens Somatom Emotion 6-Slice CT machine. Selection of slices showing stroke lesion out of a set of CT images and marking of abnormal region from the sample were done by expert physicians. The normal portions of abnormal slices were used as reference images for statistical comparisons. A set of five 20x20 pixels regions of interest were taken for calculating texture features. The initial study has been done on 90 patients, whose images are marked by the experts. Images of 60 patients are used as Training set and that of 30 are used as testing set. The algorithm has been developed on MATLAB.

Image pre-processing

The original CT image consists of unwanted portions in it. And not all times the images are properly aligned. Hence the image has to be pre-processed for alignment correction and to remove unwanted portions. Many pre-processing algorithms were developed for pre-processing of such images. A standard for selecting abnormal slices from a set of CT images was developed by Chawla *et.al.*¹⁰. Some methods^{10, 11, 12} for alignment correction are complex to implement and take much processor time. Hence a new method, for finding axial symmetry is used in our methodology. In this new method for alignment correction, the vertical-maximum length of skull was calculated after every rotation of image and the image

corresponding to maximum vertical distance was taken as alignment-corrected image. Here we have assumed that the shape of skull in the images is elliptical and it is true in most of the cases except in some cases where head is not properly held while taking scanning of head. Any unwanted portion is removed out in the next stage. The Fig.1 below shows CT images before alignment correction and after alignment correction using this method. The regions selected for calculating texture features is shown as red squares in the same figure. Only one ROI each in affected area and in normal area are shown here for reference. However such five ROIs in each region are used for analysis.

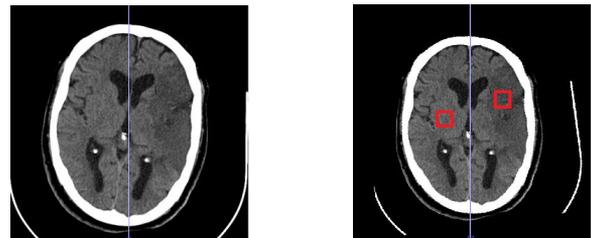


Fig.1 Images before alignment correction and after alignment correction and locations of ROI.

Texture analysis

Texture analysis is an important area of study in image processing. Using texture features for analysis of medical images is very useful because medical abnormalities sometimes does not show very distinguished region. Hence texture analysis is ideally suited in these cases. Many researchers have used texture features for analysis of medical images. Haralick *et al.*¹³ used textural features for classification of images to find region of interest. They made significant use of the knowledge about the physics of the ultrasound imaging process and tissue characteristics to design the texture model. Chen *et al.*¹⁴ used fractal texture features to classify ultrasound images of livers, and used the fractal texture features to do edge enhancement in chest X-rays. In our discussed method we have used texture features from Six different models like Spatial Gray-Level-Dependence matrices (SGLDM), Gray-Level Difference Statistics (GLDS), Statistical-Feature Matrix (SFM), Law's Texture Energy Measures (TEM), Fourier Power Spectrum (FPS) and Fractal Feature (FF).

In this study a numerical comparison is done between the normal region and the affected region. To make the numerical value more meaningful, ratio of each feature is taken between its normal and affected

region. The novelty in the proposed method is that here the ratio of affected area's value is taken with ratio of normal value. This makes the algorithm independent of inter-image variation in intensity because that ratio is being taken within one image.

Results and Discussion

In all there are 22 texture features evaluated from five ROIs of affected area and similarly 5 ROIs of normal area. Then ratio of each feature is calculated for each patient. The ratio is taken to avoid inter-image variation in gray levels. A table of all 22 features is made and ratio and the standard deviation of each feature is calculated. However to make the algorithm more effective, only top seven distinctive features are selected. The best seven features on the basis of ratio are presented here in table 1. The last column of the table 1 shows the standard deviation of each feature among its values in all images. The correlation coefficient between these features is also calculated and finally it is found that Skewness, Median and Mean are highly correlated so only one of them (Median) is used in the final algorithm i.e. only 5 features.

Table 1. Ratio of features in Normal area to Stroke affected area

Sr. No.	Feature	Ratio	Std Dev
1	Skewness_SFM	3.5260	0.6015
2	H2_FF	1.5311	0.3515
3	Med_SFM	1.2971	0.0632
4	Mean_SFM	1.2643	0.0640
5	Fr_FPS	1.2342	0.0639
6	LL_TEM	1.1228	0.3133
7	Fa_FPS	1.1171	0.0916

In the testing set of images only the selected 5 features are calculated and if the ratio is more than that of presented in the Table 1, then the image has stroke affected area. In testing 30 images are evaluated by this simple but efficient algorithm and the accuracy is calculated by sensitivity and specificity method. Result of this method is shown in Table 2.

Table 2 Evaluation of Classification Accuracy

	Is it a stroke affected image?		
	Yes	No	
Did the test indicate the presence of stroke?	Yes	True Positive (TP)	False Positive (FP) Image doesn't contain stroke area but test indicates that it is present
	No	False Negative (FN) Image is of stroke affected area but test says it is not	True Negative (TN)

On the basis of the Table 2, Accuracy is defined as:

For 90 (60 stroke affected and 30 Normal brain) images following is the result for evaluation of the proposed algorithm.

Table 3 Test of Accuracy

TP	TN	FP	FN	Specificity	Sensitivity	Accuracy
60	24	6	0	80%	100%	93.3%

The proposed algorithm is able to detect stroke in all the 20 available images (100% sensitive) and overall 93.3% accurate, however these are the preliminary results and more study is being carried on to use more sophisticated method of classification.

Conclusion

The study shows that texture analysis can be useful tool to detect early stage of ischemic stroke from CT image. In this paper only five features are proposed which are able to detect the stroke. The novelty of the method is that it considers the ratio of two area and thus avoiding any chances of inter-image intensity variation. The results show that 84 images have been correctly classified out of 90 images and thus, the method is 93.3% classification accuracy. Therefore, in future, an algorithm can be developed and implemented in CT scan machine to give the online value to help the nuero-radiologist also. The early detection can help in deciding the treatment of the patient. Moreover, the proposed method has 100% sensitivity, therefore it could be concluded that this method will never miss the hypothesis i.e. it will never miss the existing of stroke

in CT images. This makes this method suitable for other medical investigative applications also like forensic science.

Ethical Clearance - Since the present study is based on image analysis only, and there is no intrusive technique used during the study, therefore, no ethical clearance is required. However, privacy of the all the patients have been maintained as per the recommendations of the ethical committee of the institute.

Source of Funding - The study is self funded.

Conflict of Interest – Nil.

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Component Analysis of Pubic Symphysis Morphology: is it Still a Gold Standard Tool of Age Assessment?

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Abstract

Symphysis Pubis has dorsal side, ventral side and surface from anthropological view point. Study was concentrated on dorsal demi surface / margin, ventral demiface and symphyseal surface combined. Conducted in 100 dead bodies with known age, age related changes were identified, matched with that of the accepted component analysis in anthropology, the Mc Kern Stewart classification.

Keywords: Pubic symphysis, dorsal margin, plateau, lipping.

Introduction

An array of age estimation techniques are in practice. To estimate age in dead, we are at ease and liberty to go for techniques that require invasion of body. Direct Dissection techniques, invasive imaging techniques can be used liberally after death to find age. “Bones never lie”, “Bone would have stories to tell” forms the basis of anthropological and anthropometric studies. Age estimation using pubic symphysis is considered widely to be one such golden technique used post mortem.

This study utilized age related changes in dorsal & ventral margin of pubic symphysis and surface of pubic symphysis, under component analysis system.

Aim of the Study

To find out age related changes in dorsal margin of pubic symphysis and symphyseal surface To assess its reliability in the age group 16 – 49 years.

Materials and Method

Study material requiring the pubic part of both hip bones were collected after due permission from Institutional Ethics Committee and the Investigating Police Officers. Accidents vide, road traffic accidents, train traffic accidents, fall injuries, attacks around hip, dowry allegation deaths were excluded from the study.

Age limit between 16 – 49 years, of both sexes ⁽¹⁾ were included.

With ‘I’ shaped incision from symphysis menti to symphysis pubis, soft tissues are reflected for adequate working environment. Part of pubic bone on both sides measuring 2 inch from symphysis were sawed and processed. Simple maceration of cut bones in water for 20-30 days would clear the bone of all soft tissue attachments ⁽²⁾. Tagging the Autopsy number, sex and known age with samples collected, dorsal margin and symphysis pubis were evaluated with hand lens.

Changes were tabulated and compared with age related changes described in previous studies.

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Table 1: DISTRIBUTION OF SAMPLES:

Age group	Male	Female	Total
18-19	3	5	8
20-21	9	1	10
22-24	6	2	8
25-26	5	2	7
27-30	8	8	16
30-35	11	7	18
35-39	12	2	14
40-44	9	3	12
45-49	6	1	7

Discussion

TODD system focused on PHASE ANALYSIS of Pubic symphysis, dividing the metamorphosis into ten stages ⁽³⁾. Mc Kern and Stewart system ⁽⁴⁾ was an extension of Todd's phase analysis but shifting the brunt of study in analyzing three individual components, dorsal plateau, ventral rampart and symphyseal rim. Components were studied under five stages of changes with scores on each change. Hence, Mc Kern Stewart system gave more accurate estimate by ruling out observer's bias. Gilbert staging ⁽¹⁾ attempted to establish male female difference with respect to pubis which considers female pelvis undergoes more trauma by parturition. Suchey Classification ⁽⁵⁾ extended to solve the problems out of Gilbert staging.

Results

Table-2 (mean – Component I)

SCORE	MEAN AGE
0	16.2
1	21.7
2	23
3	28.9
4	32.12
5	49.48

Table 3 (Mean Component II)

SCORE	MEAN AGE
0	17.4
1	21.01
2	23.01
3	28.12
4	35.25
5	49.5

Table 4 (Mean Component III)

SCORE	MEAN AGE
0	16.2
1	20.95
2	25.1
3	28.75
4	38.38
5	51.87

Above result is based on component scoring of Mc Kern Stewart ⁽⁴⁾

Component I	Score	Component II	Score	Component III	Score
Dorsal margin Absent	0	Ventral Beveling Absent	0	Symphyseal rim Absent	0
Middle third	1	At superior extremity	1	Partial dorsal rim	1
Entire border	2	Extend inferiorly	2	Complete dorsal rim	2
Dorsal plateau Middle third	3	Ventral rampart Begins	3	Complete rim formation	3
Present Most of demiface	4	Extensive	4	Breakdown of rim begins	4
Complete	5	Complete	5	Rarefaction of symphyseal face	5

Discussion

Dorsal margin in both sexes completes at the mean age of 21.7 years. Dorsal plateau formation starts at mean age of 28.9 years and it completes by mean age of 49.48.

Ventral beveling in both sexes appears the mean age of 21.01 years, completes by mean age of 23.01. Ventral rampart formation begins at the mean age of 28.12 years, completes by mean age of 49.5.

Symphyseal rim forms at the mean age of 20.95 years, completes by mean age of 28. Rim breaks down by mean age of 38.38 years, complete rarefaction starts after 58.87 years.

Aberrations: Two males in age group 35 - 39 were presented with two ridges and one groove, one male of age group 40 - 45 showed rim formation, 3 males of age group 44 - 49 showed smooth epiphyseal surface with symphyseal erosion. 1 female of age group 40 - 44 showed lipping.

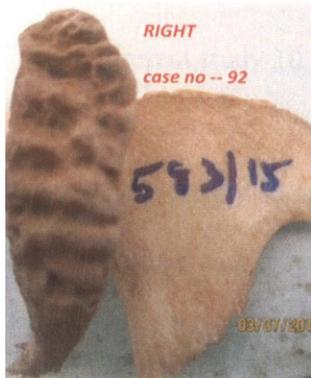


Image 1: Component I – 0, Component II – 2, Component III – 0.



Image 2: Component I – 2, Component II – 2, Component III – 1.



Image 3: Component I – 3, Component II – 3, Component III – 2.



Image 4: Component I – 5, Component II – 5, Component III – 3.



Image 5: Component I – 5, Component II – 5, Component III – 5.



Image 6: Component I – 5, Component II – 5, Component III – 5.

Conclusion

On completion of this study it was concluded that age related changes in the surface of pubic symphysis in correlation with COMPONENT ANALYSIS is still a gold standard test ⁽⁶⁾⁽⁷⁾ for assessing age in the group of 18 to 50 years.

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A Study to Corelate Stature with Anthropometric Parameters Like One Arm Length, Vertex to Upper Border of Pubic Symphysis and Foot Length in Local Population

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Abstract

Assessing stature is one way of identifying an individual living or dead. It is easy to assess in dead if the body is available in toto. If only a part is recovered then it's really a difficult task for a forensic expert to find out the actual stature. Many anthropometric parameters are used to assess the stature of an individual, but there is no accurate technique or parameter till devised. So we are using multiple parameters to assess and find the acceptable range of stature for practical purposes. In this study parameters like one arm length, vertex to upper border of pubic symphysis length and foot length are used to assess stature in an intact body and compare with real stature to find out their correlation.

Keywords: Stature, arm length, vertex pubic symphysis, foot length.

Introduction

Establishment of individuality is an important and significant aspect of forensic work, which was done using anthropometric parameters. This study is aimed to analyze some parameters like one arm length, vertex to upper border of pubic symphysis length and foot length and their credibility in assessing the stature of an individual.

Aim of the Study

To find out the correlation of anthropometric measures like one arm length, vertex to upper border of pubic symphysis length and foot length in measuring stature with real stature and their usefulness in medicolegal work in local population.

Materials and Method

This study comprises of 500 cases with known

age at death between 20-50 years, includes both sexes subjected to autopsy. Age of the deceased is collected from the age given by Investigating Officer. Mutilated bodies are excluded from study. Measurements like one arm length, vertex to upper border of pubic symphysis length, foot length and complete length were taken.

One arm length consists of length from top of shoulder to tip of the middle finger ⁽¹⁾ after breaking down the rigor mortis. Vertex to upper border of pubic symphysis is measured by using a measuring tape between two wooden blocks placed at highest point of the head and upper border of pubic symphysis ⁽²⁾. Foot length is the distance between the most prominent part of the heel backwards (Pternion) and most distant part of the longest toe (Acropodian) ⁽³⁾. All these measured statures to be compared with real stature of the body and their correlation is assessed.

Results

Cases were divided into 6 age groups for analysis like ages 20-25, 26-30, 31-35, 36-40, 41-45, 46-50. Out of 500 cases 384 (77%) are males and 116 (23%) are females.

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Table 1: AGEWISE DISTRIBUTION OF CASES:

Age group	Males	Females	Total
20-25	59	29	88
26-30	56	24	80
31-35	61	23	84
36-40	64	16	80
41-45	59	10	69
46-50	85	14	99

Table 2: ONE ARM LENGTH & CORRELATION WITH STATURE IS TABULATED

Age groups	Males		Females	
	No	Yes	No	Yes
20-25	58	1	29	0
26-30	55	1	24	0
31-35	61	0	23	0
36-40	62	2	16	0
41-45	59	0	9	1
46-50	85	0	14	0
TOTAL	380	4	115	1

Table 3: VERTEX TO UPPER BORDER OF PUBIC SYMPHYSIS LENGTH ⁽⁴⁾ & CORELLATION WITH STATURE IS TABULATED

Age groups	Males		Females	
	No	Yes	No	Yes
20-25	13	46	8	21
26-30	13	43	2	22
31-35	7	54	7	16
36-40	14	50	2	14
41-45	7	52	2	8
46-50	15	70	4	10
TOTAL	69	315	25	91

Table 4: FOOT LENGTH & CORRELATION WITH STATURE IS TABULATED

Age groups	Males		Females	
	No	Yes	No	Yes
20-25	28	31	13	16
26-30	22	34	15	9
31-35	35	26	14	9
36-40	32	32	9	7
41-45	26	33	5	5
46-50	42	43	7	7
TOTAL	185	199	63	53

Discussion

One arm length was multiplied by 2 and 34 cms added for comparing it with the known stature; Vertex to upper border of pubic symphysis measured using a measuring tape between two wooden blocks placed at highest point of the head and upper border of pubic symphysis is multiplied by 2 and compared with stature; Maximal foot length was divided by 0.15 and compared with stature of the individual.

Out of 500 samples analyzed through SPSS (Software), one arm length measure gives accurate stature in only 5 cases, 1% accuracy; with 2 standard deviations included accuracy is 2 %. vertex to upper border of pubic symphysis gives accurate stature in 406 cases, 81.7% accuracy, with 2 standard deviations included accuracy is 92 %. Foot length measure gives accurate stature in 252 cases, 50% accuracy; with 2 standard deviations included accuracy is 50.7%. Out of these 3 parameters vertex to upper border of pubic symphysis gives a better correlation of assessing stature of an individual than other two parameters.

No Conflict of Interest;

Self-funded study

Institutional Ethical Committee clearance from Tirunelveli, Tamilnadu.

Conclusion

On completion of the study it was concluded that vertex to upper border of pubic symphysis measure gives around 80% positive stature assessment than one arm length (2%) and foot length (50.7 %).

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A Study in Corelation of Stature Assessment Using Practising Anthropometric Parameters Like Forearm Length, Sternal Notch to Upper Border of Pubic Symphysis and Tibial Length in Local Population by Using Bodies Subjected to Autopsy

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Abstract

Forearm length, sternal notch to upper border of pubic symphysis length and tibial length and their credibility in assessing the stature of an individual is dealt with this study. Olecranon to tip of middle finger (Forearm length), sternal notch / jugular notch border to upper border of symphysis pubis, medial condyle to medial malleolus length (Tibial length) are considered for relating with whole stature.

Keywords: Stature, forearm length, sternal notch, pubic symphysis, tibial length

Introduction

Every object in this universe hold with it infinite variation. Principle that acts as an axle on which identification data revolve around. Anthropometry has taken a different path by finding its application into ergonomics, equipment are designed to match health, safety and productivity. In some parts of the world, fashion designing too uses the anthropometry principles. Major application of anthropometry in Forensic and Criminology field is still wide open when it comes to stature identification. Study below is intended with much zeal to seek the correlation of whole body stature with that of body proportion measurements.

Materials and Method

500 cases with known age at death between 20-50 years, of both sexes at autopsy were considered for the study. As part of autopsy,

anthropometry of the before mentioned parameters are recorded. Hence, nil ethical violation in the study. Age of the deceased, sex are tabulated with columns for forearm length, sternal notch to upper border of pubic symphysis length and tibial length.

Forearm length consists of length from tip of olecranon process to tip of the middle finger ⁽¹⁾ after breaking down the rigor mortis. Keeping the arm flat on the table, spreading caliper is used to measure the maximal length. Sternal notch to upper border of pubic symphysis is measured by fixing the pointed caliper at the maximal concavity of jugular notch ^{(1),(2)}. Tibial length is measured between medial condyle and the most distal point on medial malleolus. Being a surface bone, tibial length on surface reflects with tibial bone length ^{(3),(4)}.

Results

Cases were divided into 6 age groups for the purpose of statistics easiness by SPSS software. 20-25, 26-30, 31-35, 36-40, 41-45, 46-50 years are the group (Table: 1). Out of 500 cases 384 (77%) are males and 116 (23%) are females.

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Table 1: Agewise distribution of cases

Age group	Males	Females	Total
20-25	59	29	88
26-30	56	24	80
31-35	61	23	84
36-40	64	16	80
41-45	59	10	69
46-50	85	14	99

Table 2: Agewise stature

Age group	Males	Mean stature	Females	Mean stature
20-25	59	167.92	29	158.96
26-30	56	170.12	24	162.9
31-35	61	170.33	23	165.53
36-40	64	174.96	16	155.33
41-45	59	169.80	10	157.21
46-50	85	169.77	14	157.38

Table 3: Forearm length & correlation with stature is tabulated

Age groups	Males		Females	
	No	Yes	No	Yes
20-25	55	4	25	4
26-30	52	4	20	4
31-35	57	4	18	5
36-40	58	6	13	3
41-45	53	6	8	2
46-50	81	4	11	3
TOTAL	356	28	95	21

Table 4: Sternal notch to upper border of pubic symphysis length & correlation with stature is tabulated

Age groups	Males		Females	
	No	Yes	No	Yes
20-25	33	26	22	7
26-30	23	33	15	9
31-35	28	33	18	5
36-40	32	32	10	6
41-45	33	26	6	4
46-50	41	44	9	5
TOTAL	190	194	80	36

Table 5: Tibial length & correlation with stature is tabulated

Age groups	Males		Females	
	No	Yes	No	Yes
20-25	54	5	22	7
26-30	49	7	22	2
31-35	58	3	21	2
36-40	53	11	15	1
41-45	48	11	7	3
46-50	76	9	12	2
TOTAL	338	46	99	17

Discussion

Out of 500 samples analyzed, Forearm length measurement (by using 19/5 fraction calculation) gives accurate stature only in 49 cases. Sternal notch to upper border of pubic symphysis measure gives accurate stature only in 230 cases. Tibial length measure gives accurate stature only in 63 cases. Forearm length measure gives a positive correlation in 9.8% cases, minimum error being 11.6 cm to maximal error being 19.3 cm. Sternal notch to upper border of pubic symphysis measure gives positive correlation in 45.7% cases, minimum error being 12.9 cm to maximal error being 16 cm; Tibial length gives positive correlation in 12.8% cases; minimal error being 20.9 cm and maximal error being 23.58 cm. None of these 3 parameters is helpful in reliable assessing of stature in an individual.

Conflicts: Nil;

Funding: Self;

Clearance: Intuitional Ethical Committee, Tirunelveli, Tamilnadu.

Conclusion

Upon completion of this study it was concluded that none of the parameters (forearm length, sternal notch to

upper border of pubic symphysis length and tibial length⁽⁵⁾) analyzed is helpful in assessing the stature of an individual in the local population. Hence, a nationwide data is required to consider the failure and limitations of the above said proportions to whole body stature.

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A Study of Metamorphosis in Ventral Margin of Pubic Symphysis between 18 to 49 Years – A Tool of Age Assessment in Identification

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Abstract

Pubic symphysis (Pubic – pubis of innominate, symphysis – Union) is a region of meeting place of both innominates of our skeleton. Wear and tear change is comparatively negligible in pubic symphysis than any other parts of the body. Symphysis pubis is not altered even in skeletonized body, so it is much helpful to assess the age by its age related metamorphosis. This study was conducted in 100 dead bodies with known age that were subjected to medico legal autopsy. Age related changes were identified from the samples collected and checked with existing age proof data and found to be a reliable parameter in assessing the age in a range.

Keywords: Pubic symphysis, ventral margin, maceration, beveling, ventral rampart, lipping.

Introduction

Age assessment is a very important factor in identifying a person, either living or dead as far as medicolegal works are concerned. Many parameters are used to assess age of an individual. As those parameters and their changes are influenced by many external factors, accurate assessment of age by using a single parameter is not possible but only in an age range. This study uses age related changes in ventral margin of pubic symphysis to try to solve the mystery of age estimation in local population.

Aim of the Study

To find out age related changes (metamorphosis) in ventral margin of pubic symphysis and its reliability in assessing age between 18 – 49 years.

Materials and Method

Study material was collected from dead bodies

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subjected for medico legal autopsy at Tirunelveli Medical College, Tirunelveli. Bodies with known age at death between the ages 18-49 years, both male and female (Table 1) are selected randomly. Suspected injuries to hip bone cases were excluded. After obtaining permission from Investigating Officer of the cases concerned and relatives of the deceased, a part of hip bones on both sides, 3 cm from pubic symphysis was marked, sawed and processed. The technique used for cleaning soft tissues is simple maceration⁽¹⁾ in water for 20-30 days⁽²⁾ and then cleaning with fine haired brush to remove the debris. Changes were tabulated and compared with age related changes.

Table 1: Distribution of samples

Age group	Male	Female	Total
18-19	3	5	8
20-21	9	1	10
22-24	6	2	8
25-26	5	2	7
27-30	8	8	16
30-35	11	7	18
35-39	12	2	14
40-44	9	3	12
45-49	6	1	7

Discussion

A total of 100 samples were collected and analyzed. Out of it, 69 from males and 31 from females. As per their ages they are divided into 10 groups in correlation with 10 phases described in TODD'S PHASE ANALYSIS⁽³⁾ as age groups 18-19,20-21,22-24,25-26,27-30,30-35,35-39,40-44,45-49 and 50+.

Age related changes are noted as mentioned in the results of the Todd's study. Todd's method takes into account about the phase analysis⁽³⁾ ⁽⁴⁾ of various components of pubic symphysis. Other studies also tried to analyze individual components⁽⁵⁾. In this study, only Ventral margin component of pubic symphysis is recorded and tabulated to compare it with Todd's Phase Analysis of Pubic Symphysis in age estimation.

Results

Changes noted in various age group is tabulated as follows:

Table 2: Changes in ventral margin of pubic symphysis.

AGE RANGE	CHANGES NOTED on ventral margin
18 – 19	Not developed
20 – 21	Ventral beveling begins
22 – 24	Beveling more pronounced (Fig 1)
25 – 26	Beveling greatly increased
27 – 30	Sporadic attempt of ventral rampart formation
30 – 35	Complete ventral rampart
35 – 39	Complete ventral rampart with tendon intervention
40 – 44	No lipping
44 – 49	Irregular lipping (Fig 2)
50 +	Broken down (Fig 3)

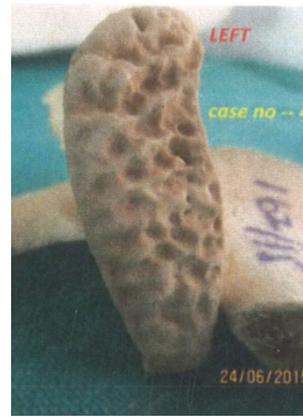


Fig 1: More beveling at ventral margin



Fig 2: Lipping & nodules on ventral margin

Results matched with that of Todd's phase analysis for the ventral component to 97%. No difference with respect to sex. Only in 3 cases out of 100, there is deviation. A male sample in age 20-21 showed premature formation of ventral rampart; A female in age 40-44 showed lipping; A male in age group 45-49 had complete ventral rampart without lipping. So out of 100 samples listed for ventral margin changes in pubic symphysis in correlation with age changes, only 3 cases deferred than existing fact.



Fig 3: Broken down ventral rampart

Conclusion

On completion of this study it was found that age related changes in the ventral margin of pubic symphysis are in correlation with TODD'S PHASE CHANGES with an accuracy of 97%. Hence in an unidentified dead body, pubic symphysis can lead us to a long way in age estimation ⁽⁶⁾.

Conflict of Interest: Nil.

Funding: Self-funded, no external funding.

Ethical Clearance: Obtained from Institutional Ethical Committee, Tirunelveli, Tamilnadu.

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Predicting Sex from the Linear Measurements of Mastoid Process: A Preliminary Study in Skulls of Eastern Indian Population

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Abstract

Assessment of skeletal remains for sex determination is required in forensic research. This study was designed to use the linear dimensions of the mastoid region to predict sex from skulls of Eastern Indian population.

A sample of 66 Adult fully ossified skulls was used in this investigation. In this population specific study, we derived an equation from Discriminant Function Analysis and applied the sectioning point to determine sex.

Overall 90.9% of the sample was correctly classified into their group by this model. At the individual group level, 85.7% of females and 93.3 % of male were correctly classified.

This is a reliable method to easily determine sex from skull using the mastoid dimensions in a population specific sample.

Key words: Forensic Anthropology, Mastoid, sex, discriminant function analysis, Eastern India.

Introduction

Sex determination is the elementary step for identification of an individual from skeletal remains.^{1,2} Often assessment of skeletal remains for sex determination is required in examining cases of mass disaster, dismembered, decomposed and mutilated bodies.^{3, 4} The success of sex determination largely depends on the available portion of the skeleton⁵ In practice of forensic investigation the bones are very often fragmentary and damaged^{6,7}

There can be extensive ante-mortem injuries and post-mortem mutilation of skull bone that might render it unreliable and difficult for forensic analysis to determine sex.^{2, 4, 8}

Those parts of the skull which are less prone to damage have been used in analysis by few researchers for sex determination in different populations. Owing to its anatomical location, mastoid is the most protected region of the skull.⁹

The sexual dimorphism of mastoid process has been established and documented by many previous researchers. Both non-metric method^{10, 11, 12} and morphometry^{2, 9, 13, 14} have been successfully used to determine sex from mastoid.

Many recent researches have also shown that the mastoid triangle can be used to determine the sex of un-identified skull. This technique of sex estimation using mastoid triangle was used by Paiva and Segre¹³ in a Brazilian sample. Population specificity of measurements and predicting equations has been clearly established in earlier works.

The aim of the present study was to use the linear dimensions of the mastoid to predict sex from Eastern Indian skulls.

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MATERIALS & METHOD

A sample of 66 adult fully ossified skulls of Eastern Indian origin was studied in this investigation. Of those 45 were males and 21 females. The skull sample was collected from the archive of the departmental osteology museum.

The measurements were taken with digital caliper to the nearest millimetre (mm).

Measurement of only the right side was chosen for convenience. All the measurements were taken by a single observer. Mean of two readings was taken to avoid any inter-observer error. Prior to this, intra-observer agreement was checked by randomly taking 20 skulls and recording two readings at an interval of seven days, then paired t test was conducted to see if there was any difference. It was seen that there was no significant difference in the mean in between the two sets of reading. For inter observer rating agreement, repeatability and reproducibility of the methods Cohen's kappa Test was done with 20 randomly selected skulls.

In consonance with previous studies ^{2, 4, 9,13,14,15} following measurements were used in the investigation

MASTOID LENGTH: The mastoid length is measured from a point on the Frankfurt plane VERTICALLY downwards to the tip of the mastoid process. **[Fig 1a]**

MASTOID BREADTH: It is measured from the highest part of the medial surface of the mastoid process within the digastric fossa to the most lateral point of the process on the same level. **[Fig 1b]**

MASTOID ANTERIO-POSTERIOR DIAMETER: It is measured from the lowest point at which the tympanic plate abuts against the anterior surface of the mastoid process to the posterior border of the process on the same level. **[Fig 1c]**

Three landmarks were identified and marked.

- **PORION (Po):** Highest point on the surface of the external auditory meatus.
- **MASTOIDALE (Ma):** Lowest cranio-metric point at the mastoid process.
- **ASTERION (As):** Meeting point of lambdoid, occipito-mastoid, and parieto-mastoid sutures.

Mastoid triangle: **[Fig 1d]**

PO-MA: straight distance between Porion and Mastoidale : a

PO-AS straight distance between Porion and Asterion : b

AS-MA: straight distance between Asterion and Mastoidale. : c

The angles of the triangle: **[Fig 1d]**

Angle at Asterion : A

Angle at Mastoidale : B

Angle at Porion : C

The three sides were plotted in Heron's formula to get the Mastoid Triangle Area in mm squared following Kemkes and Gobel¹⁵ and Kanchan⁴

The three angles of the mastoid triangle were calculated based on the three sides of the triangle applying Law of Cosines.

The mastoid triangle is anatomically a slightly curved surface. However, the area and angles calculated in the study corresponded to a two-dimensional planar view.

In Type-1 Asterion, the measurements were taken from the middle of the sutural bones in consonance with methodology of earlier works.

The data was analysed using SPSS 15 software for windows.

Results

In the present study of 66 adult bones, 45 were male and 21 females. We found presence of the Type 1 Asterion in 8 (12.12%) the skull in the sample. A direct discriminant function analysis was performed using the independent variables as predictors of sex. All the variables were entered together. The independent variables were Mastoid triangle area (MA), Mastoid length (ML), Mastoid breadth (MB), Mastoid antero-posterior diameter (MAPD), Angle at Asterion (AAS) and Angle at Porion (APO).

The classification groups were male and female. One discriminant function was calculated with Wilks' Lambda equal to 0.474 chi square (χ^2) equal to 45.555,

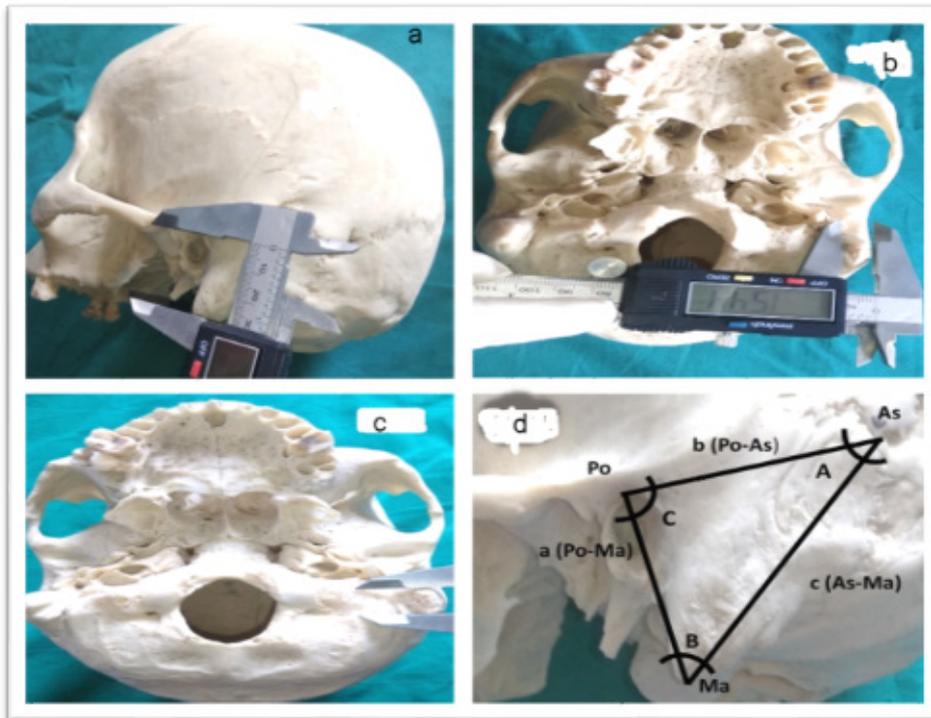
degree of freedom 6 and P value of.000. Because P value was less than 0.05, we could say that the model was a good fit for the data.

The following Discriminant Function (DF) was obtained:

$$DF = 0.24MB - 0.14 ML - 0.06 MAP + 0.01 MA + 0.12 AAS + 0.08 APO - 14.63.$$

The Cut Score was -0.41 [Calculated from group centroid (**Table 1**) by obtaining the arithmetic mean

of the values]. Those samples with discriminant score above -0.41 were male. Those cases where the D F score is less than -0.41 were female. Overall 90.9% of the sample was correctly classified into their group by this model. At the individual group level, 85.7% of females and 93.3 % of male were correctly classified. (**Table 2**). In cross validation each case is classified by the functions derived from all cases other than that case. Cross-validated results showed 87.9 % of the cases correctly classified by this model.



- 1a Figure showing measurement of MASTOID LENGTH
- 1b Figure showing measurement OF MASTOID BREADTH
- 1c Figure showing measurement OF MASTOID ANTERIO-POSTERIOR DIAMETER
- 1d Figure showing measurement OF Three Sides of the Mastoid triangle

Table 1: Functions at group centroid		$(m+f)/2$
SEX	FUNCTION	0.709 + (-1.519) = 0.81
MALE (m)	0.709	0.81/2 = 0.405
FEMALE (f)	-1.519	CUT OFF SCORE= - 0.41

Table 2: Summary of classification results

		SEX	PREDICTED GROUP MEMBERSHIP		TOTAL
			MALE	FEMALE	
ORIGINAL	COUNT	MALE	42	3	45
		FEMALE	3	18	21
	%	MALE	93.3	6.7	100.0
		FEMALE	14.3	85.7	100.0
CROSS-VALIDATED	COUNT	MALE	41	4	45
		FEMALE	4	17	21
	%	MALE	91.1	8.9	100.0
		FEMALE	19.0	81.9	100.0

90.9% of ORIGINAL GROUP cases are correctly classified.
87.9% of Cross Validated Group cases are correctly classified.

Table 3: Comparison of discriminant function analysis equation between different regions of India

Author	Region	Discriminant Function Analysis Equation	Cut-Off Score	Accuracy
SUMATI ² (2010)	NORTH INDIA	$0.199 \times \text{Mastoid Length} + 0.233 \times \text{Mastoid Breadth} + 0.04 \times \text{A-P Diameter} + 0.016 \times \text{Size of Mastoid Process} - 7.35$	0	76.7%
SUKRE ¹⁴ (2017)	MARATHWADA	$-3.814 + (3.19 \times \text{Mastoid length}) + (1.716 \times \text{medio-lateral diameter}) + (0.220 \times \text{anteroposterior diameter}) - (0.938 \times \text{Asterion-mastoidale}) + (0.169 \times \text{Asterion-porion}) - (0.913 \times \text{Porionmastoidale}) + (0.005 \times \text{Mastoid index})$	< 0	76%
PRESENT STUDY	EAST INDIA	$0.24\text{MB} - 0.14 \text{ML} - 0.06 \text{MAP} + 0.01 \text{MA} + 0.12 \text{AAS} + 0.08 \text{APO} - 14.63$	- 0.41	90.9%

Table 4: Comparison of mean of mastoid length between male and females.

AUTHORS	MALES	FEMALES	REGION OF STUDY
Keen (1950) ¹⁷	29.3	26.5	Cape coloured population
Giles and Elliot (1963) ¹⁸	28.067 30.320	25.213 26.347	Whites Negros
Sumati (2010) ²	28.30	23.18	North Indian

Table 4: Comparison of mean of mastoid length between male and females

Vidya C S (2012) ¹⁹	35.30	34.20	Mysore, South India
Poonia (2014) ²⁰	34.9	32.59	Jaipur, India
Rajni (2017) ²¹	28.62	23.92	Western UP, India
Present Study (2018)	27.61	23.87	Eastern India.

Table 5: Comparison of mean of three sides of triangle between male and females.

AUTHOR	REGION	PO-MA		AS-MA		PO-AS	
		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Kemkes& Globel ¹⁵	German	30.9	28.9	50.5	49.4	48.6	46.3
	Portuguese	31.5	28.4	49.5	45.4	47.7	45.1
Galdames ²⁴	Brazil	30.7	27.6	50.2	48.3	47.5	46.7
Manoonpol Plakornkul ²⁵	Thailand	35.1	31.2	57.2	52.2	53.5	49.6
Singh ²⁶	North India	23.1	21.7	45.2	41.1	41.3	39.0
Kanchan T ⁴	South India	27.4	25.7	48.7	47.2	43.9	42.3
Present Study	East India	29.56	24.34	49.73	44.15	45.51	42.22

Discussion

Sex can be assigned to a skull based on morphological examination of the sexually dimorphic traits. These features have been emphasised and described in forensic literature^{1, 5, 6}. Reliance on morphology alone is likely to be inaccurate. Errors can occur due to subjectivity. Metric methods can overcome this shortcoming. Further fine-tuning and precision of results are obtained by the application of sound statistical methods like DFA in population specific samples.

The present study has provided a discriminant function equation for sex determination of skulls of Eastern Indian individuals from linear measurements of mastoid process. The variables can be applied to determine sex from the mastoid region of skulls belonging to eastern Indian population. The overall predicting power from those variables was found to be 90.9%. For males the accuracy was 93.3 % while in females it was 85.7%. Our results are comparable with other earlier published works from India, Europe, Saudi and Latin American population.^{2, 14, 15, 16}

Sumati et al² their study in North Indian population had taken mastoid length, mastoid breadth, mastoid length and mastoid stature, in their DFA equation for

sex discrimination. Their cut-off score was 0 and study accuracy was 76.7%.

Sukre et al in their study examined skull sample from Marathwada region of India. The variables chosen for DFA were Mastoid length, mastoid breadth, mastoid antero-posterior diameter and three sides of the mastoid triangle. Their estimated Cut-off score was 0 and their study accuracy was of 76%.¹⁴

The present study shows that the accuracy of the discriminant function analysis equation is 90.9%, which is far greater than the previously done studies. (**Table 3**). There can be several reasons for this. Firstly the population specificity of DF is well established and further asserted by the findings of the present series. Secondly the combination of variables is different. In our investigation we have used mastoid triangle area, which has the highest power of discrimination between the sexes.

Mastoid triangle area and the respective angles are dependent on the three sides of the triangle. So the three sides were not included among the independent variables in the present study by discriminant function analysis.

The parameters of mastoid index and mastoid stature are dependent on mastoid length, mastoid breadth and mastoid antero-posterior diameter. So those were also not included as the independent variables in the DFA. Some earlier works have however used those in the combination of variables. Our study variables do not violate the assumptions of non multi-collinearity of DFA and are therefore more accurate.

Keen et al¹⁷, Giles and Elliot¹⁸ et al observed in their respective studies that the mean mastoid length was more in skulls of male individuals as compared to skulls of female individuals irrespective of race or region^{17, 18}. This same phenomenon was also observed in Indian population from studies^{2,21,22,23} in different regional samples. The results of our present investigation also reiterate the earlier findings. [Tables 3, 4, 5,]

Previous studies on the dimensions of mastoid triangle^{15, 22-26} have observed statistically significant sex differences for all the three sides of the mastoid triangle. In the present study, sex difference was observed but it was not statistically significant. Interestingly however, our results are similar to the observations of Kemkes and Gobel¹⁵ in a German sample.

Some authors have advocated the utility and greater precision of CT measurement as compared to direct osteometry¹⁶. On the contrary our results show greater and improved predicting power than previous studies.

The present investigation provides a reliable and easy method to determine sex from mastoid dimensions. It is also impressively accurate and can be applied in the field for forensic investigations. The principle and methodology is also easy, instant, and economical.

This would have anthropological, archaeological and forensic applications especially in cases of determination of sex of unknown mutilated bodies. This can be also of significant use in identifying human remains even with fragmented skull bones where only the mastoid region is intact and available for osteometry,

Conclusion

Mastoid triangle area, mastoid length and mastoid breadth are the best parameters for discrimination of sex.

Metric method for determination of sex from mastoid process is acceptable, easy and remarkably

accurate in a population specific sample.

Broad based study with more number of variables and larger sample can be designed for more precision and improved results.

Ethical Clearance- Taken from I E C Burdwan Medical College, Bardhaman, WB.

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Fingerprint Patterns in Relation to Gender and Blood Group among Residents of Central Indian District

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Abstract

Introduction: Fingerprint patterns are genotypically determined and remain unchanged from birth to death. The present study was conducted to determine the fingerprint patterns in relation to gender and blood group. **Materials and Method:** A cross-sectional study was undertaken and data from a total of 300 participants (150 male and female each) aged 18-40 years was collected. The fingerprints and blood group of each subject were obtained using the standard technique. **Results:** the majority of the subjects, 118 (39.3%), in the study belonged to blood group B, followed by blood group 'O' 87 (29%), 'A' 72 (24%) and 'AB' 23 (7.7%). We observed that frequency of whorl was highest in all the individual blood groups of ABO blood group system, followed by loop and arches except in O blood group, where loops were more commonly distributed among the subjects of different blood groups. We also noted that no significant association between gender and fingerprint patterns. In addition, we also observed that no significant association between fingerprint patterns and ABO blood group. **Conclusion:** Our results suggest that fingerprints, gender and ABO blood groups can only be assessed independently to secure identify of an individual.

Keywords: Blood groups, fingerprint, gender, identification.

Introduction

In recent times, we humans have engaged ourselves in gathering different types of data and that too in enormous quantities so as to identify an individual based on their unique genotypic and phenotypic characteristics. Unique identification has numerous personal, social and legal applications. There are various methods of unique identification viz. anthropometry, dactyloscopy, DNA fingerprinting, cheiloscopy, and handwriting.^{1,2}

Fingerprints are temporary or permanent impressions of the curved lines of skin at the end of a finger that is left on a surface.³ Each fingerprint has a unique characteristic, mark or pattern that enable us to identify one particular human.³⁻⁵ The study of fingerprints is called dermatoglyphics.³ Fingerprint patterns are genotypically determined; differentiated

in their definitive forms during the third (3rd) and fourth (4th) months of foetal life remain unchanged from birth till death.³ Some of the earliest works on the use of fingerprints for personal identification were carried out in India more than a century ago.³ With an ever-increasing population and limited resources, the incidence of various types of crimes in are increasing, yet available tools for crime detection seem not to be improving proportionately to combat the emerging challenges. In most instances, fingerprints and blood samples (either of the victim or accused) are the only evidence at a crime scene.⁶

Several researchers from India and abroad have tried to establish a relationship between the fingerprints pattern and an array of genotypic and phenotypic features in the hope that fingerprints can assist in the correct identification for medicolegal purposes.⁶ Gowda and Rao (1996) in their study on Gowda Saraswat Brahmin community of south Kannada district (Karnataka) reported a high frequency of loops with moderate whorls and low arches in the individuals

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of A, B and O blood group.⁷ Studies (Bharadwaja *et al.* 2004; Mehta and Mehta 2011, Kshirsagar *et al.* 2001, Prateek and Keerthi, 2010) have shown that the distribution of the primary fingerprint patterns is the same for the different ABO blood groups (A, B, AB and O): loop had the highest percentage, followed by whorl and the least was arch.⁸⁻¹¹ Studies have also reported a significant association between fingerprint patterns and blood groups (Bharadwaja *et al.* 2004; Mehta and Mehta 2011).^{8,9} Prateek and Keerthi (2010) reported that females have a higher frequency of loops and arches compared to males with a higher frequency of whorls.¹¹ In contrast, Odokuma *et al.* (2008) reported that there was no significant association between thumbprint patterns, and ABO blood groups and gender.¹²

In the light of above-mentioned evidence; the principal objectives of this study was to study whether or not there exists a significant association between fingerprint patterns, and gender and blood group? The aim of present study was to determine the fingerprint pattern for estimation of gender in Bhopal region of central India and its relation to ABO Blood Group distribution.

Material and Method

Study design: This was a cross-sectional study. **Study Setting:** The present study was conducted in the Gandhi Medical College, Bhopal, Madhya Pradesh. **Study duration:** The total duration of the study was eighteen months (March' 2016- October' 2017). The period of data collection was ten months (August' 2016- May' 2017). **Study participants:** An individual (both male and female) having all ten digits. **Inclusion criteria:** (i) Individual aged between 18 – 40 years (ii) those who gave informed consent for the study. **Exclusion criteria:** (i) Person with a history of hypersensitivity to endorsing ink. (ii) Individuals with a health condition(s) which effects fingerprint pattern. **Source of study participants:** This was an institute based study; all participants were recruited from the Gandhi Medical College itself. **Sampling technique:**

We employed purposive sampling method for recruiting study participants. **Sample Size:** We collected data from 300 individual: 150 men and 150 women. **Data collection:** There were three sources of data collected: first was the response from the individual during the interview, the second was the fingerprints collected using the recommended technique and third was the analysis of blood for ABO and Rh groups. **Outcome variable:** ABO and Rh blood group in relation to the fingerprint pattern. **Fingerprint collection:** The fingerprints were obtained from the participants by means of simple inking method as suggested by Cummins and Midlo.⁴ Fingerprints obtained from different digits were denoted as R I, R II, R III, R IV, R V and L I, L II, L III, L IV, L V for thumb, index, middle, ring and little finger respectively on the right and left sides.⁴ **Analysis of the fingerprint:** Digital prints were *classified* according to the Galton- Henry system.³ We carefully examined digital prints to identify the following patterns, using a hand lens (magnification 10×). **Blood group determination:** The blood group was determined as per the procedure recommended by World Health Organization (WHO) manual for “Standard Operating Procedure for Blood Transfusion”.¹³ **Data Analysis:** Descriptive analyses were conducted to study the distribution of dependent variables among study participants. P value < 0.05 was considered statistically significant. The sample was statistically analyzed using SPSS version 20.0. Appropriate statistical test(s) were applied for comparative data analysis. A P -value < 0.05 was considered as statistically significant.

Results

For the purpose of the data collection, we approached a total of 336 individuals; of which 15 participants refused to give consent for the study and 21 participants were excluded for different reasons. As can be seen from Table 1, the majority of the subjects, 118 (39.3%), in the study belonged to blood group B, followed by blood group ‘O’ 87 (29%), ‘A’ 72 (24%) and ‘AB’ 23 (7.7%).

Table 1: Gender wise distribution of Blood Group and Rh Factor (n=300)					
Blood Group	Rh Factor	Gender		Total (n=300)	%
		Female (n=150)	Male (n=150)		
	Negative	5	2	7	2.33
A	Positive	28	37	65	21.6
	Negative	2	2	4	1.33
AB	Positive	6	13	19	6.33
	Negative	4	2	6	2
B	Positive	54	58	112	37.3
	Negative	7	4	11	3.66
O	Positive	44	32	76	25.33

$\chi^2=6.14, df=13.5, P=0.21$

Table 2 depicts the pattern of fingerprints and the blood group of the study participants. We observed that frequency of whorl was highest in all the individual blood groups of ABO blood group system, followed by loop and arches except in O blood group, where loops were more commonly distributed among the subjects of different blood groups.

Table 2: Distribution of Fingerprint Pattern among ABO Blood Groups of Total Study Population						Total (n=1500)
Gender	Pattern	Blood Group				
		A	B	O	AB	
Male	Arch	12	48	9	2	71
	Ulnar Loop	148	259	172	45	624
	Radial Loop	17	11	9	0	37
	Whorl	213	282	170	103	768
Female	Arch	21	50	40	5	116
	Ulnar Loop	172	218	247	18	655
	Radial Loop	1	2	3	0	6
	Whorl	136	310	220	57	723

Cont... Table 2: Distribution of Fingerprint Pattern among ABO Blood Groups of Total Study Population

	Pattern	Rh Factor		Total (n=3000)
		+ve	-ve	
All participants	Arch	174 (6.3%)	13 (4.6%)	187
	Ulnar Loop	1157 (42.5%)	122 (43.57%)	1279
	Radial Loop	43 (1.5%)	0 (0%)	43
	Whorl	1346 (49.4%)	145 (51.7%)	1491

Discussion

We noted that majority of the subjects (39.3%) belonged to blood group B, followed by blood group O (29%), A (24%) and AB (7.7%) respectively. Maximum (90.70%) subjects in the study were Rh positive while remaining (9.3%) subjects were Rh-negative. Both female and male had higher percentage of blood group B (40% and 39% respectively), while male (26%) had higher percentage of blood group A than female (22%), and the female had higher percentage of Blood Group O (34%) than male (24%). While the percentage of blood group AB was higher among male (10%) than female (5%). In addition, both female and male had a higher percentage of Rh Positive cases (88% and 93.3%), while the Rh Negative cases female had a higher percentage than male (12% and 6.6% respectively).

Blood group A showed highest whorl 349 (48%), followed by ulnar loops 320 (44%) and arches 33 (4.5%) and radial loops 18(2.5%) were least common. In a related study, Prateek and Keerthi (2010) reported that frequency of loops as well as arches is greater in females as compared to a higher frequency of whorls in males.¹¹ Bharadwaja et al. observed that individuals with blood group A have more loops, while that of blood group AB had more of whorls.⁸ Similarly, Rastogi & Pillai (2007) noted blood group A had a higher frequency of Loops and blood group O had a higher frequency of whorls and arches were found to be high in blood group A.¹⁴

We observed that blood group B showed highest whorl 592 (50.1%), followed by ulnar loops 477 (40.4%), moderate arches 98 (8.3%), radial loops were least common 13 (1.1%). Blood group AB showed highest whorl 160 (69.5%) and ulnar loop 63 (27%),

however arches were least common 7(3%), and radial loops were absent at all. Blood group O showed *highest ulnar loops 419 (48%)*, moderate whorls 390 (44.8%) arches 49 (5.6%) and radial loops 12 (1.3%) were least common. Further, in blood group O, loops were significantly higher as compared to other patterns. In comparison Patil (2014) **noted** that majority shows the higher incidence of blood group O and lower incidence of blood group AB, they concluded that frequency of ulnar loops and combine whorls in males and females in different blood groups show a significant difference.¹⁵

In males blood group B frequency is highest among whorls 282 (47%), followed by ulnar loop 259 (43.2%), arch and radial loops are least, while in female blood group B frequency is highest among whorls 310 (53%), followed by ulnar loop 218 (37.5%), unlike male the blood group O is more common in ulnar loops than whorl. However, Ekanem A.U. (2014) of Nigeria, conducted a similar study involving 400 individuals (200 males and 200 females) and observed that the fingerprint pattern of loops had the highest frequency while arches were the least, Blood group O were mostly associated with the loop pattern while AB had the least frequency in all the fingerprint patterns.¹⁶ Manoranjitham observed that the incidence of Arches was high in group O (7.2%) and lowest in AB group(4.4%), whorls were more common in AB group (38.1%) and less frequent in blood group A, Ulnar loops were high in group A (58.9%) and low in group B(55.9%), Radial loops were almost equally seen in the order of A group (1.8%), B(1.7%), AB (1.4%) and (1.3%).¹⁷ The incidence of ulnar loops was higher in Rh positive (57.8%), Arches were more common in Rh negative and Whorls were equally seen in both Rh positive and negative blood groups. Whereas Mehta AA

observed whorls were highest in B blood group and the difference was significant with O blood group.⁹

In the present study, there was no significant association between gender and fingerprint pattern ($P > 0.05$). In a related study carried out by Odokuma *et al.* (2008) reported that there was no significant association between gender and thumbprint patterns.¹² Furthermore, Eboh DE also concluded that there was no significant association between gender and fingerprint, and the blood group and fingerprint.¹⁸

Conclusion

Based on our findings, we conclude that the prediction of the gender of a person is not possible on the basis of the person's fingerprint pattern. The prediction of ABO blood group of a person is not possible based on the person's fingerprint pattern. Nevertheless, the prediction of Rhesus and ABO-Rhesus blood group of a person is possible based on the fingerprint pattern of the individual. Therefore, gender, ABO blood group and fingerprints can only be used independently to identify an individual.

Ethical Clearance: The present study was approved in the year 2016 by ethical board on human research of the Gandhi Medical College, Bhopal.

Conflict of Interest: Authors declares that they have no conflicts of interest.

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Simple and Sensitive Technique for Fentanyl Quantification in Urine and Plasma by GC-MS

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Abstract

This work reports a sensitive and specific gas chromatography (GC) mass spectrometry (MS) method for the detection of subnanogram concentrations of fentanyl in plasma.

Objective- Fentanyl is a high-potency, rapid-onset synthetic opioid prescribed for the treatment of chronic pain and used as a surgical anesthetic. In the past decade its abuse and accidental overdose have steadily been on the rise.

Method- This study was planned to develop an analytical procedure for fentanyl detection in biological samples which will help in to distinguish between therapeutic drug use and abuse. For sample preparation Solid phase extraction coupled (SPE) was opted while quantification was done with Gas Chromatograph Mass Spectrometer (GC-MS). GC-MS is among the best known precise and effective techniques for biological samples analysis. Chromatographic separation was achieved on using DB-5MS column on a selected ion monitoring (SIM) mode.

Results-Signal to noise ratio was 3:1. The linearity lay between 0.62-40ng/ml correlation coefficient was ≥ 0.9899 and recovery was $\geq 80\%$. Limit of Detection was 0.6ng/ml and limit of quantification was 0.24ng/ml.

Conclusion- Current analytical procedure for fentanyl quantification had good specificity and sensitivity and showed good recovery. This method will be helpful for quantification of fentanyl in clinical and can be applied to forensic as well.

Keywords: Gas chromatography, Mass Spectrometry, Solid phase extraction

Introduction

Fentanyl, a potent analgesic drug, has traditionally been used intravenously in invasive or diagnostic operations. Formulations with fentanyl in oral transmucosal delivery system and in transdermal depot-patch have also been developed against breakthrough pain in cancer patients⁽¹⁾. This synthetic narcotic analgesic is of high potency with short duration of

action and it is more potent than morphine. Fentanyl has a high safety margin if taken in prescribed format. But Fentanyl can be abused and is subject to criminal diversion⁽²⁾. Mixing fentanyl with street-sold heroin or cocaine markedly amplifies potency and potential dangers. It produces significantly worse respiratory depression and non-medical use of fentanyl has resulted in numerous deaths^(3,4). Accidental overdose and abuse of anesthetic agents is a matter of concern. Cases of fentanyl over use have increased from 3 in 2000 to 12 in 2003 in United States⁽¹⁾. In India accidental overuse has claimed precious lives recently (The Hindu, 15 Feb2013). Propofol, midazolam, ketamines and fentanyl are commonly used for anesthesia⁽²⁾ among which fentanyl is a synthetic narcotic analgesic 80-100times

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more potent than morphine which make it potential for abuse⁽³⁾. Although, it is chemically unrelated to opiates, (4) it exhibits similar pharmacological & toxicological actions including analgesia, euphoria, respiratory depression and physiological dependence similar to opiates⁽⁵⁾. The therapeutic popularity has not been without problems. As a potent narcotic, fentanyl abuse is a known problem among health professionals. Recreational abuse is extremely dangerous⁽⁶⁾ and needs to be included in clinical and forensic toxicology investigation, which requires fast, precise and accurate measurements.

The Centers for Disease Control and Prevention (CDC) has released a report regarding the increase in the number of illicit drug overdose deaths, potentially due to the use of acetyl fentanyl⁽⁵⁾. Acetyl fentanyl is a fentanyl analog previously undocumented in illicit drug use and is not available as a prescription drug in the U.S. The CDC recommends to laboratories to exercise increased vigilance in the detection of this substance (immunoassay). Fentanyl is extensively metabolized, blood concentration of 1-3ng/ml is sufficient for analgesia and 4-10 ng/ml for anesthesia during surgery and only 0.4 -6% of the dose is excreted unchanged in urine^(6,7). This makes it difficult to analyze the drug in body fluids.

Existing literature contains little data concerning urine and plasma concentrations of fentanyl in terms of recreational use in our population. Although screening by immunoassay can detect its use over the prescribed cut off. Some Chromatography techniques along with Mass -Spectrometer are able to confirm the exact quantity. A highly sensitive and specific technique that can quantitate fentanyl up-to subnano levels is thus essential. Detection and quantification of fentanyl may prove beneficial for patient care, but it requires sensitive and specific analytical proof. Since therapeutic levels of fentanyl are as low as one ng/ml in plasma methods with high sensitivity are required for fentanyl determination.

GC-MS offers the best sensitivity among the currently available methods for determining fentanyl in biological fluids in the Single Ion Monitoring (SIM) mode of operation, which affords unparalleled specificity. Thus Gas chromatograph Mass Spectrometer (GC-MS) technique for quantification was selected. The objective was to develop a method for quantification of fentanyl in plasma and urine which can be used in our population

where recreational use of fentanyl is suspected. This work is the first step towards detection and quantification of anesthetics in the clinical and forensic situation and will help to distinguish therapeutic use and abuse.

Material and Method

Population- The study was carried out over a period from April 2016 to Dec 2017 attending Centre for Addiction (CAM) Out Patient Department of National Institute of Mental Health and Neurosciences, Bangalore, India. All subjected with suspected fentanyl use were selected for the study and their biological samples were collected with consent. All samples were labeled and stored in -80°C till analysis. Ethical approval was obtained.

Standards and Reagents- All chemicals used were of analytical grade. Bulk solvents and routine chemicals were obtained from Sisco Research Laboratories (Mumbai, India) and Merck & Co. Inc (Whitehouse Station, NJ, USA). Fentanyl standard were procured from Cerilliant Corporation, Round Rock, Texas. Initial fentanyl stock solution of 1000ng/ml was prepared in double distilled water and working concentrations were made from this. The standards were protected from light and stored in -20°C until analysis. For extraction of biological samples bond elute solid phase cartridges were purchased from (Agilent Technologies (USA)).

Sample Collection and Preparation: Small volume of 1-3 ml of biological sample (plasma, urine) were collected and kept 2-8° C immediately, later stored at -80° C till analysis. Urine samples were first screened with Abon screening cassettes. Samples positive by fast screening were further quantified, since for plasma samples screening device are unavailable so all samples were quantified using GC-MS.

For sample preparation 1-3 ml of biological sample was mixed with 100mM Phosphate buffer (pH-6.0) in 1:2 ratio, 100mM dibasic Sodium phosphate was added to adjust pH 6.0 ±0.5. Solid phase extraction was carried out using bond elute cartridges. Column was conditioned with Methanol, distilled water and 100mM Phosphate buffer (1:1:0.33). Sample was applied at the rate of one ml per minute followed by washing with distilled water, 0.1M Acetic acid and Methanol (1:0.33:1) v/v. After drying elute was collected in Dichloromethane/ Isopropyl alcohol/Ammonia (78:20:2) (pH 11-12). Evaporation was completed using Genevac EZ-2

series vacuum evaporators. Genvac low boiling point liquid programme ensures absolute and desiccated evaporation. These dry pure samples were reconstituted 50.0 μ L of ethyl acetate.

Instrumentation- For identification and quantification of extracted samples Agilent 7890A series GC interfaced with 5975C quadrapole MS (Agilent technologies, Santa Clara, CA) was applied. The quantification was performed in the selected-ion monitoring (SIM) mode using DB-5MS fused silica capillary column (122-5532G) carrier gas was helium at flow rate of 1ml/min. Data processing was done with HP chemstation software. Injection was made by Agilent 7693 auto sampler in split-less mode. The injection port temperature was maintained 270°C and ion source temp was 230°C the electron multiplier voltage was 70 ev. Chromatographic separation was achieved at an oven temperature of 140°C for 2 minute and injection port temperature of 280°C. The ramp was maintained at a temperature of 20°C/min to a final temperature of 290°C for 8 minute. Ions monitored were 245 being the primary ion, 189 secondary and 146 tertiary for fentanyl.

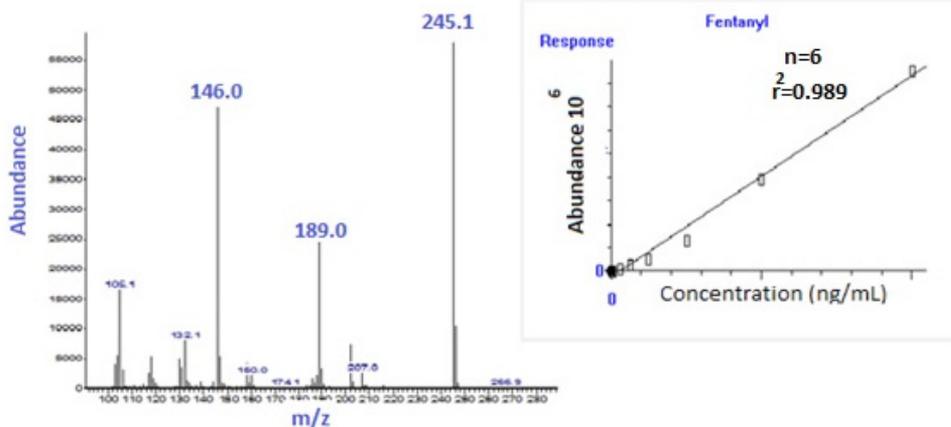


Fig.1 Mass Spectrum showing m/z along with Calibration curve for Fentanyl

Robustness- Robustness of the method was evaluated by introducing small changes in matrix, mobile phase and analyst. We report accuracy of 90% which is well within the range (80-120%).

Sample Stability- Since samples reconstitution was in ethyl acetate, we injected samples immediately

Results

Method Validation- Current analytical procedure is rapid, accurate and reproducible for simultaneous extraction and quantification of fentanyl cotinine in urine and plasma. Method was validated as per UNODC (United Nation Office of Drug and Crime) guidelines.

Linearity- Six point calibration curve from 0.62 to 40.0 ng/ml was constructed by plotting peak area versus concentration. Linear regression was ≥ 0.9899 . This method would be able to quantitate fentanyl up to sub-nano levels.

Sensitivity- The limit of detection (LOD) and limit of quantization (LOQ) were 0.06ng/ml and 0.24 ng/ml (with one ml sample) and signal to noise (S/N) ratio was 3:1.

Precision- Intra and inter day precision was observed within range (Table-1). Matrix effect in urine and plasma was investigated using six lots of blank matrix form individual donors was $\leq 10\%$ while test carry over was negligible.

Recovery- Mean recovery was around 85% in urine and 87% in plasma matrix.

to avoid solvent evaporation. Fentanyl in urine frozen at -80°C was found stable for 3 months while fentanyl in frozen plasma was stable for 6 months at -80°C .

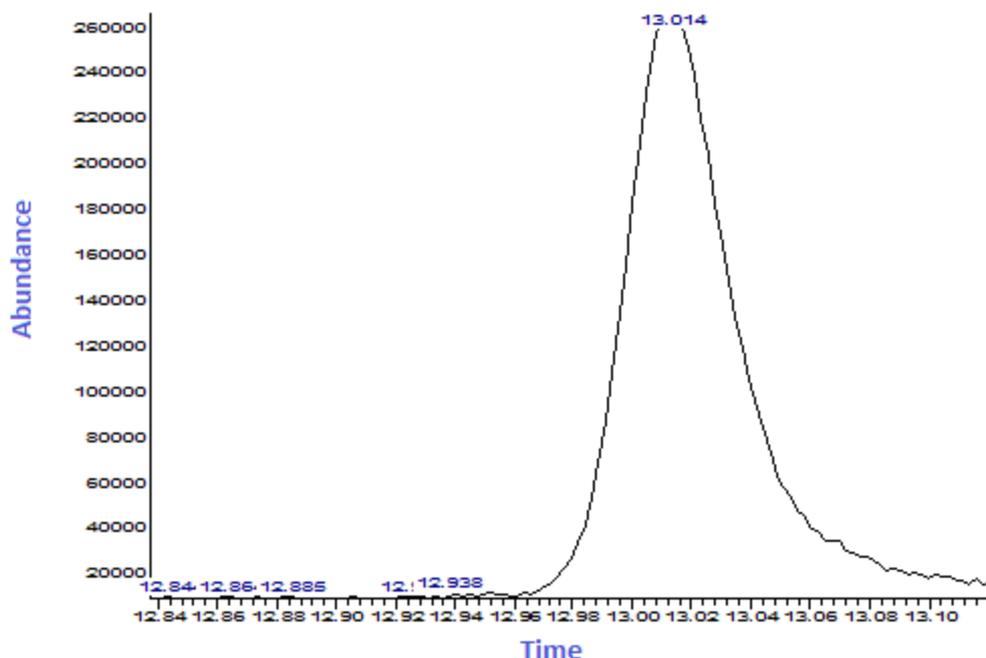


Fig.2 Chromatogram showing peak of Fentanyl

Table 1: Method validation parameters of Fentanyl standardization along with comparison other GC-MS technique.

Serum	Our Results	Ahmad (2008)	Alphonse (2004)	Strano-Rossi (2010)
Method	GC-MS	GC-MS	GC-MS	GC-MS
Linearity Confidence limit (ng/ml)	0.62-40	1-1500	0-933	0.5-50ng/ml
Linear Regression coefficient(r^2)	0.9899	0.99	NA	0.99
LOD (ng/mL)	0.06	3	3	0.08
LOQ (ng/mL)	0.24	4	3	0.5
Recovery (%)	>85%	70%	--	85%
Precision % Inter Day(1,5,40 ng/ml) Intra Day	5.22% 1.5%			9.88 5.7

Twenty four samples received were analyzed out of which 8 were of plasma while 16 were urine sample. Since for the screening of plasma samples cassettes are not available samples were quantified by GC-MS. Two samples were negative, while six had values ranged between 4.0 to 50.0ng/ml mean 10.6 ± 16.4 . For blood or plasma cutoff is 2.0 ng/ml (immunoassay) .Urine samples were first screened by spot testing cassettes

for which cutoff was 20.0ng/ml (Abon). Out of 16 urine sample nine were negative by cassette testing. Quantification by current analytical procedure matched the screening results. Negative samples had values between 0 -12 ng/ml. Nine on quantification using GC-MS there values lied between 0-12 ng/ml . Mean of 16 samples we analyzed was 25.36 ± 29.34 (Graph-1).

Discussion

Numerous analytical techniques designed for detection and quantification of fentanyl via, High performance Liquid Chromatography (HPLC), HPLC-MS & GC as well as GC-MS have been reported till date. GC-MS technique is a unique and full proof tool for identification and quantification purpose ⁽⁷⁾. Mass spectrometric detection provide electron ionization fragment of the molecules with mass to charge ratio, which determines the relative abundance of the ions by GC-MS without any doubt. For extraction of biological samples liquid as well as solid phase extraction techniques was applied. SPE has advantage over liquid-liquid extraction ⁽⁸⁾ as it is humble, rapid accurate with high degree of recovery ($\geq 85\%$) clear extracts were obtained. This simple, sensitive & specific method can be functional for extraction and quantification of many samples at a time.

Few methods have been published previously for extraction of fentanyl (4) in different biological matrices. However SPE was carried out using bond elute cartridges offered good recoveries (Table-1). Fentanyl was screened in full mass scanning (SCAN) mode and compound identification was done with in-built National Institute of Standards and Technology research library (NIST). Quantification was done in Single Ion Monitoring (SIM) using GC-MS, the retention time (13.01 min) was determined by standard solution and no interference from co-extracted compound was seen nearby (fig1, 2). To prepare calibration curve and analyzing samples GC-MS was operated in SIM mode to enhance the sensitivity and selectivity. Six point calibration curve from 0.62 to 40.0 ng/ml was constructed by plotting peak area versus concentration. Linear regression was ≥ 0.9899 . This method would be able to quantitate fentanyl up to sub-nano levels. The limit of detection and limit of quantification were 0.06ng/ml and 0.24 ng/ml with one ml sample and signal to noise (S/N) ratio was 3:1.

Furthermore, the current procedure was validated based on selectivity, linearity, accuracy, precision and recovery of the analytes (Table 1). Blank plasma samples were tested for endogenous interferences, and the anticipated fentanyl retention time regions were shown to be free from interference. The chromatographic conditions for the GC-MS method endow a well-defined separation of drug, without endogenous components.

Typical chromatograms and spectrum are shown in Fig. 1, 2. The linearity ranged from 0.62 to 40.0 ng/ml and coefficient of determination was (r^2) > 0.989 . Within run precision and extraction recovery at 0.5 ng/ml were found to be 84.8%. At the lowest calibration point 0.1ng/ml signal to noise ratio was 3:1. This technique would prove beneficial for quantification of fentanyl in clinical and forensic samples. Further larger scale studies should be undertaken to better understand the implication of testing fentanyl and its metabolites in clinical population.

The described GC-MS method has the advantage of using one calibration curve for both low and high concentrations of fentanyl. Furthermore, solid phase extraction procedure is quick and has high degree of recovery of the analytes. The validation results indicate that the method is sensitive, specific, and reliable for the quantitation of high number of blood samples. In conclusion, we have described a method, for the fentanyl quantification in urine and plasma. Fentanyl recovery in synthetic and real urine samples was comparable. Results obtained by current analytical procedure were in agreement with screening by spot testing cassettes. The method was validated, showing good within-day and between-day precision, excellent accuracy and reasonable limits of quantitation 0.24ng/ml. As well, the stability of fentanyl in synthetic urine was also demonstrated over 12 weeks.

In conclusion summary a simple, selective, accurate and precise method for the analysis of fentanyl has been developed and validated. This procedure has good sensitivity and specificity along with good extraction efficiency even with smaller volume.

Conflict of Interest: The authors had no conflict of interest to declare in relation to this article.

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Ethical Clearance- Ethical Clearance for was obtained from Institute Ethics committee

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An Autopsy based Study about Bisexual Variation for Determination of Age from the Fusion of Manubrium with the Body of Sternum in the Central India Indore Region (M.P.)

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Abstract

Skeleton remains or decomposed bodies are an important initial step in forensic investigation. Accurate determination of skeletal Age has been a critical issue in medico legal cases and the accuracy depends on the nature of material available and methods applied. Sternum is a bone which is easily retrievable even from the advance decomposed body and also from the bundle of bone so it become very important bone for age and sex determination in the advance stage of decomposition and from mutilated, fragmented bodies. In our study we have taken Total 770 subject in which 432 male and 338 female was taken between the age group of 10 to 70 years and data analysis was done by using SPSS software and relevant statistical test was applied. In our study bisexual variation in relation to fusion of manubrium with mesosternal was found inconclusive.

Keywords:- Anthropometry, Bisexual variation, Age estimation, manubrium Sterni fusion.

Introduction

Creation of an individual's biological profile is of extreme importance and depends on age, and sex. The cranial and pelvic bones, in addition to the long bones, are important in estimating age and identifying the sex of an individual. etc. Forensic experts are left with no choice but to depend on less sexually dimorphic elements of the human skeleton such as the sternum. Thus, studies focusing on sternum have provided important information to forensic experts.¹

Identity means the determination of individuality of a person based on certain physical characteristics i.e. exact fixation of personality. "Article 6 of the Universal Declaration of Human Rights" states that everyone has the right to recognition everywhere as a person before the law.²

Identification of dead body and proof of "corpus delicti" is essential and integral part of any criminal and civil justice delivery system throughout the world. The main part of corpus delicti (i.e. the body of the offence; the essence of crime) is the establishment of the identity of the dead body.^{3,4,5}

In present study all existing parameters are used for determination of age by study of sternum and data based has been developed for sternums of known age. In which parameters like a pattern of **fusion** is examined and recorded in relation to age. This data base of measurement and indices are statistically analyzed and conclusions were drawn.

This study is done in various region of India but is not done in central India Indore region. It is establish fact that study of anthropometry result, standards differs according to different races, and different region, and it is advised that one should not used the study data of one place to other, that is why this study is undertaken and sternum is selected for anthropometry to develop the standards which will be helpful to determination of age in central Indian population. Sternum is a bone which is easily retrievable even from the advance decomposed body and also from the bundle of bone so it become very

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important bone for age determination in the advance stage of decomposition and from mutilated, fragmented bodies.

Material and Method

This is an observational Cross sectional based analytical study done in mortuary of Department of Forensic Medicine and Toxicology M.G.M. Medical College Indore (M.P.). Study was carried out over a period of 12 month from July 2016 to June 2017. In this study for age estimation total 770 subjects out of which 432 male and 338 female of Age>10 year were taken. Sternum showing any pathology, fracture, gross

deformity or any missing part and body with unknown age will be excluded from the study.

As routine protocol for opening the thoracic cavity during autopsy, the sternum was removed from the body by sectioning the costal cartilages just beside the costo-chondral junction. The age of the deceased was obtained from the nearest relatives and police and verify by necessary documents. The age of the deceased was rounded off to full figures. For estimation of age the elements of each sternum i.e. body of sternum was examined for their degree of fusion:-(complete / partial /absent.)

Observation & Result

Table No. 1: Association of gender with fusion of manubrium to body

Age (year)	Gender	Fusion of manubrium to body				χ^2 value	P value
		Complete	Partial	Non-fusion	Total		
10-15	Female	0	0	6	6	-	-
	Male	0	0	8	8		
16-20	Female	4	0	36	40	0.829, df=1	0.363, NS
	Male	2	0	40	42		
21-25	Female	0	3	29	32	0.047, df=1	0.828, NS
	Male	0	4	46	50		
26-30	Female	4	0	32	36	2.047, df=2	0.359
	Male	10	2	46	58		
31-35	Female	6	0	29	35	1.524, df=2	0.466
	Male	14	2	48	64		
36-40	Female	16	0	14	30	14.331, df=1	0.000*
	Male	6	0	40	46		
41-45	Female	3	13	23	39	10.321, df=2	0.006*
	Male	4	2	34	40		

Cont... Table No. 1: Association of gender with fusion of manubrium to body

Age (year)	Gender	Fusion of manubrium to body				χ^2 value	P value
		Complete	Partial	Non-fusion	Total		
46-50	Female	7	18	5	30	5.745, df=2	0.057, NS
	Male	10	21	0	31		
51-55	Female	35	0	0	35	44.390, df=2	0.000*
	Male	6	4	20	30		
56-60	Female	0	0	35	35	14.903, df=1	0.000*
	Male	11	0	20	31		
>60	Female	20	0	0	20	14.444, df=2	0.0007*
	Male	16	2	14	32		

Pearson Chi-Square = 235.578, DF = 20, p value = 0.0000, Significant

The above table shows the association of gender with fusion of manubrium to the body of sternum in relation to various age groups.

Till the age of 10-15 year, there is non-fusion of manubrium to the body. In the age group 16-20, 21-25, 26-30(The fusion usually starts during this age), 31-35, 46-50, year year, There was statistically no significant association between fusion of manubrium to the body ($P>0.05$) showing that fusion of manubrium to body is independent on the gender.

In the age group 36-40, 41-45, 51-55, 56-60, >60year, There was statistically significant association between fusion of manubrium to the body ($P<0.05$), showing that fusion of manubrium to body is dependent on the gender.

The complete fusion of manubrium to the body is not complete even by the age of more than 60 year. There was statistically significant association seen between the age and the fusion of manubrium to the body ($P<0.05$), showing that the distribution in relation to fusion is dependent on the age.

TABLE NO. 2 showing mean age of fusion of manubrium to the mesosternum (B)

MANUBRIUM			
ONSET		COMPLETE	
M	F	M	F
44	41.34	47.70	50.82

The mean age of onset of fusion of manubrium (M) to mesosternum (B) is 44 and 41.34 year in male and female respectively while mean age of complete fusion in male is 47.70 year and in female 50.82 year.

Discussion

In present study Association of gender with fusion of manubrium to the body of sternum in relation to various age groups shows no significant association between fusion of manubrium to the body ($P>0.05$) in the age groups between < 15 year, 16-20 year, 21-25 year, 26-30 year, 31-35 year, 41-45 year and in 46-50 year. while positive correlation found, in the age group 36-40 year, 51-55 year, 56-60 year and in > 60 year. There is statistically significant association between fusion of manubrium to the body ($P<0.05$), showing that fusion of manubrium to body is dependent on the male and female shows that mean age of onset of fusion is 44

and 41.34 year in male and female respectively while mean age of complete fusion in male is 47.70 year and in female 50.82 year, but it shows there is no significant association of age with fusion of this segment ($P < 0.05$) but shows that fusion starts at the age of 16 – 20 yrs and found that maximum fusion observed in the age group of > 60 year. unlike present study **Kaneriya et al 2013**³ shows that in all the cases below the age of the 40 year did not show either complete or partial fusion of the manubrium and the body of the sternum. In cases above 40 year of age, and case has been recorded with complete fusion below 50 year of age. Above 55 year fusion is complete /partial in all. In the study of **Gautam et al in 2003**⁴ shows that fusion started at the age of 40 year and completed by 55 year of age and stated that fusion is depended on age but not on sex which is not consistent with our study. In the study done by **Jit and Bakshi**⁵ 1986 in Punjab, Haryana and Himachal populations shows that complete fusion of manubriosternal joint does not take place before 21 year of age and reported that non fusion was seen in 11.4% of males above 66 year and 37.5% of female above 40 year, **which partially consistent with present study, In the study of singh et al**⁶ in 2004 in Manipuri populations found that the earlier age at which fusion starts is 26 year in male and 31 year in female and according to him complete fusion of joint does not take place before 50 year in both the sexes and usually take place in very old age and shows fusion occurs earlier in male as compare to female. whereas in the study of **Wadhawan et al**⁷ in 2009 in Delhi population observed that mean age of onset of fusion of Manubrium with body was 42.6 ± 4.33 in male and 42.12 ± 3.27 in female and for complete fusion 65.81 ± 10.68 year in male and 58.36 ± 5 year in female shows that fusion in female occurs early as compare to male. In the study of **sobhan et al**⁸ in 2005 concluded that fusion of manubrium to body starts at the age of 28 year and completed by 60 year, but it is not reliable and erratic which consistent with present study. In the textbook of forensic medicine and toxicology by **Bardaley**⁹ in 2011 in his text book of forensic medicine and toxicology mentioned that, fusion take place at the age of 60 year. In the study of **Waghmare et al**¹⁰ in 2012 in Mumbai population stated that fusion of manubrium with body occurs at the age of >40 year but no opinion is possible from the incidence of no fusion, which also consistent with present study.

In the study of **chandrakanth et al**¹¹ in 2012

in south Indian population shows that manubriomesosternal junction observe to be vary variable with regards to fusion status as the J point remain unfused even at elderly age, based on the variability of fusion it can be concluded that sternum alone is not sufficient to estimate the age in south Indian population which consistent with present study.

Summary

Following summary was drawn based on present study:-

For Age:-

Fusion of Manubrium to body of sternum (mesosternum) :- Test of significance of **association of gender with fusion** was observed **highly significance ($P < 0.05$)** in the age group of 36-40, 41-45, 51-55 and above, rest age group was not significant ($P > 0.05$).

The mean age of onset of fusion of manubrium (M) to mesosternum (B) is 44 and 41.34 year in male and female respectively while mean age of complete fusion in male is 47.70 year and in female 50.82 year.

Conclusion

The pattern of fusion of manubrium to mesosternum is not very strong predictor for determination of age bisexually, so for calculation we have to follow other bone also for age determination.

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Conflict of Interest:- Nil

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Study of Blunt Fatal Injuries in Udaipur Region

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Abstract

This study has been undertaken to determine the pattern blunt injuries, socio-demographic profile of cases and to identify the risk of various body organs in cases reported at Udaipur region.

In this study, by virtue of the inclusion criteria for the cases, a significant number of victims suffered thoraco-abdominal injuries, though they may be only external injuries, with or without associated internal injuries or internal injuries with or without associated external injuries. Among these, not all injuries were fatal in nature.

In the thoracic region, injuries were seen in 80 cases either individually or in association with abdominal injuries. Out of these fatal thoracic injuries were seen in only 16% cases. Among non fatal thoracic injuries, majority of cases had external injuries to the chest wall. External thoracic injuries were seen in only 16% cases. Among non fatal thoracic injuries, majority of cases had external injuries to the chest wall. External thoracic injuries were seen in 72 cases. (In this study abrasions were the most common external thoracic injury in 69% cases; followed by contusions in 13% and lacerations in 07% cases.

Keywords: Trauma, abdomen, blunt, injuries, fatal

Introduction

Since prehistoric times, thoraco -abdominal cavity has been looked upon as one of the most vulnerable region of the body and injuries involving it have always been considered serious. Due to anatomical position and dimension, the thoraco -abdominal region is a major site of impact in any type of trauma.

Thoraco-abdominal injuries provide a major contribution to death because the bony thoracic cage contains vital organs of circulation and respiration and trauma to these organs challenges the integrity and viability of entire human body. Similarly, abdomen is the third commonest region of body that is injured in civilian trauma, as human abdomen is largely unprotected by bony structure²⁷. Injuries to abdomen are important as it contains numerous important vital

organs like liver, spleen, kidney, pancreas and hollow viscous like stomach, intestines and urinary bladder, and injuries to these organs are significant as individually or cumulatively sufficient for morbidity and mortality³.

It is frequently seen that subsequent to blunt force trauma to the thoracic wall may or may not show any injuries but abdominal walls usually escape gross injury by transmitting the force of violence to the more resistant organs inside the abdominal cavity which get injured without any visible external injury in the region⁷. Injuries are overlooked during three phases in patient management: these include (a) initial assessment, (b) diagnostic work-up (imaging, laboratory studies etc.), and (c) surgical exploration. Hence, there is always a possibility of fatal thoraco -abdominal injuries to go unnoticed and leading to their late detection and fatal outcome.

Thoraco-abdominal injuries are of particular interest in medico-legal cases for several reasons. The study of pattern of external and internal injury may all together helps in the determination of actual or probable anatomical site of primary impact which may be useful

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in reconstruction of the events. Thus, a careful study of total injury pattern is of vital importance in every case⁹. In the difficult scenario of assessing the manner of death, meticulous autopsy in combination with visit to the scene of occurrence and presence of any intervening object is of extreme help¹⁸.

This post-mortem study of pattern of thoraco-abdominal injuries, its type pattern and nature of external and internal injuries involved is an attempt to highlight the trends in the region regarding various modes of injuries for this region²¹. The risk stratification in the susceptible population and the study of nature of offending agent can help the authorities in propagating safety measures and better availability of health care.

This study will not only help us to broaden the horizon of the knowledge of clinicians for treatment of trauma victims and medico-legalists to deposit evidence in the court of law but also help us to devise strategies and policies to reduce mortality and morbidity from thoraco-abdominal injuries.

Material and Method

Place of study: Department of Forensic Medicine & Toxicology, R.N.T. Medical College, Udaipur.

Study Design: Hospital based Descriptive Observational Study

Study period: October 2016 to September 2017

Sample Size: At least 100 cases of traumatic deaths satisfying the inclusion and exclusion criteria from amongst the dead bodies received for postmortem examination at the mortuary of RNT Medical College, Udaipur, during the study period.

Study subject: Cases of traumatic deaths brought for medico-legal autopsy to the mortuary of RNT Medical College, Udaipur satisfying the mentioned inclusion and exclusion criteria.

Inclusion Criteria: 1. Treatment records suggestive of blunt thoraco- abdominal Trauma

2. Police inquest suggestive of blunt thoraco-abdominal Trauma

3. Post-mortem findings suggestive of blunt thoraco-abdominal Trauma

Exclusion Criteria

1. Cases of penetrating thoraco- abdominal injuries.
2. Any case of death due to non thoraco -abdominal trauma like burn, asphyxia.
3. Any case of non-traumatic cause as poisoning.

All cases having post-mortem findings of blunt thoraco -abdominal trauma with or without history will be included in the present study.

After the routine medico-legal formalities and inquest procedures, history will be elicited from the relatives and the investigating authorities to fill up all relevant details of the Performa and a meticulous post-mortem examination will be performed as per recommended procedures for each case. All relevant post-mortem findings will be recorded as per the proposed Performa.

Findings

Observations

Table 1: Showing sex wise distribution of 100 cases n=100

Sex	Number	%
Male	88	88
Female	12	12
Total	100	100

Amongst the 100 cases, 88 subjects were male and 12 were female, which is an obvious figure owing to preponderant active participation of males in socio-economic activities.

Table-2: Showing age group wise distribution of 100 cases n=100

Age group (Years)	Total no. of victims	%
0-9	2	2
10-19	4	4
20-29	33	33
30-39	23	23
40-49	18	18
50-59	13	13
>60	07	07
Total	100	100

Out of 100 fatal cases, 33 victims were in the age group of 20-29 years and 23 in 30-39 followed by 18 cases in 40-49 years age group and 13 between 50-59 years of age. A total of 87 cases of fatalities were from the productive age group of 20-59 years. Out of the remaining cases 06 subjects were of less than 20 years and 07 above 60 years of age. The lesser preponderance

of total traumatic fatalities 13 is obvious for these age group on account of their lesser mobility.

The fatalities included in the study population were 65 cases from rural region and 35 cases of urban region

Table-3: Showing distribution of 100 cases according to mode of injury and cause of death n= 100

Mode of injury	Cause of death					Total
	Shock and Haemorrhage	Coma	Septic shock	Traumatic asphyxia	Decapitation	
Road accidents	53	29	2	1	0	85
Fall from height	9	02	00	00	00	11
Train accident	2	00	00	00	00	02
Assault	1	00	00	00	00	01
Machine injury	1	00	00	00	00	01
Total	65	32	02	01	00	100

Maximum (65%) fatalities occurred as a result of haemorrhagic shock, 32% deaths resulted due to head injury. 01 cases where death occurred as a result of traumatic asphyxia and 02 cases septic shock.

Maximum three quarter of fatalities 85 were due to road accident followed by 11 subjects who succumbed of an episode of fall from height further followed by 02 casualties owing to train accidents and only 02 casualties occurred as a result of an episode of assault or machine injury.

Classifying the cases of road accidents according to the victim vehicle, there were 05 (5.88%) pedestrians, 49 (57.64%) two-wheelers and 31 (36.47) four-wheelers. Among the two wheeler riders 30 (35.29%) were riders and 19 (22.35) were pillion riders. Also, there were 26 light motor vehicles with 20 drivers and 06 occupants. There were 05 cases of heavy motor vehicle with all the victims being occupants.

Table 4: Showing distribution of 100 cases according to body region involved in trauma n=100

Body region	Number of cases	%
Thoracic injuries	12	12
Abdominal injuries	19	19
Thoraco-Abdominal injuries	68	68
Others	01	1
Total	100	100

Out of the total 100 cases, there were thoracic injuries in 12 cases, abdominal injuries in 19 cases and thoraco-abdominal injuries in 68 cases. 01 case were included in the study on the basis of the information in

the police requisition and treatment records; however on post mortem examination, there was no thoraco-abdominal injury in these cases. These 1% cases were of injuries to other body parts but were included in the study as they satisfied the inclusion and exclusion criteria.

Thoracic injuries were seen in 80 cases; out of which there were 72 cases of external injuries having 68 associated internal injuries. There were 08 cases of internal thoracic injuries without associated external injuries. In 68 cases of external as well as internal thoracic trauma, thoracic trauma remained uninvestigated.

Out of the cases of thoracic injuries, in 72 cases, there was visible external trauma; however, investigations for evaluation of that trauma were performed in only 09 cases. A highly significant number of cases with external thoracic injury remained unevaluated as regards to the type and severity of the injury and in 63 cases, out of the total 79 cases in which external injuries were present but investigation were not performed; the external injuries were associated with visceral thoracic injuries.

Table 5: Showing distribution of 72 cases of external thoracic injury according to type of injuries

n=72

Type of injury	Chest	
	No. of cases	%
Abrasion	50	69.44
Bruise	09	12.50
Laceration	05	6.94
Swelling / Deformity	08	11.11
Total	72	100

Out of the 72 cases with external thoracic injuries, in 50 cases the type of injury was abrasion, bruises in 09 cases, laceration in 05 cases and 08 cases with swelling &/ or deformity of the thoracic wall.

Out of 72 cases of thoracic injuries which showed external signs of trauma, there was fracture of thoracic cage bones in 68 cases and remaining 4 cases were non-bony involvement.

Table 6: Showing pattern of bony injury in 68 cases of fracture of thoracic cage n=68

Bone fractured in thoracic cage	No. of cases	%
Ribs	32	47.05
Sternum	08	11.76
Clavicle	12	17.64
Vertebrae	01	1.47
Sternum+ Clavicle	02	2.94
Sternum+ Ribs	04	5.89
Ribs+ Clavicle	05	7.35
Ribs+ Sternum+ Clavicle	04	5.89
Total	68	100

Out of 72 cases of thoracic injury, there was fracture of thoracic cage bones in 68 cases, with multiple type of bony involvement in 15 of the cases. The fracture of ribs was the commonest injury in the thoracic region and ribs remained the most common bone of thorax to be fractured followed by clavicle, sternum and thoracic vertebrae.

Out of the total 72 cases of thoracic injuries, there were associated fractures of the thoracic cage in 68 amongst which in 53 cases, only one type of bone was fractured and in rest of 15 cases, more than one type of bone were fractured.

Conclusions

This study revealed that out of the 100 fatal cases of thoraco-abdominal trauma, 16.0% cases had not succumbed as a result of thoraco-abdominal injuries. In these cases, the death had resulted as a consequence to head injury, pelvic injury and injuries to extremities. In rest of the 84% cases, the death had resulted following either thoracic or abdominal or both injuries. Amongst them in 19% cases death resulted from abdominal trauma in 12% cases there was fatal thoracic trauma and in 68% cases both thoraco-abdominal injuries were responsible for the mortality. The injuries in thoraco-abdominal region were thus of fatal and non fatal categories and

a total of 99 cases suffered fatal thoraco-abdominal trauma and rest had suffered non-fatal injuries to the thoraco-abdominal injuries.

From the present study we summarize that:

Majority of the victims were males (88%)

Youngsters in the age group of 20-29 years (33%) were most commonly involved age group. Majority of the victims were of the most productive and active phases of life ranging from 20-49 years (74%).

Majority of the victims had succumbed to accidental traumatic episodes. Road traffic accidents were the major cause of fatality due to blunt thoraco-abdominal trauma (85%).

Among vehicular accident victims, most common population was of two-wheeler rider (57.67%) followed by the four – wheeler (36.47%).

80% victims suffered thoracic injuries out of which fatal injuries were seen in only 16% cases. External injury was more common than internal injury in the thoracic region.

Fracture of thoracic cage was the most common thoracic injury (68%) with fractured ribs in 66% of these cases. Lungs were the most commonly involved organ in visceral injury.

Abdominal injury was found in 87% victims however external injuries were seen in 53% cases. Thus, internal injuries were more common in abdominal region and were also seen without associated external injuries.

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Trends and Outcomes of Acute Poisoning Cases in a Tertiary Care Teaching Hospital in Navi Mumbai

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Abstract

Background: Acute poisoning is a major health problem causing morbidity and mortality throughout the world. With the availability of a vast number of chemicals and drugs, acute poisoning is a common medical emergency in any country. Based on the disability-adjusted life years (DALYs), it is responsible for the loss of over 7.4 million years of healthy life.

Objectives: To study the patterns and outcomes of patients admitted to a Tertiary Care Teaching Hospital as acute poisoning cases.

Method: Retrospective study conducted at a Tertiary Care Hospital over a period of 3 years from Jan 2015-December 2017 wherein all acute poisoning cases admitted were included.

Results: The Incidence of Poisoning was higher in the Females (68.2%) as compared to males (40%). Age group 21-30 (45%) was commonly affected followed by age group 11-20 (35%). Higher cases of poisoning were reported in Hindu Patients (95.5%) with majority of the patients belonging to an Urban Area (95%) and 64.1% being married. Oral (90.9%) was the most preferred route of intake. The most frequent time of consumption was between mornings 6 am to 12pm and 12 pm to 6 pm (35%). Majority (61.4%) of poisoning cases were found to be due to corrosives with Phenyl being the commonly used substance.

Conclusion: Various socio-economic factors along with psychiatric morbidities can influence suicidal ideation in Youth Age group thereby making them a high risk group for such cases.

Keywords: Poisoning, Medical Emergency, Disability Adjusted Life Years.

Introduction

Poison is a substance that causes damage or injury to the body and endangers one's life due to its exposure by means of ingestion, inhalation, or contact¹. Acute poisoning is a global health problem causing morbidity and mortality throughout the world. With the availability of a vast number of chemicals and drugs, acute poisoning is a common medical emergency in

any country. The exact incidence of this problem in our country remains uncertain but it is estimated that about 10-15 million cases of poisoning are reported every year, of which, more than 50,000 die². A variety of factors could lead to cases of poisoning such as existing stressors, socio-economic status, cultural influences etc. According to the World Health Organization (WHO), it is the ninth leading cause of death in young adults (15–29 years old). Based on the disability-adjusted life years (DALYs), it is responsible for the loss of over 7.4 million years of healthy life. In 2004, an estimated 346,000 people globally died from unintentional poisoning. Disproportionately, 91% of these deaths were from low- and middle-income countries³. The type of poisoning cases varies in various countries as per the

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common chemical or drug used for the same. There has been a significant rise in the number of poisoning cases due to easy accessibility of chemicals and drugs, however not very much data is available on the same of patients admitted in emergency units of hospitals. In general, accidental poisoning is more common in children, whereas suicidal poisoning is more common in young adults.⁴ In a study done by Thomas M et al, an increasing trend of self-poisoning, especially among young adults was reported.⁵ In lieu of the same, this study was carried out with the objective to seek an insight into the patterns and outcomes of patients admitted to a tertiary care hospital as Acute Poisoning Cases.

Material and Method

This study was retrospective in nature, conducted at a Tertiary Care Teaching Hospital over a period of 3 years from Jan 2015- December 2017, wherein all acute poisoning cases admitted were included. The present study was conducted in compliance with all the ethical principles to be followed for medical research which involve human subjects. The demographic profile of patients, time of exposure to poison, history of psychiatry illness, duration of hospital stay, nature and class of poison, clinical features and treatment delivered to the patients, outcome and manner of poisoning were documented on a pre-structured proforma. A p value of <0.05 was taken as the essential criteria for statistical significance.

Results

A total of 148 patients were included in the study. There were 60 males and 88 females thus bearing a higher female ratio. Age group of participants was from 0- 60 and above. Mean Age of the participants was 3.8 with a standard deviation of 1.18.

Socio-Demographic Profile of study participants are listed in Table 1.

Table 1- Characteristics of Study Participants

SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS IN PERCENTAGE			
SEX			
	2015	2016	2017
Male	31.8	39.1	40
Female	68.2	60.9	60
AGE			
	2015	2016	2017
0 to 10	2.3	3.1	2.5
11 to 20	31.8	25	35
21 to 30	43.2	40.6	45
31 to 40	13.6	14.1	12.5
41 to 50	2.3	10.9	Nil
51 to 60	4.5	6.3	2.5
>60	2.3	Nil	2.5
RELIGION			
	2015	2016	2017
Hindu	95.5	79.7	82.5
Muslim	4.5	20.3	17.5
AREA			
	2015	2016	2017
Urban	86.4	87.5	95
Rural	13.6	12.5	5
MARITAL STATUS			
	2015	2016	2017
Single	40.9	35.9	50
Married	59.1	64.1	50

The age group 21-30 (63%) was most commonly affected with Phenyl being the common substance used.

Table 2 illustrates the common age groups affected with the nature of poison consumed by them. A significant association was found between Age and Poisoning Cases with P <0.05.

Table 2 – Age and Poison

AGE	Poison Name					Total
	Phenyl	HouseHold	Animal Bite	Drugs	Kerosene	
0-10	0	3	1	0	0	4
11-20	26	11	4	3	0	44
21-30	40	10	1	10	2	63
31-40	5	7	2	5	1	20
41-50	2	1	4	1	0	8
51-60	2	3	2	0	0	7
>60	0	1	1	0	0	2
Total	75	36	15	19	3	148

$\chi^2 = 50.78$, DF= 24, $P = 0.001$

Incidence of Poisoning was higher in the Females as compared to males thus showing a significant association with Gender. Table 3 illustrates the Gender Disparity and Poison Consumption with $P < 0.05$

Table 3 – Gender Distribution and Poison

Sex	Poison Name					Total
	Phenyl	HouseHold	Animal Bite	Drugs	Kerosene	
Male	24	14	12	5	0	55
Female	51	22	3	14	3	93
Total	75	36	15	19	3	148

$\chi^2 = 15.42$, DF=4, $P = 0.004$

Among admitted patients a majority of admitted patients were married. However, this was not statistically significant as $P > 0.05$.

Table 4 shows the relation between Marital Status and Admitted Cases.

Table 4 – Marital Status and Poisoning

Marital Status	Poison Name					Total
	Phenyl	HouseHold	Animal Bite	Drugs	Kerosene	
SINGLE	36	16	5	4	0	61
MARRIED	39	20	10	15	3	87
Total	75	36	15	19	3	148

$\chi^2 = 7.256$, DF= 4, $P = 0.123$

The most frequent time of consumption was between mornings 6 am – 12pm and 12pm - 6 pm (35%)

Oral (90.9%) was the most commonly opted route of administration of poison.

The maximum Time Lapse between consumption of Poison and Admission of the patient was between 2-12 hours. Majority patients were admitted for a period of 2 days (79.7%) across the years.

A major amount of patients admitted did have a history of previous poisoning incidence. Table 5 shows the history of previous incidence of poisoning in

admitted patients with $P < 0.05$, signifying that previous history of suicidal attempt was a potential risk for further such incidents.

Table 5: Past History of Suicidal Attempt

Past History / Incidence	Poison Name					Total
	Phenyl	House Hold	Animal Bite	Drugs	Kerosene	
Yes	37	19	15	10	3	84
No	38	17	0	9	0	64
Total	75	36	15	19	3	148

$\chi^2 = 15.762$, $DF = 4$, $P = 0.003$

Poor mental health and psychiatric illness can play a major role in suicide ideation in patients. A significant amount of patients admitted did have a previous history of psychiatric disorders such as Major Depressive Disorder. Table 6 shows the trend in the existing psychiatric co-morbidities present among patients admitted in percentage. Furthermore, Table 7 correlates the Manner of poisoning – whether accidental or suicidal, with the latter being highly prominent.

Table 6 – Previous History of Psychiatric Illness

HISTORY OF PSYCHIATRIC ILLNESS			
	2015	2016	2017
Yes	47.7	50	55
No	52.3	50	45

Table 7 – Manner of Poisoning

MANNER OF POISONING			
	2015	2016	2017
Accidental	36.4	43.8	25
Suicidal	61.4	56.2	75
Homicidal	0	0	0
Not known	2.2	0	0

Majority admitted patients suffered from a variety of complications with Gastro-Intestinal complications (47%) being the highest followed by Neurological Complications (35.6%) across the years. Intubation was performed on Majority of patients admitted across the years (78%) to promote survival rate whereas Gastric Lavage (31.2%) was done in only a minor fraction of patients across the years.

Table 8 shows the final outcomes of admitted patients across the years with P<0.05.

Table 8 – Final Outcomes

Final Outcomes Phenyl	Poison name					Total
	Household	Animal Bite	Drugs	Kerosene		
Survived	74	27	13	15	3	132
Complications	1	9	1	2	Nil	13
Morbidity	Nil	Nil	1	1	Nil	2
Mortality	Nil	Nil	Nil	1	Nil	1
Total	75	36	15	19	3	148

$\chi^2 = 31.382, DF=12, P = 0.002$

Discussion

The Incidence of Poisoning was higher in the Females (68.2 %) as compared to males (40%). Similarly, Banarjee G et al found that women (79.3%) outnumbered men in the number of suicide cases seen.⁶ Various pre- disposing factors such as domestic abuse, quarrels, poor status of women in families and long term dependence on the spouse for income could lead to a higher prevalence of depression and suicide in females. Likewise, Nandi et al reported a higher suicide rate in women in West Bengal over the last one hundred years and remarked that the state of absolute dependence of women on men resulted in abject humiliation of the ego of women.⁷ In contrast; Gunnar DG eal. showed that 65.65% of poisoning cases were male.⁸ The difference could be attributed to a variation in individual social settings. The age group 21-30 (45%) was commonly affected followed by age group 11-20 (35%). Similar results were seen in a study done by Subash Vijaya Kumar et al where majority of poison cases were between 21 - 30 years of age.⁹ Factors such as academic stress, poor financial resources, relationship stress could be few of the reasons which could lead to a higher trend of suicide in this age group. Higher cases of poisoning were reported in Hindu Patients (95.5%) with majority of the patients belonging to an Urban Area (95%). Similar results were show by Abhishek Gupta et al where Hindus were majority (56.5%) among poisoning cases admitted to a tertiary care hospital and most belonged to Urban Areas (60.5 %).¹⁰ Another reason for a high prevalence

of Hindu patients is that Navi Mumbai has majority Hindus (80.39%) residing among a footfall population of 1,120,547.¹¹ While the exact influence of religion on suicide ideation is not known, variety of reasons have led to an increased trend of Urban Youth attempting self-harm by consuming poison and other drugs. Job stress, financial crisis, poor social life and emotional disturbances are few of the reasons leading to the same. Rajiv Radhakrishnan et al showed that the suicide rate is generally reported to be higher in urban areas because of a variety of stressors related to living and working in cities, including overcrowding and social isolation.¹¹

We found where that majority (64.1%) of admitted patients were married. Similar results were shown by M ShoaibZaheer et al where majority (67.3%) of poisoning patients was married.¹² However, statistically we could not derive a significant association for the same. Constant fights leading to marital discord could be one of the reasons for married people more likely to have suicidal thoughts. In contrast, Kposowa AJ found that divorced and separated persons were over twice as likely to commit suicide as married persons and being single or widowed had no significant effect on suicide risk.¹³ Oral was the most preferred route of intake. Similar results were found in a study done by SandeshDatir et al where in Oral route of poisoning was observed in maximum cases (64.81%).¹⁴ The most frequent time of consumption was between mornings 6 am – 12pm and 12pm –6 pm (35%) Similar results were shown by Shreemanta Kumar Dash et al with 55.9% cases reported

during 6am- 6pm and 42.5 % between 6pm-6am.¹⁵ The reasons for this timing could be lesser chance of family members and spouse being at home at this time due to work. Majority (92.2%) did have a previous history of poisoning, with a significant association of previous history of suicide attempt and currently admitted cases. This proved that previous history of suicide is a pre-disposing factor for repeated cases. Likewise, Beghi M et al showed the presence of a previous suicide attempt increases the risk for repeated suicide attempt.¹⁶ 55% suffered from existing psychiatric morbidities such as Major Depressive Disorder which could have acted as a pre- disposing factor towards suicidal tendencies. Similarly, in a study done KN Ramesha et al majority of the suicidal cases were associated with reactive depression.¹⁷ Majority (61.4%) were cases of suicidal poisoning followed by accidental (43.8%). Likewise, Singh S et al revealed that intention was suicide in 72% cases, followed by accidental (25%).¹⁸ Majority (61.4%) of poisoning cases in our study were found to be due to corrosives with Phenyl being the commonly used substance. Similarly, Zariwala RC et al observed maximum cases with acid-corrosives.¹⁹ In contrast, Sinha US et al observed maximum cases reported due Aluminum phosphide as Aluminum phosphide is widely used as grain preservative and fumigant in the North India.²⁰ The difference could be attributed due to the availability of different substances in that particular area.

Conclusion

Acute Poisoning is common in the age group 21-30 years with incidence being higher in females. Early Care in a Tertiary care hospital with, multi-centric approach can definitely help in increasing the survival rate and thereby contribute towards reducing mortality among admitted patients.

Limitations: Since this was a Hospital Based Retrospective Study, there was a limitation of sample size.

We were not able to deduce the mortality in terms of time lapse and final outcome since some patients had to be discharged against medical advice on the behest of relatives.

Recommendations:

Acute Poisoning is a major Public Health Issue.

Individuals from low socio-economic strata, especially youth are highly prone to consume poisonous substances due to a variety of social stressors and long term depression. It is thus highly recommended that counselling sessions and psychiatric drug treatment be given to these individuals to reduce the burden of reactive depression and other mental illness which could serve as a pre-disposing factor for suicidal poisoning cases. Family therapy, Cognitive Behaviour Therapy can help these individuals cope better with existing stressors and adapt to the situation. In the long run, this not only will reduce the number of suicide cases but also promote a better Quality of Life among these individuals.

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Estimation of Financial Burden to Victims of Ocular Injuries Presenting to a Tertiary Care Hospital in Coastal Karnataka

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Abstract

The aim of the study is to measure the financial burden incurred by patients of ocular injuries visiting a tertiary care teaching hospital. Methods: The study was a prospective questionnaire based telephonic interview with 262 patients who were treated at the Department of ophthalmology at a tertiary care teaching hospital in South India, for ocular injuries; over the past 5 years between Jan 2012 and Dec 2016. Each patient in Udupi district was interviewed in person. For patients who were based outside Udupi, a letter containing the study details, the basic information questionnaire and an informed consent form was sent via post along with a prepaid reply envelope. 163 patients were excluded and a final sample size of 99 was achieved. The results of the study showed that patients in the age group of 28-37 years formed the major group affected by ocular injuries. Males were affected more than females. The most common pattern of ocular injuries was other injuries of eye and orbit followed by ocular laceration and rupture with prolapse or loss of intraocular tissue. In the current study, the right eye was injured 44% of the time, the left eye 43% of the time and both eyes 13% of the time. A majority of the patients were not able to return to the same job due to the severity of the injuries sustained by them. Around 57% of patients of ocular injury are earning, 6% are not earning and the remaining 37% are dependent on their family.

Keywords: Ocular injury, Eye injury, Financial burden, Medical expenses, Open globe injury, Closed globe injury.

Introduction

Eyes constitute only 0.1% of the total body surface area.⁽¹⁾ Ocular trauma, which was once a “neglected disorder,” has been highlighted recently as a cause of visual morbidity.⁽¹⁾ The frequency of eye injuries in the first three decades of life is remarkably high and often results in physical and psychological trauma and

associated financial burden to the injured patient for the rest of their life. It is therefore important to understand the causes of ocular trauma and their management and prevention.^(2,3) Ocular trauma care in developing countries leaves much to be desired. There is a general lack of access to preventive health care at all levels.^(5,6) The male to female ratio of ocular injury victims is around 4:1 worldwide with Open globe injury being the commonest form of injury. A significant number of studies on ocular injuries have been conducted in the US as well as in other developed countries but the pattern of ocular injuries in developing countries is not known due to a lack of data.⁽⁵⁾ The annual incidence rate of

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hospitalization for eye injuries per lakh population/year is 5–16% worldwide. Blindness resulting from ocular trauma has prevalence rates of 0.6%–0.8%.⁽²⁾

A study in the urban slums in Delhi reported a 2.4% prevalence rate for ocular trauma resulting in blindness in 11% of injured eyes.⁽⁴⁾ Andhra Pradesh and Tamil Nadu have found prevalence rates of 2% to 10% for ocular trauma.⁽²⁾ Annually, over 2.5 million Americans suffer an eye injury, and globally more than half a million blinding injuries occur every year. The prevalence of ocular trauma in India was reported at 2.4%.⁽³⁾ Worldwide, there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss.⁽¹⁾ The forty-seventh round of NSSO, 1991 noted a high prevalence of injury-related visual disability (35/1000 in rural and 32/1000 in urban areas). According to the 58th round of NSSO report, 2002, injury-related visual disability increased to 51/1000 population.⁽⁴⁾

Loss of vision in one or both eyes is so significant that it has been classified as 24% of whole person impairment and 85% of whole-person disability, respectively.⁽⁷⁾ Worldwide eye injuries are responsible for about 1.6 million people being blind and a further 19 million suffering from monocular blindness.⁽⁸⁾ Even though the socioeconomic burden of ocular injuries are overestimated, the patients affected are usually afflicted with life style changes, a lack of job opportunities and often permanent physical problems.⁽⁹⁾

Considering the importance of ocular trauma and its effect on eye health and public health,⁽¹⁰⁾ prevention of ocular injuries must form the basis of management for which collection of data is a must. Seeing the seriousness and enormity of ocular injuries, this study is undertaken to assess the financial burden associated with ocular injuries and suggest recommendations which can help prevent ocular trauma.

Methodology

The study was a prospective questionnaire based telephonic interview which included 262 patients (213 men and 49 women). These were the patients who were treated at the Department of Ophthalmology, Kasturba hospital, Manipal, for ocular injuries over the past 5 years between Jan 2012 and Dec 2016. The contact details of these patients were accessed from their case files in the Medical Records Department (MRD) and

details of their medical expenditure were accessed with prior permission from the Finance Department of the hospital. Each patient in Udupi district was interviewed in person. Informed consent was taken and then questions like income before and after injury, recovery period and source of financing were asked.

For patients based outside Udupi, a letter containing the study details, basic information questionnaire (not involving questions related to their injuries), the informed consent form and a prepaid reply envelope were sent via post. Patients who replied back and patients who agreed for a telephonic interview were contacted for additional information. Out of all the cases of ocular injuries a final sample size of 99 was achieved. A total of 163 were excluded (patients who did not consent to participate in the study, patients who did not reply back)

Outcomes measured

- The following outcomes were measured: -
- Incomes before and after the eye injury
- Recovery time
- Income during the recovery period
- Return to the same job or not
- Income lost per month
- Percentage change in income.
- Medical expenditure
- Treatment expenditure borne by
- Average out of pocket medical expenses

Data analysis and observations

The objective was to assess the financial costs of ocular injuries to the patients presenting to the tertiary care teaching hospital.

Out of the sample of 262 patients, 99 patients were considered for this study.

- A comparison of incomes before and after the ocular injury was done using a paired t-test, in which the p value <0.001 showed that there was a significant difference in incomes before and after the ocular injury.

- The median of the income before and income after the ocular injury was calculated separately for each injury.
- The recovery time from ocular injury among patients was calculated and presented in the form of a percentage.
- Income in the recovery period was calculated i.e. how many had some income source and how many did not have any source of income in the recovery period. It is presented in the form of frequencies and percentages.
- The percentage of patients who were able to return to the same occupation post recovery and those who were not able to return to the same occupation was calculated.
- The frequency and percentage of victims who had income post recovery and those who didn't have any income post recovery was calculated.
- The percentage change in the income post recovery was calculated which was categorized as no change in income, decrease between 50% to 100%, decrease up to 50% and increase in income post recovery.
- Cross tabulation for each type of injury was done which presented the relation between pattern of ocular injuries and return to same occupation. 9 patterns of ocular injuries were identified.
- Medical expenses i.e. the total cost incurred to the patient during the course of treatment along with source of financing of the medical expenses was calculated, and represented in the form of percentages.
- Income lost per month by the victims was also calculated.

Results

Gender

It was observed in almost all the articles referred that males were affected more than females. This study also reported a similar pattern. Out of 99 patients, 73 males and 26 females had ocular injuries.

Income before injury:

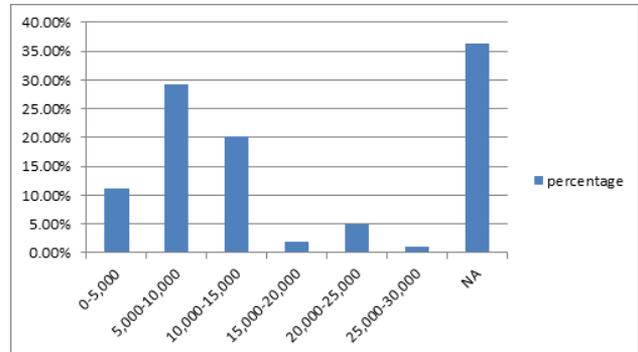


Fig 1. Income before injury

The participants had an income of about 9500 rupees before injury.

Income after injury:

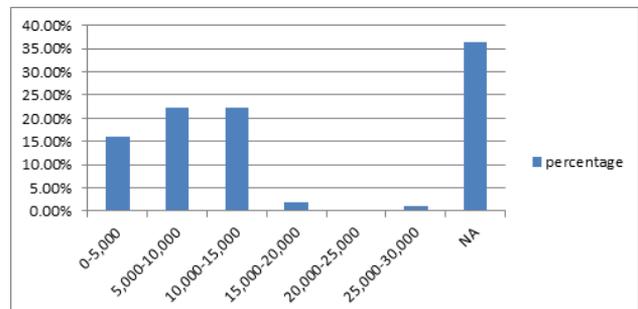


Fig 2. Income after injury

The participants had an income of about 8000 rupees after injury.

Recovery time (days)

About 28% of victims healed between 11- 20 days of the injury, 25% of victims took 21-30 days to heal, 19% of victims healed within 10 days, 12% took more than 60 days to recover, 8% took 31-40 days and 7% took 41-50 days.

Income in the recovery period

Some of the victims of ocular injury had some sort of a source of income in the recovery period: mostly paid by the employer or their own business or rental income. Many of them did not have any source of income during the recovery period. During the recovery period, 18 patients had an income while 45 patients had no income. 36 were not considered as they were students, housewives, or patients who were dependent on their family.

Return to the same occupation

Even though a majority of patients were able to continue with the same occupation, there were a considerable number of patients who had to either change their occupation or who had a significant fall in their income or were not working at all. Out of 99 patients, 52(48%) were able to return to the same occupation. 10(18%) were not able to return to the same occupation. 36(36%) were not considered as they were students, housewives, or patients who were dependent on their family.

Income post recovery

About 56(57%) of victims had an income post recovery. 6(6%) did not have a source of income post recovery. 36(36%) were not considered as they were students, housewives, or patients who were dependent on their family.

Percentage change in income post recovery

Among 99 victims of ocular injury, 49(50%) of victims had no change in their income post recovery. 12

victims out of 99 (12%) saw a fall in income. 2 victims out of 99(2%) had an increase in income. 36(36%) were not considered as they were students, housewives or patients who were dependent on their family.

Table 1. Showing patients with percentage change in income post recovery

Percentage change in income post recovery	Frequency	Percentage
No change	49	49.50%
Decrease in income	12	12.12%
Increase in income	2	2.02%
NA	36	36.36%
Total	99	100%

Pattern of ocular injuries vs return to the same job

Following is the cross tabulation of ocular injuries and return to the same job

Table 2. Relation between pattern of ocular injuries and return to the same job.

Code	Pattern	Return to same job			Total
		NA%	No%	Yes%	%
S05.0	Injury of conjunctiva and corneal abrasion with mention of foreign body	2.2(1)	0(0)	7.7(4)	51.(5)
S05.1	Contusion of eye ball and orbital tissues	27(10)	40(4)	9.6(5)	19.2(19)
S05.2	Ocular laceration and rupture with prolapse or loss of intraocular tissue	21.6(8)	20(2)	23(12)	22.2(22)
S05.3	Ocular laceration without prolapse or loss of intraocular tissue	13.5(5)	0(0)	9.6(5)	10.1(10)
S05.4	Penetrating wound of orbit with or without foreign body	2.7(1)	0(0)	3.8(2)	3(3)
S05.5	Penetrating wound of eye ball with foreign body	0(0)	0(0)	9.6(5)	5.1(5)
S05.6	Penetrating wound of eye ball without foreign body	0(0)	10(1)	3.8(2)	3(3)
S05.8	Other injuries of eye and orbit	32.4(12)	20(2)	21.2(11)	25.3(25)
S05.9	Injury of eye and orbit , part unspecified	0(0)	10(1)	11.5(6)	7.1(7)
	Total	100(37)	100(10)	100(52)	100(99)

Medical expenses

It was seen that medical expenditure for machine-cut ocular injuries ranged from 1065 rupees to 3,13,336 rupees. The majority of the patients spent between 10,000- 20,000 rupees on the treatment(41%). For 33% of patients, the expenditure on the treatment was less than 10,000 rupees. For 9% of patients, the expenses lay between 20,000-30,000 rupees. About 9% of victims had to spend between 30,000-40,000 rupees on the treatment. About 4% of the victims spent more than 50,000 rupees on treatment. 3% of victims spent between 40,000-50,000 rupees on treatment

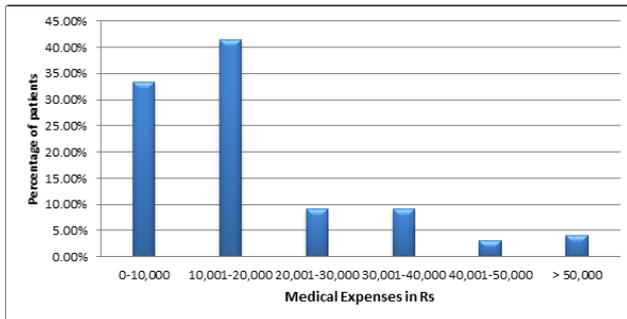


Fig 3. Expenditure on treatment of ocular injuries

Types of expenditure

Almost half (65%) of the patients paid the expenses out of their pocket (self, family, self + family). This was about 11,480 rupees.

Expenses of 21% of the victims were covered under insurance.

For 28% of the victims, their families paid the medical expenses.

For 33% of the victims, medical expenses were paid by a combination of self, family, insurance and employer.

Table 3. Frequencies of type of expenditure

Type of expenditure	Frequency	Percentage
Self	18	18.18%
Family	28	28.28%
Insurance	21	21.22%
More than 1 option	32	32.32%
Total	99	100%

Discussion

The present study showed that patients in the age group of 28-37 years formed the major group affected by ocular injuries and males were affected more than females. The most common pattern of ocular injuries was other injuries of eye and orbit followed by Ocular laceration and rupture with prolapse or loss of intraocular tissue. In the current study, the right eye was injured 44% of the time, the left eye 43% of the time and both eyes 13% of the time.

In the present study, the majority of ocular injury patients got healed between 11 to 20 days followed by patients who got healed between 21 to 30 days. About 48% of ocular injury patients were able to return to the same occupation; 18% were unable to return to the same occupation. This study has calculated the medical or in-hospitalization expenses only for ocular injuries. The majority of patients spent between 10,000 and 20,000 rupees on the treatment. The majority of the medical expenses were paid out of pocket.

In the present study, the median of income before ocular injury was calculated to be 9,500 rupees and the median of income after ocular injury was calculated to be 8,000 rupees. There was a significant fall in the income of patients. 49% of patients were earning the same income post recovery that they were earning before the occurrence of the ocular injury; about 12% of patients had a fall in income. It is clear that ocular injury is a burden on society. That the majority of patients were not able to return to the same job shows that the severity of those injuries had restricted them from continuing in the same job.

Conclusion

We conducted the study to estimate the average financial burden of ocular injuries on the affected individuals. However, the study results reflected a particular pattern of age and gender distribution of ocular injuries among the affected individuals also. The study reported that the young male adults constituted the larger group of people who were affected by ocular injuries. The frequency analysis revealed that there is no such significant difference in proportion of left and right eye injuries where as proportion of both eye injuries was lesser than that of the single eye injuries. Minimum healing time from ocular injuries was reported to be 11 days and average out of pocket expenditure for ocular

injuries as reported by study participants was around 11,500 Rs. Wage loss during this minimum duration of healing time which is around two weeks creates an additional financial burden over and above the out of pocket expenditure. Also, among the study participants there was a down fall of income reported after the ocular injuries get healed. All these factors together indicate that ocular injuries can be cause of considerable financial burden among the affected individuals.

However, financial protection mechanisms in terms of health insurance were insufficient as it was only availed by one fifth of the study participants. Eyes are indispensable to human activity. Policies to use personal protective equipment to prevent ocular injuries should be made and implemented in all areas of human work, primarily among blue collar workers and in the informal and unorganized sector. Financial protection mechanisms may be leveraged for protecting people from the financial burden from ocular injuries. This study results warrant for a larger study among the people especially among people working in the occupations which involves risk of ocular injuries as an occupational hazard.

Ethical Clearance- Taken from Institutional ethics committee

Source of Funding- Self

Conflict of Interest - Nil

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Factors Contributing to Workplace Violence Against Doctors in a Tertiary Care Teaching Hospital in South India

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Abstract

Introduction: The objective was to study the factors contributing to workplace violence against doctors in a tertiary care teaching hospital. **Method:** A cross-sectional study was conducted after obtaining institutional ethical clearance and requisite permissions from the authorities of the tertiary care hospital. Information was obtained using a validated semi-structured questionnaire from doctors having at least 1 year of experience in the hospital after obtaining informed written consent. To assess the prevalence of violence against doctors in the current settings, the data obtained was analyzed using SPSS software. To assess the contributing factors, the selected variables were correlated to find those factors associated to workplace violence against doctors in this setting. Along with these, knowledge and awareness among doctors regarding reporting procedures and local policies was also assessed to identify reasons for underreporting of violence in the tertiary healthcare setting. **Results:** A total of 263 doctors were included in the study out of a sample size of 296. The prevalence of violence was found to be 35.7%. The most common type of violence among those who experienced violence in the last 12 months was verbal abuse (86.2%) followed by mobbing or bullying (7.4%) and physical violence (5.3%). The most common contributing factors that showed statistically significant values for association with violence were Miscommunication 86.2% (P= 0.01), Prolonged waiting time 70.2% (P= 0.09), Death of the patient 31.9% (P= 0.00), Billing issues 28.7% (P= 0.46) and others 19.1% (P=0.01).

Keywords: Workplace violence, Tertiary care, Doctors, Health care workers, Healthcare settings.

Introduction

The Occupational Safety and Health Administration (OSHA) defines workplace violence as “any act or threat of physical violence, harassment, intimidation or other threatening disruptive behaviour that occurs at the work site. It ranges from threats and verbal abuse to physical assaults and even homicide.”¹ WHO studies

reveal that all over the world healthcare workers suffers physical violence at some point in their careers (8% to 38%). A country case study undertaken by the WHO and several partner agencies reported that more than half of responding healthcare personnel had experienced at least one incident of physical or psychological violence in the previous year.²

According to a study by the Indian Medical Association, more than 75% of doctors have seen violence at the workplace. National newspapers constantly report doctors being abused, bullied, manhandled and even killed by the patient's relatives. Trust in the doctor-patient relationship has taken a beating over the last few decades. Over time with medical care commercialization, some physicians were accused of being driven by greed and of adopting

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unethical practices. The ever hungry media rapidly jumped to conclusions and published sensational stories of organ theft, medical negligence and malpractice. Underreporting is an “iceberg problem.” One study revealed that only 44.2% of doctors reported the event to authorities. Under reporting represents a major hurdle to tackling the problem. Another study says that only 26% of physicians and 30% of nurses report because of the professional culture in healthcare, which often considers violence as a “part of the job”. Anger, frustration, irritability were the most common symptoms experienced by the doctors who were subjected to violence at the workplace.³

Workplace violence occurs in every industry and field; however it is most prevalent in the healthcare environment. Healthcare workers face many obstacles with regards to violence. They are tasked with dealing with difficult patients, who are often at their lowest point. Healthcare staff must be able to identify escalating behaviours and know the proper interventions to prevent or lessen the impact of potential violent behaviours. The first step in this process is learning what to look for and how it impacts the working and home lives of the healthcare workers. Violence in healthcare is broad; it can be attributed to patients, visitors and staff. Staff will need to have to be educated on how violence occurs, how to prevent it and how to cope with violence when it does occur.⁴

It has been estimated by a number of reliable studies that stress and violence together possibly account for approximately 30% of the overall costs of ill-health and accidents. Based on the above figures it has been suggested that stress/violence may account for approximately 0.5 – 3.5% of GDP every year.⁵ According to the data of the Bureau of Labour Statistics (BLS), USA for 1995, workplace assaults and violent acts occur in the health sector more often than in any other industry. Several independent studies all over the world have reported the prevalence of workplace violence among physicians to be 56%–75%. Patients and their relatives are the most common perpetrators of non-fatal workplace violence. India has the second largest population in the world, where healthcare is one of the growing fields. Instances of patient’s relatives assaulting the treating doctor are a common scenario all over India. However, there is limited research on violence in healthcare settings against physicians in India.⁶

Physical workplace violence has been shown to carry health consequences for victims, to affect the morale of teams and organizations, and to generate economic costs for employers, health and social services. Physical forms of workplace violence have been investigated as well, but there has been comparatively little research on consequences of physical assaults against workers. As a matter of fact, many studies and reviews have concentrated on identifying risk factors and assessing the prevalence of this phenomenon. The healthcare setting has drawn particular attention. Acts of physical violence at work are defined as assaults carried out by one or several perpetrators, by members of the same organization as the victim (internal violence) or by “outsiders” (external violence) such as clients and patients. External forms of physical violence are more common than internal ones and affect more often, but not exclusively, “frontline staff” in the services industry. Workplace violence presents a growing health and security challenge for many organizations.⁷

Methodology

A cross-sectional study was conducted after obtaining institutional ethical clearance & permissions of the authorities from the tertiary care hospital. Participants included were doctors having at least 1 year of experience in the given tertiary care hospital, Participants having less than 1 year of experience and those who were not willing to participate were excluded from the study. The study included 263 participants who had more than 1 year of experience in the tertiary care hospital. Data collection was done using a validated questionnaire designed with various domains. After obtaining informed written consent, the participants were administered the questionnaire and requested to respond once it was filled. Follow up was required for many of the participants. The response rate for the study was 54.8%.

The domains included were related to socio demographic characteristics, knowledge and awareness on the local language, policies, reporting procedures, exposure to workplace violence, type and description, consequences of exposure, and perceptions of contributing factors for workplace violence. These variables were analyzed using SPSS on various scales and measures to determine the prevalence of workplace violence, type and description of violence, and possible contributing factors for workplace violence against doctors.

Results

A total of 263 participants were included in the study. There were 129 male doctors and 134 female doctors. The socio-demographics can be seen in Table 1. The prevalence of violence was found to be 35.7%. The most common type of violence among those who experienced violence in the last 12 months was verbal abuse (86.2%) followed by mobbing or bullying (7.4%) and physical violence (5.3%). Among those who witnessed violence in the last 12 months, the most common type of violence was verbal abuse (84.6%) followed by mobbing or bullying (7.6%) and physical violence (5.6%) as seen in Table 2.

The most common contributing factors as shown in Table 3, some also showing statistically significant values for violence were found to be miscommunication (86.2%, P= 0.01) followed by prolonged waiting time (70.2%, P=0.09), Death of the patient (31.9%, P= 0.00), Billing issues (28.7%, P= 0.46) and others (19.1%, P=0.01).

Table 1: Socio-demographic characteristics of the respondents.

Characteristics	Frequency (%) (n=263)
Age (years):	
24 & under:	45(17.1%)
25 to 34	167(63.4%)
35 to 44	30(11.4%)
45 to 54	14(5.5%)
55 to 64	7(2.6%)
Gender:	
Male	129(49.1%)
Female	134(50.9%)
Qualification:	
Intern	0(0%)
Graduate	20(7.6%)
Post-Graduate	211(80.2%)
Doctorate	32(12.2%)
Work Experience:	
1 to 2 years	157(59.6%)
2 to 5 years	52(19.7%)
5 to 10 years	20(7.6%)
10 years and above	34(12.9%)

Table 2: Type of violence and other characteristics experienced by the perpetrators of the violence

VIOLENCE:	Frequency: n (%)
Experience Type	94 (35.7%)
Physical	5 (5.3%)
Verbal	81 (86.2%)
Mobbing/bullying	7 (7.4%)
All the above	1 (1.1%)
Offender	
Patient	09(9.6%)
Patient's relative	76(80.9%)
Third party	09(9.6%)
Anyone unknown	00(0.0%)
Time of incident	
Between 7 am to 1 pm	28(29.7%)
Between 1 pm to 6 pm	36(38.2%)
Between 6 pm to 12 am	21(22.3%)
Between 12 am to 7 am	09(9.5%)
Emotion experienced	
Anger	27(28.7%)
Frustration	30(31.9%)
Irritability	26(27.7%)
Fear	11(11.7%)
Witnessed - Type	156(59.3%)
Physical	9(5.6%)
Verbal	132(84.6%)
Mobbing/bullying	12 (7.6%)
All the above	3(1.9%)
Offender	
Patient	21(13.5%)
Patient's relative	120(76.9%)
Third party	14 (8.9%)
Anyone unknown	01(0.6%)
Time of incident	
Between 7 am to 1 pm	43(27.6%)
Between 1 pm to 6 pm	58(37.2%)
Between 6 pm to 12 am	42(26.9%)
Between 12 am to 7 am	13(8.3%)
Emotion experienced	
Anger	44(28.2%)
Frustration	46(29.5%)
Irritability	51(32.7%)
Fear	15(9.6%)

Table 3. Associated factors between responses of victims of violence and those who witnessed the violence.

Variables	Responses	Percentage	P- Value
Experienced	N=94	(35.7%)	
Prolonged Waiting Time	66	70.2%	0.092
Death of Patient	30	31.9%	0.000
Miscommunication	81	86.2%	0.013
Billing Issue	27	28.7%	0.461
others	18	19.1%	0.010
Witnessed	N=156	(59.3%)	
Prolonged Waiting Time	97	62.2%	0.592
Death of Patient	61	39.1%	0.002
Miscommunication	127	81.4%	0.071
Billing Issue	42	26.9%	0.051
others	22	14.1%	0.246

Table 4. Knowledge and awareness of laws and reporting procedures, responses to violence.

Knowledge & awareness	Frequency (%)
State violence act (Karnataka violence act 2009)	
Yes	94 (35.7%)
No	169 (64.3%)
Existing reporting procedure	
Yes	150 (57.0%)
No	30 (11.4%)
Not sure	83 (31.6%)
Exercising reporting procedure	
Yes	65 (43.4%)
No	85 (56.6%)
Reasons for not reporting	
Unimportant	155 (58.9%)
Felt ashamed	029 (11.0%)
Felt guilty	7(2.7%)
Afraid of negative consequences	72 (27.4%)
Responses to violence	
As victim	
No action	16 (17.0%)
Asked person to stop	44 (46.8%)
Told friends/family/colleague	27 (28.7%)
Defended myself physically	02 (02.1%)
Sought help from union/ association	05 (05.3%)
As witness	
No action	58 (37.2%)
Asked person to stop	38 (24.4%)
Reported to authority	34 (21.8%)
Sought help from security	26 (16.7%)

Discussion

Workplace violence is becoming an occupational health hazard among doctors. Our study revealed that 35.7% of doctors at the tertiary care hospital had experienced workplace violence in the past 12 months. Tanu et. al. in a study in tertiary care settings in Delhi revealed that 40.8% of resident doctors had experienced workplace violence in the past 12 months.⁶ This is much less than that reported by Ori *et al.* in 2014 in Manipur where 78.3% of postgraduate students had faced at least one form of violence during their entire residency period.⁸ The duration of exposure, different definitions of workplace violence and different geographical locations may explain the difference between these studies. However, the findings of our study are in line with the study conducted by Newman *et al.* in 2011 in Rwanda where 39% of health workers reported experiencing at least one form of workplace violence in the previous 12 months.⁹ Verbal abuse (86.2%) was the most common form of violence followed by bullying or mobbing (7.4%). Males (46 out of 129) and females (48 out of 134) were almost uniformly targeted.

From our study, more than three-fourths of affected resident doctors who faced violence were post graduates. Many studies have recognized the emergency department as a particularly violent environment. These departments usually have patients who are critically ill and are accompanied by relatives who are anxious and stressed. Hence, they are more prone to aggression and violence if they feel that the patient was not attended to well. In our study, patients (9.6%) and their relatives (80.9%) were frequently reported to be the main source of violence. Patients' relatives should have realistic expectations of the course and outcome of illness. For this to happen, treating doctors should explain to them the nature of the illness, the investigations needed, the possible line of management and the probable course and outcome in a simple-to-understand manner. They should also provide periodic updates of the condition of the patient. Work-related violence usually results in short and long-term effects on the victims' physical state, psychological state and professional performance. Further, some studies have shown that victims of violence at workplace can have adverse mental health outcomes such as acute stress disorder or post-traumatic stress disorder. Thus, there is an urgent need to institute policies and measures to deter violence in the health sector.

Violence remains an under-reported phenomenon. In the current study, while 57% of doctors were aware of reporting procedures, 56.6% of them didn't know how to use them. Also, all those who did not report considered reporting unimportant (58.9%) and were afraid of negative consequences (27.4%). This highlights the need to encourage reportage of violence among afflicted workers and to develop institutional mechanisms for speedy measures to avoid such events. The state of Karnataka had passed a law: the Karnataka prohibition of violence against Medicare service personnel and damage to Medicare service institution Act 2009. This legislation protects the rights of patients, doctors and hospital properties in the event of an attack. Only 35.7% of the respondents were aware of such legislations. Violence is a style of communication and conflict resolution; physicians are treated no differently from anybody else. Similar risk factors were perceived as physician risk factors in our study too.

The risk factors found overall from the perceptions of the respondents were mainly prolonged waiting time (63.5%), death of the patient (47.1%), miscommunication/inappropriate communication by staff (77.6%), billing issues (31.6%) and lastly other issues (12.2%) contributing to workplace violence. It is vital that doctors take a realistic account of all the risks of assault and build a comprehensive and supportive approach to the problem so as to ensure the safety in workplaces. From another study, incidences of patient's party assaulting the treating doctor are a common scenario nowadays all over India. Many incidents of strikes, closing down of emergency service, sit in protest following alleged assault of duty doctor has been reported frequently in media from different parts of the country.⁸

Miscommunication by physician causes attendants to have unrealistic or too high expectations for patient recovery. Hence it is important to emphasize the patient's prognosis to the attendants in a lucid manner. As a doctor trained in India, I can say that Indian medical schools are excellent in imparting medical training to their students however teaching to be empathetic toward the patient is seriously lacking. Young doctors fresh out of medical school are often not empathetic enough with the attendants, leading to a sense of perceived neglect.³ The most common psychological effects are reduced job satisfaction and fear.¹⁰ Healthcare workers are nearly four times more likely to be injured and require time

away from work as a result of Work Place Violence than all workers in the private sector combined. The actual extent of the problem is estimated to be substantially bigger. Healthcare workplace violence remains grossly neglected and under-reported. Approximately 70 to 80% of incidents are never reported.¹²

Conclusion

Violence remains an under-reported phenomenon. Only half of doctors were aware about the reporting procedures yet half of them didn't know how to use them. Also, all those who did not report considered it unimportant and were afraid of negative consequences. This highlights the need to encourage reporting of violence among afflicted healthcare workers and to develop institutional mechanisms for speedy measures to avoid such events. Treating doctors need to ensure effective communication with their patients. Periodic updates to the patient party regarding the condition of the patient should be ensured such that timely communication is maintained which helps in relieving the anxious and stressful moments while waiting. Identification and estimation of the severity of this rapid growing threat is only possible if we have adequate reporting mechanism & also awareness among the respondents. The healthcare organisation is following the culture of "no data no problem" this perception among them needs to be addressed accordingly. This study attempts to highlight the Tertiary care hospital administration to sensitize the healthcare workers on these issues.

Ethical Clearance- Taken from Institutional ethics committee

Source of Funding- Self

Conflict of Interest - Nil

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Sexual Assault by Digital Penetration – A Case Report

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Abstract

Brutal sexual assault on children should attract the harshest punishment the law can provide. Here reported, is a case of sexual assault and murder of a 3-year-old child who was presented as a case of death due to snake bite. Meticulous post-mortem examination is required in such cases where history of the case do not coincide with the injuries on the body.

Key words: Sexual assault, child, injuries, post-mortem.

Case report

A girl child aged 3 years was found dead near her house and her body had been shifted to her home before the police arrived. History given was that it was a case of snake bite and was booked under section 174(1) Cr.PC.

On examination, multiple pinpoint abraded contusions were present over the forehead, cheeks, nose, upper and lower lips (Fig.1). Similar pinpoint abraded contusions were found over the lateral aspect of the neck, upper chest and the lateral aspect of the left thigh. Eyes were congested with subconjunctival haemorrhage. Sand particles were present in the nostrils.

On dissection, the lumen of the respiratory tract showed sand particles adherent to mucosa up to the bronchioles (Fig. 2). Examination of the genitalia revealed contusion of the posterior fornix and vaginal wall (Fig. 3).

Vaginal swab samples were sent to the Forensic Science Laboratory for detection of the presence of spermatozoa which turned out to be negative.

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Discussion

From the external and internal findings, it was most likely a case of sexual assault by digital (finger) penetration, as penetration of the penis would have caused significant damage to the genitalia considering the age of the child. In digital penetration of the infant vagina, bruising of labia and vestibule is frequently seen but circumferential tears are absent.⁽¹⁾ Bruising over the anterior aspect of the vaginal wall are more likely to be the consequence of digital manipulation ⁽²⁾ but it can vary based on the position of the body, in this case the body of the child, based on the injuries, was in a prone position hence the bruising was over the posterior aspect of the vaginal wall. Based in the pinpoint abraded contusions over the mouth and nostrils, and the presence of sand in the respiratory tract, the cause of death was determined to be smothering by compressing the face of the child against the sand on the ground.

Several terms are used to describe such type of heinous act - sexual murder, sex-related homicide, sexually-motivated murder or rape-homicide.⁽³⁾ It is considered as an extreme form of sexual violence especially against a child. Such type of murders is more likely to have been committed by psychopaths suffering from serious personality disorders, paraphilia-related disorders and sadistic sexual fantasy.^(4,5)

Thought the child was brutally murdered, the external injuries were not very significant to the police to raise a suspicion of homicide and the cause of death was presumed to be due to snake bite. Thus, a careful

post-mortem examination by Forensic experts is necessary to interpret injuries and determine the cause of death.



Fig 1: Multiple pinpoint abraded contusions over the face.

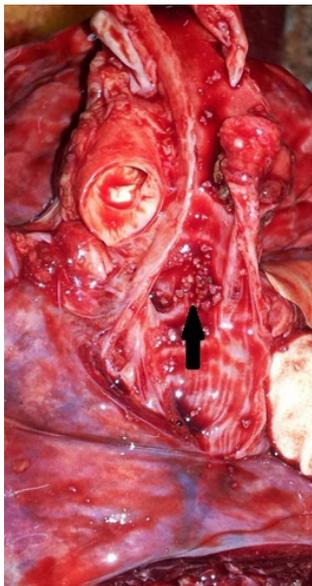


Fig 2: Sand particles in the trachea and bronchi.



Fig 3: Contusion of the posterior fornix and the vaginal wall.

Conclusion

Such heinous acts of crime deserve the harshest punishment the law can provide. But for justice to prevail it is imperative that substantial evidence is provided to prove a crime. Hence, a painstaking post-mortem examination is mandated, especially in such cases, to provide crucial evidence for an accused to be convicted and to bring justice to the victim.

Source of Support : Nil

Conflict of Interest : Nil

Ethical Clearance: Not required as identity of the individual is not revealed. murderers. *Psychopathology*.2008; 40: 22-28.

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Pattern of Head Injuries in Motorised Two-Wheeler Riders Involved in Fatal Road Traffic Accidents: A Retrospective Autopsy based Study

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Abstract

Objective: Road traffic accidents is one of the leading causes of death in India. Due to the rapid increase in the number of two-wheeler commuters, the number of fatalities in victims involved in fatal two-wheeler accidents has also increased substantially. The aim of this study was to determine the pattern of head injuries in victims involved in fatal motorised two-wheeler accidents. **Methods:** A retrospective study was conducted in 100 cases. **Results:** It was found that most of the victims were males. Motorcycles and mopeds were more frequently involved in fatalities when compared to scooters. Head injury was the commonest cause of death. This may be due to the fact that, in straddle type of seated position adopted by riders on motorbikes and mopeds causes the rider to fall sideways in the event of an accident and the impacting surface is usually the side of the head, this was corroborated with the injuries sustained over the head. This is not the case in scooters, as the position of the legs over the footrest in front allows for more manoeuvrability and prevents the rider from falling sideways. **Conclusion:** Hence, this study comes to the conclusion that scooters are a safer alternative to motorcycles and mopeds as a means of transport.

Keywords: Road Traffic Accidents, Head injury, Motorcycles, Scooters, Skull fractures, Safety

Introduction

India has experienced rapid growth in motorization in the last decade, with concomitant increases in road traffic accident (RTA) related mortality.⁽¹⁾

Motorised two wheeler (MTW) account for a large proportion of vehicles on the roads⁽²⁾and two wheelers accounted for a highest share in total road accidents.⁽³⁾ It is the leading cause of mortality for young adults of less than 45 years and a major burden of disease across all age groups.⁽⁴⁾ Despite these established facts, motorcycle use as a means of transportation is on the rise worldwide.⁽⁵⁾

Injury to the head is the commonest cause of mortality and morbidity following two-wheeler crashes and motor cyclists are about 25 times more likely than passenger car occupants to die in traffic crashes.⁽⁶⁾

The head being the most vulnerable part of the body is involved frequently and lead to morbidity and mortality in road traffic accidents.⁽⁷⁾ The aim of this study was to analyse the pattern of head injuries in riders involved in fatal motorised two-wheeler crashes.

Material and Method

This is a retrospective study of autopsy findings in 100 cases of MTW rider fatalities, conducted by the author, from 2012 to 2017 at Jawaharlal Institute of Postgraduate Medical Education & Research, Pondicherry. Most of the cases are from areas in and around Pondicherry treated in Jawaharlal Institute of Postgraduate Medical Education & Research.

The aim of this study was to describe the pattern of head injuries in MTW riders involved in fatal of RTA.

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History of the cases i.e. age, sex, vehicles involved was obtained from the police inquest forms, case files and autopsy reports. The data was recorded in a proforma and analysed.

Results

Of the 100 cases, the highest number of victims belonged to the most productive age group of 21 to 30 and 31 to 40 comprising of 42 (42%) and 25 (25%) cases respectively. Overwhelming majority of the victims were males accounting for 99 (99%) cases. The duration of survival was found to be 2 to 7 days in 61 (61%) of the victims. The type of MTW driven by the victims were motorcycles in 72 (72%), mopeds 21 (21%) and scooters in 7 (7%) cases (Fig. 1).

Commonest mode of injury was found to be collision with a two-wheeler in 26 (26%) cases closely followed by impact with a light vehicle (car) in 23 (23%) cases and skid and fall in 22 (22%) cases. In majority of the victims, the cause of death was due to cranio-cerebral (Head) injury sustained in 82 (82%) cases (Fig. 2).

Based on the pattern of injuries over the head, the external injuries to the scalp (contusion/laceration) was found over the parietal region in 26 (26%) cases followed by the occipital region in 19 (19%) cases and no external injuries over the scalp was found in 35 (35%) cases (Table 1). Subscalpular haematoma was most commonly seen over the temporal region in 63 (63%) cases and parietal region in 61 (61%) cases, it was found to be intact in only 7 (7%) cases (Table 2). In the vault of the skull, the temporal bone was most involved with fractures seen in 36 (36%) cases followed by the frontal bone in 28 (28%) cases and in the base of skull, the fractures were found mainly over the anterior and middle cranial fossa in 26 (26%) and 25 (25%) cases respectively (Table 3). No skull fractures were present in 21 (21%) cases. The commonest type of skull fracture was fissured fracture in 44 (44%) cases followed by comminuted fracture in 33 (33%) cases. A combination of subdural and subarachnoid haemorrhage was the most common intracranial haemorrhage seen in 74 (74%) cases.

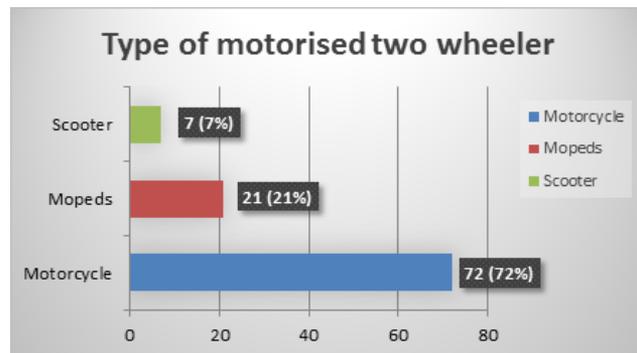


Figure 1: Type of motorised two-wheeler

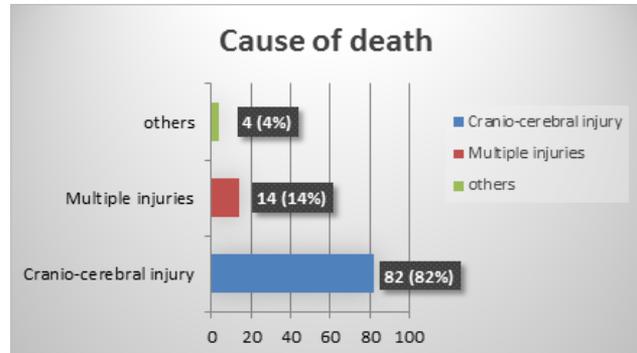


Figure 2: Cause of death

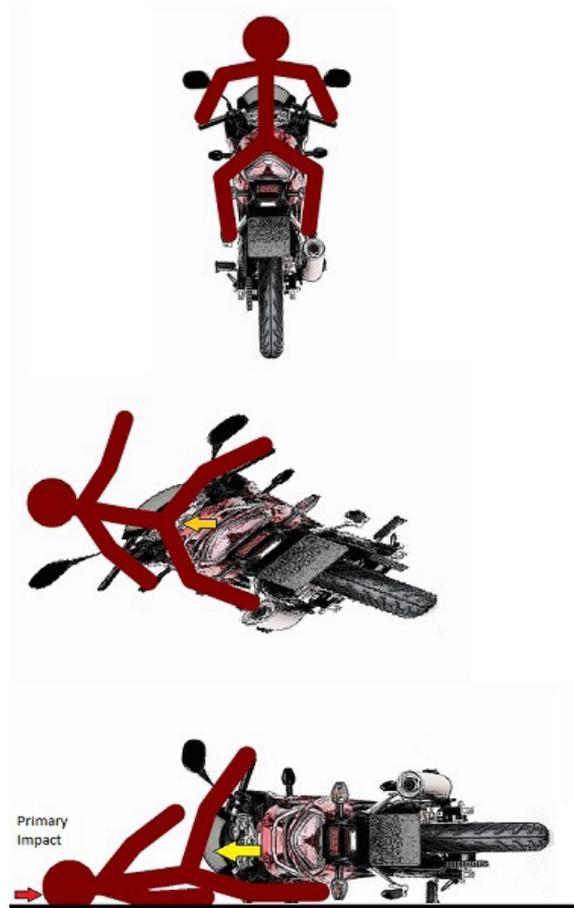


Figure 3: Sketch representing fall off motorcycle in the event of an accident.

Table 1: Region of the scalp involved in injuries (external) sustained (contusion/laceration)(combined injuries were separated region wise).

Region of scalp	Number of cases (n=100)
Frontal (F)	10 (10%)
Parietal (P)	26 (26%)
Temporal (T)	10 (10%)
Occipital (O)	19 (19%)
Intact	35 (35%)

Table 2: Region of the scalp involved showing sub-scalpular haemorrhage (combined sub-scalpular haemorrhage were separated region wise):

Region of scalp	Number of cases (n=100)
Frontal (F)	46 (46%)
Parietal (P)	61 (61%)
Temporal (T)	63 (63%)
Occipital (O)	53 (53%)
Intact	7 (7%)

Table 3: Bones involved at the site of skull fracture(combined fractures were separated region wise)

Site of skull fracture*	Number of cases (n=100)
Frontal (F)	28 (28%)
Parietal (P)	17 (17%)
Temporal(T)	36 (36%)
Anterior cranial fossa	26 (26%)
Middle cranial fossa	25 (25%)
Posterior cranial fossa	20 (20%)
Intact	21 (21%)

* occipital bone included in fractures of posterior cranial fossa

Discussion

Exploding population, increasing registration of automobiles, habitual tendency of violating rules and chaotic traffic systems have greatly contributed to

rapid strides in RTA's.⁽⁸⁾ Most of the victims belonged to the budding age group of 21 to 40 years comprising of individuals in their prime (students, breadwinners). Most of the victims were male accounting for 99 cases. Motorcycles (72%) and mopeds (21%) were more frequently involved in fatalities when compared to scooters (7%). The mode of injury was found to be collision with another two-wheeler (26%) followed by impact with a light vehicle (car) (23%) and skid and fall(22%). Cranio-cerebral injury (82%) was the commonest cause of death, injuries to the head was more common in other similar studies.^(9,10,11,12,13)

Based on the pattern of head injuries, external injuries over the scalp involved the parietal (26%) and occipital region (19%). Incidentally, no external injuries (35%) over the scalp could be made out but it should be kept in mind that injuries like contusion may be difficult to determine under the scalp hair. Subscalpular haematoma was most commonly seen over the temporal (63 %) and parietal region (61 %). Skull fracture was most commonly found over the temporal bone (36 %) caused mainly due to impact over the side of the head. The anterior (26 %) and middle cranial fossa (25 %) were the most common base of skull fractures. The skull was intact in 21% of the cases. Fissured fracture (44 %) was the commonest type of skull fracture which was found in other similar studies.⁽¹⁴⁾The commonest intracranial haemorrhage was a combined form of subdural and subarachnoid haemorrhage (74 %) which was also found in similar studies.^(15,16)

From this study, it is found that the head is most vulnerable to injuries and head involvement is responsible for or is a major contributor to death. It was found that in many of the studies^(4,7,8) the type of MTW has not been mentioned except in one study which states that crashes in geared motorcycles is greater than in non-geared two-wheelers.⁽¹⁷⁾ This is found to be true to some extent in this study, but for the fact that mopeds (21%) are non-geared vehicles and has been found to be significantly more involved in fatal accidents than scooters (7%). This may be due to the fact that both geared motorcycles and mopeds are straddle (legs on either side) type of vehicles so, in the event of an accident, when the vehicle falls to one side the rider is forced to fall sideways and the primary impacting surface is usually the side of the head (Fig 3), this can be corroborated with the pattern of injuries over the head i.e. subscalpular haematoma over the temporal region (63%), fracture of the temporal

bone (36%), base of skull fractures (71%) all which are usually found in motorcycle riders involved in fatal accidents.^(18,19) This is not the case in scooters, where the legs placed over the footrest in front provides a more flexible mode of exiting from the vehicle when involved in an accident preventing fatal head injuries. This may be the reason why fatalities in female riders involved in two-wheeler accidents are less, as the MTW preferred by females are scooters.

Conclusion

It is found that head injury (82%) is the commonest cause of fatalities in riders of MTW. The commonest MTW involved in fatal accidents were motorcycles (72%) and mopeds (21%) followed by scooters (7%). The reason for increased incidence of head injuries in straddle type of vehicles like motorcycles and mopeds is, when involved in an accident, it forces the rider to fall sideways and the primary impacting surface of the body is the side of the head, this can be corroborated with the subscalpular haematoma over the temporal region (63%), fracture of the temporal bone (36%) and base of skull fractures (71%) which is commonly seen in impact over the side of the head. Fatal head injuries are less common in scooters probably due to the position of the legs over the footrest in front which allows for more manoeuvrability and prevents the rider from falling sideways. It was also found that fatalities among females were significantly lower, most probably because the mode of two-wheeler transport preferred by females are scooters which is less prone to fatal crashes due to reasons discussed. From this study, it is found that scooters are a much safer alternative to motorcycles and mopeds as a means of MTW form of transport.

Source of Support : Nil

Conflict of Interest : Nil

Ethical Clearance: Not necessary as it is a retrospective study and identity of the victims have not been revealed.

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Age Estimation of an Individual Using Olze's Method in Indian Population- A Cross-Sectional Study

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Abstract

Introduction: Age estimation of an individual using dental records is a valuable method in cases of identification and in legal cases, thus age estimation finds a pivotal play in forensic dentistry. There are two methods of age estimation one is the direct method, which uses extracted teeth a histological analysis of the same, and the indirect method using x-rays and CT examinations.

Aim: The study aims apply the Olze's formula of age estimation to estimate the age of the individual using the orthopantomograph.

Materials & Method: Digital panoramic images of 20 individuals (10 males and 10 females) from the same centre; were retrospectively collected for this study. Blinding was done to avoid bias and the evaluation of the x-rays was performed in a randomized way. The formulas were applied and the observations were tabulated.

Results: The precision of the formula is found to be statistically significant with both the observers. The inter observer agreement was found to be moderate.

Conclusion: The Olze's method for age estimation proves to be a very good, non-invasive, indirect method to estimate the age of an individual. Further studies need to be performed to check the validity of the formula for various age groups and to check the validity of the equation

Keywords: Age determination by teeth; Forensic anthropology; Forensic dentistry; orthopantomograph; Olze's method.

Introduction

Age estimation of an individual using dental records is a valuable method in cases of identification in legal cases, thus age estimation finds a pivotal play in forensic dentistry. There are two methods of age estimation one is the direct method, which uses extracted teeth a histological analysis of the same, and

the indirect method using x-rays and CT examinations. The scientific basis of forensic age assessment is based physical development, skeletal maturation, and dental development.

In 1950, Gustafson G, used a formula to qualitatively assess the age of an individual by relating the dental changes through histological analysis, which makes it close to impossible for healthy living individuals by using the following parameters degree of attrition, degree of root transparency, and degree of secondary dentin deposition, cementum apposition, and root resorption. In 2012 Olze A, adapted Gustafson's method for indirect analysis through orthopantomography, using lower premolars, and specifically in German population. It has been shown that the state of the teeth has closer

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correlation with age than any other hard tissue of the body. Age can be estimated in children and in adolescent by means of development and eruption of deciduous and permanent teeth up to 14 years.

This study aims to study orthopantomograph using the Olze's method of age estimation to estimate the age of the individual.

Materials and Method

Digital panoramic images of 20 individuals (10 males and 10 females) with known chronological age and gender were retrospectively collected for this study. Several selection criteria, such as good image quality and the visible absence of medical evidence or pathology affecting tooth development on the panoramic images, were imposed to prevent any confounders to the data. The exclusion criteria included, crowned teeth, bridge or abutment, presence of filling, partial crown or inlay, post and core restoration, carious lesion, root filling, infected tooth, impacted tooth, retained root, apicectomy and severely attrited teeth, orthodontic treatment, other pathologies affecting teeth and crown fracture. In order to avoid bias, the examiners did not have access to any previous information related to birth and the evaluation of the x-rays was performed in a randomized way. Preceding the examination of the dental X-rays both the examiners were intensively trained in the Olze's method of age estimation.

The method used was proposed by Olze et al.¹, which takes into consideration the dental involution through four different dental parameters, scoring from

0 to 3: (I) formation of secondary dentine, (II) cement apposition, (III) periodontal recession, and (IV) attrition,² which were the characteristics used Gustafson.³ These characteristics were adjusted for use in panoramic x-rays. The following stage classifications were used according to Table 1.

The estimated age of the individual was estimated by using the formulas suggested by Olze's, which are specific for men and women shown in table 2 and 3.

Data Analysis

The scoring was tabulated and the formulas were applied according to the formulas provided in the tables 2 and 3. The average was obtained for each individual and this was used to find the correlation between the chronological age and the estimated age. The obtained ages were then tabulated and independent t test was done and the inter observer agreement was checked by kappa statistics.

Results

In this study chronological age was found to be \pm 2.3 years of the estimated age, by using the formula given by Olze. This finding was consistent with both the observers. The p values were found to be insignificant ($p= 0.523$ and $p=0.403$) suggesting that the difference between the chronological age and the estimated age was minimal. To determine if there was agreement between both the observers in estimating the age of the individual the kappa statistics was used and found that there was moderate agreement ($k=0.430$).

Table 1. Showing the scoring criteria used for the Olze's method of age estimation.

Stage	Secondary dentine formation	Cementum apposition	Periodontal recession	Attrition
0	Pulp horn reaches to above crown equator	No visible cementum apposition	No periodontal recession	No attrition, cusp tips present
1	Pulp horn reaches at maximum to crown equator	Beginning apical cementum apposition	Periodontal recession into cervical root third	Beginning attrition with loss of cusp tips
2	Pulp horn exceeds enamel-cementum boundary and falls short of crown equator	Clearly visible cementum apposition, reaching beyond the apex	Periodontal recession into middle root third	Attrition reaching into dentin
3	Pulp horn reaches at maximum to enamel-cementum boundary		Periodontal recession into apical root third	Attrition reaching into dentin with opening of pulp cavity

Table 2: Shows age as the dependent variable and dental age changes as independent variables for teeth 34, 35, 44 and 45 for females.

Tooth number	Formula
34	$18.21 + 3.161 \times CE + 2.4 \times SE + 4.448 \times PE + 4.05 \times AT$
35	$17.61 + 2.596 \times CE + 3.065 \times SE + 5.031 \times PE + 2.687 \times AT$
44	$19.11 + 2.596 \times CE + 2.667 \times SE + 4.3 \times PE + 3.3 \times AT$
45	$17.64 + 3.336 \times CE + 3.161 \times SE + 4.722 \times PE + 2.943 \times A$

Table 3: Shows age as the dependent variable and dental age changes as independent variables for teeth 34, 35, 44 and 45 for males.

Tooth number	Formula
34	$18.43 + 1.131 \times CE + 4.19 \times SE + 5.202 \times PE + 2.881 \times AT$
35	$18 + 1.905 \times CE + 3.662 \times SE + 5.011 \times PE + 3.003 \times AT$
44	$18.69 + 1.292 \times CE + 3.813 \times SE + 5.533 \times PE + 3.14 \times AT$
45	$18.28 + 2018 \times CE + 3185 \times SE + 5433 \times PE + 2879 \times AT$

Discussion

Age is one of the essential factors in establishing the identity of a person and is used vividly in the field in forensic odontology for identifying the age of an individual. It has been shown that the state of the teeth has closer correlation with age than any other hard tissue of the body. Age can be estimated in children and in adolescent by means of development and eruption of deciduous and permanent teeth up to 14 years. After the age of 14 years, the third molar is the only remaining tooth which is still developing and consequently dental age estimation methods have to rely on the development of this tooth until 20 years of age.⁴ After this period, age determination is mainly done by visual examination, radiographic methods, and structural changes in teeth; and by means of biochemical methods.⁵

The Gustafson’s method is the most popular age estimation method being used since 1950. He used six retrogressive changes in teeth, namely attrition, secondary dentin deposition, periodontal status, root transparency, cementum apposition, and root resorption.⁶

Limitation of Gustafson’s method is the required direct clinical examination.³ Various pathological conditions and quality of oral hygiene influence adversely the different dental features which may affect the scoring of secondary changes in teeth.⁴

So, Olze et al. proposed to modify Gustafson’s method, through orthopantomography analysis, assessing only lower premolars, because some studies show that these teeth present a better relation to real age when compared with other dental groups.² Regarding dental involution analysis, the use of mandibular premolar is suggested because they are predominantly single-rooted teeth and have a large pulp area, and, due to the spinal column projection in the anterior region expected in panoramic radiographs, the pre-molars were the teeth chosen in Olze’s method.¹ The use of orthopantomographs reduces the patient exposure, better patient compliance and is easier for the record maintenance, thereby making the use of Olze’s method for age estimation an uncomplicated method. In a study done by Nikhil Raj et al, an attempt was made to check the reliability of the Olze’s formula for third molars in

an Indian population.⁷ The disadvantage of this method is that in many individuals the third molar is either missing or is being removed.

In our study, “independent *t*-test of significance” was used to test a significant difference in between actual and calculated age. The mean age difference between actual and calculated age of total 20 cases studied was ± 2.3 years. The mean age difference between actual and calculated age was less as compared to the Gustafson’s original work which was ± 3.63 years. The mean age difference between actual and calculated age was significant, but the difference was less as compared to those reported by previous workers like Dalitz⁸ in 1962; Pillai and Bhaskar⁹, in 1974 and Singh and Mukharjee¹⁰ in 1985.

Originally, Olze’s method was developed and tested in German people, aged 15-40, but Timme et al.¹¹ studied German people to validate Olze’s method and suggested that the research should investigate the influence of ethnicity, dietary habits and modern health care on the degenerative characteristics in question. Our study was the first to estimate the age of an individual using the Olze’s formula for lower premolars in the Indian population, we were able to show that the Olze’s method can be used for precise age estimation using just the orthopantomograph of an individual. Thus, the Olze’s method of age estimation is found to be superior to the generally used direct method (Gustafson’s method).

Conclusion

The Olze’s method for age estimation proves to be a very good, non-invasive, indirect method to estimate the age of an individual. Further studies need to be performed to check the validity of the formula for various age groups and to check the validity of the equation.

Ethical Clearance- Taken from the Institutional Review committee, with a reference number SDC/MDS17/OMP/40

Source of Funding- Self

Conflict of Interest - NIL

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Using Multi Detector Computed Tomography of the Maxillary Sinuses as an Aid in Identification in Contemporary Indian (Bengali) Population-A Pilot Study

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Abstract

It is obligatory in terms of the law and social reforms to establish post-mortem identity. The study of anthropometric characteristics aids in solving the problems related to identification. It has been reported that maxillary sinuses remain intact and well protected. That is the reason that maxillary sinuses can be used for identification. Best part of investigating maxillary sinuses is that the width, length, and height of maxillary sinus together can be used for sex determination when the whole skeleton is not available. The data used in this study was obtained from patients who underwent CT scan examination of PNS in the radiology department of EKO Imaging Institute. The data consists of 50 individuals from 17 years age to 73 years age. The sample consisted of 35 males and 15 females. Discriminant function analysis was used. $Df=0.199$ right antero posterior -0.044 left antero posterior -0.291 right transverse $+0.105$ left transverse $+0.406$ right cephalocaudal -0.125 left cephalocaudal $+0.295$ right sag -0.277 left sag -13.264 (Constant). The classification characteristics show that 82% of original cases were correctly classified; It is possible to predict sex with 80% accuracy cases in contemporary Bengali adult population from the measurements of maxillary sinus. Accuracy rate in prediction was more in females. Age however could not be estimated from this preliminary study. This database built on radiological data can be used by extrapolation for use in fragmentary remains in mutilated or decomposed bodies.

Keywords: Multidetector CT- identification- maxillary sinus- forensic

Introduction

It is obligatory in terms of the law and social reforms to establish post-mortem identity. The study of anthropometric characteristics aids in solving the problems related to identification. ⁽¹⁻⁵⁾ Craniometrical features are included among anthropometric characteristics which are closely related to forensic dentistry, because they can be used to identify an individual from a skull found detached from its skeleton ⁽⁶⁾. Skeletal remains next to enamel of teeth have been

used for sexing the individual ⁽⁷⁾. Bones of the body are last to perish after death and this makes this method of sex discrimination advantageous over other methods. It has been reported that maxillary sinuses remain intact and well protected. That is the reason that maxillary sinuses can be used for identification ⁽⁸⁾. Best part of investigating maxillary sinuses is that the width, length, and height of maxillary sinus together can be used for sex determination when the whole skeleton is not available ⁽⁹⁾. Computer tomography (CT) scans provide excellent images of maxillary sinus without involving an invasive path in the cadavers and also can be used in cases of living persons. This study was conducted to derive a model for determination of sex from fragment of adult maxilla in a population specific (Indian Bengali) sample applying discriminant function analysis.

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Material & Method

The data used in this study was obtained from patients who underwent CT scan examination of PNS in the radiology department of EKO Imaging Institute. To obtain the reformatted MDCT images, an MDCT light Speed (GE Medical Systems, Milwaukee, Wis., USA) with a high-resolution bone algorithm, 15 cm field of view, 200 mA, 120 kV, scanning time of 1 s and slice thickness of 0.625 mm was used to obtain the axial images from the occlusal margin of the maxillary teeth to the inferior margin of the orbit. The axial images were reformatted to coronal and sagittal images and the reformatted cross-sectional images coronal and sagittal were used for the radiographic evaluation of the inferior wall of maxillary sinus and to observe the anterior and posterior limit of the sinus. Using the MDCT data as Digital Imaging and Communications in Medicine (DICOM) files, three-dimensional reconstructed images of the maxillary sinuses were made using the V-works (version 3.0) program. We performed various measurements on three-dimensional reconstructed images using V-works 3.0 program. The used measurement parameters were antero-posterior and transverse measured from axial images, cephalo-caudal measured from coronal and sagittal reformatted images. All measures were taken between the widest points of the all of the sinuses.

The data consists of 50 individuals from 17 years age to 73 years age. The sample consisted of 35 males and 15 females. Antero posterior length measured between the widest point of the maxillary sinus in axial image as shown in fig. 1. Transverse parameter measured from axial images at the widest distance in transverse plane as shown in fig. 2. Cephalo-caudal measured between the widest points from coronal images as shown in fig. 3. This study was based on retrospective review of the paranasal sinuses MDCT scans in 50 cases (age ranged between 17 and 76 years old) who had MDCT (General Electric light speed 16 slice Helical CT, Milwaukee, US) of maxillary sinuses for various reasons. These were used to get the Discriminant equations by SPSS 15 version by Discriminant function analysis.

Results

A Discriminant function was performed to the, data entering all the variables together with sex as the grouping variable. The variables were entered together

as the sample size of this pilot study was small. The mean and standard deviation of the variables are seen in the chart in fig. 4. ROC curve was first done on the variables to see the discriminating power of the variables. The Wilk's lambda for the model is 0.52 which signifies a good discriminating power of the model as shown in table 1. Relative contribution of each variable to the discriminant equation is shown in table 2 and 3. The discriminant function equation is,

$$Df = 0.199 \text{ right antero posterior} - 0.044 \text{ left antero posterior} - 0.291 \text{ right transverse} + 0.105 \text{ left transverse} + 0.406 \text{ right cephalocaudal} - 0.125 \text{ left cephalocaudal} + 0.295 \text{ right sag} - 0.277 \text{ left sag} - 13.264 \text{ (Constant)}$$

The cutoff point is $-0.616 + 1.438/2 = 0.411$ as shown in table 4. So above this value 0.411, the cases are male. Below this value 0.411, the cases are female. Overall 82.0% of the sample was correctly classified into their group by a model as shown in table 5. At the individual group level, 93.3% of females and 77.1% of male were correctly classified. Cross-validated results showed 80% of the cases correctly classified by this model. When age was correlated with the measured variables none of them showed any significant correlation as shown in table 6. So age could not be predicted with accuracy from this preliminary study.

Discussions

In our study, the Wilk's Lambda is 0.52 with significance value of 0.000. According to the study by Uthman et al, the Wilk's Lambda was 0.745.⁽¹⁰⁾ Among the maxillary sinus measurements, a significant sex difference was found in case of right cephalo-caudal, right sagittal and right antero-posterior as was seen from the canonical discriminant function. This is different from the findings of the study by Uthman et al where left maxillary sinus height was the main discriminant function. On the other hand our study showed an accuracy rate of 77.1% in males and 93.3% in females in contrast to the study by Teke et al⁽¹¹⁾ which was 69.3% for males and 69.4% for females. The study by Uthman et al showed an accuracy rate to be 74.4% for males and 73.3% for females. In forensic identification, maxillary sinus measurements can be taken by high speed with relatively good accuracy which is comparable to those using more complex techniques and parameters. The ROC curve shows good discriminant function between male and female as has been shown by the ROC curve.

The canonical discriminant function coefficients show that right cephalocaudal and right sagittal have the greatest discriminating property within all the factors. The classification characteristics show that overall 82.0% of the sample was correctly classified into their group by this model. At the individual group level, 93.3% of females and 77.3% of male were correctly classified.

Conclusions

The results of this preliminary study show that these eight variables contribute to discrimination between the two sexes in the Indian Bengali population. Overall 82.0% of the sample was correctly classified into their group by this model. At the individual group level, 93.3% of females and 77.3% of male were correctly classified. It is possible to predict sex with 80% accuracy cases in contemporary Bengali adult population from the measurements of maxillary sinus. Accuracy rate in prediction was more in females. Age however could not be estimated from this preliminary study. This database built on radiological data can be used by extrapolation for use in fragmentary remains in mutilated or decomposed bodies. This will be of practical importance in Forensic osteology work when fragmentary human skeletal remains are examined to establish identity and construct a biological profile of the subject. Further studies on gender determination from the maxillary sinuses are needed. This regional variation agrees with previous studies. Separate models must be developed for different populations. This would have anthropological, archeological and forensic applications especially in cases of determination of sex of unknown mutilated skull. The sample size is small so a larger study is required to see the applicability of the results for use of the test in forensic practice. An equal number of subjects from both sexes could not be analyzed as this was a preliminary study and this is a limitation of our pilot study.

Legends of the figures and charts

CT scan plates of the measurements taken (in one sample case) Figure 1,2 & 3



Fig. 1



Fig. 2



Fig. 3

Table. 1 (Wilks' Lambda)

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.520	28.760	8	0.000

Table 2: Standardized Canonical Discriminant Function Coefficients

	Function 1
Right anterior posterior	0.439
Left anterior posterior	-0.143
Right transverse	-1.330
Left transverse	0.558
Right cc	1.363
Left cc	-0.546
Right ag	1.008
Left ag	-1.270

Table 3: Structure Matrix

	Function 1
Left transverse	-0.526
Left sag	-0.385
Left anterior posterior	-0.369
Right transverse	-0.360
Right cc	0.220
Right ag	-0.117
Left cc	-0.100
Right anterior posterior	0.085

Pooled within groups correlations between discriminating variables and standardised canonical discriminant functions. Variables ordered by absolute size of correlation within function

Table 5 (Classification Statistics)

Classification Results^{b,c}

		Predicted Group Membership			
		sex	Male	Female	Total
Original	Count	Male	27	8	35
		Female	1	14	15
	%	Male	77.1	22.9	100.0
		Female	6.7	93.3	100.0
Cross-validated ^a	Count	Male	27	8	35
		Female	2	13	15
	%	Male	77.1	22.9	100.0
		Female	13.3	86.7	100.0

Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

82.0% of original grouped cases correctly classified.

80.0% of cross-validated grouped cases correctly classified.

Table 6: Correlations

		Age	Left transverse
age	Pearson Correlation	1	0.071
	Sig. (2-tailed)		0.626
	N	50	50
Left transverse	Pearson Correlation	0.071	1
	Sig. (2-tailed)	0.626	
	N	50	50

Table 4: Canonical discriminant coefficient

Canonical Discriminant Function Coefficients

	Function 1
Right ant post	0.199
Left ant post	-0.044
Right transverse	-0.291
Left transverse	0.105
Right cc	0.406
Left cc	-0.125
Right sag	0.295
Left sag	-0.277
(Constant)	-13.264

Unstandardized coefficients

Conflict of Interest: Nil

Ethical Clearance: Ethical clearance has been taken for this study from Ethical clearance committee, Burdwan Medical College, Govt of West Bengal

Source of Funding: Nil

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Postmortem Study of Pattern of Ligature Mark and Injuries to the Neck Structures in Case of Suicidal Hanging

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Abstract

The death due to suicide are highly incidental in the morden way of life. The present study was conducted in Department of Forensic Medicine, Madurai Medical College, Madurai during January 2014 to December 2014 to find out the various patterns of ligature and the neck injuries during the autopsy examinations in deaths due to hanging. Total 210 cases of autopsy were studied irrespective of age, gender, religion, casteetc., who has died due to hanging. All the data is related to ligature pattern, internal injuries in neck, marital status etc are recorded with detailed autopsy examination subsequently analysed statistically. We conclude that majority of victims were male of 21-30 years age involved in hanging, due to love, financial factor, work related issues and other motivational factors.

Keywords: Hanging, Ligature pattern, Neck injuries, Motivational factors

Introduction

In India, hanging is the commonest method of committing suicide in cities and towns as it is considered as a painless form committing self destruction. Hanging is among the top five methods of choice for committing suicide, the other preferred methods being poisoning, drowning, burning and jumping from a tall structure etc. According to the NCRB(National Crime Reports Bureau) report 2009, the incidence of suicide by hanging in India is 31.7% in 2007, 32.2.% in 2008 and 31.5% in 2009⁽¹⁾. A good number of people die each year by suicide, making it one of the 10 leading causes of death in the world accounting more than a million deaths annually⁽²⁾. Any material available at the time of the impulse may be used as the ligature material eg. Rope, wire or saree. The ligature mark is vital evidence of asphyxial deaths⁽³⁾. various studies in the forensic literature have reported considerable differences in the frequency of hyoid bone or thyroid cartilage fractures, injuries to the musculature and the vasculature of the

neck. Some important reasons to which these variations could be attributed including: lack of a common method for examination of neck structures, varying degrees of thoroughness n examining the neck structures and lack of seriousness in the documentation of the findings (as cases of hanging are almost always suicidal) thus affecting the results of retrospective studies⁽⁴⁾. the tendency of males to commit suicide was more than that of females in the same age groups. The suicidal trend in Tamil nadu shows that the distribution of cause of death in suicide cases is seen among males. It shows that suicide due to poison, is the most common method among males (31%), followed by hanging (26%), firearms (16%), burns (11%), drowning (10%), and finally, falling from a height(6%)⁽⁵⁾.

The distribution of cause of death in suicide cases among female showed that suicide due to poison is the most common cause of suicide among females (48%), followed by hanging (24%), burns (12%), drowning and falling from a height (7% and 6% each) and finally firearm (3%)⁽⁵⁾.

Materials and Method

A total of 210 cases of suicidal hanging whose autopsy examinations are conducted in the mortuary. All the cases of suicidal hanging showed the pattern of ligature mark and injuries in the neck structures both

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externally and internally (dissection of neck). all the data were obtained and the findings were recorded as tables, graphs and subsequently subjected to the computer aided statistical analysis.

Observation

Among the 210 cases of suicidal death studied showed that 136 (64.8%) were male and 74 (35.2%) were female, which shows that males are at higher prepondance when compared to females⁽⁶⁾. The age group of males is between 31-40 years (67.7%) and females were at the age range of 11-20 years (37.5%). The minimum and maximum age range noted for males were 16 years and 45 years respectively and for females it was 18 years and 35 years respectively. Nylon rope was the commonest (39%) ligature material used for hanging purpose⁽⁷⁾. The commonest ligature materials of choice were nylon (n=82; 39%), saree (n=41; 19.05%) and dupatta (n=35; 16.07%). The next common ligature material of choice was dhoti (n=18; 8.06%). The other materials used were electrical wire (n=15; 7.01%), jute rope (n=9; 4.3%) and towel (n=8; 3.8%). In 87.6% (n=184) of cases the ligature marks were situated above the thyroid cartilage⁽⁸⁾. Only 2.9% (n=20) were situated below the thyroid cartilage, whereas 9.5% (n=20) were situated over the thyroid cartilage. In 96.2% (n=202) of cases the ligature showed discontinuity (incomplete) and only 13.8% (n=8) showed complete ligature (continuity) mark. The oblique shape of the ligature mark was present in 94.3% (n=198) of hanging. 5.7% (n=12) of cases showed horizontal ligature mark in partial suspension. In 94.31% of cases the ligature mark (n=210) was characterised by Excoriation (Abrasions), Grooving, Leathery hard consistencies, Paleness and showed heaping and displacing of the superficial part of the skin around the ligature mark⁽⁹⁾.

Majority of the victims were married comprising 75.2% (n=158) of the cases and only 24.8% (n=52) of the cases were unmarried. In 80.05% (n=169) of cases, the incidents occurred inside the house, the least preferred place was work place in 1.9% (04). And the other preferred place was outside the house in 17.6% (n=37). 56.02% (n=118) belonged to poor or lowsocioeconomic class, 35.2% (n=74) belonged to average class and 8.6% (n=18) were from the high income group⁽¹⁰⁾. Issues related to love is the commonest factor which is responsible for hanging (n=69), of which female (n=46) formed the major share of victims. This

was followed by domestic related issues (n=25), disease conditions (n=19) and other factors like financial issues (n=38), education / career issues (n=27), work related issues (n=32) contributed to self suspension. Contusion on sternocleidomastoid muscles noted on 43.8% (n=92) cases. Tear in carotid artery was noted in 1.4% (n=3) cases.

Discussion

Suicide is menace in present day society, causing huge damage to young population affecting the socio economic aspects of the nation. The age group between 21-30 years are the most stressful period as it is the time for oneself to settle in life like getting job, marriage, education, starting a business. Failure leads the individual weak and may opt to end life. The age groups between 31-40 years are also vulnerable as it is the period where one will be beginning to settle in life. Since, the age group 20-40 years is the most active phase of life physically and socially⁽¹¹⁾. According to Anton J.L. VanHoff, hanging was the most common suicide method in primitive and pre-industrial societies⁽¹²⁾. The commonest choice of ligature material used was female dress (soft) material (stole (n=79), sari (n=68)) constituting to 55.68% (n=147) cases and the least preferred choice was the waist belt, reported in only 2 cases (0.76%), similar were the observations made by Jayprakash and Sreekumar and Sharma et.al. These results were contrary to the observations made by Pradhan et.al. The ligature findings (n=91) was found to be complete (n=15, 16.48%), incomplete (n=76, 83.52%), loops single (n=85, 93.41%), multiple (n=06, 6.59%), level above larynx (n=77, 84.62%). At the level of larynx (n=5, 5.50%), below larynx (n=2, 2.20%), not mentioned (n=7, 7.69%), position obliquely placed (n=89, 97.80%), transversely placed (n=2, 2.20%), below thyroid cartilage (n=4, 100%).

According to Dinesh Rao 94.31% of cases showed ligature mark (n=249) which was characterised by excoriation (Abrasion), Grooving, leathery hard consistencies, paleness and showed heaping and displacement of superficial part of the skin around the ligature mark. 91.4% of 210 suicidal hanging is complete hanging in the study but as of Dinesh Rao among the total of 264 cases, 88% of the hanging was complete and 12% was due to partial hanging⁽¹³⁾. In my study 80.5% persons have chosen the house. Few study observed that the domestic issues were the commonest

factor responsible (n=82) for hanging, of which female (n=68) formed the major share of victims. This was followed by love/relationship related issues (n=64), here too females formed the major part of the victims (n=49). Bapin Kumar Singh observed that 97.62% of cases showed pale, white, glistening tissue underneath the ligature mark and only 2.38% of the showed mild contusion of neck tissue⁽¹⁴⁾.

Conclusion

The high incidence of suicidal hangings among young adults, especially males imposes a huge socioeconomic burden on our society. Private nature of hanging and easy availability of ligature materials and ligature points makes prevention of suicide by hanging a difficult task. Marital unhappiness, problems associated with organic illness and dowry harassment are the main causative factors for suicidal hangings at

chennai. Family members, friends, teachers, healthcare professionals especially psychiatrists have to play a major role in primary and secondary prevention of suicidal hangings. Also a change regarding social practices and perceptions in India will prevent most of the suicides.

People mostly resort to hanging using easily available clothes as ligature in the confines of their homes. Literacy has an inverse relation with suicidal behaviour as people with no or less education are more prone for committing suicide by hanging. This calls for a well designed and comprehensive programme involving medical, non medical persons like NGOs, social workers, media and the government to identify and tackle the causative reasons amongst the people to prevent precious loss of life to such a preventable cause.

Table 1: Age and sex distribution

AGE GROUP							
SEX	<10	11-20	21-30	31-40	41-50	51-60	>60
MALE	0	10	45	42	29	9	1
FEMALE	0	6	29	20	16	3	0
TOTAL	0	16	74	62	45	12	1

Table 2: Variation of ligature materials

MATERIALS	NUMBERS	PERCENTAGE %
DUPATTA	35	16.7
JUTE ROPE	9	4.3
SAREE	41	19.5
NYLON ROPE	82	39
TOWEL	8	3.8
ELECTRICAL WIRE	15	7.1
DHOTI	18	8.6

Table 3: Shape and placement of ligature mark

LIGATURE MARK	NO.OF CASES	PERCENTAGE %
COMPLETE MARK	8	3.8
INCOMPLETE (DISCONTINUITY)	202	96.2
OBLIQUE SHAPE	198	94.3
HORIZONTAL SHAPE	12	5.7
ABOVE THE THYROID CARTILAGE	184	87.6
OVER THE THYROID CARTILAGE	20	9.5
BELOW THYROID CARTILAGE	6	2.9

Table 4: Types of Hanging

TYPES	NO.OF CASES	PERCENTAGE
COMPLETE HANGING	192	91.4
PARTIAL HANGING	18	8.6

Table 5: Place of suspension

PLACE OF SUSPENSION	NO.OF CASES	PERCENTAGE
INSIDE HOUSE	169	80.5
OUTSIDE HOUSE	37	17.6
WORK PLACE	4	1.9

Table 6: Motivating factor

MOTIVATING FACTOR	MALE	FEMALE
DOMESTIC	4	21
LOVE / RELATIONSHIP	23	46
FINANCIAL	37	1
EDUCATION / CAREER	25	2
WORK RELATED	32	0
DISEASE RELATED	15	4

Table 7: Internal findings in the neck

NECK TISSUE	NO.OF CASES	PERCENTAGE
STERNOCLEIDOMASTOID	92	43.8
THYROID CARTILAGE	1	0.5
HYOID BONE	2	1
CRICOID CARTILAGE	0	0
CAROTID CARTILAGE	3	1.4
CERVICAL VERTEBRA	0	0

Source of Funding: Self

Conflict of Interest: None

Ethical Clearance: Ethical clearance is obtained from ethical committee of Madurai Medical College and Hospital.

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Estimation of Stature Using Length of Front and Back of Index and Ring Finger in Contemporary Regional Indian (Bengali) Population-A Pilot Study

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Abstract

Post mortem identification is one of the important aspects of any medico-legal investigation. The partially destroyed dead bodies may be found in the form of skeletal remains or dismembered and mutilated body parts. Such bodies are encountered in air crashes, intentional mutilation and dismemberment, explosions, and other mass disasters. This present study was designed to develop a population specific regression formula (Regression equation) to correlate the stature of an individual with length of index and ring fingers in Indian (Bengali) population. The study was conducted among the students of Burdwan Medical College who were aged between 19 & 22 years. Total numbers of students were 68 of which 29 were males and 39 were females. On performing linear regression analysis, it was found that the regression equation for estimation of stature from ring and index fingers came out to be $\text{Stature} = 94.44(\text{Constant}) + 1.48 \times \text{Ring Finger (Front)} + 1.23 \times \text{Index Finger (Front)} + 1.53 \times \text{Ring Finger (Back)} + 3.40 \times \text{Index Finger (Back)}$. The R^2 was found to be 0.41 and R was 0.64 with standard error of estimate found to be 6.33. So, it can be seen that the predictive power of ring and index finger for stature is not very high and the same must be kept in mind while application of the formula in forensic practice.

Keywords: Identification – forensic –finger length- stature –Bengali-linear regression

Introduction

Post mortem identification is one of the important aspects of any medico-legal investigation. The partially destroyed dead bodies may be found in the form of skeletal remains or dismembered and mutilated body parts. Such bodies are encountered in air crashes, intentional mutilation and dismemberment, explosions, and other mass disasters.⁽¹⁾ Age and sex along with stature plays important role for establishing the identity of the remains of the human body.⁽²⁾ This is because

every human body part has more or less constant relation with stature.⁽³⁾ Numerous population specific studies have been published showing consistent results.^(4,5) Population specific studies that has been done on estimation of stature from fragments of tibia⁽⁶⁾ and bicondylar width⁽⁷⁾ and maximum length of femur; from sternal length⁽⁸⁾ in Bengali population, help us to form a basic idea on the applicability of regression equation from long bones in ethnic groups.

This present study was designed to develop a population specific regression formula (Regression equation) to correlate the stature of an individual with length of index and ring fingers in Indian (Bengali) population.

Materials & Method

The study was conducted among the students of

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Burdwan Medical College who were aged between 19 & 22 years. Total number of students were 68 of which 29 were males and 39 were females. The height of the individuals was measured by stadiometer in a erect standing position in Frankfurt plane. The length of the index and ring fingers were measured by callipers after keeping the palm on a flat surface. The anterior and posterior length of the right hand was taken for this study.

The length of the index and ring fingers were measured as the linear distance between the midpoint of the proximal-most flexion crease of the base, and the anterior-most points (tip) of the index and ring finger respectively in the midline on the palmer surface. Similarly the back of the finger length was measured from fingertip to first or major knuckles. The measurements

were repeated by three observers at interval of 3 weeks. The repeatability of the measurements was checked by Cohen’s kappa statistic and the interobserver repeatability was found to be good.

Results

The data was analysed using SPSS software version 20.0..On performing linear regression analysis, it was found that the regression equation for estimation of stature from ring and index fingers came out to be $\text{Stature} = 94.44(\text{Constant}) + 1.48 \times \text{Ring Finger (Front)} + 1.23 \times \text{Index Finger (Front)} + 1.53 \times \text{Ring Finger (Back)} + 3.40 \times \text{Index Finger (Back)}$. The R^2 was found to be 0.41 and R was 0.64 with standard error of estimate found to be 6.33. The distribution was normal as can be seen from the scatter plot.

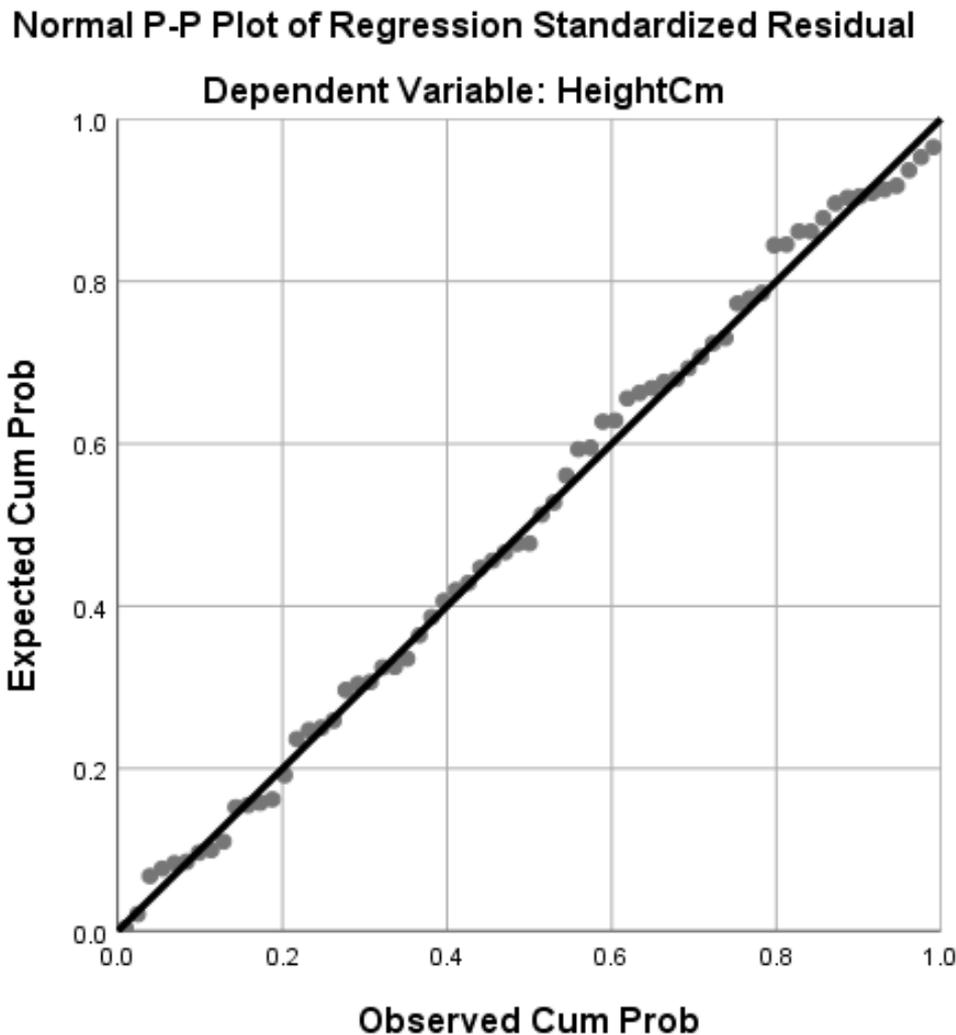


Figure 1 P-P plots

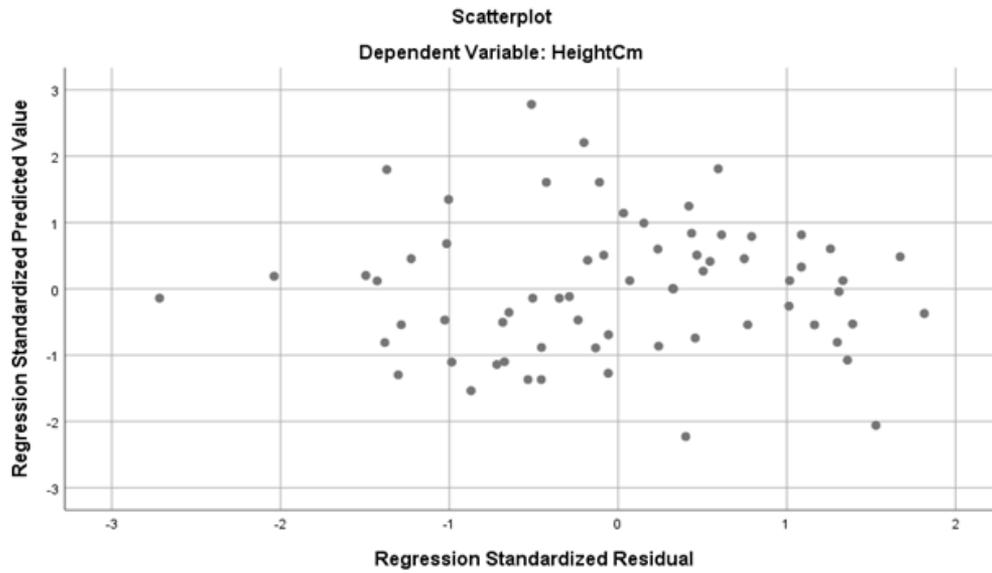


Figure 2 Scatter plot of distribution

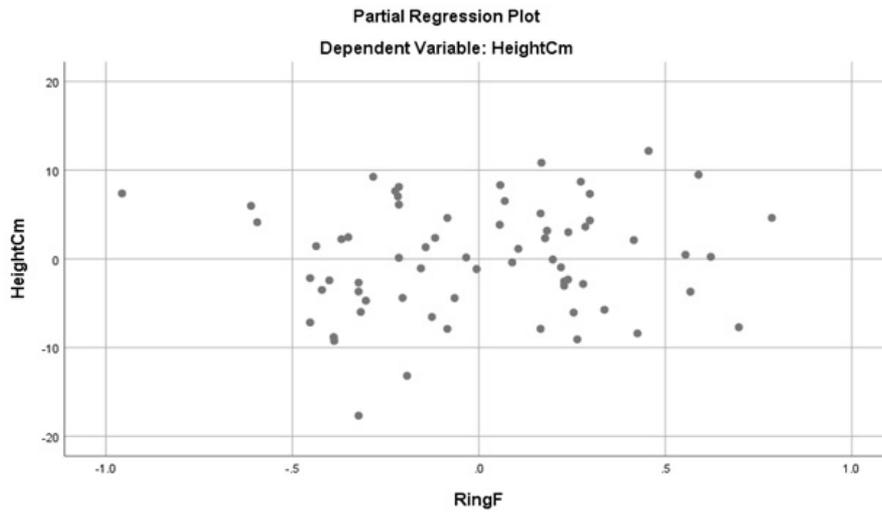


Figure 3 partial regression plots

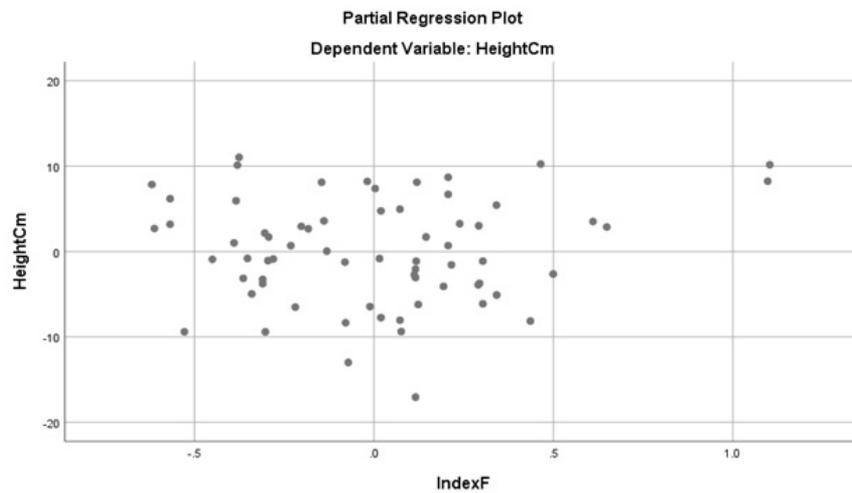


Figure 4 Partial regression plots

Table 1 regression model

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.643 ^a	.413	.375	6.332	.413	10.909	4	62	.000	1.996

a. Predictors: (Constant), IndexB, RingF, RingB, IndexF

b. Dependent Variable: HeightCm

Table 2 coefficients of the regression

Coefficients ^a						
Model	B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	94.449	10.365		9.112	.000
	RingF	1.487	2.198	.126	.677	.501
	IndexF	1.232	2.151	.114	.573	.569
	RingB	1.533	2.105	.144	.728	.469
	IndexB	3.405	1.976	.358	1.723	.090

a. Dependent Variable: Height in cm

Discussion

In this study we have utilized both the front and back lengths of index and ring fingers. However, the lengths were calculated irrespective of right or left hand. Since front and back lengths have not been considered in the estimation of stature in any earlier studies in Bengali population, the findings of our study cannot be compared with any other similar study in Bengali population..

On performing linear regression analysis, in our study we found standard error of estimate to be 6.33. In close line to our study, the work done by J. Sen et al.⁽⁹⁾ showed similar standard error of estimate, the values (irrespective of gender) being 5.742 for left index finger, 5.830 for left ring finger, 5.860 for right index finger and 5.9 for right ring finger. K. Krishan et al.⁽¹⁰⁾ in their

work showed that standard error of estimate in stature estimation using liner regression models ranged between 5.41 cm and 6.04 cm among males and between 4.37 cm and 4.79 cm in females.

The R² was found to be 0.41. The value of R² varied from 0.711 to 0.731 irrespective of the gender in the study done by J. Sen et al.⁽⁹⁾ Similarly. K. Krishan et al.⁽¹⁰⁾ in their work showed that the value of R² varied from 0.451 to 0.560 in males to 0.205 to 0.367 in females.

Pearson correlation (R) for stature and finger lengths was found to be 0.64. Similar observations were noted in the work of J. Sen et al.⁽⁹⁾ when all the subjects (males and females) are taken together. Stature was observed to be significantly and positively correlated with left index finger (R=0.731), left ring finger (R=0.721), right index finger (R=0.718) and right ring finger (R=0.731). While

the values were higher in males varying between 0.671 for right ring finger and 0.748 for left index finger; than females varying between 0.367 for left ring finger and 0.531 for right index finger. Value of R and R² being appreciably high, we can use regression equation for estimating stature in the Indian (Bengali) population.

Conclusion

Forensic anthropology is a good predictor of various collaborations that can be adjunctive in the process of identification. The studies which are conducted in a specific ethnic group can be an addition to the existing database of studies of various populations around the world so that a large international database is made available which can be of use in practical forensic investigation. From our study it is seen that the model can predict stature in 41% of the ethnic contemporary Bengali population. So, it can be seen that the predictive power of ring and index finger for stature is not very high and the same must be kept in mind while application of the formula in forensic practice. But since we have limitation of small study population it is suggested that a larger study with a bigger study population with more predictive factors can help to improve the results in future.

Conflict of Interest: None

Source of Funding: Nil

Ethical Clearance: Taken from IEC, Burdwan Medical College, Burdwan. Government of West Bengal

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A Prospective Analytical Study of Fatal Head Injuries in Road Traffic Accidents and Accidental Fall; An Autopsy based Study

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Abstract

The injuries and death due to head trauma are inescapable in the modern way of life and their correct interpretation is vital to the reconstruction of the events of Forensic Medicine and their proper management for treatment of the injured. The present study was conducted in Department of Forensic Medicine, Madurai Medical College, Madurai during January 2016 to January 2017 to find out the patterns of intracranial injuries during autopsy examinations in deaths due to RTA.

Total 1800 cases of autopsy were studied irrespective to the age; gender, religion, cast etc., who have died due to head injuries in RTA. All the data related to time, manner and manifestation of head injury were recorded with detailed autopsy examination and subsequently analyzed statistically. We reached at a conclusion that majority of the victims were male of 20-40 years age involving in road traffic accidents, when they were going on two wheelers without wearing helmets, while fall from height was the second most common cause...

Keywords: - Head injury, Road Traffic Accident (RTA), Fracture, Haemorrhage.

Introduction

Among all the regional injuries, the injuries to head and neck are the most common and important in Forensic practice. Deaths from head injury comprise 1-2% of all deaths from all causes and one third to one half of all deaths due to trauma are due to head injury. Of the survivors, those with a head injury were substantially more impaired than those without the former, therefore also being an important cause of morbidity. Head injury not only affects the primary victims but it has got innumerable secondary victims also, who suffer financially, psychologically and socially, whether the injury is produced by a vehicular crash, fall from height or by some other means. As head injury provides the major contribution to death, a sound practical understanding of the neuropathology of trauma with intracranial injuries is more essential to the Forensic Pathologist than any other aspect of his subject Road traffic accidents cover

almost two third of the total deaths due to head injuries, hence being the major devastating factor adding to total head traumas.

Materials and Method

A total of 1800 cases of autopsy examination, which are brought to mortuary directly or from accidental emergency or from neurosurgery department, were studied. All cases who have associated hypertensive, cardiac, endocrinal and metabolic disorders were excluded by history, and previous clinical records, with cases who are having only external evidence of injury over head and cause of death is other than the head injury. The pathological features of these cases as scalp injury, pattern of skull fractures and intracranial hemorrhages and their distribution were noted at the actual autopsy examination of victim with detailed history related to time, manner and hospitalization. All the data were reduced to tables, graphs and subsequently subjected to computer aided statistical analysis.

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Observations:

The age group between 20-40 year covers the

maximum number of incidences of head injury

(Table-1). Around 56% of the cases were fatal on the very first day and half of the cases among them could not reach to the hospital and died either on the spot, on the way or immediately after they getting admitted in emergency. The skull fractures (83.38%), intracranial haemorrhages (90%) and brain injuries (87.11%) were common features of almost all fatal Head injuries in combination, which suggests that these are the common lesions and causes of high percentage of mortality (Table-2). The dominant type of skull fracture found was the linear (fissured) fracture in 43.05% cases followed by basilar fracture counting 30.22% and being the 2nd common type.

The depressed, comminuted and crush fracture shared a percentage of [7.9], [6.05] and [2.77] among all showing their lesser and uncommon existence. In rest 10 cases no skull fracture was found (Table-3). Linear fracture is comparatively more common in the thin areas of temporal and parietal bones (Table-4), while on basal region basilar fracture is more commonly involving the anterior and middle cranial fossa (Table-5). Comparative study shows that linear fractures are more common in cases of RTAs while basilar fractures are comparatively more common in cases of fall from height. The incidences of intracranial haemorrhages shown in Table reveals that the dominant type of intracranial haemorrhage is sub-dural haemorrhage (SDH) involving 79% cases followed by sub-arachnoid haemorrhage (SAH) in 27.77% and intra-ventricular haemorrhage (IVH) in 18% while the extra-dural haemorrhage (EDH) is the least common type involving only 8.22% cases. We observed that all cases of EDH are associated with SDH while 75% cases of SAH and IVH are associated with SDH. On comparative study we found that SDH is more commonly seen in cases of RTAs while SAH and EDH are comparatively more common in cases of fall from height.

Discussion

Head injury is a major health problem all over the world. According to WHO estimate the injury is going to third leading contributor of the global burden of the disease after ischemic heart disease and unipolar depression by 2020. Motor vehicle accident is the leading cause of serious injuries with associated head trauma especially in youth and middle age. These

accidents occur more frequently in certain age groups, at certain times of day and at certain localities. Some people are more prone to accidents than others and susceptibility is increased by the alcohol, unawareness of traffic discipline and carelessness. RTA is on the increase globally and India is not an exception. Delhi records the highest number of accidents every year in India - one of the highest in the world. The rate of incidence is higher in India because of its traffic patterns and possibly the lack of preventive measures such as helmets in motor cyclists and seatbelts in automobiles and poorly controlled traffic conditions and poor road conditions. Age group 20-40 which covers the maximum youth and the middle age populations, involving males formed the major sufferer group of head trauma with more prone to RTA, compatible to other studies [4], [5], [8], [11], [12], [13]. The rest of the age groups i.e. the females, old aged and children are comparatively involved with a history of fall and other trauma. This can be explained by the fact that at the age of 20-40 people especially male are more mobile, go out for work and take risks, while elderly people, females and children usually stay at home, which coincides with the study of other workers [4], [5], [11], [13].

The ratio of male:female 'head injury cases in our study is 5:1 which is very well supported by the other studies [4], [6], [13]. It also gives an almost similar distribution of the external causes of RTAs covering 66% and falls 24% as in our study. As study shows, the linear (fissured) fracture is the most common type of skull fracture. The more vulnerable thin areas of skull lie in the temporoparietal, lateral part of frontal and occipital zones. The similar type of finding was presented by other authors [4], [15]. A heavy impact on the side or over top of the head often leads to the linear fracture of skull vault in these thin areas, extending up to the base of skull, causing basilar fracture also. Other author also implicates the above-mentioned facts [1].

The linear fractures extending upto the base of skull are comparatively more common in cases of road traffic accidents than fall from height and assault because this type of pattern is more common in those head injury cases which are caused by forcible contact with a broad resisting surface like ground, especially in a moving condition. In fatal head injuries subdural haemorrhage (SDH) and subarachnoid haemorrhage (SAH) are the two common type of haemorrhages in which SDH is mainly traumatic in origin with broad etiology while the

EDH and SAH both are comparatively more common in fall from height cases than road traffic accident and assault. The extradural haemorrhage was observed in the least and almost all cases -were'found in age group of more than 20 years, which shows that the EDH is less common in children and old age due to the greater adherence of dura to skull and absence of a bony canal for the artery. Contusions and lacerations of the brain are Particularly prominent in regions where the brain is in contact with projectile buttresses and ridges on the inner'surface of the skull i.e. the inferior surfaces of temporal poles and orbital surfaces of the' frontal lobes, which were also reported by others. [4], [10], [15].

Conclusion

Our current study and previous similar studies suggest that the basic cause of the concern is the lack of awareness and carelessness of the common masses regarding the traffic and safety discipline and onthe other hand a kind of leniency shown by the' legal authorities towards such

Fallacies. The increasing number of vehicle in India indicates the' progress and improvement of a developing nation, but it should be kept in mind that the"mobility should not get priority over human lives" ..

Proper safety guidelines to be taught right from' school children, to the youth' and especially drivers regarding safe driving. Promotions' of safety measure like use of seat belts and helmets should. be"made compulsory and forget the use of mobiles duringdriving. ' Alcohol and other drug 'users should be Punished legally and also fined heavily so as to create a lesson for others to not to follow alcohol and drug intake While driving. There should be a proper segregation for Pedestrianson the roads while traffic is moving. '

The proper layout of roads and speed Breakers is an excellent investment and cost effective measure rather. than the expenditure on the treatment and the rehabilitation,of the traffic injured persons.,'

Table 1. Age distribution of study sample:

Age in yrs	No. of cases	Percentage
Less than 10	190	10.55
11-20	200	11.11
21-30	396	22
31-40	301	16.72
41-50	212	11.77
51-60	231	12.83
More than 60	270	15

Table 2. Distribution of cases as per

Types of Head Injuries	No. of Cases	Percentage
Fracture of Skull	1501	83.38
Intracranial Hemorrhage	1620	90
Brain Contusions and Lacerations	1568	87.11

Table 3: Types of Skull Fracture Observed

Fracture Type	No. of Cases	Percentage
Linear	775	43.05
Basilar	544	30.22
Depressed	142	7.9
Comminuted	109	6.05
Crush	50	2.77
No Fracture	180	10

Table 4: Distribution of cases according to Site of Linear Fracture:

Site of Fracture	No. of Cases	Percentage
Frontal Bone	380	21.11
Temporal Bone	574	31.88
Parietal Bone	432	24
Occipital Bone	414	23

Table 5: Distribution of cases according to Site of Basilar Fracture:

Types of Intra Cranial Hemorrhage	No. of cases	Percentage
EDH	148	8.22
SDH	1422	79
SAH	500	27.77
IVH	324	18

Table 6: Types of Intra cranial Hemorrhage seen in Head Injuries :

Site of Fracture	No. of Cases	Percentage
Anterior Cranial Fossa	700	38.88
Middle Cranial Fossa	648	36
Posterior Cranial Fossa	452	25.11

Ethical Clearance – Not needed as it is a statistical study

Source of Funding – Self

Conflict of Interest- None

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Socio Demographic Study of Homicidal Victims

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Abstract

Homicide refers to the killing of one human being by another human being with or without any intention. In the present study, a total of 100 homicide cases autopsied at Madurai Medical College, Madurai, Tamil Nadu, during the year 2016 were analysed for the various socio-demographic factors involved in the homicidal acts. Results showed that males were commonly victimized in the homicidal acts compared to females. Majority of the victims were in the age group of 31 to 40 years, married, belonged to lower socio-economic status, and hailed from rural areas. Most of the attacks on males occurred at outdoor by the acquaintance and those on females at their house by the spouse. The offenders involved were multiple in 48% and single in 31% of cases. Majority of the deaths were caused by infliction of mechanical injuries on the body with blunt force trauma accounting for 32% of cases. Defence wounds were observed in 33% of cases.

Keywords: Homicide; Victim; Offender; Blunt force; Weapon; Defence wound.

Introduction

Unlawful killing of human being is murder (S.300 IPC). Culpable homicide cases may be amounting to murder (S.299 IPC) or not amounting to murder (S.304 IPC). Punishment of murder (S.302 IPC) is death or imprisonment for life and also fine.¹ Homicide is the most serious of violent crimes and it is as old as civilization. The incidence of homicide has been increasing at an alarming rate worldwide. According to the Law, homicide may be criminal or non-criminal. To constitute a criminal act, the act of a human that causes the death of another human must be committed with criminal intent and without any lawful excuse or justification.

The increasing rate of homicide has become a major public health problem. This is due to the growing population, urbanization and industrialization associated with high materialistic mind of the individuals. Criminals, having the advanced knowledge of science at

their disposal are adopting various means of committing homicide in the present world. Thus, in the investigation of such deaths, the role of medical officer and forensic science personnel is very important. The purpose of the present study is to analyse the socio-demographic aspects of the victims of homicide.

Material and Method

This retrospective study is carried out by analysis of data from post-mortem reports, inquest papers and post-mortem registers of the Forensic Medicine and Toxicology Department. The study sample included 100 homicidal deaths that were performed in the year 2016 in the Department of Forensic Medicine, Madurai Medical College, Madurai, Tamil Nadu, India. All the cases were reviewed prospectively. The factors such as age, sex, marital status, socio-economic status and locality of the victims were studied. In addition, the information regarding the location of crime, methods employed and relationship between the offender and victim were analysed using the police and hospital records, and from interviewing the relatives or known people accompanying the corpse.

Results

During the study period, there were 100 homicidal deaths with male to female ratio of 4.:1

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The age distribution of the victims of homicide is shown in Table 1. The commonest age group of the victims was 31 to 40 years. Three-fourth of the victims was married (Fig. 1) and mainly belonged to lower socio-economic status (Fig. 2). Majority of the victims were from the rural community (Table 5).

Table 1. Age distribution of study sample:

Age (yrs)	No. of cases
Less than 10	02(2%)
11- 20	02(2%)
21-30	25(25%)
31-40	37(37%)
41- 50	14 (14%)
51- 60	13 (13%)
More than 60	07 (7%)

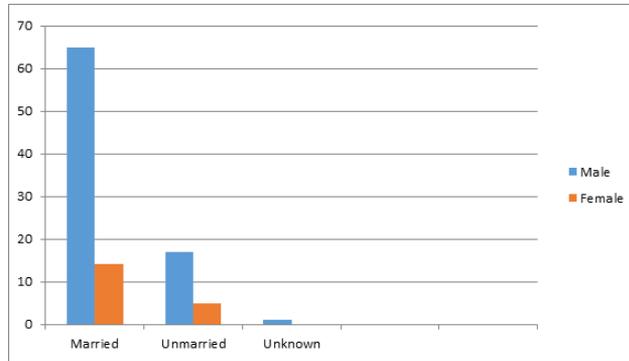


Fig.1 Marital Status of Victims:

The relationship of the offenders and victims is shown in Table 2. Majority of the victims were killed by an acquaintance in males and spouse in females. The offenders were multiple (more than one) in 48% of cases, single in 31% of cases, and not known in the remaining cases. Most of the Offenses on males had occurred in the outdoor location (street or in front of the house) and on females in the house (Table 4). The methods used for the assault is shown in (Table 3). Majority of the deaths were caused by inflicting mechanical injuries. Blunt force impact was used to kill nearly one-third of the victims. Defence wounds were present in 33% of cases.

Table 2. Relation of the offender and victim:

Offender	Male	Female
Acquaintance	40 (40%)	03 (3%)
Stranger	15 (15%)	02(2%)
Spouse	01 (1%)	10(10%)
Relative	10 (10%)	04(4%)
Unknown	14 (14%)	01(1%)

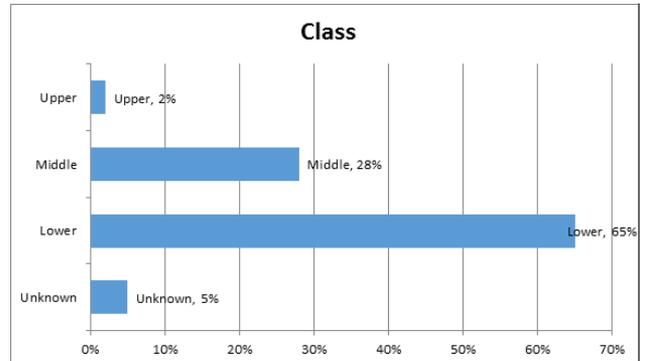


Fig 2-Socioeconomic status of victims:

Table 3. Methods used for the crime:

Methods	Male	Female
Mechanical injuries	57 (57%)	5 (5%)
Asphyxia	22 (22%)	11 (11%)
Firearm	0	0
Burns	0	04(4%)
Poisoning	0	01(1%)

Table 4. Location of crime:

Location	Male	Female
Outdoor	53(53%)	03 (3%)
Home	13(13%)	15 (15%)
Work place	04(4%)	01(1%)
Other	05(5%)	0
Unknown	05(5%)	01 (1%)

Table 5. Location of crime:

Locality of Victims	No. Of Cases (%)
Rural	60
Urban	37
Unknown	03

Discussion

During the trial of a homicide in the Court of Law, many questions can be raised viz., the number of assailants involved, type of weapon or method used, location of the crime, presence of any defence wounds, etc and sometimes these could be the decisive factors. These factors were analysed in the present study. The number of male victims were more when compared to the females in our study. This is consistent with other studies²⁻⁶ This indicates that males are more exposed to the outside environment and indulge in more violent activities. In the present study, people from all the age groups were affected in homicide, but the highest incidence was found in the fourth decade of life (Table 1). The majority of victims were in the age group 31 to 40 years. Our findings coincide with the studies^{6,9,10}. In these studies the fourth and fifth decades were commonly involved in the homicide in Scandinavian capitals (Oslo and Copenhagen), Newfoundland of North America, and Toyama Prefecture of Japan. But it differs with the findings of other studies^{2,3,5,7,21,22}.

Most of the victims were married (Fig. 1). Similar observations were made in other studies^{11,12}. Our study indicates that marital disharmony may play an important role in homicides. Homicides in women were mostly attributed to spouse or male partners. Women murdered by their past or present male partner make up the vast majority of (female) victims.³ More than 50% of the victims belonged to the lower socio-economic status (Fig. 2) and hailed from the rural community (Table 5). Similar findings were observed in a study from Varanasi¹³ With respect to victim-offender relationship, it has been seen that the victim is more likely to be killed by acquaintance,^{9,10,14,15} spouse,^{4,16} and strangers.¹⁷ A mentally ill offender is more likely to kill relatives or family members than the remaining offenders.¹⁸ In the present study, the male homicides were more commonly committed by the acquaintance, whereas the

female homicides by the spouse (Table 2).

The number of offenders involved in homicides was more than one in majority of the cases. This is consistent with another German study.¹⁵ In the present study, majority of the offenses on males have taken place at the outdoor, and on females inside the house. Similar findings were observed in other studies.^{6,19} This could be due to the fact that, males being the common group that moves in the crowd and gets involved in street fights, whereas majority of the females confine to the house work. However, our findings differ with some studies, where majority of the offenses have occurred in the home of victims.^{14,15,17} In the present study, majority of the deaths have occurred due to infliction of mechanical injuries (Table 3). Blunt force trauma has been used in the offenses, accounting for 32% of all the deaths. This is consistent with the finding of other researchers.^{8,10,21,22} This could be due to the reason of cheaper and easy availability of blunt weapons. In countries where there are difficulties in possessing firearms, other methods like blunt injury, sharp injury and asphyxia are the major causes of death.^{10,15,20}

In the present study, asphyxia and burns were Out numbered in the females compared to the male victims.

This could be explained as the female victims have less defence and resistance which results in succumbing easily to the act of asphyxial deaths and burns. The presence of such injuries indicates an assault by some other person or persons. The absence of defence wounds does not exclude homicide since the victim may be incapable of effective defence for reasons such as a surprise attack, victim in unconscious state or under the influence of alcohol, and hands in the pocket or coat sleeves.

Conclusion

There is slight decreasing trend of homicidal deaths during the period of study even though number of total autopsies had increased. The incidence has also reduced to less than half over a period of two decades in the city due to stringent measures taken by the police department. Because of Post mortem examination, 5 cases had been turn out to be homicidal deaths, though it was reported as accidental deaths. Being most vital body-organs, brain, lungs and heart were most commonly injured. Deaths due to mechanical injuries constitute the majority of homicidal deaths followed by asphyxial deaths.

The increase in trends of homicide by acquaintance and spouse point out to a

Social disharmony which should be immediately dealt with measures such as psychological counselling since most of these deaths are due to provocation.

A stringent curb on alcohol is also the need of the hour.

Source of Funding: Self

Ethical approval: Not needed as the study involves statistics only.

Conflict of Interest: None

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Abdominal Solid Visceral Injuries in Fatal Road Accident - An Autopsy Based Study

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Abstract

Introduction: Road accident is one of the leading causes of death due to trauma. Injuries to head and thoraco-abdominal regions proved to be most fatal of all the visceral injuries, the abdominal solid viscerae constitute a significant percentage in blunt trauma abdomen.

Objectives: The present study is conducted to study the pattern and distribution of abdominal solid visceral injuries and their correlation with the age and sex of the victims.

Method: This is a cross sectional study involving 179 subjects. During autopsy, the abdominal solid viscerae were dissected en-block and examined, and the data were inserted in a predefined scoring chart. The data were further analysed using SPSS17 for windows.

Results: Fatal injuries displayed a male predominance, with majority of fatalities being between 30-40 years. Hepatic injuries (83.67%) were found in majority of cases, followed by Spleen (38.76%), Kidneys (22.45%) & Pancreas (6.12%). Significant correlation ($p=0.052$) was found between brought dead patients and visceral injuries. Of all the deceased, majority were pedestrians.

Conclusion: The solid abdominal visceral injuries constitute a potential factor of morbidity and mortality in road traffic accidents. Early transportation facilities to specialised hospital coupled with early diagnosis and management will be the keystones in decreasing the fatalities due to road accidents.

Keywords: Solid viscera, Blunt trauma, Fatal Road Accidents.

Introduction

Road traffic accident is one of the leading causes of death due to trauma and number of death due to road traffic accidents are increasing every year. In 1990, Road Traffic Accidents were the 9th major cause of death and disability¹. According to WHO road accidents were the

10th major cause of death in 2015, which contributed about 1.3 million deaths worldwide². According to a report on road accidents by Government of India; in the year 2016 road accidents in India were decreased by 4.1% than the previous year, but road accident fatalities were increased by 3.2% than the previous year. Total number of Road accidents in 2015 was 501423 and in 2016 it was 480652. In 2015 total number of road accident fatalities was 146133 and in 2016 it was 150785³.

Although injury may occur any part of the body in case of RTA, but the most common sites of injury are head-neck, then comes the thoracic region, the abdominal region, the lower limbs, and the upper limbs in chronological order⁴. Among the sites, injury to head and thoraco-abdominal region is most fatal. Abdominal

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visceral injuries form an important part contribution to death due to road accidents, because percentage of victims may be comparatively small, but mortality is disproportionately high⁵. Although no abdominal viscerae are safe from injury; but solid viscerae are injured more commonly in blunt trauma abdomen⁶. In the present study abdominal solid visceral injuries (liver, spleen, kidneys and pancreas) have been taken into consideration.

Aims & Objectives

The aims & objectives of this paper is to study the pattern of abdominal solid visceral injury in fatal road traffic accident cases, to determine the most common solid visceral injury contributing to fatality in road traffic accident, to study the age & sex distribution of victims and to study the distribution of abdominal solid visceral injury among different types of road users.

Materials & Method

This study is a cross-sectional study. Data are collected by examining all the fatal cases of road traffic accident came for autopsy examination in the mortuary of Burdwan Medical College for one year duration (from February 2011 to January 2012) and from the police inquest report. Total numbers of cases studied were 179 among which 49 cases had only abdominal visceral injury. Decomposed bodies & unknown bodies were excluded from this study as well as those cases in which there are associated major injuries on parts other than abdominal solid viscerae. After thorough external examination and dissection of the bodies, abdominal solid viscerae are dissected in en block method and examined very carefully for any injury. A scoring system is done to measure the severity of the injuries. All the data have been put in the Microsoft excel and calculations are done by using SPSS 17. The scoring system is as follows:

Table 1: Relation between survival and net score.

Injury type	Description	Score
Contusion	<10% surface area involvement	1
	10-50% surface area involvement	2
	>50% surface area involvement	3
Laceration	<1 cm parenchymal depth involvement	1
	1-3 cm parenchymal depth involvement	2
	>3 cm parenchymal depth involvement	3
	Completely shattered	4

Each organ (among liver, spleen, kidneys and pancreas) are scored separately in the above manner. The maximum score is being 28.

Result & Analysis

Among 49 cases with abdominal solid visceral injuries 42 are male (85.71%) and 7 are female (14.29%). 5 victims (10.2%) were in their 1st decade of life, 2 victims (4.08%) were in 2nd decade of life, 10 victims (20.41%) were in 3rd decade, 14 victims (28.57%) were in 4th decade, 8 victims (16.33%) were in 5th decade, 6 victims (12.24%) were in 6th decade, 3 victims (6.12%) were in 7th decade and only 1 victim (2.04%) was in 8th decade of life.

Among the 49 cases most of the cases had multiple visceral involvements. Hepatic injury was found in 41 cases (83.67%), 19 cases (38.76%) had splenic injury, injuries to Rt and Lt kidney was found 11 cases each (22.45% each), only 3 cases (6.12%) had pancreatic injury.

For one unit increase of NET SCORE, odds of dying increases 1.14 times and it is significant (C.I → 1.07 – 1.21), (p < 0.05).

For one unit increase of admission gap, odds of dying decreases O.R is 0.816 (C.I → 0.74 – 0.89), (p < 0.05).

Hazard Function at mean of covariates

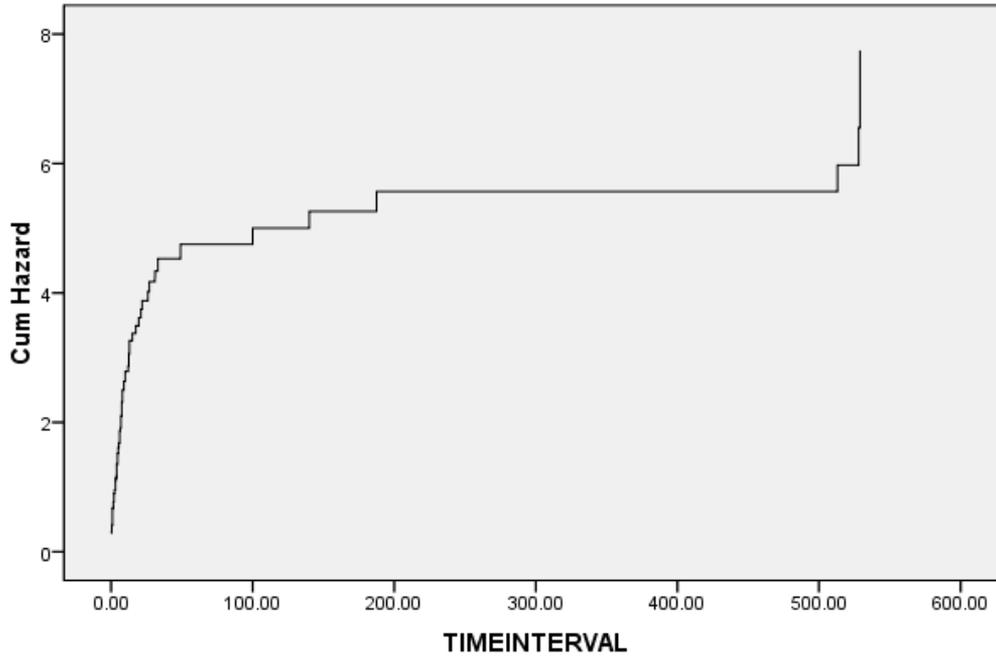


Fig 1: Distribution of interval between time of incidence and time and death

Table 2: Association between brought dead cases and abdominal solid visceral injury.

Within 1st 100 hours maximum death occurs, then a plateau phase is reached.

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.771 ^a	1	.052		
Continuity Correction ^b	3.104	1	.078		
Likelihood Ratio	3.664	1	.056		
Fisher's Exact Test				.071	.040
N of Valid Cases ^b	179				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.60.

b. Computed only for a 2x2 table

Chi-square test shows there is an association present between **brought dead & visceral injury** – presence of visceral injury increase the chance of being brought dead and this association though not significant at 95% C.L (CONFIDENCE LEVEL), but it is significant at 90% C.L (p = 0.052, df = 1, chi-square value = 3.77).

Table 3: Association between spot dead cases and abdominal solid visceral injury.

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.421 ^a	1	.001		
Continuity Correction ^b	9.243	1	.002		
Likelihood Ratio	9.880	1	.002		
Fisher's Exact Test				.002	.001
Linear-by-Linear Association	10.363	1	.001		
N of Valid Cases ^b	179				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.41.

b. Computed only for a 2x2 table

Chi-square test suggest highly significant association between spot death and visceral injury (p = 0.001,df = 1, chi-square value = 10.42).

Spot dead vs net score

Table 4: Association between spot dead cases and net score.

SPT DEAD Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.509 ^a	11	.004
Likelihood Ratio	26.949	11	.005
Linear-by-Linear Association	20.466	1	.000
N of Valid Cases	179		

a. 20 cells (83.3%) have expected count less than 5. The minimum expected count is .27.

Chi-square test suggests significant association between spot dead & net score (p = 0.004, df = 11, chi-square value = 27.51).

Brought dead vs net score

Table 5: Association between brought dead cases and net score.

BRD DEAD Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.905 ^a	11	.111
Likelihood Ratio	19.700	11	.050
N of Valid Cases	179		

a. 20 cells (83.3%) have expected count less than 5. The minimum expected count is .32.

Not significant (p = 0.11, df = 11, chi-square value = 16.91).

Among pedestrians 31.5% were spot dead, among cyclists 26.7% were spot dead, among motor cyclists 24% were spot dead, among four wheeler occupants 14.3% were spot dead, among heavy motor vehicle occupants 27.3% were spot dead. No spot dead was

found among the tri cycle users.

Among spot dead 59.2% were pedestrians, 8.2% were cyclists, 12.2% were motor cyclists, 2% were four wheeler occupants and 18.4% were heavy motor vehicle occupants.

Table 6: Percentage wise distribution of brought dead cases among different types of road users.

BRGHTDEAD * ROADUSER Crosstabulation									
			ROADUSER						Total
			1	2	3	4	5	6	
BRGHTDEAD	N	Count	66	10	18	3	3	22	122
		% within BRGHTDEAD	54.1%	8.2%	14.8%	2.5%	2.5%	18.0%	100.0%
		% within ROADUSER	71.7%	66.7%	72.0%	42.9%	42.9%	66.7%	68.2%
	Y	Count	26	5	7	4	4	11	57
		% within BRGHTDEAD	45.6%	8.8%	12.3%	7.0%	7.0%	19.3%	100.0%
		% within ROADUSER	28.3%	33.3%	28.0%	57.1%	57.1%	33.3%	31.8%
Total		Count	92	15	25	7	7	33	179
	% within BRGHTDEAD	51.4%	8.4%	14.0%	3.9%	3.9%	18.4%	100.0%	
	% within ROADUSER	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Among pedestrians 28.3% were brought dead, among cyclists 33.3% were brought dead, among tri cyclists 28% were brought dead, among motor cyclists 57.1% were brought dead, among four wheeler occupants 57.1% were brought dead, among heavy motor vehicle occupants 33.3% were brought dead.

Among brought dead 45.6% were pedestrians, 8.8% were cyclists, 12.3% were tri cycle users, 7% were motor cyclists, 7% were four wheeler occupants and 19.3% were heavy motor vehicle occupants.

Discussion

Total number of cases examined was 179, among which only 49 victims died solely due to abdominal solid visceral injury. Among the 49 victims 42 were male (85.71%) and 7 were female (14.29%). Among the victims, 65.31% belong to the age group above 20 years to below 50 years; rest 34.69% belong to other age groups. Most of the victims had multiple abdominal solid organ involvements. 41 victims had hepatic injuries (83.67%), 19 victims had splenic injuries (38.76%), 11 victims had Rt kidney injuries and 11 victims had Lt kidney

injuries (22.45% each), 3 victims had pancreatic injuries (6.12%). The findings are not consistent with findings of previous studies. A study in Aurangabad shows splenic injuries were found in most of the victims followed by liver, kidney and pancreas. In that study 20% victims had hepatic injuries, 27.2% victims had splenic injuries, 9.09% victims had kidney injuries and 7.2% victims had pancreatic injuries⁵. Another study from Maharashtra shows most of the victims had hepatic injury (11.88%), followed by injuries to kidneys (8.41%) and splenic injuries (5.94%)⁷. A Portugal based study shows most common solid visceral injury involves the liver and the spleen (5%), liver and kidney (4.6%), spleen and kidney (3.7%) in abdominal trauma cases; and the findings are consistent with the present study⁸. A study from Brazil shows that most of the victims are male (83.29%) as compared to female (16.71%) and 18-29 years age group shows maximum deaths due to blunt abdominal trauma (34.41% cases) and the hepatic and splenic injuries being the commonest (79% & 42% respectively). These results support the findings of the present study⁹. 21-30 years (26.53%) males (85.96%) are the commonest victim as compared to female (14.04%) of age group of 51-60 years (31.25%) in blunt abdominal injuries. Due to its large size, solid consistency and fixed location the liver (58.77%) is the commonest solid viscera followed by the spleen (36.84%) and 42.1% victims of blunt trauma abdomen are brought dead or died on the spot according to an Indian study in the year of 2017¹⁰, these results are also consistent to that of present study.

Conclusion

The solid abdominal visceral injuries constitute a potential factor in increasing the amount of morbidity and mortality and, therefore, proper attention towards their accurate and early diagnosis and satisfactory management is mandatory. Early transportation from the site of occurrence is necessary by improving transportation facilities and increasing more numbers of specialized hospitals with ICU/ITU facilities would help in diminishing the morbidity and mortality rates in these cases.

Conflicts of Interest: None.

Source of Funding: None.

Ethical Clearance: Taken.

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Demographic Study of Fatal Craniocerebral Injuries in Road Traffic Accidents at Indore Region of Central India

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Abstract

Road traffic accident is major burden of casualty in present scenario in this modern way of life and expanding vehicular load on the road make this problem more complicated. Road Traffic Accidents is still the major cause of death. Brain damage, as a result of head injury, constitutes a hidden epidemic and is a major problem worldwide including India. Injuries to the body intrinsically related to the impact velocity of the vehicle and the point of striking surface to the body and termination of its force. This prospective study has been conducted at mortuary of the department of forensic medicine, Mahatma Gandhi Medical College, Indore, in the year 2016 to 2017 to study the pattern and distribution of Head Injuries of fatal road traffic accidents and to prepare the demographic profile. Study was conducted on total 215 cases of fatal head injuries due to road traffic accident. Number of male victims were 151 and female were 64 (male to female ratio was nearly 7:3). Commonest age group affected was 21-30 years with 61 cases (28.37%). Among total victims, Hindus were 186 (86.5%) and rests were Muslims 19 (8.83%) and other religions. Total hospitalized cases were 174 (80.93%). Fatal skull fractures were found in 208 (96.74%), in which linear/fissure fracture were 143 (68.75%), which was most common. Most common bone fractured was parietal bone in 118 cases (54.88%). The commonest variety of intracranial hemorrhage was subdural hemorrhage in 131 cases (60.93%) and craniotomy was done in 22 (10.23%) cases.

Keywords: Road traffic accident, Fatal, Cranial cerebral injury, Fracture, Skull.

Introduction

A report on Road Accidents in India 2016, published by Transport Research wing under Ministry of Road Transport & Highways, Government of India, has revealed that more people died on roads accidents in India last year, as compared to the number of deaths in 2015. The country recorded at least 4,80,652 accidents in 2016, leading to 1,50,785 deaths. The number suggests that at least 413 people died everyday in 1,317 road accidents. At least 17 deaths occurred in road accidents in 55 accidents every hour in which Head injury is most common and major component cause

of death and often emergency encountered in trauma units and the casualty department.^[1] "Head injury is a morbid state, resulting from gross and subtle structural changes in the scalp, skull and or the contents of the skull produced by mechanical force", as per the National Advisory Neurological Diseases and Stroke Council.^[2] Approximately half of all deaths are among vulnerable road users - motorcyclists, pedestrians and cyclists.^[3]

Material and Method

The present prospective study was conducted at Mahatma Gandhi Medical College and associated Maharaja Yaswant Rao Hospital, indore (M.P.) from year 2017 to 2018 for a period of one year. Material included all dead bodies (n = 215 cases) of fatal RTA brought to the Department of Forensic Medicine MGM College indore for autopsy. Keeping in mind that injuries present over body its pattern and all possible

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demographic profile data was collected by Police, relatives, treating doctors, Hospital records and also from post-mortem findings. The relevant history about the injuries to the victims was also collected. All RTA victims died on spot and hospitalized and operated after the time of accident were incorporated in this study.

Observations and Results

It was observed in the study that most affected age group was between 21-30 years having total 61 cases (28.37%), followed by 41-50 years 53 cases (24.65%), all age groups are dominated by males with maximum sex differentiation in 21-30 years age group (Table 1)

TABLE 01: CASES DISTRIBUTION ACCORDING AGE

Age Group (In Years)	Total Case	percentage
0 – 10	7	3.25 %
11 - 20	29	13.48
21 -30	61	28.37
31 – 40	36	16.74
41 -50	53	24.65
51 and above	29	13.48

Females were affected maximum in age group of 31-40 years, whereas males were affected maximum in 21-30 years of age group. In the present study males (n=151, 70.23%) outnumbered females (n=64, 29.26%) significantly with male to female ratio of nearly 7:3 describe on (Fig. 01).

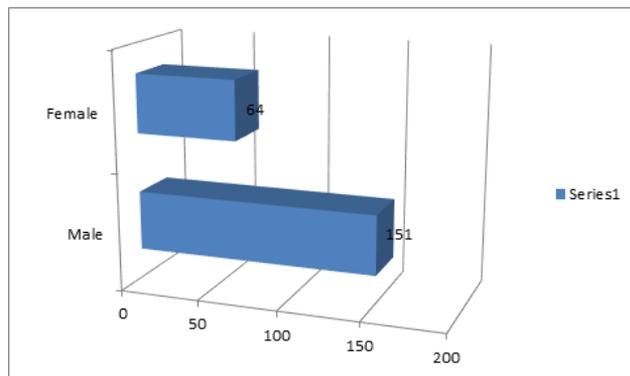


FIG. 01: SAMPLE SIZE ACCORDING SEX (M/F)
Total number of cases 215

In this study total 215 cases reported were Hindus are 186 (86.5%) and 19 were Muslim (8.83%) rest belong from other community.

Total numbers of hospitalized cases were 174 (80.93%) and rest was not hospitalized 41 (19.06%), which showed that either the victims died on spot or on the way to the hospital Surgical intervention undergone craniotomy was done in 22 (10.23%) cases. (Table 2)

TABLE 02: DISTRIBUTION ACCORDING (HOSPITALIZED/SPOT DEATH)

	Number of cases & Percentage (%)
HOSPITALIZED CASES	174 (80.93%)
BROUGHT DEAD TO HOSPITAL / SPOT DEATH	41 (19.06 %)
CRANIOTOMY DONE	22 (10.23 %)

Head injury alone was most common injury (excluding minor abrasions, laceration and contusion) and was present in 208 cases (96.74%).

In our study we find the parietal bone is most common site of fracture followed by temporal bone. We segregate all site separately, therefore when we find fracture over frontal-parietal region acknowledge this, as frontal site separately as well as parietal site separately, in our case we find frontal-parietal region is combined affected mostly, followed by parietal-temporal region. Among the Skull Fractures, most common site we find Parietal bone in 118 cases (54.88%) followed by Temporal bone in total 87 cases (40.46%), Frontal bone was fractured in total 72 cases (33.48%), and Occipital bone was fractured in total 38 cases (17.67%). Base of the skull bone (including all cranial fossa was fractured in total 74 cases (34.41%), Comminuted fractures found 54 (25.11%). (Table 3)

TABLE 03: SKULL FRACTURE ACCORDING SITE

SKULL FRACTURE SITE	
SKULL FRACTURE	NUMBER OF CASES & PERCENTAGE (%)
PARIETAL REGION	118 (54.88%)
TEMPORAL REGION	87(40.46%)
FRONTAL REGION	72(33.48%)
OCCIPITAL REGION	38(17.67%)
BASILAR REGION	74(34.41%)

Out of 215 cases, Linear/Fissure type of skull fracture was most common (n=143, 66.55%) followed by comminuted fracture in 54 cases (25.11%). (fig. 02)

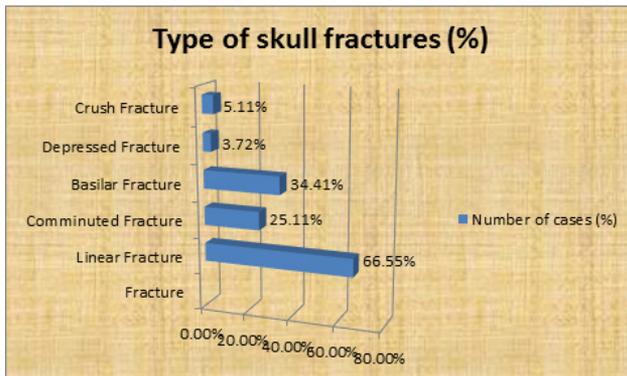


FIG. 02: DISTRIBUTION ACCORDING TYPE OF SKULL FRACTURE

In our study 05 (2.23%) victims had Extradural haemorrhage, 131 (60.93%) had Subdural haemorrhage, whereas subarachnoid haemorrhage was present in 78 cases (36.27%). Intra-cerebral haemorrhage was seen in 17 cases (7.9%).

Most common type of individual intracranial haemorrhage was subdural followed by subarachnoid haemorrhage. (Table 4)

TABLE 04: INTRACRANIAL HAEMORRHAGE

TYPE OF INTRACRANIAL HAEMORRHAGE	NUMBER OF CASES INCIDENCE & PERCENTAGE (%)
EXTRA DURAL HAEMORRHAGE	5(2.32%)
SUB DURAL HAEMORRHAGE	131 (60.93%)
SUB ARACHNOID HAEMORRHAGE	78 (36.27%)
INTRA CEREBRAL HAEMORRHAGE	17 (7.9%)

In our study we find along with head injury mostly common vital organ lung injury associated in 31 (14.41%) cases, followed by liver injury which was 23 (10.69%), heart injury in 3 (1.39%) cases which is minimum. (Table 5)

TABLE 05: VITAL ORGAN DAMAGE ALONG WITH FATAL CRANIO CEREBRAL INJURY

LUNG INJURY	31(14.41%)
LIVER INJURY	23(10.69%)
SPLEEN INJURY	16(7.44%)
SPINAL INJURY	15(6.97%)
KIDNEY INJURY	7(3.25%)
HEART INJURY	3(1.39%)

On month wise distribution we find most common fatal accident occur in the month of December 34(15.81%) cases, followed by month of January 28 (15.81%) cases, minimum incidence we find at the month of August 10(4.65%) cases. (Fig. 03)

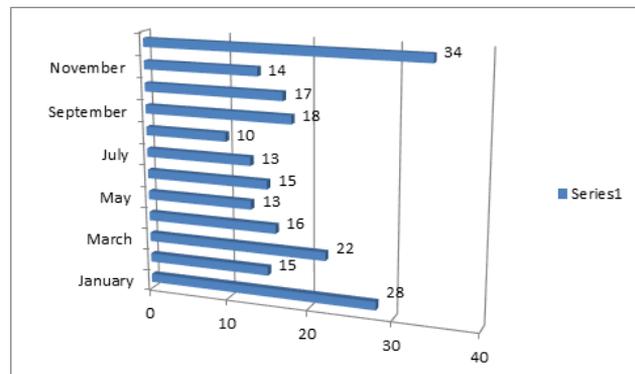


FIG. 03: NUMBER OF CASES AND MONTH WISE DISTRIBUTION

Maximum number of cases find in the month of December 34 cases followed by January with 28 cases minimum cases find at month of October.

Discussion

In the present study young people of age group 20-30 years (30.5%) were the most common victims, which is similar to findings of multiple authors from various geographical regions of India. [4-8] Pramod Kumar Verma et al [9] showed high incidence of traffic injuries in age group 15-55 years. H. Singh and Dhatarwal [10] found two third of cases are in age group 11-40 years. According to the NCRB Report for the year 2012 and 2013, the most common age group involved in RTA was 30-44 years followed by 15-29 years. [11, 12]

A large number of cases in the young age group can be justified by the fact that young persons in this age group are at the peak of enthusiasm, energy and creativity and passion.

In present study it was observed that male outnumbered females with a significant male to female ratio of nearly 7:3. Almost all the studies over RTA have conclusively pointed out male dominance. Arvind Kumar et al,^[6]

R. Ravikumar,^[8] Dhaval Patel et al,^[13] B. C. Shivkumar et al,^[14] and Behera et al^[15] also got the same findings. In NCRB report of 2013 out of all RTA fatalities 76.7% are male and 23.3% are female.^[12] The predominance of male can be explained by the fact that males lead a more active life, travel more, drive more and so expose to the hazards of traffic, accidents and trauma.

Females generally stay at home, but now there is increasing trend of RTA among females too due to their awareness regarding career and their active participation in socio-economic activities. Our findings regarding sex ratio did not match with Akhilesh Pathak et al,^[16] Harman Singh et al,^[10] Chandra et al,^[17] and Agnihotri et al,^[18] who found lesser sex ratio in the range of 2:1 to 5:1.

Hindus (n=282) outnumbered Muslims in the ratio of nearly 9:1 which is simply due to more numbers of Hindus in and around indore region. Other religions are quite less populated in and around indore region.

In our study 61.2% (172) cases sought Medical aid. Dhaval et al,^[13] reported 67% cases died on spot. This reflects the severity of injuries produced by the accidents as well lack of proper medical aids soon after the accidents. Large number of studies supports our findings.^[10, 13, 17, 19] In our study Head Injury was the most common type of injury sustained with total 215 cases (including superficial and serious injuries). The reason might be that head is the most vulnerable part because of its top location in the body and immovability of brain tissue.

According to the Brain Injury Association Traumatic Brain injuries, mainly due to RTA is the leading cause of death in young people and Motor vehicle crash accounts for 50% of total fatal and non - fatal injuries.^[20]

Majority of other studies are supporting our findings.^[5, 15-17] According to B. R. Sharma et al^[21] head injury accounted for 75% of all fatal road traffic accidents. Pamod Kumar Verma et al,^[9] et al and E. Ravikiran et al,^[19] contradicted our findings by concluding limb

injuries and abdominal injuries respectively, are the major injuries in RTA.

Our study match with Dhaval et al,^[13] we find Parietal bone fracture as most common whereas Arvind Kumar et al,^[6] stated base of skull as most common bone fractured. Rajeev Kumar Banzal et al,^[4] and other reported Temporal bone was most commonly involved followed by parietal.^[4, 5, 10, 17, 21]

In our study finding regarding individual types of fracture, simple/linear or fissure fracture was the most common type encountered in 66.55% cases followed by radiating fractures which is similar to findings of other studies.^[13, 14, 16]

Over all multiple types of fracture were most common comprising 54 (25.11%) cases and can be explained by the fact that in majority of cases secondary impact is common after primary impact.

Our findings of subdural haemorrhage 131 (60.93%) followed by subarachnoid haemorrhage 78 (36.27%) as most common intracranial haemorrhage is similar to other studies.^[5, 10, 13, 14, 16, 21]

Chandra et al,^[17] in contrast found Subarachnoid haemorrhage most common. Subdural haemorrhage occurs mostly due to tear of bridging vein during frequent change in the velocity.

In present study we find most common site of injury occur over head and neck region followed by chest injury similar finding appreciate by A. R. Marak et al,^[22] in our study we find after head injuries, lung was the most common vital organ which damage responsible for the death of accident victim. After chest injury abdominal region is the common site of the impact in which liver injury find in majority of cases.

Our findings are differing from Anuj Gupta et al,^[23] they find maximum number of cases during the summer month of June (10.4%). Asharam and Das Gupta et al,^[24] they reported that most of accidents took place in the months of summer followed by October and November. In our study we find that the maximum number of accidents took place during the month of December and January (15.81% and 13.02% respectively). This may due to at the winter season evening visibility decrease earlier than other month and driving indulge with the alcohol intake due to cold significantly increase in this

month which is majorly contributed these accident incidences.

Conclusion

In this Present study, we found RTA were more common in the younger age groups age range 21-30 years (28.37%) and more number of male sexes.

In our study we find Head injury was the cause of death in majority of cases of RTA mostly due to Subdural and Subarachnoid Haemorrhages.

We find out of 215 cases 174 cases were hospitalized, and 41 cases were found brought dead to hospital either due to spot death or death during transportation majority of victims sought medical emergency.

Our study reveal that the number of accident case majorly occur in the month of December 34 (15.81%) due to decrease visibility more at evening comparatively other months.

We find most of the accident happens due to rash driving these further shows the need of strict implementations of rules for controlling the speed of vehicle. As Head injury is the major cause of death in RTA, the Government should make strict rules for implementation of use of safety helmets for bike riders, for prevention of driving under influence of alcohol, and for the proper training of Drivers, Police personnel, Traffic controller etc.

Government must also make arrangements for proper lighting and signaling over roads and install modern vigilance system.

Overall improvement in the Emergency Medical services is a must to decrease the death toll due to RTA.

Ethical Clearance - Taken.

Source of Funding - Self.

Conflict of Interest - Nil.

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Autopsy Analysis of Head Injuries in South Bangalore: A Three Year Prospective Study

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Abstract

Background: Head is the most vulnerable region in the human body to sustain injury by mechanical force. Head Injuries are a leading cause of mortality in India and continue to increase by the year. In order to assess the magnitude, a three year prospective autopsy analysis of head injuries was conducted in KIMS hospital, Bangalore, between 2011 and 2014 with regard to demographic and injury pattern. **Results:** Majority of the victims were males and aged between 31-40 years. 57% of the cases of head injury were due to road traffic accidents. The parieto-temporal region of the vault of the skull was the most frequently involved in fractures. 40% cases were associated with intracranial haemorrhage, and the most frequently present intracranial haemorrhage was Subdural Haemorrhage.

Keywords: Head Injury, Autopsy, Assault, RTA, Fall, Skull fractures, Intracranial Haemorrhage.

Introduction

Head injury is defined as a morbid state resulting from gross or subtle structural changes in the scalp, skull and or the contents of skull produced by mechanical force¹. It is estimated that approximately 1.6% of today's emergency department visits are for a head injury. However, Head injuries have been described since antiquity. The injuries can range from a minor swelling on the scalp to serious brain injury². Rapidly growing population and urbanization of human beings, the incidence of unnatural deaths increasing in geometrical progression. Of all unnatural deaths trauma plays a main role and head is the most vulnerable part to sustain injuries in different manners³. Injuries to the head can be grouped into two broad categories based on the mechanism by which the injury is produced, namely Impact injuries and acceleration or deceleration

injuries. Impact injuries are caused when an object strikes or is struck by the head. These injuries consist of the local effects of contact between the head and the object. These comprise of lacerations, abrasions, and contusions of the scalp, Fracture of the skull, Contusions of the brain, Epidural hematomas and Intracerebral hemorrhages. Acceleration or deceleration injuries are due to sudden movement of the head the instant after injury, with resultant production of intracranial pressure gradients and the subjecting of the brain to both shearing and tensile forces. Injuries produced here are subdural hematomas and diffuse axonal injury⁴.

To better understand the magnitude of head injuries, selective parameters were taken into consideration at autopsy such as the demography, etiology and injury profile, chiefly skull fractures and intracranial haemorrhages in our study.

Material and Method

The study material consisted of 1695 medicolegal autopsies conducted in the department of forensic medicine and toxicology, Kempegowda Institute of Medical Sciences and Hospital, Bangalore, Karnataka, during a period of 3 years (from June 2011 to June 2014). Of these, 109 cases were deaths due to head injury sustained, which were studied, prospectively

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after obtaining clearance from the institutional ethical clearance committee.

Data for the study comprised of inquest reports and interviews from relatives and friends, of the victims. A detailed proforma for recording the particulars, history, and injury pattern was prepared. The information thus collected, was analyzed using appropriate statistical tools (namely Microsoft Excel 2007 and IBM SPSS V.20).

Observations and Results

During the study period, 1695 cases were brought for Medicolegal postmortem examination, of which 109 (6%) cases were deaths due to head injury sustained.

Year wise analysis between mid-2011 to mid-2014 showed highest number of deaths due to head injury in the year 2011, where we encountered 31 cases (28%) [Table 1]. Maximum number of victims (42%) belonged to the age group ranging between 31-40 years [Table 4]. Observing sex wise death distribution, majority of the victims were found to be males (83%) [Table 3]. Majority of the victims sustained head injury and succumbed to death during road traffic accidents (57%) [Table 2]. Highest frequency of skull fracture (39%) was observed in the parieto-temporal region of the vault of the skull [Table 5]. Lastly and interestingly, all the cases were associated with intracranial haemorrhage, and the most frequently present intracranial haemorrhage was Subdural Haemorrhage (40%), [Table 6].

Table 1: Year Wise Distribution of Cases.

S.No	Year	No. of Head Injury Cases	Percentage (%)
1.	2011	31	28
2.	2012	30	28
3.	2013	28	26
4.	2014	20	18
	Total	109	100

Table 2: Etiological Distribution of Head Injury Cases.

S.No	Cause	2011	2012	2013	2014	Total	Percent%
1.	Assault	10	11	8	5	34	31
2.	RTA	19	14	17	12	62	57
3.	Fall	2	5	3	3	13	12

Table 3: Sex Wise Distribution of Head Injury Cases.

S.No	Sex	No. of Head Injury Cases	Percentage (%)
1.	Male	91	83
2.	Female	18	17
	Total	109	100

Table 4: Age Wise Distribution of Head Injury Cases.

S.No	Age Group (Years)	No. of Head Injury Cases	Percentage (%)
1.	0 to 10	2	2
2.	11 to 20	9	8
3.	21 to 30	24	22
4.	31 to 40	46	42
5.	41 to 50	17	16
6.	51 to 60	7	6
7.	> 60	4	4
	Total	109	100

Table 5: Head Injury Cases Associated with Skull Fractures.

S.No	Type	No. of Cases	Percentage (%)
1.	Only Vault (Parieto-temporal)	43	39
2.	Only Vault (Temporo-Occipital)	13	12
3.	Only Base	10	9
4.	Both	21	20
5.	Neither	22	20
	Total	109	100

Table 6: Head Injury Cases Associated with Intracranial Haemorrhages.

S.No	Type	No. of Cases	Percentage (%)
1.	Extradural Haemorrhage	3	3
2.	Subdural Haemorrhage	44	40
3.	Subarachnoid Haemorrhage	41	38
4.	Combined SDH with SAH	21	19
	Total	109	100

Discussion

In this section a comparison is made with observation made specifically on deaths due to head injury sustained by other researchers prior to our study. In the present study the total number of deaths due to head injury sustained were about 6% of all deaths encountered during the 3 year study period, which is consistent with the findings made by Singh et al and Mohammad. J et al^{4,5}. However it is not correlating with the high numbers observed by researchers such as Dash et al and Rastogi et al^{3,6}. This could be due to varied conditions and regional differences. The age group in our study showed maximum numbers falling within 31-

40 years which is consistent with findings made by Dash et al, Singh et al, Rastogi et al^{3,4,6}. This finding did not correlate with observation made by Mohammad J et al and Gururaj et al^{5,7}. Taking Sex into consideration, male death preponderance was observed and this finding is consistent with observation made by all researchers compared here in this section³⁻⁷. While our findings were consistent with observation made by Dash et al Singh et al and Rastogi et al^{3,4,6} with regard to the cause of head injury being road traffic accidents, it did not correlate with the findings made by Mohammad J et al and Gururaj et al who observed Falls as the frequent cause of head injury^{5,7}. We observed skull fractures present

in 39% of the cases, with high frequency in the parieto-temporal region of the vault, and Subdural haemorrhage as the most common intracranial haemorrhage, which correlated with the findings made by all researchers compared with here in this section³⁻⁷.

Conclusion

Head injuries have been described since antiquity with more inclination as a good method to kill or injure another person as it is an easily accessible part of the body and certain to cause death when assaulted with considerable force. In the 21st century approximately 1.6% of all emergency department visits are for head injury read statistics. The authors find it difficult to suggest any measures against head injury due to assault as we personally believe that its etiology is multifactorial and the solution to the problem is within the scope of the individual and his ability to regulate his conduct in accordance with the law of the land. With regard to falls, once again the authors find themselves in a tight spot as accidental falls are most frequent and the only helpful measure that can be suggested is to the employers, employing people to work in such heights, under safe and protected conditions. Lastly taking Road traffic accidents into consideration we may observe that decades have passed, yet it continues to remain the leading cause for head injuries and death. The authors wish to express that the law enforcement agencies and the state must jointly act upon to bring down the death rate by providing separate pedestrian walkways, properly designed double lane roads, speed breakers, speed limiters, street lights and reflectors at least in areas where high death rates are being reported scientifically. The law enforcement agencies must be strict with regard to drunk and driving, usage of Helmet and passenger seat belts. A good chunk of responsibility also lies with

the vehicular manufactures in the modern era and must pay more attention towards the ergonomics and other safety equipment within the vehicles at an affordable rate, which is right now vehemently missing in India.

Ethical Committee Clearance: Obtained

Conflict of Interest: None

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Sexual Ambiguity based on the Length of Femur- A Statistical Analysis in South Indian Population

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Abstract

Introduction: Identification of sex from skeleton is an important demographic assessment in medicolegal investigation. Length of femur is an important and reliable skeletal element for sex determination.

Objectives: The aim of the study is to determine the sex of the individual based on the length of femur from the femora obtained from the students in a medical college in South India.

Method: A total of 50 bones were obtained from the students of Forensic Medicine Department in a medical college in South India and the maximum vertical distance between upper end of head of femur and the lowest point on femoral condyle were measured with the osteometric board.

Results: The maximum length of right male femur ranges from 39cm to 48cm and the maximum length of a right female femur ranges from 38cm to 43cm. The demarking point is 45.2cm and 44.8cm respectively for right and left male femora and 35.45cm and 35.97cm respectively for right and left female femora. p-value <0.05 is statistically significant in both male and female femora.

Conclusion: The mean maximum length of femur in a male is about 43.23cm and female is about 40.76cm contributing to the increased general height of the males. Definite sexual identification can be made only in male femora- 23.07% on the right and 30.76% on the left. The study concludes that the female femora most often shows a mixed range making it difficult to determine only with the linear dimension and requires the need for other parameters for correct sex determination.

Keywords: Length of femur, Demarking point, sex determination, forensic anthropology, sexual dimorphism.

Introduction

One of the main goals of forensic anthropology is sex determination, either from skeletal remains, decomposed or mutilated bodies, or cremains¹. The assessment of human sex from skeletal parts is of particular importance in forensic Osteology and it relies heavily on the up-to-date techniques in order to provide accurate information to medico legal system. With

time the assessment has a shift from visual analysis to anthropometric measurements which when processed through modern statistical techniques has made sex determination more objective.

Often the sex determination can be done at crime site from isolated bones or their fragments in medicolegal investigations. Sex determination is relatively easy if the entire skeleton is available, pelvis and skull are more reliable bones for this purpose². Data concerning the sexing potential of the femur are available in the literature and it is well known that these data vary a great deal according to the population sample from which they were taken. These studies all contribute to demonstrate that there is considerable intra- and inter-population variability in femoral dimensions and

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no single standardized formula can be used within all population groups for sexing individuals. This is due to the influence of specific genetics, the environment and socio-cultural factors.

As the femur is composed of hard tissue, they are the best preserved part of skeleton after death and in many times they are the only available parts for forensic examination. The femur is the longest and, by most measures, the strongest bone in the human body. Its length on average is 26.74% of a person's height a ratio found in both men and women and most ethnic groups with only restricted variation, and is useful in anthropology because it offers a basis for a reasonable estimate of a subject's height from an incomplete skeleton.

The study on sexual dimorphism is based on the principle that the axial skeleton weight of the male is relatively and absolutely heavier than that of the female and the initial impact of this weight is borne by the femur in transmission of the body weight^{3, 4}. Hence, in the present times of increasing violence, accidents and mass disasters when encountering human skeletal remains has become common; femur can play an important role in determining sex.

Femoral anthropometric measurements from different countries are likely to be affected by racial variations in diet, heredity, climate and other geographical factors related to life style. India is a vast country with a number of different populations but only a few studies pertaining to femur are available from this part of the world⁵. Therefore, in the present study, femur was studied for sex determination with the bones available in the Forensic department in a medical college in South India, most probably referring to the population of South India.

Method

A total of 52 femur bones of which 26 are male and 26 are female were measured for its length. The bones were obtained from the students of Forensic Medicine Department in a medical college in South India. An Osteometric board was utilized to measure maximum length of femur which is taken as the maximum Vertical distance between the upper end of head of femur and lowest point on femoral Condyle in such a way that medial condyle touches the short vertical wall; the moveable cross-piece should touch the highest point of

the head.

All intact, well-formed and adult femora were included in the study. Pathological, deformed, damaged or broken bones were excluded from the study. The measurements were recorded, tabulated and analysed statistically. Mean and Standard Deviation (S.D.) were worked out and to assess the efficacy of statistical tests in determining sex and to predict the proportion of individuals which can be identified correctly either male or female, a limiting value was worked out, either side of which represented a particular sex. To determine this, demarcating and limiting values were calculated assuming normal distribution. The demarcating point for females is 'a' below which all will be females and 'y' is demarcating point for males above which all will be males. Based on the above values, limiting value was worked out. A limiting value is the value above which majority bones were male and below which most bones were female.

Results

The metric parameters and statistical analyses are tabulated in table 1.

As evidenced from the table, there are 52 femora of which is equally distributed between male and female- 13 right femora and 13 left femora each of male and female. The mean values are greater in males as compared to females. Using student's t- test, $p < 0.05$ showing that the difference is statistically significant. The standard deviation is also higher in males denoting that males show greater variability as compared to female.

Males:

The maximum length of right male femur ranges from 39cm to 48cm with mean and standard deviation of 42.92cm and 2.49 respectively and that of left femur ranges from 40cm to 48cm with mean and standard deviation of 43.23cm and 2.42 respectively.

Females:

The maximum length of a right female femur ranges from 38cm to 43cm with mean and standard deviation of 40.76cm and 1.48 respectively and that of left femur ranges from 38cm to 43cm with mean and standard deviation of 40.69cm and 1.37 respectively.

Table: 1 – Statistical analysis of the measured femoral length

Statistical parameters	Male femora		Female femora	
	Right	Left	Right	Left
Range	39-48cm	40-48cm	38-43cm	38-43cm
Mean	42.92	43.23	40.76	40.69
Standard Deviation (SD)	2.49	2.42	1.48	1.37
Calculated range Mean \pm 3SD	35.45-50.39 cm	35.97- 50.49cm	36.32- 45.2cm	36.58- 44.8cm
Demarking point (DP)	>45.2cm	>44.8cm	<35.45cm	<35.97cm
% DP	23.07%	30.76%	nil	nil
t-value	2.48		-4.37	
z-score	3.42		2.65	
p-value	0.0003		0.003	

Cm= centimetres; SD- standard deviation; %- percentage

p-value : probability value ; t-value : students test statistic value

z-score: standard score.

The calculated range mean was used to observe the demarking point which is 45.2cm and 44.8cm respectively for right and left male femora and 35.45cm and 35.97cm respectively for right and left female femora (Table 1). p-value is statistically significant in both male and female femora. Definite sexual identification (%DP) can be made only in male femora-23.07% (3 bones) on the right and 30.76% (4 bones) on the left (Table 1).

There were arbitrary variations in between the right and left femora of male and in right and left femora of female which were statistically insignificant and were not recorded

Discussion

Sex determination from long bones or their fragments is often required to establish a possible identity. Forensic scientists are often left with fragments of bones for determination of sex and stature as intact bones are not always available⁶. Due to tubular structure of long bones, they are often better preserved than other shorter bones. Thus data for long bone measurements will be more useful. Axial skeleton weight is heavier in male than that of the female⁷. This weight is received by femur and takes part in transmission of body weight,

therefore the stress and strain on the femur is different in a male than in a female.

There have been previous studies by several workers in different populations; according to Krogman and Iscan, standards of morphological and morphometric attributes in the skeleton may differ with the population samples involved and this is true with reference to dimensions and indices (Average and range) and as a general rule, standards should be used with reference to the group from which they are drawn and upon which they are based^{8,9}. Kate working on different femora from different regions of India found that the values showed a regional variation and also a downward gradient from North to South^{10, 11}.

Reliability of sexual dimorphism depends on magnitude of sexual dimorphism exhibited in a population, availability of skeletal elements, anatomical areas of the bone preserved and degree of preservation. The variables most suited for identifying sex vary in different populations demonstrating the population specific nature of sexual dimorphism.

Length of femur is an important and reliable skeletal element for sex determination¹². The mean maximum length of femur in a male is about 43.23cm and female is about 40.76cm contributing to the increased general height of the males. The mean and standard deviation were also high compared to females showing that males

show greater variability than females.

The demarcating and limiting values are summarised in Table 1. It is an extension of sex determining values for metric traits. Calculated range is mean \pm 3 S.D., covering 99% population. For male femora, the calculated range was about 35.45-50.39 cm on the right and 35.97- 50.49cm and for female femora it was about 36.32-45.2cm on the right and 36.58-44.80 cm on the left. Based on these calculated range, we can statistically fix a measurement above which no female bone can be found and another measurement below which no male femora can be seen, these measurements can be termed as demarking points.

With the help of these demarking points, right femur with maximum length more than >45.2cm can be correctly classified as a male and right femur with maximum length less than <35.45cm can be correctly classified as a female. However if the length is between 35.45cm and 45.2cm, sexing was not possible due to overlapping. With the demarking points, definite sexual classification in male right bone was 23.07% and nothing can be made in the female bone.

With the help of these demarking points, left femur with maximum length more than >44.8cm can be correctly classified as a male and left femur with maximum length less than <35.97cm can be correctly classified as a female. However if the length is between 35.97cm and 44.8cm, sexing was not possible due to overlapping. With the demarking points, definite sexual classification in male left bone was 30.76% and nothing can be made in the female bone.

This absence of clear delineation in the female femora may possibly be a result of factors affecting bone morphology like genetic constitution, diet, nutrition status, environment and physical activity and is subjected to vary across regions, states and countries. The mean values were lower in studies on Japanese and Thai populations¹³ which supports the inference that these parameters differ with the population under consideration.

Some of the powerful methods of sex determination from skeletal element are based upon the application of statistical analysis to osteological material¹⁴. Statistical analyses were made on the male and female femora where the p-value in both of them was found to be statistically significant. 95%CI and p<0.05 are taken as

statistically significant on a standard scale. p-value in male femora indicated that it shows great variability and will have striking features to determine the sex easily.

With the above results, the % of correctly sexed bones dropped down by using the demarking point analysis has 100% classification accuracy for any sample of osteological remnants which is useful in medico legal cases compared to multivariate analysis. Biological variables may show wide variations, which the simple analysis may not cover even if the sample size is large which can be overcome by DP analysis. The differential cortical remodeling of the bone bearing the effect of physical activities related to occupation, nutrition, etc. may result in subsequent dimorphism¹⁵.

Conclusion

The present study was an attempt to construct data on linear dimension of adult femur and sexual variations in South Indian population. The current study clearly demonstrates that all statistical techniques are individually as well as collectively effective in sex determination. As expected there was a male dominance in range and mean of the femoral bones that shows wide variations as compared to the female femora. The study concludes that the female femora most often shows a mixed range making it difficult to determine only with the linear dimension and requires the need for other parameters for correct sex determination. Special attention has to be paid to develop standards for ends of femur, so that sex can be determined even if fragmentary remains are available. The classification accuracy increases with increase in number of parameters. Morphometric data of femur might help a doctor or nutritionist for calculating body energy need of a normal individual or to identify malnourished cases. So this type of study has a vital role in anatomy, forensic science, radiology, orthopedic surgery, plastic surgery, medical rehabilitation, sport science and nutrition science.

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Osteometric Gender Determination from Head Diameters in Adult Femur

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Abstract

Determination of sex from skeleton remains is one of the vital parameters in the establishment of human identity. Of all the long bones of the human body, femur has the maximum length and strength. The aim of this study was to determine the sex based on the dimensions of femoral head and it was done on specimens comprising of 121 dry, completely ossified right and left femurs belonging to both sexes i.e. 60 males (29 left, 31 right) and 61 females (31 left and 30 right). Vertical as well as transverse diameters of head of each side femur of male and female sex were recorded using digital sliding caliper. The analysis clearly inferred that these parameters were significantly higher in male femur compared to female and therefore, can be reliably employed in determining sex from femur bone in various forensic situations.

Keywords: Femur, Head diameters, Sex determination.

Introduction

Race, sex and age are important identification data without which it is not possible to fix the identity of the deceased.¹ Determination of sex of an individual from the skeletal components is of great significance in forensic medicine. Sex identification is relatively easier if the whole skeleton is provided, pelvis and skull being the most dependable individual bones for this purpose.² Nevertheless in many medicolegal circumstances instead of more reliable pelvis or skull, only long bones are available for sexing.

The long bones have often been utilized for sex identification, reason being the easiness in estimating measurements and are well preserved, particularly the femur since it is the strongest and longest bone of our body.³ Compared to tibia, femur is more reliable for gender discrimination.⁴ Many studies have been carried

out by forensic experts and anatomists involving various parameters pertaining to femur and found that femoral head diameters and bicondylar width were better discriminants of sex compared to other parameters in femur.⁵⁻⁹ The present study was an attempt to establish the sexual dimorphism in vertical and transverse diameters of femoral head in the study specimens.

Materials and Method

The materials chosen for this study were dry femurs of known sexes from the Departments of Anatomy and Forensic Medicine, Chettinad Hospital and Research Institute, Kelambakkam. A total of 121 femur specimens comprising of 60 males (29 left, 31 right) and 61 females (31 left and 30 right) were selected for analysis after excluding those with fractures, prosthesis, deformities, osteoarthritis or any other obvious pathological changes.

Side of the femur i.e. right or left was first identified. A digital sliding caliper capable of measuring up to the accuracy of 0.01 cm. was used to record femoral head dimensions in mm. The vertical diameter of femoral head [VDH] was measured as a straight distance between the most superior and most inferior points on the femoral head, in a vertical plane perpendicular to the line passing along the long axis of femoral neck. Using the same caliper, the transverse diameter of head [TDH]

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was estimated in horizontal plane as the straight distance between two farthestmost projecting points on femoral head at right angle to its vertical diameter. To avoid any inter-observer error, measurements were taken by the same observer and the recorded data was analyzed statistically by using SPSS software (version 23) and various significant parameters such as mean, standard deviation, Demarking Point (D.P.) etc. were tabulated in Tables 1 & 2 to extrapolate the significant differences in dimensions of femoral head with respect to gender.

Results

As per the data tabulated in Table 1, the mean vertical diameter of head of left femur was 45.43 mm. and 40.38 mm. while the same for right femur was 45.16 mm. and 40.25 mm. in males and females respectively. Similarly, the transverse diameter of left femur was 45.67 mm. and 40.65 mm. whereas the same for right femur was 45.59 mm. and 40.55 mm. in males and females respectively. The values of both vertical and transverse diameters of

head of right and left femur were significantly higher in males compared to females while it was clearly evident that there were no statistically significant differences in either of these two parameters between right and left femur in the same sex.

Since there was overlapping in ranges of these parameters between male and female femurs, it was essential to determine the Demarking Point from respective mean and standard deviation and the range for estimating D.P. for each parameter was derived. The D.P. for a head parameter in male femur was the highest value recorded in the respective derived range for female femur whereas the D.P. for a head parameter in a female femur was the lowest value recorded in the respective derived range for male femur. Using the Demarking point sexing of significant percentage of femur was done as shown in the Tables 1 and 2. Comparison of estimated data from this present study pertaining to vertical diameter of femoral head with that of other authors were tabulated in Table 3.

Table 1: Statistical analysis of various parameters corresponding to vertical diameter of femoral head

Statistical parameters	LEFT FEMUR (n=60)		RIGHT FEMUR (n=61)	
	Male (n=29)	Female (n=31)	Male (n=31)	Female (n=30)
Range (mm.)	42.69 - 47.93	37.71 - 42.78	42.57 - 47.72	37.35 - 42.43
Mean (mm.)	45.43	40.38	45.16	40.25
S.D. (mm.)	1.46	1.51	1.47	1.54
3 S.D. (mm.)	4.38	4.53	4.41	4.61
Range for D.P. [Mean \pm 3 S.D. (mm.)]	41.05 - 49.81	35.85 - 44.91	40.75 - 49.57	35.64 - 44.87
Demarking Point [D.P. (mm.)]	>44.91	<41.05	>44.87	<40.75
% of bones whose sex identified by D.P. (n)	58.62 (n=17)	67.74 (n=21)	58.06 (n=18)	56.67 (n=17)
p value	<0.001	<0.001	<0.001	<0.001
Remarks	Highly significant	Highly significant	Highly significant	Highly significant

Table 2: Statistical analysis of various parameters corresponding to Transverse diameter femoral head

Statistical parameters	LEFT FEMUR (n=60)		RIGHT FEMUR (n=61)	
	Male (n=29)	Female (n=31)	Male (n=31)	Female (n=30)
Range (mm.)	42.87 - 48.15	37.24 - 43.59	42.96 - 48.17	37.81 - 43.76
Mean (mm.)	45.67	40.65	45.59	40.55
S.D. (mm.)	1.46	1.55	1.43	1.62
3 S.D. (mm.)	4.38	4.65	4.29	4.86
Range for D.P. [Mean ± 3 S.D. (mm.)]	41.29 - 50.05	36 - 45.3	41.3 - 49.88	35.69 - 45.41
Demarking Point [D.P. (mm.)]	>45.3	<41.29	>45.41	<41.3
% of bones whose sex identified by D.P. (n)	58.62 (n=17)	64.52 (n=20)	58.06 (n=18)	66.67 (n=20)
p value	<0.001	<0.001	<0.001	<0.001
Remarks	Highly significant	Highly significant	Highly significant	Highly significant

Table 3: Comparison of our study involving vertical diameter of head of femur (mm.) in males and females with results from other researchers (n = Number; S.D.= Standard Deviation; D.P.= Demarking Point; HS = Highly significant)

Researcher	Year	Population	Sex	n	Mean (mm.)	S.D. (mm.)	D.P. (mm.)	% of identified bones	p value	Remarks
Dittrick J & Suchey JM ¹⁰	1986	California	M	175	47	2.5	-	88.70	-	
			F	171	42.2	1.9	-			
Liu Wu ¹¹	1989	Chinese	M	74	45.3	3.2	-	85.1	<0.001	HS
			F	67	40.4	1.9	-			
Iscan MY & Shihai ¹²	1995	Chinese	M	37	46.16	2.62	-	83.10	<0.001	HS
			F	39	41.13	2.64	-	79.50		
Igbigbi PS & Msamati BC ¹³	2000	Black Malawians	M (R)	260	48.30	3.51	54.93	03.50	<0.01	HS
			F (R)	236	44.61	3.44	37.77	01.80		
			M (L)	260	48.30	3.11	54.76	0	<0.01	HS
			F (L)	236	44.50	3.42	38.95	01.70		
Maske SS et al ¹⁴	2012	Marathwada	M	189	43.61	1.9	48.86	0	<0.001	HS
			F	179	38.7	3.4	37.66	10.58		

Cont... Table 3: Comparison of our study involving vertical diameter of head of femur (mm.) in males and females with results from other researchers (n = Number; S.D.= Standard Deviation; D.P.= Demarking Point; HS = Highly significant)

Srivastava R et al ¹⁵	2012	North Central India	M	94	43.77	2.70	46.84	8.5	<0.001	HS
			F	28	39.40	2.48	35.67	14.28		
Laeque Md et al ¹⁶	2013	Maharashtra	M	137	43	2.13	43	50	<0.001	HS
			F	66	37	1.89	37			
Kukadiya U.C. et al ¹⁷	2014	Gujarat	M	115	44.15	2.60	48.43	2.61	<0.01	HS
			F	26	39.27	3.05	36.34	19.23		
Present study	2019	Tamil Nadu	M (R)	31	45.16	1.47	44.87	58.06	<0.001	HS
			F (R)	30	40.25	1.54	40.75	56.67		
			M (L)	29	45.43	1.46	44.91	58.62	<0.001	HS
			F (L)	31	40.38	1.51	41.05	67.74		

Discussion

Several anthropologists and anatomists have carried out studies on the femoral head dimensions for the determination of sex. These studies also inferred that the dimensions of femoral head have been influenced by various factors like heredity, race, climate, geographical variations etc. Hence every population has its own metric standard values.

The understanding and expertise with respect to the mean diameters of head of femur in males and females will not only favour the early determination of sex by forensic experts in cases of disputed identity but also of much help to the orthopedic surgeons in developing suitable prostheses as well as in hip replacement surgeries.⁹ This necessitates the need for the analysis of various parameters related in femoral head in both sexes and hence the present study was carried out.

The demarking points are higher in male femurs compared to that of females which indicate that these parameters can be relied upon for gender determination in skeletal remains. Therefore, it can be said that whenever femurs with whole intact head are provided, sex can be effectively assigned to them.

Conclusion

From the above observations, the authors would like to advocate that in medicolegal situations where more advanced and accurate methods of identification

of sex from fragmentary femur bones are not possible, the demarking points could be a significant tool for anthropologists and forensic experts. The results from this study clearly prove that there exists a definite sexual dimorphism in the femur with respect to head diameters and this is applicable in cases where only fragmentary remains of femur bone alone are available.

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Estimation of Stature from Ulnar Length in Living Adult Females of Tamil Population

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Abstract

Forensic Medicine experts are often confronted with a common situation where they have to establish the identity of an individual from skeletal remains or dismembered body parts by the investigating authority. In the identification, estimation of stature bears a primary significance in addition to sex and age. In the present study, the relationship between height and ulnar length has been analyzed, based on which the regression equation was derived. Measurements of height and percutaneous ulnar lengths of both forearms of 115 females belonging to Tamil population were recorded. The age group of the subjects was between 21 and 30 years. The results were analyzed using Pearson's correlation to derive the relationship of height with respect to length of the left and right ulna respectively in the study subjects. The results from this present study showed that percutaneous ulnar length can be reliably used for determination of stature in females belonging to Tamil population.

Keywords: Stature, Ulnar length, Regression equation, Females, Tamil population.

Introduction

Traditionally anthropometry is often considered as the fundamental tool of Forensic Anthropology, Forensic Medicine and Anatomy. Stature is an important component in the human anthropometric study.¹ It is a well known fact that trunks and extremities show steady relationships among themselves and with respect to stature. These ratios among body segments are population, sex and age dependent.^{2,3} So this gives a baseline for identification of human skeletal remains in medico-legal case investigations.

Several researchers have provided regression equations for estimation of stature from the length of ulna as well as other long bones. Nevertheless as Pearson stated, a regression equation worked out for a particular population should be employed to other populations only

with due caution, because there exists inter-population variation with respect to estimation of stature. Therefore, deriving regression equations pertaining to individual population for stature is recommended.

The ulnar length has been known to be a precise and reliable metric parameter in predicting height of an individual.⁴ In the year 1952, Trotter and Gleser published a selective study on stature estimation for American blacks and whites for which data collected was from casualties of the second world war and Terry collection.⁵

In India, multiple casualties secondary to road traffic accidents are increasing and the scenario of providing dismembered or mutilated body parts that are required to be identified. Since population specific regression formulae pertaining to Tamil population are scant, we did this study and derived group specific regression formula to address this issue and find a superior and reliable model for more accurate stature determination.

Materials and Method

The study subjects selected for this study comprised of 115 Tamil females who belong to the age group

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between 21 and 30 years. Subjects with congenital or acquired musculoskeletal disorders, malnutrition, endocrinopathies, previous history of fractures involving extremities, spine etc. were carefully excluded. A well informed written and duly signed consent was obtained from each individual. Measurements were taken between 2 pm and 4 pm to avoid diurnal stature variation and by the same investigator to exclude possible inter-observer errors.

The subject was asked to sit on the chair in relaxed position. Ulnar length of the left and right side was measured independently with the help of a digital sliding caliper with accuracy upto 0.01 cm. between the most proximal point on the olecranon process and the most distal point on the tip of the styloid process with elbow held in flexion and palm placed over the contra-lateral shoulder after marking these anatomical landmarks using a skin-marking pencil. Measurement of standing height in cm. was done using a stadiometer. The subject was made to stand barefoot on the baseboard platform, with the head maintained in Frankfort horizontal plane and the arms loosely hanging on the sides. The height was obtained by estimating the distance from the vertex to heel. The collected data was analyzed with the aid of SPSS software version 23 to derive mean, standard deviation and the linear regression formula.

Results

The observations recorded were analyzed separately with respect to left and right ulna in female subjects and results are exhibited in the Tables 1 and 2 respectively to extrapolate different parameters. The estimated mean height of the subjects was 156.7 cm with a standard deviation of 4.2 cm. Similarly the mean lengths of left and right ulna were estimated to be 25.09 cm (with standard deviation of 1.02) and 25.43 cm (with standard deviation of 1.01 cm) respectively.

The Pearson’s correlation coefficient r for stature and the length of left ulna was 0.801 (p<0.001) with regression coefficient (b) of 3.296 (p<0.001). Similarly the Pearson’s correlation coefficient r for stature with respect to length of the right ulna was 0.838 (p<0.001) with regression coefficient (b) of 3.496 (p<0.001).

Based on the data collected from study group, scatter diagrams (Fig. 1 and 2) were made by plotting the stature versus the lengths of left and right ulna. From these plots, the Regression equations for stature were

derived as $3.296 \times [\text{Left Ulnar length (cm)}] + 73.965$ and $3.496 \times [\text{Right Ulnar length (cm)}] + 67.719$ for the left and right ulnar lengths respectively.

Table 1: Various statistical parameters for Left Ulna in Females

	Independent Variable	Dependent Variable
	Left Ulnar length (cm)	Stature (cm)
Mean	25.09	156.7
Standard Deviation	1.02	4.2
Correlation Coefficient (r)	0.801 [p<0.001]	
Coefficient of Determination R ²	0.642	
Regression Constant	73.965	
Regression Coefficient	3.296	
Standard Error of the Mean	0.09	

Table 2: Various statistical parameters for Right Ulna in Females

	Independent Variable	Dependent Variable
	Right Ulnar length (cm)	Stature (cm)
Mean	25.43	156.7
Standard Deviation	1.01	4.2
Correlation Coefficient (r)	0.838 [p<0.001]	
Coefficient of Determination R ²	0.702	
Regression Constant	67.719	
Regression Coefficient	3.496	
Standard Error of the Mean	0.09	

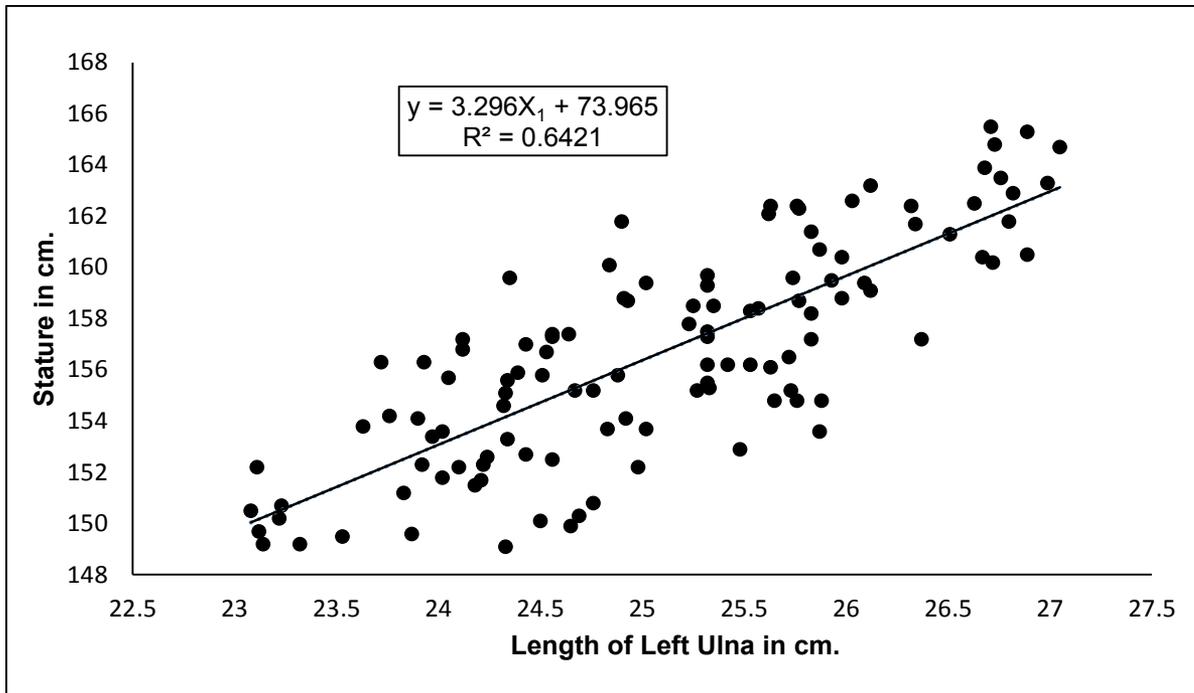


Fig. 1: Correlation between Left Ulnar length (X₁) and Stature (y) in Females

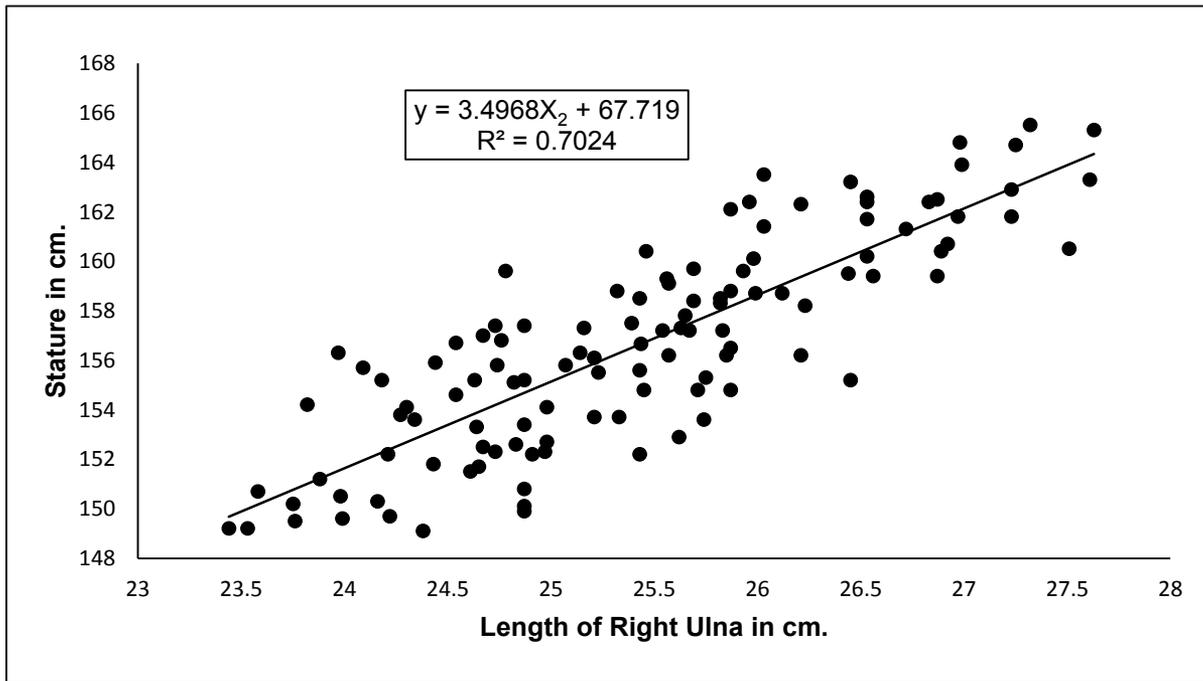


Fig. 2: Correlation between Right Ulnar length (X₂) and Stature (y) in Females

Discussion

Determination of stature of deceased individuals from skeletal remains is frequently used in the field of forensic medicine which can be done by using either

numerical or anatomical methods.^{6,7}

The current study provides important new data specific to the ulnar length and its correlation in relation to the height in adult females of Tamil Population.

Trotter and Gleser have underlined the necessity for population specific stature determination formulae⁵, the principal reason being that the proportions of different body portions to stature varies from one population group to another. In addition to racial variations, secular trends⁸, environmental factors like socio-economic status and nutrition level can affect body proportions.⁹

Therefore, population specific nomograms are needed for various populations.^{3,10} Hence it is essential to identify the race, age before application of regression formula specific to that region, to determine the height of the person and this was underlined by Laxmi et al.¹¹ The findings in our study of females belonging to Tamil population also favour the necessity for ethnic group-specific formula. In our current study, the mean stature of female subjects is 156.7 cm. which is comparable

with previous research studies.

Table No. 3 clearly shows that mean stature of subjects changes within various regions of a nation. This may be because of geography, race, genetic factors, diet habits, lifestyle or physical stress. Therefore, if the variations in mean stature of subjects belonging to various population groups are secondary to geographical, genetic as well as racial factors, it can be reliably presumed that for any taken period of time this will remain constant. At the same time if the predominate influence found to be of plastic ones (viz., lifestyle, dietary habits, physical stress etc.), it may be presumed that the anthropometric reference standards would have to be studied periodically pertaining to above said influences for their reliability.¹²

Table 3: Comparison of Mean Stature in Females

Name of the Researcher	Year	Population for study	Mean Stature (cm)	Mean Length of Ulna (cm)	
				Left	Right
Present Study	2019	Tamil Nadu	156.7	25.09	25.43
Anuj Jain ¹³	2019	Uttar Pradesh	156.35	25.19	25.33
Chintala Durga Sukumar ¹⁴	2017	Vijayawada	160.58	26.63	26.7
Acharya Veena Anand ¹⁵	2016	Gulbarga	157.28	25.05	25.48
Avantika Bamne ¹⁶	2015	Maharashtra	172.31	27.75	27.9
Malay Kumar Mondal ¹⁷	2012	West Bengal	153.83	24.46	24.55

Table 4: Comparison of Regression Formula for Stature (Y) in Females from length of Left Ulna (X₁) and Right Ulna (X₂)

Name of the Researcher	Year	Population for study	Regression Formula	
			Left	Right
Present Study	2019	Tamil Nadu	$Y=3.296 X_1 + 73.965$	$Y=3.496 X_2 + 67.719$
Anuj Jain ¹³	2019	Uttar Pradesh	$Y=2.59 X_1 + 91.04$	$Y=2.78 X_2 + 85.84$
Chintala Durga Sukumar ¹⁴	2017	Vijayawada	$Y=4.23 X_1 + 47.05$	$Y=3.87 X_2 + 57.16$
Acharya Veena Anand ¹⁵	2016	Gulbarga	$Y = 3.33 X_1 + 74.0$	$Y = 3.03 X_2 + 80.2$
Avantika Bamne ¹⁶	2015	Maharashtra	$Y=2.21 X_1 + 102.82$	$Y=3.46 X_2 + 70.75$
Malay Kumar Mondal ¹⁷	2012	West Bengal	$Y=4.39 X_1 + 45.89$	$Y=3.89 X_2 + 58.72$

From Table No. 4, it is clear that all researchers arrived at positive correlation between height and ulnar length which indicates there exists a strong relationship between above two parameters.

Regression formulae are population specific and gender specific due to isolation variations, genetic differences, bio-cultural history differences and similar other factors. The researchers have found that the formulae for estimation of stature should be re-estimated, even for same ethnic populations, within proper time intervals.¹⁸ Body proportions within particular population groups also vary over time because of changes in lifestyle, nutrition, socio-economic conditions and hence the present regression equations may require readjustment.¹⁸ In addition, racial differences in the corresponding relationship between stature and ulnar length have been demonstrated by comparative data studies between White, Black and Asian subjects.¹⁹

Conclusion

Simple regression formula derived from our study can be applied in the determination of stature from ulnar length in females belonging to Tamil population. This may be useful in difficult and challenging circumstances in getting a direct stature assessment as in mutilated body remains, amputated limbs, accidents, mass casualties and grossly decomposed bodies. We highly recommend that further similar studies have to be done in future involving higher number of female subjects among Tamil population to enhance the reliability of the regression formula and its application in various forensic scenarios.

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Ethical Clearance: Necessary ethical approval was obtained from the Institutional Ethics Committee, Chettinad Academy of Research and Education, Kelambakkam – 603103.

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Acceptance of Legalization of Euthanasia in India and Chance of Medical Miracle- A Survey among Medical Students

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Abstract

The Hon'ble Supreme Court of India, on 9th March 2018 legalized Passive Euthanasia by means of the withdrawal of life-support to patients in a permanent vegetative state. The decision was made as part of the verdict in a case involving Aruna Shanbaug, who had been in a Persistent Vegetative State (PVS) until her death in 2015. On the other side, events seemingly inexplicable, outside the range of medical precedents, the Medical Miracles make a question mark on this legalization. A study was conducted taking the views of 96 MBBS students on it based on a questionnaire. There was mixed response from the students and the expectations of some miraculous outcome (in treatments) have been expressed that imposes a still persisting doubt in justified acceptability of legalization of Euthanasia in India.

Key words: Euthanasia, Legalization, Medical Miracle, Passive, Persistent Vegetative State.

Introduction

Euthanasia or Mercy Killing is an act or practice of painlessly putting to death persons suffering from painful and incurable disease or incapacitating physical disorder¹. In Active Euthanasia, direct act to end a life (like application of some Drug in absence of which the person would have not died immediately, etc) is done. Passive Euthanasia is defined as a decision not to prolong life or a non-treatment decision, for instance, non-resuscitation after cardiac arrest, a no antibiotic policy, withdrawal of artificial feeding and ventilation and abstaining from an intrusive feeding regimen. The phrase Medical Miracle means a situation in which a person makes an unexpected recovery despite great odds or a pessimistic prognosis. Often it is used in seemingly supernatural healing event like faith healing. The question of such tracing of link between the two apparently unrelated subject of discussion lies on the fact that medical science has been advanced at such a standard where in some cases even death can be

delayed with application of modern gadgets and then definitely the question of so called expenditure and expected outcome rises that brings the question of so called Assisted Suicide, the Euthanasia and of course its legal applicability. Side by side, a country with an area of 3,287,263 square kilometer and population of 1.32 billion(2016) having overall literacy rate 74.04%(2011) with great disparity at states and a considerably strong belief on religion, chances of false explanations and mal-applications of so called assisted suicide in the society cannot be ruled out. Based on this view, present survey was sought for with the objectives-1) to get an overview of acceptability of Euthanasia legalization through faiths of a person of science on miraculous cures, 2) to form an indirect awareness on the legalization procedures on Euthanasia.

Material and Method

Second Professional MBBS students were considered as study group at Academic Program on Euthanasia. Total 96 students attended the programme and each student was given a semi-structured questionnaire form having 10 questions with answer option- yes/no /do not know. The views were calculated in percentage and a reasonable conclusion has been formed. Confidentiality was maintained on identity of

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the student.

- 1) Do you know about Euthanasia?
- 2) Have you any idea on recent court order on Euthanasia?
- 3) Do you know about Medical Miracle?
- 4) Do you feel that Euthanasia should be legalized in India?
- 5) Do you think that if Medical Miracle is there, Euthanasia should not be accepted?

- 6) Have you come across any incidence where you felt that Euthanasia might be a solution?
- 7) Do you feel that less consciousness and less literacy may be a burden to legalize Euthanasia?
- 8) Have you come across any incidence of Medical Miracle?
- 9) Do you feel that more time should be taken to legalize Euthanasia in country like India?
- 10) In an imaginary case, would you prefer to wait for Medical Miracle and not to go for Euthanasia?

Findings-

TABLE SHOWING NUMBER AND PERCENTWISE DISTRIBUTION OF ANSWERS : N=96

QUESTION NUMBER	ANSWER-YES	ANSWER-NO	ANSWER-DO NOT KNOW
1	96 (100%)	00 (00%)	00
2	36 (37.5%)	60 (62.5%)	00
3	94 (97.9%)	02 (02.08%)	00
4	80 (83.33%)	16 (16.6%)	00
5	24 (25%)	68 (70.83%)	04 (04.16%)
6	40 (41.66%)	56 (58.33%)	00
7	74 (77.08%)	22 (22.91%)	00
8	26 (27.08%)	70 (72.91%)	00
9	50 (52.08%)	46 (47.91%)	00
10	40 (41.66%)	56 (58.33%)	00

Results

Results show that all of the students know what Euthanasia as per Question (1) is. In **Question (2)**, 60 (62.5%) students expressed their ignorance on Court Order on Legalization of Euthanasia. **Question (3)** depicts that Medical Miracle is known to 94 (97.9%) students, while 80 (83.33%) students felt that legalization of Euthanasia is justified as in **Question (4)**. In **Question (5)**, 24 (25%) students expressed that if Medical Miracle is there, Euthanasia should not be accepted, 04 (04.16%) students could not comment on it and 68 (70.83%) did not agree on it. In **Question (6)**, 40 (41.66%) students agreed that they felt the rationality of Euthanasia as a solution in connection

with some case experiences. **Question (7)** shows that 74 (77.08%) students answered that less literacy and consciousness may be a burden on the application of this verdict. 26 (27.08%) students told that they have seen medical Miracle cases as per **Question (8)** and 50 (52.08%) students think more time should have been taken by The Hon'ble Supreme Court to give this landmark decision as has been asked in **Question (9)**. In **Question (10)**, 40 (41.66%) students opted that if chance is given, they would wait for any miracle before commencing Euthanasia on their Patients.

Discussion

Euthanasia, or Mercy killing as often termed as, has also been used as Physician assisted suicide. Debate

on its pros and cons has come up mainly with the legal application of it, side by side due to on growing concept to stick to right on religion and naturally expecting some unusual unexplainable, the miracle in medical field. Countries all over the world had a thought on it. In 1906, first Euthanasia bill was drafted in Ohio, USA but it could not succeed. The watershed event in the history of Euthanasia was the Dutch Supreme Court's decision in 1984 to permit Netherlands to become the first country to give legal sanction to some forms of assisted suicide and euthanasia. Netherlands is the first country to legalize Euthanasia in 2001 and Germany became the 5th in June 2010. In India, The Karnataka High Court argued That Article 21 grants the right to life, but that does not imply that one has a right to death.² At last, a person's right to Die with dignity finally got approval on March 7, 2011 from Supreme Court.³

The Hon'ble Supreme Court of India, on 9th March 2018 legalized Passive Euthanasia by means of the withdrawal of life-support to patients in a permanent vegetative state.

Present survey shows all of the attending students has knowledge on Euthanasia, but the Court Order, as noted, is not known to 62.5% of them. It is a matter of concern as all of the students are of Medical fraternity. Question 4, 5 and 9 are important to get an way of thinking on Euthanasia acceptance. It is seen that while 83.33% supports legalization, about 71% does not prefer Euthanasia if Medical Miracle is true. Also regarding the timing of its legalization, about half of them are of opposite thought. Such type of mixed reaction shows unsoundness in expressing a clear view on any topic.

Jha MK et al summarizes the views against Euthanasia as-1) Humanitarian,2) Constitutional,3) Legal,4) Religious,5) Hippocrates oath related, and in favour are-1) Relief from pain,2) Enhancement of quality of life, 3) Freedom of choice, 4) Individual autonomy⁴

If otherwise the views of physicians are considered from already legally experienced countries, It has been shown that majority of the physicians think that the Euthanasia Act has improved their legal certainty and contributes to the carefulness of life-terminal acts.⁵ as elaborated in study by **Rietjens JAC** et al. Also when the concepts on autonomy of patients are concerned, it has been expressed by **Peterkovas H** that although the

will of the patient can with no doubt be understood as a condition sine qua non for decriminalization of life termination on request and/ or assisted suicide, without being accomplished with other legal requirements it cannot be pleaded as full defense. Therefore, as the area of end of life decision making is concerned, the primacy of principal of autonomy should not be automatically taken for granted.⁶

The UN has expressed concern that the system may fail to detect and to prevent situations in which people could be subjected to undue pressure to access or to provide Euthanasia and could circumvent the safeguards that are in place.⁷

As the Medical Miracle question arises, like Euthanasia, in this survey it is seen that almost everybody (97.9%) knows it but 72.9% did not have any first hand knowledge or experience on miraculous outcome in medical field. The students are of second professional course, and naturally still awaiting to be exposed to clinical arena, such result tallies with the view.

The word Miracle comes from the Latin word *Miraculum*, which is derived from *mirari* (to wonder). Thus the most generalized epistemological characterization of a miracle is an event that causes wonder and is in some way unusual or contrary to our expectations.⁸ **Bandini JI** et al finds that religion can be central to conflict over life sustaining treatment but was also present in two additional ways through 1) religious coping, including a belief in miracles and support from a higher power, and 2) chaplaincy visits.⁹ Like any other country, India is also no way different in religious faiths of population, and it is the main concern when health care workers feel more firmness on faith. **Pawlikowski J** says if health care workers unconsciously impose their personal concept of miracles on their patients, this can adversely affect the quality of patient care. So interpretation of miracle is important for both patient and physician in rendering health care service.¹⁰

In present study also as per answer of question no 10, students are near half divided in thought of preference on Euthanasia or some Miraculous outcome. As per **Schneiderman LJ**, from the time of Hippocrates, the Doctors' goal has been to "assist nature" to heal (which means "to make whole") the patient (which comes from the word "to suffer"). The Hippocratic physician acknowledged the limits of nature and shunned claims

of miraculous cures to avoid the taint of Charlatanism. Even today, we must acknowledge that Medicine has great powers, but not unlimited powers; physicians have important obligations, but not unlimited obligations. These form the bases for professional standards of practice.¹¹ Though in India, Passive Euthanasia has been legalized, but in a study related to Voluntary Euthanasia by **Sharp S**, based on results from General Social Survey (N= 1799), it highlights the need to consider specific religious beliefs when predicting individuals' attitudes towards voluntary euthanasia.¹² Studies had been conducted on a pediatric age groups and their parents where **Superdock et al** finds that parents consider religion and spirituality fundamental to decision making but apply this concept in vague ways.¹³

Thus, belief on Medical Miracle, which is basically mirror of mind's religious faith, has a definite role on society even in today's scenario of legalized Euthanasia and health care persons are no exception as is depicted in this present survey.

Conclusion

Euthanasia and Medical Miracle, if we think, appears to be altered sides of same coin. In Euthanasia, life is terminated and in Medical Miracle, one waits for last breath of any outcome of life. But where is the conflict? Probably this lies on highest point of thinking of self Autonomy and human Right and question of probability of mal-application of Euthanasia. Incidentally, India bears the chances of both showing massive religious faith and a sense of right to maintain it on one side and on the other side illiteracy, that may turn up as mal-application. In an expression on Dignified end of life through Euthanasia, **Vaibhav Goel** feels so far as the misuse of Euthanasia is concern, it is known that every boon possesses some curse, even Code of Medical Ethics (Sec 33 of Indian Medical Council Act 1956) may also be treated as a safeguard while legalize Euthanasia as a safeguard for the curse.¹⁴ In an Indian Perspective, **Sinha VK et al** says that It can be argued that in a country where the basic human rights of individuals are often left unaddressed, illiteracy is rampant, more than half of the population is not having access to potable water, people die every day due to infections, and where medical assistance and care or less, for the few people, issues related to Euthanasia are irrelevant.¹⁵

Keeping aside, it is no less irrelevant to note that Euthanasia in terminally ill patients provides an opportunity to advocate for organ donation. This in turn will help many patients with organ failure waiting for transplantation. So, indirectly causes 'Right to live' for some persons.¹⁶

Though with consideration of advent of advanced Medical Gadgets as on date, their application and question of so called non beneficial therapy (and chance of miracle through it) opposes the logic of Euthanasia **Rosoff PM** says Non Beneficial therapy (and a faith based world of hope for a miraculous cure) by its definition cannot be helpful, and indeed is often harmful to patients and cannot be justified no matter what the source or kind of reasons used to support its use.¹⁷

In a country like India, having an uneven illiteracy of about one fourth of population and so also the consciousness, possibility of adverse application of euthanasia also similarly cannot be ruled out. In spite of scientific base, study group could not nullify some miraculous outcome in medical science which reflects that legalized stoppage of one LIFE which could not be created, still remains as a big question but in today's scenario when India has already occupied a praiseworthy position in world's scientific arena, it is rather expected that soon a time will come when mass consciousness will be in such a standard, which will abolish all such conflicts even after balancing individual's faith and medical science will get free hand to keep a 'RIGHT TO LIVE'.

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A Cross Sectional Study to Assess the Agreement between Stevenson & Tanner-Whitehouse Method for Bone Age Estimation

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Abstract

Bone age is an indicator of the skeletal and biological maturity of an individual. This is different from chronological age. The TW2 method relies on the systematic evaluation of the maturity of all the bones in the hand and wrist and gives a more accurate estimation of age and reproducible, it is less frequently used as it is more complex and requires more time. Comparison of bone age estimated by Tanner Whitehouse (TW2 method) with Stevenson method in Indian population was undertaken in this study. 53 digital x-rays of left wrist joint antero-posterior view of males taken during 2016 to 2018 were included. Blinded expert estimated bone age using TW2 method and Stevenson method. Unblinded expert analyzed the demographic, physical and date of birth and then compared the agreement between age estimation calculated by the blinded forensic expert with the age calculation from date of birth with Bland Altman analysis. The mean bone age as estimated by TW2 method was 14 ± 1.6 yrs. The mean lower limit (LL) of bone age estimated by Stevenson method was 14.2 ± 2.3 yrs while the mean upper limit (UL) of bone age estimated was 16.2 ± 1.76 yrs. This study demonstrated that the bone age estimated by Tanner- Whitehouse method is in close agreement with birth age (chronological age) and also in acceptable agreement with LL of bone age estimated by Stevenson method.

Key words: *Tanner Whitehouse method, Stevenson Method, Bone age, Chronological age.*

Introduction

Bone age is an indicator of the skeletal and biological maturity of an individual. This is different from chronological age, which is calculated using the date of birth of an individual.¹ In medico-legal practice; estimation of bone age is commonly requested for identification of living & dead in both criminal &

civil disputes. Bone age assessment also has clinical significance & is frequently performed in pediatric endocrinology, orthodontics and pediatric orthopedics. Bone age is an effective indicator for diagnosing various diseases, and determining the timing of treatment. The aim of bone age assessment clinically is to evaluate growth and maturity and to diagnose and manage pediatric disorders. Therefore, the accuracy of bone age assessment is very important.²

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In India the estimation of age in the living is done by considering the following Physical examination, basic anthropometric measurements (weight, height, build); ascertainment of signs of sexual maturity (stage of pubic hair development according to Tanner etc.);

identification of any developmental disorders affecting age-appropriate development, dentition and bone age assessment. The appearance and union of ossification centers are analyzed most commonly by Stevenson method, which recognizes the four stages, no union (O), beginning of union (B), recent union (R) & complete union (C).³

Another method in analyzing the ossification centers is Tanner-Whitehouse 20-bones method, a scoring method using x-ray wrist joint anteroposterior view. Firstly, the maturity level of each bone is categorized into a stage (from stage A to H or I). Afterwards, a score replaces each stage, and a total score is calculated. Finally, the total score is transformed into the bone age. Though The TW2 method relies on the systematic evaluation of the maturity of all the bones in the hand and wrist and gives a more accurate estimation of age and reproducible, it is less frequently used as it is more complex and requires more time. The essentially source of discrepancy between bone age and chronological age is systematic error inherent in the method used to assess bone age, so we have compared the estimated bone age estimated by Tanner Whitehouse (TW2 method) with Stevenson method in Indian population.

Methodology

The study was designed in accordance with Good Clinical Practice guidelines & started after getting Institutional Ethics Committee approval. The study design is retrospective & cross sectional.

In this study, 53 digital x-rays of left wrist joint antero-posterior view of males taken during 2016 to 2018 were included. The X rays which had fused epiphyses, inadequate quality and/or uninterpretable were excluded. For the X rays that met eligibility, the age estimation was done by both Stevenson method and TW2 method. Existing radiographs were chosen because it was considered unethical to irradiate normal children, however small the dose, when no benefit would accrue to the subject. There was a blinded and unblinded forensic expert.

Blinded forensic expert of Dept of Forensic Medicine & Toxicology, Apollo Institute of Medical Science & Research, Jubilee Hills, Hyderabad analyzed the digital X-rays for estimation of bone age using TW2 method and Stevenson method. The forensic expert was blinded to the demographic details, physical

examination, clinical examination and date of birth details of the subjects enrolled in the study.

The unblinded forensic expert of Dept of Forensic Medicine & Toxicology, ASHRAM, Eluru, collected the x-rays, analyzed the demographic, physical and date of birth and then compared the agreement between age estimation calculated by the blinded forensic expert with the age calculation from date of birth with Bland Altman analysis.

The demographic characteristics were expressed as mean \pm SD for quantitative variables and percentages for qualitative variables. The agreement between estimated bone age by Tanner Whitehouse method and Stevenson method was assessed using Bland Altman analysis.

Results

In this study, a total number of 53 Digital X-rays of Antero-Posterior view of left hand of males aged between 12 to 16 were included. Of these, 42 were analyzed, as the remaining radiographs were rejected for a variety of reasons, but mainly because the epiphyses were all fused (4), radiographic quality was inadequate (6), or the whole hand cannot be examined (1). The mean age of the 42 subjects (age as analyzed according to date of birth certificate) was 14.02 ± 1.08 yrs.

The bone age estimation was done for each X-ray using Tanner-Whitehouse (TW2) method and Stevenson method (SM). The mean bone age as estimated by TW2 method was 14 ± 1.6 yrs. As Stevenson method estimates the approximate bone age (and expressed as range), the upper limit (UL) and lower limit (LL) of bone age was analyzed individually to understand which limit was more closer to birth age and TW2 method. The mean lower limit (LL) of bone age estimated by Stevenson method was 14.2 ± 2.3 yrs while the mean upper limit (UL) of bone age estimated was 16.2 ± 1.76 yrs.

When analyzed by Bland Altman method, the lower limit of age as obtained by Stevenson method overestimated the bone age by 2.4 months (Fig No 1) when compared with TW2 Method, which was statistically non-significant as the 95% CI for bias is -0.807 to 0.398, while the upper limit of age as obtained by SM overestimates the bone age by 2.4 years when compared to TW2 method (Fig No 2) and is statistically significant as 95%CI is -2.62 to -1.74. Therefore, bone

age estimated by TW2 method is not in agreement with upper limit of bone age estimated by Stevenson method.

Further, the bone age estimation done by TW2 method and SM were individually tested for agreement with age as per birth certificate records. The bone age estimated by TW2 method underestimated the age by 0.1 month when compared to birth age (Fig No 3), which was statistically non-significant with a 95%CI of -0.53 to 0.5. The lower limit of bone age as estimated by SM over-estimated the bone age by 2.4 months (Fig No 4) which was statistically non-significant (95%CI -0.53 to +0.50).

The upper limit of bone age as estimated by SM over-estimated the bone age by 2.4 years (Fig No 5), which was statistically significant with 95%CI of 1.74 -2.59.

The TW method non-significantly underestimates the birth age by 0.1 months while SM overestimates the birth age by 2.4 months to 2.4 years (LL to UL), which is significant for the upper limit of age.

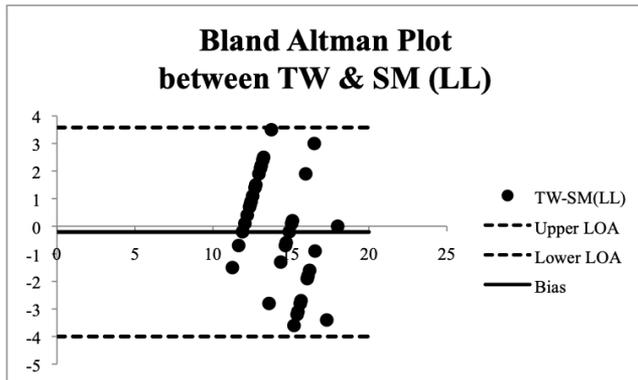


Fig No 1 assessing agreement between Tanner Whitehouse method (TW2) and Lower limit of age estimated by Stevenson method (SM)

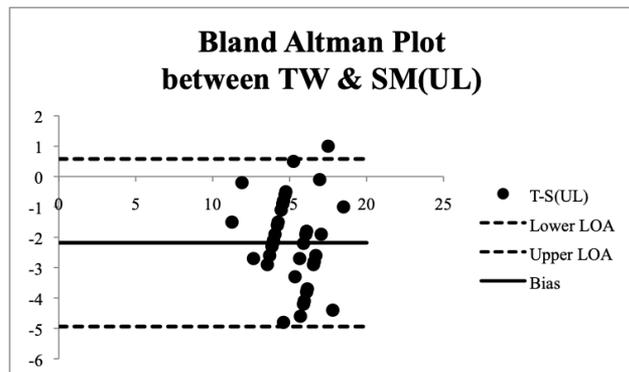


Fig No 2 assessing agreement between Tanner Whitehouse method (TW2) and Upper limit of age estimated by Stevenson method (SM)

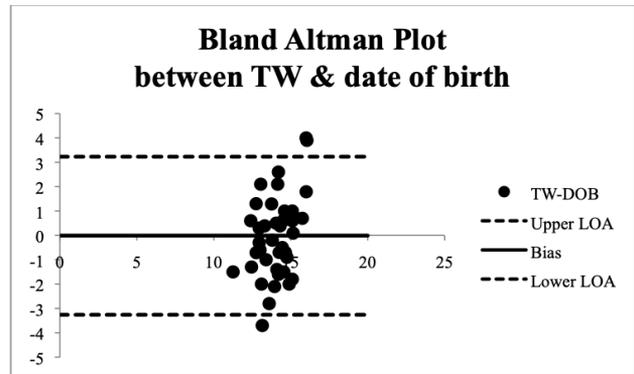


Fig No 3 showing agreement between Tanner Whitehouse method (TW2) and Date of birth

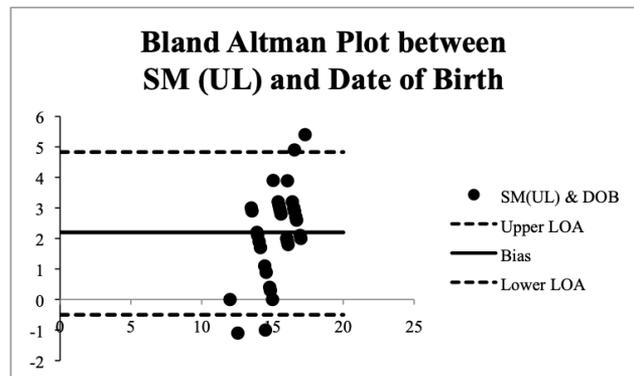


Fig No 4 assessing agreement between Upper limit of Stevenson method (SM) and Date of birth

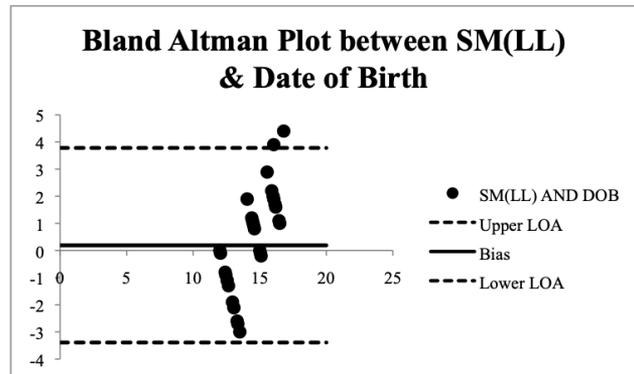


Fig No 5 assessing agreement between Lower limit of Stevenson method (SM) and Date of birth

Discussion

This study demonstrated that the bone age estimated by Tanner- Whitehouse method is in close agreement with birth age (chronological age) and also in acceptable agreement with LL of bone age estimated by Stevenson method. Stevenson method over-estimates the bone age ranging from 2.4 months to 2.4 years when compared to both TW2 method and birth age, particularly UL of bone age by SM is overestimated significantly.

Essentially the source of discrepancy between bone age and chronological age is due to systematic error

inherent in the method used to assess bone age and the source of systematic error is said to derive from the way the estimation is actually carried out.⁴

The TW2 method is a more objective, systematic method which demonstrated precision in studies done by Breunen and Cameron and Wenzel and Menson, who showed that the same assessor gave same scores for bone maturity using TW method on two occasions in 90% of X rays and with a acceptable difference in 0.2% of cases.⁵

With regard to bone age, Breunen and Cameron, the within observer confidence limits were found to be 0.54 to 0.82 yrs and the inter-observer variability in 75% -85% of cases with 95% confidence limits of 1 year. In an International Child Study at London, the inter-observer difference in bone age estimation was 0.5 ± 0.35 years.⁵

Tanner Whitehouse II system addresses the disadvantages of other methods like Greulich-Pyle Atlas method and the Oxford method as it allows a chronological age independent estimation of bone maturity and can be applied to any population.

However, to the best of our knowledge, there are no studies comparing TW2 method and Stevenson method.

Stevenson described four distinct phases of epiphyseal union, stage of no union, stage of beginning union, stage of recent union and stage of complete union⁶, which was used in a number of studies done in India.

In a retrospective study done in India, by Sangma WB et al., in North East states, the bone age was estimated by examining the different phases of fusion (5 stages)-Non-Union, Commence of Union, Incomplete union, complete union and complete union with epiphyseal scar and concluded that bone age estimation can be reliably done from wrist joint and pelvis by comparing it with bone age.⁷

In a study done by Krishnamoorthy S et al., in Khammam, South India, they also considered the three stages of ossification and compared it with birth age.⁸ In a study done by Bhise SS et al., at Mumbai, the four stages of ossification were used to determine the age using wrist joint and hand and compared it with birth age (from records).⁹

To the best of our knowledge, there are no studies done in India, which compared Tanner-Whitehouse (TW2) method and Stevenson method (SM) for estimation of age. This study demonstrated that TW2 method is more objective and requires only one hand X ray to estimate the age which is closely in agreement with Lower limit of Stevenson method and Chronological age from records. Upper limit of age as predicted by Stevenson method was shown to over-estimate age significantly.

Conclusion

As there is significant agreement between the ages estimated from TW2 method with that of age calculated from date of birth, more studies should be done on Indian population of different regions.

To make it easy and more commonly used, software should be developed to overcome the tedious procedure of age estimation from TW2 method.

Conflict of Interest – None

Source of Funding- self

Ethical Clearance – study approved by institutional research committee.

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Original Article

Study of Association between Mode of Delivery and Blood Glucose Levels in Neonates

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Abstract

Background: In neonates, there is not always an obvious correlation between blood glucose concentration and the classical clinical manifestations of hypoglycemia. The absence of symptoms does not indicate that glucose concentration is normal. **Aim and Objectives:** The study was aimed to find the effect of mode of delivery (Caesarean Section or Vaginal delivery) on glycemic status in term neonates after 24 hours from birth. **Materials and Method:** A cross-sectional study of neonates born in KIMS Hospital Karad from December 2013 to February 2015 was done. Blood samples were collected from the cord at birth and 24 hours sample collected from peripheral veins while observing all safety and aseptic precautions. A total of 462 samples were collected and all were included in the study. Descriptive statistics with respect to mode of delivery was studied. Neonates were divided into groups on the basis of mode of delivery. The relationship of BSL values with mode of delivery was evaluated statistically. **Results:** In our study mean BSL Value in (mg/dl) born by FTND was 65.18 ± 14.06 and mean BSL in LSCS born babies was 62.23 ± 11.84 with p value 0.015 which is statistically significant. **Conclusion:** We found a statistically significant and relation between mode of delivery and glycemic status in newborn at 24 hours indicating that mode of delivery affects the level of blood sugar in neonates at 24 hours.

Keywords: Blood glucose levels, mode of delivery.

Introduction

Glucose homeostasis is particularly important for neonates, in whom there is an abrupt transition from intrauterine life, characterized by dependence on transplacental glucose supply, to extra uterine life, characterized ultimately by the autonomous ability to maintain euglycemia. Because prematurity or placental insufficiency may limit tissue nutrient deposits, and genetic abnormalities in enzymes or hormones may become evident in the neonate, hypoglycemia is common in the neonatal period.¹

In neonates, there is not always an obvious correlation between blood glucose concentration and the classic clinical manifestations of hypoglycemia. There is evidence that hypoxemia and ischemia may potentiate the role of hypoglycemia in causing permanent brain damage. Consequently, the lower limit of accepted normality of the blood glucose level in newborn infants with associated illness that already impairs cerebral metabolism has not been determined. Out of concern for possible neurologic, intellectual, or psychologic sequelae in later life, many authorities recommend that any value of blood glucose <50 mg/dL in neonates be viewed with suspicion and vigorously treated. This is particularly applicable after the initial 2–3 hr of life, when glucose normally has reached its nadir; subsequently, blood glucose levels begin to rise and achieve values of 50 mg/dL or higher after 12–24

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hr. In older infants and children, a whole blood glucose concentration of <50 mg/dL (10–15% higher for serum or plasma) represents hypoglycemia.¹

Therefore, we undertook this study to find out the effect of mode of delivery and glucose levels at birth and after 24 hours in neonates.

Materials and Method

1. Study Design: A cross-sectional study of neonates born in KIMS Hospital Karad from Dec 2013 to February 2015 was done. Blood samples were collected from cord blood at birth and 24 hours sample collected from peripheral veins while observing all safety and aseptic precautions. Blood samples were analyzed for glucose by using GOD-POD method on EM360 TRANSASIA fully automated analyzer. A total of 462 samples were collected and all were included in the study. The relationship of mode of delivery with blood glucose levels was evaluated statistically.

2. Statistical Methods & Analysis: Descriptive statistical analysis was carried out in this study. Results on continuous measurements are presented as Mean SD (Min- Max) and results on categorical measurements are presented in number(%). Significance was assessed at 5 % level of significance. Student t test (two tailed, independent) was used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. SPSS (Statistical Packages for Social Sciences) 20.0 software was used for the data and Ms-Excel have been used to generate the graphs, tables, etc.

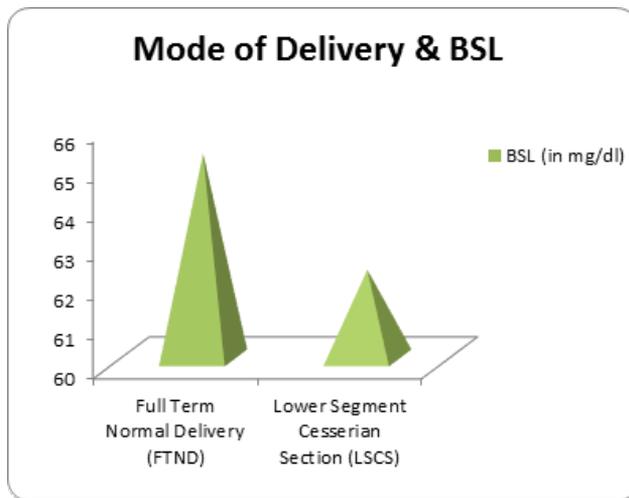
Results

In this study 462 neonates were included based on inclusion and exclusion criteria. Sample for TSH was collected at birth. The mean 234 were born through full term normal vaginal delivery while 228 were born through caesarean section.

Table 1 showing mode of delivery and the levels of blood sugar at 24 hours after birth

Mode of Delivery		BSL (in mg/dl)
Full Term Normal Delivery (FTND)	N	234
	Minimum	32.00
	Maximum	100.00
	Mean	65.1880
	Std. Deviation	14.06266
Lower Segment Cessarian Section (LSCS)	N	228
	Minimum	38.00
	Maximum	120.00
	Mean	62.2368
	Std. Deviation	11.84243
STATISTICAL ANALYSIS	Unpaired 't' test value	2.437
	p value	0.015

In our study mean BSL value (mg/dl) born by FTND was 65.18 ± 14.06 and mean BSL in LSCS born babies was 62.23 ± 11.84 with p value 0.015 which is statistically significant. (Table 1 Graph 1)



Discussion

In our study mean BSL Value (mg/dl) born by FTND was 65.18 ± 14.06 and mean BSL in LSCS born babies was 48.5 ± 10.6 with p value 0.015 which is statistically significant. (Table 1)

K.K. Diwakar found that, there was no any statistical significance in plasma glucose levels of infants delivered vaginally and those delivered by caesarean section in formula fed babies⁸.

Hussein et al showed that cord blood glucose levels are significantly lower in cesarean-delivered neonates than vaginally-delivered neonates. In addition, cord blood glucose levels are significantly associated with cesarean delivery and maternal blood glucose levels at delivery⁹. Our findings matches with Hussein et al which clearly indicating that, mode of delivery affect blood sugar level after birth.

Ronella Marom et al compared cord blood glucose concentrations in healthy term infants born after VD (n = 16) or by elective CS (n = 21). Glucose concentrations were obtained immediately at birth from the umbilical cord. Kruskal–Wallis was used to compare glucose concentrations and demographic variables between the groups. Cord blood glucose concentration was higher in VD (81.3 ± 16.9 mg/dL) than CS infants (70.3 ± 9.7 mg/dL, (p = 0.039). The change in blood glucose concentration over the first 2-h of life differed significantly between the two groups, being an increase in CS versus a decrease in VD infants (3.5 ± 15.2) vs. (15.4 ± 24.6 mg/dL), (p = 0.013).²

One study of infants delivered vaginally showed that cord blood glucose values were significantly higher

than those of infants delivered by CS³, which the authors interpreted as possibly related to catecholamine release generated by the stress of vaginal delivery³⁻⁵. This is inconsistent with the results of Borgwardt et al.⁶ who reported a higher incidence of neonatal hypoglycaemia in infants delivered vaginally than in infants delivered by CS.

Kayiran S M et al studied 1,540 healthy term and near-term neonates delivered at a private hospital from January 2005 to May 2007. Vaginally delivered infants were found to have a significantly higher mean blood glucose concentration (59.1 ± 14.3 mg/dl) compared with those delivered via caesarean section (48.5 ± 10.6 mg/dl) (p < 0.001).⁷

In general, cord blood glucose concentrations correlate with maternal blood glucose concentrations, as it occurs throughout most of the foetal life¹⁰. We therefore can assume, although we did not measure it, that mothers who delivered by CS may had at the time of delivery a lower blood glucose concentration than that of mothers that delivered vaginally. We can only speculate about the reason for this assumption: it is possible that maternal fasting prior to CS contributed to lower maternal, then foetal (cord blood) glucose concentrations in this group of patients. Also, though we did not measure prospectively, in our study, maternal nutrient intake prior to delivery, VD women were allowed to eat and drink at their leisure, per institutional protocol.

From this, we can conclude glucose concentrations in VD infants are higher than in infants born by CS. Whether maternal fasting of CS delivered infants or stress responses of VD infants are the reasons remains to be elucidated.

Conclusion

This study was undertaken to evaluate effect of mode of delivery and birth weight on glycemic status in newborn at 24 hours which was found statistical significant indicating that mode of delivery affects the level of blood sugar in neonates at 24 hours.

Ethical Clearance: Institutional Ethics Committee, KIMSUDU, Karad.

Source of Funding: KIMSUDU.

Conflict of Interest: None.

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Structured Teaching through a Picture Module on Child Sexual Abuse: A Potential Tool to Increase Knowledge among School Children

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Abstract

Background: Sexually abusing a child by an adult or for that matter even by an adolescent for sexual stimulation is categorised as Child sexual abuse (CSA). It refers to the involvement of a child in a sexual act aimed towards the physical gratification or the financial profit of the abuser.

Objective: The study was done to assess the knowledge of school children regarding child sexual abuse and to determine effectiveness of a structured teaching program implemented through a picture module by comparing the pre-test and post-test knowledge scores.

Method: A quasi- experimental one group pre-test post-test design was used. Information was collected from 60 participants using a structured knowledge questionnaire. Pre-test was done to assess the knowledge of participants, then a structured teaching program through a picture module on child sexual abuse was implemented and it was followed by a post-test to find out the effectiveness.

Results: Forty percent (40%) of the participants had previous information about good and bad touch, source of information for majority (31.6%) was television and only 8.33% had got information from parents. The mean knowledge score in pre-test was 5.75 ± 2.37 , whereas mean post test score was 14.67 ± 3.22 with a mean difference of 8.92. The structured teaching program which was implemented through a picture module was found to be statistically significant ($t=32.97$, $p=0.001$) in improving the knowledge of the participants regarding CSA.

Conclusion: CSA is preventable. Teaching program through a picture module helped to enhance knowledge of the participants regarding CSA.

Keywords: Child abuse, Picture module, Child sexual abuse, School children

Introduction

Children are the “Nations supremely important asset” to their family and society. They can be the best resources for the nation if developed and utilized well.¹

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There are four major categories of child abuse: neglect, physical abuse, psychological abuse and sexual abuse. Child sexual abuse (CSA) is defined as detrimental behaviour directed against a person who is below the age of consent. Child abuse can occur anywhere, at home, school or at the community.² CSA is a form of child abuse in which an adult abuses a child for sexual stimulation. It refers to the involvement of a child in a sexual act aimed toward the physical gratification or the financial profit of the abuser. The different forms of CSA include indecent exposure of the genitals, displaying pornography, sexual contact, touching or viewing the child’s genitals. There are multiple

causes contributing to CSA like parents who physically abuse their spouses, when parent's expectations are particularly deviant, children resulting from unintended pregnancies, substance abuse, unemployment and financial difficulties, non-biological parents and step children have much higher risk of being abused, poverty, culture, social norms also influence child abuse.³

A report from Ministry of Statistics and Programme Implementation, Government of India revealed that cases registered under Protection of Children from Sexual Offences Act, 2012 (POCSO) were as high as 34.4%. Rape was found to be a big category of crime against children amounting to more than 18% of all crimes against children.⁴ Around 53,000 children died worldwide because of homicide in 2006 as reported by United Nations (UN) on violence against children. One hundred and fifty million girls and 73 million boys under 18 faced sexual abuse during 2002.⁵ Another report by Women and Child Development Ministry (Government of India) which was supported by UNICEF revealed that younger children have reported higher level of abuse. The risk of abuse is equal for both boys and girls. Seventy percentage of abused children never revealed the incident to anyone. About 53.22% children faced one or more forms of sexual abuse, 21.90% children faced severe forms and 50.76% other forms of sexual abuse.⁶

Awareness among children regarding recognition of good touch and bad touch, reporting of possible abuse to a trusted adult, early identification of family members with abusive tendencies, initiating legal procedure to identify real abusers will save our children from such shameful incidents of abuse. School programs regarding "good touch and bad touch" can provide children with a platform to avoid potentially harmful situations.

Method and Materials

Study design and Setting:

A quasi experimental one group pre-test post-test research design was used for this study. The target population consisted of children studying in fourth grade from a selected school of Udupi district. Simple random sampling (lottery method) was used to select the school for the study. The participants were selected using convenient sampling technique consisting of 60 fourth

grade children. The study was conducted after obtaining administrative permission, the purpose of the study was explained to the participants and their guardians and informed consent was obtained from them.

Study duration:

The study was conducted between January 2016 to December 2016.

Description of the tool:

Structured knowledge questionnaire in the form of pictures consisting of 20 items regarding child sexual abuse was used for the study. Structured teaching program through a picture module was developed consisting of the following main headings: introduction & meaning, definition of good touch and bad touch, identification of private parts, touching rules, prevention of uncomfortable situation, difference between good secrets and bad secrets, how to seek help, what to do when friends get abused. Content validity for the tool was established above 80% by obtaining the suggestions from 9 experts from the field of Mental Health Nursing, Psychiatrist, Clinical Psychologist and Psychiatry Social Worker. Reliability of the tool was measured by split half method with Spearman's Brown prophecy formula and it was found to be 0.98.

Statistical analysis:

Chi-square test was done to find the association between the variables and paired t test was used to find the effectiveness of structured teaching program through a picture module on CSA.

Results

Demographic findings

Majority (61.67%) of the participants were 9 years of age and 58.33% were females. Sixty percent of them had no previous exposure to information regarding child sexual abuse. Among those who had previous exposure, 31.67% got information from mass media like television. The sensitive topic of child sexual abuse was not discussed by caregivers for majority (92%) of the participants. Parents were the main source of information for those who got information from caregivers.

Knowledge Scores

Table 1: Comparison of knowledge scores regarding child sexual abuse.

Level of Knowledge	Scores	Number of participants and percentage			
		Pre-test		Post-test	
		Frequency	Percentage	Frequency	Percentage
Poor	1-5	30	50	--	--
Average	6-10	29	48.33	8	13.33
Good	11-15	1	1.67	27	45
Excellent	16-20	--	--	25	41.67

N=60

Table 1 reveals that most (50%) of the participants had poor knowledge scores in the pre-test, but in the post-test about 45% of them secured good knowledge score and 41.67% had obtained excellent knowledge regarding child sexual abuse.

Table 2: Area-wise distribution of the participant's knowledge level

Sl.no	Area	Score	Participant's knowledge level			
			Pre-test		Post-test	
			Mean±SD	Mean %	Mean±SD	Mean %
1	Basic concepts	4	0.98±0.85	24.5%	2.4±1.12	60%
2	Identification	5	2.45±1.02	49%	4.2±0.82	84%
3	Emotional reactions	3	1.3±0.78	43.3%	2.38±0.76	79.33%
4	Preventive measures	5	0.95±0.96	19%	3.45±1.28	69%
5	Legal support	3	0.06±0.25	1%	2.23±0.85	74.33%
	Total	20	5.75±2.37	28.75%	14.67±3.22	73.5%

N=60

Table 2 reveals that highest mean percentage which is 49% with a mean score of 2.45±1.02 was obtained on Identification of good and bad touch in pre-test, whereas, the least mean percentage which is of 1% with a mean score of 0.067 ±0.25 indicated very poor knowledge on

legal support regarding child sexual abuse. In post-test majority of them had obtained excellent knowledge on identification of good touch and bad touch with a mean percentage of 84% and mean score of 4.2 ±0.82. Further,

the participants showed improvement in the mean percentage of emotional reactions, legal support and preventive measures.

Therefore, significant improvement is noticed in all the areas of post test scores in comparison with pre-test scores which indicated by overall gain in mean percentage of 44.75%.

Effectiveness of Picture Module

Table 3: Paired ‘t’ test showing the effectiveness of picture module

N=60

Participants	Mean±SD		Mean Difference	t value	p value
	Pre-test	Post-test			
Fourth grade school children	5.75±2.37	14.67±3.22	8.92	32.97	0.001

Data in table 3 depicts the significant difference in knowledge scores with the mean difference of 8.92. The calculated ‘t’ value (32.93) was found to be statistically significant.. Therefore, it was concluded that there was significant gain in knowledge after implementation of structured teaching through picture module.

Association of knowledge scores with the selected demographic variables

Table 4: Association of the post-test knowledge scores with selected demographic variable

Sl. no	Demographic variable	Chi square value	df	Chi square table value	Level of significance
1.	Age	4.80	4	9.488	Not Significant
2.	Gender	6.56	2	5.911	Significant
3.	Religion	4.47	4	9.488	Not Significant
4.	Information from caregivers	7.64	2	5.911	Significant

N=60

Data in the table 4 reveals that chi square value for gender and information obtained from caregivers was statistically significant.

Discussion

Majority (61.67%) of the participants were 9 years old. This study mainly focussed on the age group of 8-10 years as it was supported by many other previous studies. A report on the prevalence of CSA in India revealed that majority 70% of children reported they experienced sexual abuse before the age 16 years. So,

the study concluded that preadolescents are at greater risk of CSA.⁷

In this study 40% had previous information about good and bad touch. Majority (31.67%) of the participants obtained information from TV. This is supported by the findings of a study on sexual abuse prevention in New York City, where around 58% of the children were exposed to previous source of information. For majority of them source of information was television program.⁸ Also it was found that only 8% of the participants

obtained information from caregiver's i.e. from parents, this trend was similarly seen in studies conducted in other parts of the world like at Beijing which revealed that only 20% of children obtained information from caregivers regarding child sexual abuse prevention⁹.

Most (50%) of the participants had poor knowledge scores in the pre-test. Post test showed about 45% of the participants secured good knowledge score and 41.67% had obtained excellent knowledge scores. This is supported by a meta-analysis which found significant effect sizes at mean post intervention ($d = .71$) and follow-up ($d = .62$), thus concluding that school-based awareness programs are effective in teaching children abuse-prevention concepts¹⁰

The effectiveness of structured teaching program through a picture module was effective to improve the knowledge among fourth standard children with 't' value 32.93. This is supported by a study done to assess effectiveness of STP on fourth grade students in Bangalore, which revealed that, in the experimental group the pretest mean was 16.57 whereas after structured teaching program, it was 25.77. The calculated "t" test was 12.034 at df (58) and $p=0.05$, which showed that there was a significant gain in knowledge after STP.¹¹

Conclusion

CSA is preventable. Creating awareness in the child, at a very young age, may be as young as 5-6 years, to recognize inappropriate behaviour and report possible abuse to the concerned people is the need of the hour. As health professionals, its high time we reach to the grassroot levels and create awareness among young children.

Conflict of Interest: The authors hereby declare that there is no conflict of interest.

Source of Funding: Nil

Ethical Clearance: The study received clearance from the Institutional Ethical Committee.

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Emerging Role of Digital Forensics in the Investigation of Online Child Pornography

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Abstract

Information Technology has been of immense use to the mankind. It has heralded a new age of faster and easier communication and access to information. But it has also provided a new platform for criminal activities such as child pornography. Online Child pornography is a global crime whose investigation may require the joint support of several countries. Detection and investigation of online child pornography involves the role of digital forensics to ensure admissibility of digital evidence in a court of law. In this paper, the authors have presented an overview of online child pornography, its impact and the role of digital forensics in the investigation of online child pornography.

Keywords: *child, pornography, digital, forensics, investigation*

Introduction

The advancement in Information Technology has been a boon to mankind. The people across the globe has come closer because of faster and cost-effective communication through the Internet. Internet has played an important role in strengthening the regime of democracy. However, this technology is dependent on the human intervention for its use, that is, it is neutral against the human brains who make use of it. As Kofi Annan states that [w]hile technology shapes the future, it is the people who shape technology, and decide to what uses it can and should be put.¹ Thus whether internet is put to positive or negative use depends upon the usage by human beings. Internet is an amazing gift of science to the world which has opened up endless opportunities for the users but at the same time, it has become a haven for criminals. One such controversial activity is the circulation of online pornographic content which has huge economic implications running into billions.

Not that pornography was inexistent prior to internet. But it was not easily accessible and procuring

it was more through secretive means. It was also subject to checks at various points within and across the borders during distribution.

Prior to internet, anyone caught with pornographic content was more concerned about embarrassment rather than unlawfulness aspect. But there is no such risk in the online content. It can be watched risk-free within one's private space and convenient time. In fact, it is pornography which has popularized the use of internet. While the other cybercrimes threaten the very credibility of the Internet, cyber pornography promotes the use of the Internet.² Internet has rendered easy availability and accessibility of pornography. Its supply in huge quantities is promoting the vast viewership of such content and not vice versa. Internet has made possible the instant availability of vast quantities of images at any point of time and that too with anonymity.³ Anonymity, ease of access and cheaper availability has made it one of the popular forms of adult entertainment. As a result, the quantity of online sexual content has increased dramatically. This brings in the significance of digital forensics in detecting the illegal pornographic content online.

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Online Child Pornography – A Global Crime

Most legal systems of the world have specifically banned 'child pornography' even though they do

not agree upon a common definition of ‘obscenity’. The Laws, in general, impose a ban on the online production, distribution, transmission and depiction of child in pornographic content. Though there may not be consensus as regards adult pornography but when it comes to child pornography, almost all the nations of the world are on the same footing. Along with an increased public concern there is also a simultaneous commitment by governments in most countries to strike out this malady. The global nature of the crime results in difficulties and challenges for the enforcement agencies. Any related investigations are likely to involve more than one country where image may be created in one country with server located in another country and users in many more countries. Thus investigations require the joint cooperation and coordination of all the countries involved in this global crime.

First important point to understand is that the consent of the child is immaterial for sexual depiction or transmission in any manner. Legally speaking, the children are presumed to be innocent and not able to understand the nature or the implications of their act. The child victims of pornography undergo long-term trauma. Interpol and Europol use the term ‘child sexual abuse’ material to refer to what is otherwise considered child pornography on the basis that since children are unable to give consent, and are being harmed physically and emotionally, the phrase pornography is reductive and unfair to the victims.⁴ One problem area is that the legal age of ‘consent’ may vary in different countries. Virtual images i.e. computer generated images is another grey area on the aspect of legality.

PSYCHOLOGICAL ASPECTS OF THE PROBLEM

➤ Impact on child victims

- The victim may or may not be aware that they have become a subject of abuse. In case of secret filming the impact of production may not be there but certainly impact of distribution can be immense.

- Direct sexual abuse may result in fear, anxiety, depression, social withdrawal, distress, anger, aggressive behavior, etc.

- Increased risk of further sexual victimization.

- Loss of trust if the abuser is a family member or a known person.

- Repeated abuse may result in general disinterest in sex in later life

- Feeling of guilt, shame or embarrassment due to fear of public humiliation

➤ **Impact on offenders**

- Isolated life and withdrawal from social relationships

- Increasing interest in more extreme sexual images

- Intensification of sexual desires towards children in real life

- May get used to habitual viewing child pornography

- problems in personal relationships

The above mentioned impact may or may not have been conclusively established by empirical research. Also these effects may vary from person to person based on their circumstances and other conditions.

INVESTIGATION PROCESS FOR ONLINE CHILD PORNOGRAPHY

Since cyber world is characterized by several complexities, dissimilar laws, jurisdiction issues and anonymity, it becomes difficult if not impossible, to nail the criminal liability with sure-shot evidence in a court of law. It is here that digital forensics comes into play. Computer forensics can investigate web resources and user systems such as phones, computers, or anything in between as long as it contains digital data.⁶ Digital forensics is a fairly novel science. It is used synonymously with the term computer forensics; its definition has come to cover the forensics of all digital technology.⁷

Online transmissions are not simple communication between the sender and the receiver. It is a more complex system with multiplicity of participation at various stages with the possible involvement of more than two actors. Though technology has an important role in unlawful transmissions but the real perpetrator behind these transmissions is a human being. Talat Fatima says that without the agency of human hand, the virtual world will be reduced to non-existent.⁸ The nature of modern mobile technology has brought in a changed

behavior of individual in the cyber world. It may not be necessary that the criminal activity is taken up online by professional criminals or pedophiles of the physical world. Even an ordinarily non-deviant individual may venture into prohibited fields of the cyber world perhaps out of curiosity or even unknowingly.

Due to increased risks the offenders may not use the open areas of the Internet and quite possibly use the more secured forums of e-mails, peer- to peer networks, online groups, file-sharing, chatrooms, etc or even some more sophisticated methods of dissemination such as skype or webcams for live streaming of child sexual exploitation. Many adult sites may be running such services and would require undercover police operations. The investigation of Internet child pornography may require a dedicated and specialized team including the local police. It may also require software tools such as filtering software, image recognition software, surveillance software and date-linking software, spyware applications, etc. The investigation process involves the following steps:

- Searching and exploring the internet for such images
- Online under-cover operations
- Keeping a track of similar offenders previously caught
- Tracking the persons who visit the offending sites
- Keeping a record of the images as digital evidence to prosecute the offenders

The filtering mechanism is applied to block and deny access to the sites found to be illegal. When someone tries to access these blocked sites the Internet Service Provider redirects the request to a proxy server, which sends the message that the connection has been blocked.⁹

Ensuring legal admissibility of digital evidence in a court is a challenging task. For this purpose a systematic process needs to be followed. The investigation process basically consists of the following steps:¹⁰

- i. Identification
- ii. Collection of evidence
- iii. Examination

- iv. Analysis
- v. Reporting

Image-retrieval also acquires significance for evidentiary value as the culprits may have deleted them from the hard drive of the computer. History of online activity and communication can be traced through browser history, e-mail records, chat logs, modem logs. Devices attached to the computer such as cameras, smartphones, iPods etc. may also be looked into for the retained records. Perhaps offenders' bank accounts, credit card and e-payment details can also provide valuable evidences for transaction details for online child pornography.

Conclusion

The growth in Information Technology has given a new dimension to traditional crimes such as child pornography. The internet provides a new mode to criminals engaged in child sex abuse and child pornography. Therefore in order to crack down such tech-savvy offenders, the evidence collection and investigation requires special role of digital forensics. Better evidence collection and investigation will ensure successful prosecution in such cases. A trained manpower will go a long way in detection and investigation of such crimes. The information technology induced globalization has made it imperative that the law enforcers, judiciary and legal experts become more acquainted with the basics of digital forensics.

Ethical Clearance - Not applicable

Source of Funding - Self

Conflict of Interest - Nil

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Comparison of Bone Density around an Immediately Temporized and Submerged Implants Placed in the Region of Partially Edentulous Posterior Mandible Using Radiovisiography [RVG]: An In-Vivo Split Mouth Study

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Abstract

Purpose: To compare the density of bone in an immediately temporized implant and conventionally placed implant through radiovisiography.

Method: Implants were placed in posterior edentulous mandibular region on either side out of which one was conventional implant and the other was immediately temporized implant. RVGs were taken at baseline and after 3 and 6 months of implant placement. The alveolar bone density was calculated at 6 different points through all the RVGs obtained at different time intervals. The values were obtained by using Image J software. All the mean values obtained were compared at different time intervals in both the groups of implants and were subjected to paired t test

Results: There was no statistically significant difference in the two groups. The mean values of alveolar bone density is more in ITI group than the conventional group at all the intervals of time (142.60± 22.6, 132.81± 23.10 ,133.96± 24.88 and 120.67±28.77 , 131.61±38.81 and 128.53± 36.05 at baseline , at 3 months and at 6 months in ITI group and conventional group respectively).

Conclusion: Bone density is not affected either in immediately temporized implant or conventionally placed implant during different follow up periods although it is more in the ITI group.

Keywords: Bone density, Provisionalized implant, Radiovisiograph,

Introduction

Implant therapy helps in accomplishment of goals of restoring missing tooth/teeth regardless of any disease, atrophy or damage to the stomatognathic system. ^{1,2} Density of bone plays an important role in planning

the treatment, healing of surgical site, designing of implant and in loading of implant during the fabrication of prosthesis ⁴. Usually, thick cortical bone and dense trabecular bone pattern is seen in mandible when compared with maxilla. But in the posterior region, both the jaws have trabecular pattern of bone with less density and the thickness ^{5,6,7,8}. It has been proved in various prospective studies that the bone around the implant may be responsible for the total failure of implant's stability ^{8,9,10}. It has been observed that the greatest density of bone is found in anterior mandibular region followed by anterior maxilla, posterior maxilla and posterior mandible respectively when HU (Hounsfield Unit) were collected in all the four quadrants using

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computed tomography^{8, 11}. So, evaluation of density of bone is important from clinician's view.

Branemark introduced the protocol of leaving an implant undisturbed for healing period of 4-6 months referred to as the conventional protocol.¹² The concept of immediate temporization or provisionalisation of the implant placed was recommended when a sufficient primary stability (40 Ncm) is achieved during the surgical procedure.^{13, 14, 15} The temporized implant may be functionally or non-functionally loaded. In non-functional loading, the temporized crown onto the implant has no occlusal contacts with its antagonist tooth/teeth in either of the centric or lateral positions. So the implant has the forces from the cheek, soft tissues and the tongue but the intensity of stresses is reduced^{16,17, 18}.

Use of conventional intra oral periapical radiographs and panoramic radiographs have been used for pre-surgical evaluation and treatment planning. But these have limited value in detection of the minimal changes of bone density. Digital subtraction radiography is also used for the assessment of bone density changes around an implant placed but its sensitivity and specificity is still unanswerable¹⁹. CBCT is not reliable for bone density measurement as there is specificity of distortion of Hounsfield Units in it. It is a time consuming (15-20 sec) radiographic aid and patient has to be still while the scan is being carried out²⁰. Digital radiography has less exposure and superior resolution on being compared with conventional radiographs²¹.

The purpose of this study is to compare the quantitative alveolar bone density changes in an immediately temporized implant and a conventionally placed implant in a partially edentulous posterior mandible using RVG at different intervals of time upto a follow up period of 6 months.

Method

The study was initiated after obtaining clearance from the Institutional Ethics Committee in the Department of Prosthodontics and Crown and Bridge of this Institution

A sample size of four which achieves an 85% power was selected based on the Inclusion and exclusion criteria^{22,23} (Table 1)

GROUPING

GROUP A (CI) – Patients with submerged implant (conventionally placed)

GROUP B (ITI) - Patients with immediately temporized implant (non-submerged implant)

Following proper treatment planning and obtaining consent for the procedure CBCT of the planned side was obtained. Impressions were made and diagnostic casts were obtained and a stent was fabricated.

Oral prophylactic antibiotics (500 mg Amoxicillin thrice a day) were administered and a standard protocol for placing, an implant (MIS SYSTEM, ISRAEL) of suitable dimensions (according to CBCT) was followed. Primary stability of 40 Ncm was achieved. After implant placement, a temporary abutment was screwed onto the implant placed and a temporary acrylic crown (3M-ESPE Protemp 4) was cemented with temporary cement (PROVICOL – VOCO) and Immediate Non-functional loading was done . Baseline RVG with paralleling device with grid and bite record placed was taken. Patient was recalled after 7 days for the suture removal and the same procedure for placing a conventional implant on the contralateral side was followed , In the post surgical phase RVGs of both sides were taken after 3 months and 6 months with paralleling device with grid and bite record placed

Comparison of Bone Density Using Image J Software

The alveolar bone density in both the groups was assessed at six different points using the RVGs obtained and the Image J software. The histogram tool (circle with dimensions 30 by 30) was used to measure the mean pixel value ranging from 0 to 255 on the grayscale to represent the alveolar bone density of a selected region. For both groups, a 576 pixel region of interest was drawn with the help of cursor. The alveolar bone density was measured on the mesial and distal sides at crestal, mid-crestal and apical levels points of both the implants placed. An arithmetic mean of mesial and distal readings were calculated. Summarization of data was done in mean +/- SD (standard deviation).

Results

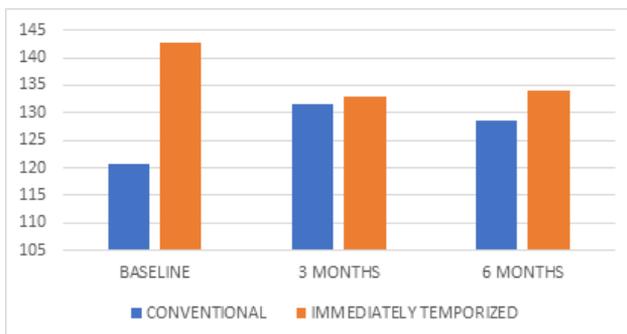
The results are shown in Table 2 and Graph 1 and 2.

Table 1 : Inclusion and exclusion criteria followed in the study

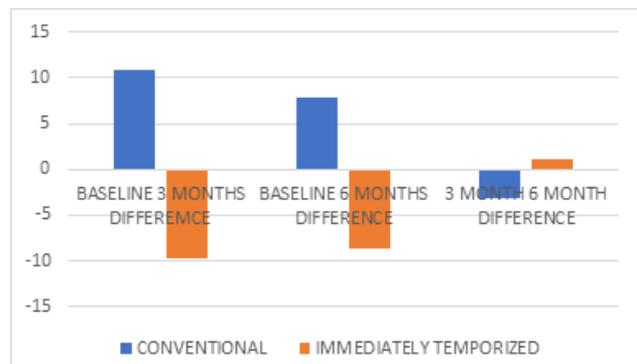
INCLUSION CRITERIA	EXCLUSION CRITERIA
Partially edentulous area in either side of posterior mandible	Uncontrolled diabetes or other systemic diseases
At least one tooth missing in posterior mandible	Presence of defects at the desired site
Age limit – 20-60 years	More than 60 years of age
Non diabetic and non-smokers	Smokers
No signs and symptoms of immuno-compromised diseases	Patients with irregular follow up
No bone or soft tissue augmentation procedure required during the surgery	Patients who cannot afford for the implant therapy
Antagonistic tooth present	With para-functional habits

Table 2 - Mean alveolar bone density (in gray scale pixels) of all the RVGat different intervals of time in both groups

	Group	N	Mean	Std Deviation	t	P value
Baseline	Conventional	4	120.673	28.77717	-1.199	0.276
	Immediately Temporised	4	142.6062	22.61154		
3 months	Conventional	4	131.6129	38.8132	-0.053	0.959
	Immediately Temporised	4	132.819	23.10858		
6months	Conventional	4	128.5353	36.05075	-0.248	0.812
	Immediately Temporised	4	133.9694	24.88012		
Baseline 3 months	Conventional	4	10.9398	20.61853	1.74	0.133
	Immediately Temporised	4	-9.7872	11.9363		
Baseline 6 month Difference	Conventional	4	7.8668	18.09228	1.72	0.136
	Immediately Temporised		-8.6368	6.36561		
3 month 6 month Difference	Conventional	4	-3.0775	4.40785	-0.988	0.361
	Immediately Temporised	4	1.1504	7.33707		



Graph 1 –Graph representing the mean alveolar bone density of all groups at different intervals of time



Graph 2 – Graph representing the difference in alveolar bone density at different time intervals in both groups

Discussion

The present split mouth *invivo* study compared the changes in the alveolar bone density around the conventionally placed and an immediately temporized implant through radiovisiography. At baseline, 3 months and 6 months. Alveolar bone density was evaluated at six sites namely: crestal, mid-crestal and apical levels at both the mesial and the distal sides. The results of this study showed that the mean alveolar bone density values were more in ITI group (142.60 ± 22.6 , 132.81 ± 23.10 and 133.96 ± 24.88 at baseline, 3 months and 6 months respectively) as compared to conventionally placed group (120.67 ± 28.77 , 131.61 ± 38.8 and 128.53 ± 36.05 at baseline, 3 months and 6 months respectively) at all intervals of time. This was seen because of some remodelling of bone due to pressure applied by tongue and cheek on the temporized implant. During 3 and 6 months interval, the difference is higher in ITI group with no statistical significance, implying that density was not affected by technique of placement.

A split mouth study design was followed in this study. A randomization scheme was followed in which two interventions were distributed to each half of the mouth. By following this design, inter-subject variability was removed hence increasing the power of study as compared to full mouth design. Moreover, a split mouth design has an advantage with respect to sample of the study as the intervention on one of the sides is considered as the control.^{24,25}

In the present study immediate non-functional loading was done as in the earlier studies it has been an established fact that non-functional loading is a predictable treatment option. In the study conducted by **Grandi et al**²⁶ in 2012, a success rate of 97.2% was achieved when non-functional loading was done in single post extraction implants placed in maxillary anterior region. In 2009, **Eitan mijiritsky et al**²⁷ achieved success rate of 95.8% when implants were loaded with non-functional loading in maxillary anterior region. In a study conducted by **Degidi et al**²⁸ in 2003 immediate non-functional loading was preferred over immediate functional loading as there was failure rate of 0.9% and 1.4% respectively.

Present study provides clinician with a radiographic modality option in assessing and evaluating the quantitative changes in alveolar bone density at different

intervals of time. Use of an Image J Software is easy and simple as it is non-invasive technique for quantification of density of bone. Standardization is mandatory while using a radiographic aid for assessment and evaluation. The **limitations** of the study are as follows:

The follow up period of the study was less.

The sample size of the study was small to extrapolate the results to a larger population.

Conclusion

Bone density is not affected either in immediately temporized implant or conventionally placed implant during different follow up periods although it is more in the ITI group.

Conflict of Interest : Nil

Source of Funding : Self

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Study Impact of the Negative Relationship between Isolated Bacteria from the Left and Right Wing of the *Musca Domestica* Fly

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Abstract

This research work has included 100 insect of *Musca domestica* were collected from different places of Hilla city such as Al Karama, Shubar, Al Akramin quarter for period from April to July 2018. The findings have showed the great number of bacteria such as *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Escherichia coli*, *Shigella*, *Klebsiella*, as well as this current study has involved isolation some from fungi such as *Alternaria alternata*, *Aspergillus fumigatus*. In addition, this work included isolation some kind of yeast such as *Saccharomyces cerevisiae* from the insect body whereas found $5,600 \times 10^3$, $5,720 \times 10^3$, $4,640 \times 10^3$ and 1500×10^3 colony / cm on blood agar, MacConkey Agar, Mannitol salt Agar and S.S Agar respectively. While the result of the right wing is $2,500 \times 10^3$, $4,320 \times 10^3$, $3,800 \times 10^3$ and 400×10^3 colony / cm on the same media above. While the findings from left wing were revealed $3,420 \times 10^3$, $4,500 \times 10^3$, $4,200 \times 10^3$ and 500×10^3 colony / cm respectively.

Keywords: *Musca domestica*, Bacteria, antagonism, antimicrobial activity.

Introduction

House fly is one of the most insects with the nomenclature of *Musca domestica* Linnaeus, this insect due to the order Diptera and family Muscidae¹. This insect has play important role in transmission of many microbial disease throughout the world². *Domestica* fly has considered from daily active insect species normally present around of human. Home flies are capable of transport different pathogens from one area to another, posing humans to the risk of various diseases^{3,4}. Some from microorganisms living inside or outside insect surface body, these flies can remain viable more than 35 days^{5,6}. The house-fly, *Musca domestica* L not only is a boring pest but also performance an important mechanical transmitter for very much of pathogenic microorganism agents including: bacteria, protozoa, worms, fungi and viruses amongst humans and animals

where it's found as population of houseflies are able to can transmit the disease agents by different parts of insect body (hairs body, appendages and mouth parts) and secretions⁷ Research in the field of microbes associated with insects is one from exciting studies where the relationship between microbes and insects may be a relationship of pregnancy Phoreshy or symbiotic relationship, the role of microbes associated with insects in the transmission of disease or spoilage of food was studied by several scientists^{8,9} Consequently, There are many types of flies that transmit many diseases, including the black fly, which transmits the disease of black fever and sand fly, which transmit skin disease Leishmania and fly horse, which transmit bacteria that cause hidden anthrax and possibly HIV and Tsetse fly, which transmit the deadly sleep disease and fly home movement between the stool Food becomes an ideal carrier for many deadly diseases, including poliomyelitis¹⁰ house fly for example can spread diseases such as food poisoning and dysentery regarding to bacteria.

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Goal of Study

To detect the bacterial contaminations of house flies, and study antagonism impact between bacterial

isolated from left and right wings for study insect.

Objectives of Study

1. To determine and identify the different kinds of bacteria found on the wings of domestic flies *Musca domestica* and detection its ability to generate antibacterial substances is gotten from the wings of the study fly .

2. To identify the disease and medicine in both wings of domestic flies in accordance with the Prophet (peace and blessings of Allah be upon him) “The flies fell into the vessel of one of you, then the phlegm, to put it in one of the wings of a disease and in the other healing”, which is a valid Hadith as narrated by many narrators.

Materials and Method

100 samples of domestic flies were collected from the city of Hilla and from different regions during the period April to July 2018. The insects were transferred in sterile tubes to the laboratory for dissection and isolation of microorganisms. Dissection tools have used to separate both wings of the insect body .The left and right wings , and body were placed separately in 5 ml of 0.9% sterilized normal saline ¹¹. 0.5 mg of the three samples (right wing, left wing, and fly body) were placed in a dish of each of the following media such as blood agar, MaCconkey agar , mannitol salt agar , s.s agar . Then , Gram stain used for each colony for identification of Gram-negative and positive bacteria Gram stain ¹⁴ , as well as was done using the ¹³ method, which was modified by ¹⁴ to study the antimicrobial activity of different bacterial species in the right wing against the left -wing bacteria and vice versa.

Results and Discussion

In recent years, house flies have been recognized as a potential agent to mechanically transport pathogenic bacteria ¹⁵. One of the objectives of the present study was to address this question that which type or types of bacteria are likely to be transported by these flies. The results of our study demonstrated that all house flies were capable to carry of different types of bacteria .The results in table (1) have shown that there is density and high diversity in microorganisms found on

the wings of the domestic fly, especially the bacteria, where the microbial diversity in both wings of flies and the numerical density Reflect the environment in which they live ¹⁶. Table (2) have appeared the most important bacterial isolates of negative and positive from the right wing is the following bacterial species: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Escherichia coli*, *Shigella*, *Klebsiella*, *Alternata Alternaria* and *Aspergillus fumigates*. While left wing contained the different types of bacteria such as *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella* . The bacterial isolates on the wings of the flies were characterized by special medical importance in their ability to cause the transmission of many diseases affecting humans, animals, plants, food corruption ¹⁷. The findings of our study has agreed with the text of the Prophet Prophet (peace and blessings of Allah be upon him) in the matter of immersing the flies, the mechanism of the secretion of the active substance is clear. The effectiveness of beneficial bacteria and fungus is done only by the presence of food or drink inside the all. The organisms are useful to eliminate harmful organisms, and found that the antimatter that kills bacteria does not release unless the liquid absorbed and osmosis pressure will swell and explode and release toxins to eliminate harmful bacteria. From table (3) have been noticed *Pseudomonas aeruginosa* has isolated from left wing had good microbial activity on *Klebsiella*, *Escherichia coli*, *proteus vulgaris*, which it isolated from right-wing of *Musca domestica* .While *Staphylococcus aureus* bacterium has not affected by any bacteria In comparison with *Klebsiella* showed a clear effect on *proteus vulgaris* bacteria showed no effect on the rest of the species. Because of the importance of *Pseudomonas* isolated from both wings in terms of antibiotic production (Pyocynin), their effect on isolated bacteria from the same wing was studied as shown in table (5). This table shows efficacy in inhibition of isolates of the kinds such as *Klebsiella*, *Staphylococcus aureus* and *Escherichia coli*. The image (A) Show an inhibitory effect of *Klebsiella*, *Shigella* bacteria on *Escherichia coli*. The image (B) Show an inhibitory effect of *Klebsiella*, *Shigella* bacteria on *Staphylococcus aureus*.

Table no (1): Number of bacterial colonies (1 \ CFU cm 3) isolated from domestica flies (*Musca domestica*)

Sample number	Culture Media	Number of bacterial colonies CFU/ cm ³ ×10 ³		
		Body	Right Wing	Left wing
100	Blood Agar	0- 5.600	0 - 2.500	0 - 3.420
	MaCconkey Agar	0 - 5.720	0 - 4.320	0 - 4.500
	Mannitol salt Agar	0 - 4.640	0 - 3.800	0 - 4.200
	S .S .Agar	0 - 1.500	0 - 400	0 - 500

Table no (2): Most important microscopic species isolated from the domestic fly wings

Microorganisms isolated	
Left wing	Right wing
Pseudomonas aeruginosa	Proteus vulgaris
Staphylococcus aureus	Pseudomonas aeruginosa
Klebsiella	Staphylococcus aureus
	Shigella ,
	Klebsiella
	Escherichia coli
	Aspergillus fumigates
	alternata Alternaria

Table (3): Shows the antimicrobial activity of bacterial species isolated from the left wing against the bacteria isolated from the right wing.

Left wing Right wing	Staphylococcus aureus	Klebsiella	Pseudomonas aeruginosa
Pseudomonas aeruginosa	-	-	-
Klebsiella	-	-	+
Shigella ,	-	-	-
Escherichia coli	-	-	+
Proteus vulgaris	-	+	+

Table no (4): Shows the antimicrobial activity of bacterial species isolated from the right wing against the bacteria isolated from the left wing.

Right wing Left wing	Pseudomonas aeruginosa	Klebsiella	Shigella	Escherichia coli	Proteus vulgaris	Staphylococcus aureus
Pseudomonas aeruginosa	-	-	-	-	-	-
Klebsiella	+	-	+	-	-	-
Staphylococcus aureus	+	-	+	+	-	-

Table no (5): Effect of Antagonistic Activity of the *Pseudomonas aeruginosa* isolated from the right wing against the bacterial species isolated from the same wing .

Right wing	<i>Pseudomonas aeruginosa</i>
Klebsiella	+
Staphylococcus aureus	+
Proteus vulgaris	+
Escherichia coli	+
Shigella	-

Conclusion

Isolation and identification different types of pathogenic bacteria from the wings of the domestic fly such as *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Escherichia coli*, *Shigella*, *Klebsiella*, The ability of some types of isolation bacteria, especially bacteria *Pseudomonas* to the secretion of the antimicrobial substances such as Pyocynin and anthocyanin which it inhibits the growth of other bacterial species. Disease has found in one wing of flies while medicine find in another wing.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology / Faculty of Science for Women / Babylon University. Iraq and all experiments were carried out in accordance with approved guidelines.

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Study the Causes of the Women's Fear from Breast Self-Examination in Babylon Province

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Abstract

Breast cancer is the greatest cancer of women worldwide, as well as in Iraq, which is considered as the most common malignancy distressing women, whose must exposed to breast Self-Examination (BSE) as one practice for early recognition for breast cancer, and should started at age 20 on monthly systematic bases. A descriptive correlational study used to assess an approach for the determinant factors contributes to women's fear of breast self-examination in Babylon. A purposive "non-probability" sample consist of (130) women who were free from breast problems and attended the health centers seeking health services. Questionnaire was designed for study objectives achievement; utilized for data collection, by self-reported questionnaire which includes two parts measured the sociodemographic variables (first part), and Commitment to BSE scale (second part) which consisted of 10 items, where the response range from strongly agree (high commitment) to strongly disagree (low commitment).

Keywords: Breast self-examination and women's fear.

Introduction

Cancer is a crucial unrestricted health problem worldwide" in 2018, (1,735,350) new cancer cases and (609,640) cancer deaths are anticipated to arise in the United States." The cancer incidence rate (2005-2014) was stable in women and declined by approximately 2% annually in men ¹. According to the World Health Organization (WHO) 2017, its incidence is expected to increase by 50% by 2020. Likewise, arab, Middle Eastern women seems to be at greater hazard for far along diagnosis and higher death from breast cancer than Caucasian women in developed countries like the United States ². The current population of Iraq is 39,851,992 as of Monday, December 31, 2018, based on the latest United Nations estimates. 49.0 are women. Cancer was the third prominent cause of deaths in Iraq and the 7th leading cause of morbidity, little is known about the pattern of cancer in Iraq. The need for comprehensive knowledge about cancer forms in Iraq is mandatory to

plan and establish control programs for the common cancer which may be agreeable to prevention, early detection and cure. Breast self- examination (BSE) has an important part for early diagnosis of cancer, that in numerous literatures stated that (90%) of breast cancer is first perceived by the person herself ³. The good news is (19%) of deaths among women were due to cancer evidence-based research, which showed that one-third of all cancers are preventable and a further one-third, if diagnosed early, is potentially curable. This surveillance stresses that cancer control should be increased priority in health care programs of developing country ⁴. Mahdi Moshki, (2017) mentioned that " there are associations between self-efficacy and other allied constructs that might inspired mammography behaviors. For example, it has been shown that women with a moderate level of breast cancer fear, in arrangement with a higher level of self-efficacy for mammography will have superior mammography adherence than women who experience a high level of breast cancer fear in combination with lower self-efficacy for mammography. Besides who specified that there are few published studies on factors upsetting breast cancer screening behaviors of Iraqi women. Although, it informed in recent times to account for 23% of all new cancer cases and 14% of all cancer

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deaths. Half of the cases and 60% of deaths happen in economically developing countries. Initial recognition via mammography is unfeasible for economically developing countries and therefore clinical breast exam and promotion of awareness of early signs and symptoms are recommended for these countries. Cancer is a multi-causal, chronic, silent disease, which in many instances may be prevented under certain living conditions and may be cured when the diagnosis is performed during the early stages of the disease. Since midwives are the health suppliers involved in the care of women all through their reproductive life, they are in the ultimate position to provoke women on breast cancer prevention. A midwife has a compassionate role in educating women on the way in which breast self-examination should be accomplished, and in illuminating the fundamental importance of clinical examination and mammography⁵. The nonexistence of screening programs in Jordan certainly contributes to delays in diagnosis, attributed the delay between breast cancer symptom onset and diagnosis to a lack of symptom awareness, as well as fear of having the disease.

Methodology

A descriptive correlational study used to assess an approach for the determinant factors contributes to women's fear of breast self-examination in Babylon. The study was carried out through the period of June 2018 to Dec 2018. The population of the study were consisted of (130) women attended to health centers seeking health services, as a purposive "non-probability", who free from breast problems. Questionnaire was designed for objectives accomplishment, which comprised of (2) parts, part (1) demographic information sheet whereas part (2) related to factors donate women's fear of breast self-examination. The data were collected through the consumption of assembled questionnaire, and interview performance for the women's fear from breast self-examination, who were visited the health centers. Interview took a timetable of (25-30) minutes for each woman, through the period of 15th July 2018 to 25th August 2018. Data were analyzed through descriptive and inferential statistical approach (frequency and percentage, Chi-Square).

Results and Discussion

The table above showed that 53.8% of women aged 31-35 years with 35.4% read and write education, 73.8% of them don't working, 39.2% single and 75.4% ever

heard of breast self-examination. (80%) of women didn't know the right way to self-check her breast and 81.5% of them did not exam their breast because 76.2% had the source of information about breast self-examination by their family. The table (3) identify women knowledge about breast self-exam scale was 2 for yes and 1 for no, the mean was 1.5 most items had the mean around the low significant; women had low knowledge regarding breast self-exam. This study was conducted to consider the causes of women's fear from breast self-examination and after analyzing the information composed by the researchers, the study displayed that (53.8%) of women aged 31-35 years with 35.4% read and write as level of education, while 73.8% of them don't working, 39.2% single and 75.4% ever heard of breast self-examination. It was observed that a low knowledge of women was conveyed more frequently in younger women. Prior research has created alike outcomes⁷. Vickberg, (2003) proposed that this finding may be accredited to the element that in fresher women, there is logic that a cancer judgment early in the life cycle is predominantly unexpected or "off schedule." A recent Australian study (Connell,2006) found that fresher survivors especially those without children, stated that children would be the greatest concern. (80%) of women didn't know the right way to self-check her breast and 81.5% of them did not exam their breast by them self that was because 76.2% had the source of information about breast self-examination by their family, that was against Al-Najar study that said the sources of information about breast regarding the practice of breast self-examination, self-examination among the participants in this study, the American Cancer Society and other leading cancer majority mentioned that radio and TV. Another study conducted in Iraq in 2017 showed that TV and internet were the main sources of knowledge about SBE for 47% of all participants. There was a low awareness of BC and BSE among the participants and there are a need for continuing education programs by TV and the internet about BC warn signs, BSE and risk factors.(Ada Leticia et al., 2018). Regarding women knowledge about breast self-exam scale the table (2) showed that women had low knowledge about breast self-exam; they had low mean score for most items of total score Which agree with other study conducted in Australia in 2011 that the most common reasons.in a study among Chinese women in Hong Kong for not doing BSE was "not knowing how to perform BSE" only 16% reported that they performed BSE every month (98.5%), "not expecting

to get breast cancer” (45.6%) and “not having a close relative with breast cancer” (42.9%). In another study, less than one-fifth of the women believe that they do not get cancer in interviewed reported practicing BSE. In order to know the causes of women’s fear of self-breast exam, table (5) showed that positive correlation between age of women and their knowledge, young women had low knowledge regarding self-breast exam, we established that women were unaware of breast cancer and 95.4%. Were unknowledgeable about breast cancer screening, conflicting with a study in Qatar, where the authors highlighted that there was a lack of awareness and knowledge of breast cancer screening. A possible explanation for such differences might be that in Zimbabwe women are sensitized about breast cancer screening during antenatal care. Sometimes

clinical breast examinations are carried out during these antenatal care sessions, which may account for the high frequency in breast cancer screening knowledge among women in our study setting. The youngest age group, women aged 35 to 44, showed significant relationships with susceptibility, seriousness, barriers, confidence, and knowledge. Results indicate there may need to be different approaches for increasing BSE depending upon the age of the woman. A survey indicated in Benghazi by FatmaYousuf M Ziuo in 2018, indicated that women had positive attitude toward BSE. However, as their knowledge is poor, they will not be capable to perform effective BSE despite their reported enthusiasm. Moreover, they have poor knowledge about risk and protective factors of breast cancer.

Table (1) shows the characteristics of participants women in the study.

	Age	Frequency	Percent
	21-25 years aged	3	2.3
	26-30 years aged	23	17.7
	31-35 years aged	70	53.8
	36 years aged and more	34	26.2
	Total	130	100.0
	Level of Education	Frequency	Percent
	Read and write	46	35.4
	Primary school	42	32.3
	High schools	26	20.0
	Diploma	16	12.3
	Total	130	100.0
	Occupation	Frequency	Percent
	Don't Working	96	73.8
	Working	34	26.2
	Total	130	100.0
	Income	Frequency	Percent
	don't enough	65	50.0
	Enough	65	50.0
	Total	130	100.0
	Marital status	Frequency	Percent
	Single	51	39.2
	Married	33	25.4
	Divorced	30	23.1
	Widow	16	12.3
	Total	130	100.0
	How many years have you been married?	Frequency	Percent
	Less one year	60	46.2
	1-5 years	45	34.6
	More than 6 years	25	19.2
	Total	130	100.0
	Do You Have Children?	Frequency	Percent
	No	96	73.8
	Yes	34	26.2
	Total	130	100.0
	How many children	Frequency	Percent
	0	96	73.8
	1-3	18	13.8
	More than 4	16	12.3
	Total	130	100.0

Table (2) shows the sample characters'

Does anyone in your family have breast problems		Frequency	Percent
	No	88	67.7
	Yes	42	32.3
	Total	130	100.0
Do you suffer from chronic diseases?		Frequency	Percent
	No	105	80.8
	Yes	25	19.2
	Total	130	100.0
Do you take medicines daily?		Frequency	Percent
	No	110	84.6
	Yes	20	15.4
	Total	130	100.0
Have you ever heard of breast self-examination?		Frequency	Percent
	No	98	75.4
	Yes	32	24.6
	Total	130	100.0
Do you know the right way to self-check your breast?		Frequency	Percent
	No	104	80.0
	Yes	26	20.0
	Total	130	100.0
Did a member of your family have breast cancer?		Frequency	Percent
	No	110	84.6
	Yes	20	15.4
	Total	130	100.0

Table (3) Descriptive statistics of items related to women knowledge about breast self-exam.

	Mean	Std. Deviation
A woman must stand in front of a mirror when examining the breast	1.38	.486
The hands should be raised behind the head and observed	1.38	.488
Check the two breasts so that they are the same look and shape	1.38	.486
Check the two breasts to have the same size and look	1.39	.521
Note the presence of any ulceration or necrosis of the nipple	1.40	.522
When you are a mammary, place your arms around your body	1.55	.558
When examining the breast, lift my arms to the top	1.43	.497
When examining the breast, place one arm behind my head	1.47	.516
For breast examination, touch it gently	1.42	.511
When you touch the breast I sleep on my back straight	1.53	.516
When examining the breast I am in the position of sleep I put the pillow under my back under my breasts	1.56	.543
When examining the breast and I am in the position of sleep, put one arm under my head	1.54	.516
Use the fingertips to touch the breast	1.40	.492
Use the fingertips to touch the breast with a reflex movement	1.55	.558
Use the fingertips to touch the breast with a longitudinal movement	1.57	.596
Use the fingertips to touch the breast with a circular motion	1.32	.483
Touching the breast from the armpit arm is very important	1.38	.504
Press the nipple to see the presence of blood or secretions	1.40	.492
Checking the examination of the axillary lymph nodes is very important	1.44	.513
Breast self-examination Women should be repeated every two months	1.53	.587
A woman should do breast examination seven days after her period	1.48	.517

Table (4) Overall scores of women knowledge about breast self-exam

Information on breast self-examination scores	Frequency	Percent
Low knowledge	124	95.4
High knowledge	6	4.6
Total	130	100.0

Table (5) the relationship between age and knowledge of women regarding breast self-exam

Age and women knowledge Cross tabulation					
Count					
		women knowledge		Total	
		Low knowledge	High knowledge		
Age	21-25 years aged	3	0	3	
	26-30 years aged	23	0	23	
	31-35 years aged	67	3	70	
	36 years aged and more	31	3	34	
Total		124	6	130	
Symmetric Measures					
		Value	Asymptotic Standardized Error ^a	Approximate T ^b	Approximate Significance
Interval by Interval	Pearson's R	.140	.066	1.594	.113 ^c
Ordinal by Ordinal	Spearman Correlation	.142	.072	1.627	.106 ^c
N of Valid Cases		130			
There was weak positive correlation between age of women and their knowledge.					

Table (6) the relationship between marital status and knowledge of women regarding breast self-exam

Marital status and knowledge of women Cross tabulation					
Count					
		knowledge of women		Total	
		Low knowledge	High knowledge		
Marital status	Single	47	4	51	
	Married	31	2	33	
	Divorced	30	0	30	
	widow	16	0	16	
Total		124	6	130	
Symmetric Measures					
		Value	Asymptotic Standardized Error ^a	Approximate T ^b	Approximate Significance
Interval by Interval	Pearson's R	-0.157	.051	-1.798	.074 ^c
Ordinal by Ordinal	Spearman Correlation	-.157	.058	-1.796	.075 ^c
N of Valid Cases		130			
There was weak negative correlation between Marital status of women and their knowledge					

Conclusion

A descriptive correlational study used to assess an approach for the determinant factors contributes to women's fear of breast self-examination in Babylon. A purposive "non-probability" sample consist of (130) women who were free from breast problems and attended the health centers seeking health services. Questionnaire was designed for study objectives achievement; utilized for data collection, by self-reported questionnaire which includes two parts measured the sociodemographic variables (first part), and Commitment to BSE scale (second part) which consisted of 10 items, where the response range from strongly agree (high commitment) to strongly disagree (low commitment).

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing, Faculty of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Systematic Analysis and Meta-Analysis of Obesity, Hypertension, and Diuretic Use as Double Risk Factors for Incident Gout

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Abstract

The treatment of gout lacks the significance it requires. To reduce the incidence of there is need to identify incident gout in populations. The study analyses obesity, hypertension, and diuretic use as risk factors for incident gout. The study applies a descriptive design. The study did a systematic review and meta-analysis of cohort studies in an adult population with the minimum age for participants being aged 18 years. The study identified 9932 articles. 23 of the articles achieved the inclusion requirements and 17 of them had data that was used in meta-analysis. Obesity had four articles for publication, six for hypertension, and three for diuretic use identified to it. The use of diuretics, hypertension, and obesity use double the risk for incident gout. All these factors doubled the chance of acquiring gout in comparison to individuals outside this category. There is a need for clinicians to identify incident gout in populations and offer these populations proper treatment and management to reduce the incidence of gout.

Keywords: *Meta-analysis, systematic review, gout, obesity, hypertension, diuretic use.*

Introduction

Gout is mainly caused by high levels of serum urate (hyperuricemia). The deposit of urate crystals in the joints cause progressive damage to the joints and acute attacks from crystal synovitis¹. The basic treatment of gout entails the use of therapies that lower the levels of urate, normally allopurinol¹⁰ that inhibits xanthine oxidase hence improved long-term outcomes. Despite the availability of long-term treatment, its use is still suboptimal²⁰ which makes it important to identification of incident gout in populations especially at the primary care level where management of most of these patients happens. This increases the chances of preventing gout¹³. Currently, the prevalence of gout is more common in nations in Western Europe and North America with a prevalence ranging from 1% to 4%. According to a recent report, from 2007 to 2008, 3.9% of adult Americans (age 20 and above) were diagnosed with gout. In this paper, a systematic review and meta-analysis of cohort studies on diuretic use, hypertension, and obesity as double risk factors for incident gout is done.

Methodology

Study design

Descriptive design is applied for the study. This scientific method entails observing and describing a specific subject's behavior without any influence²³. Descriptive studies help in the description of pattern occurrence of specific diseases in relation to certain factors.

Literature research

The study did a search on Cochrane Library, CINAHL, Embase, and MEDLINE since they started to 2018. The study combined medical subject heading (MeSH) and free-text terms as well as database-specific equivalents. To find additional eligible articles, a search for reference lists of included articles was done.

Criteria for Inclusion and exclusion

The study applied the PICOS framework to develop the inclusion criteria¹⁶. An adult population of 18 years and above was the focus of the study. Publications that had underage participants when the cohort was begun

but analysis of the results of the study was done when the participant was in adulthood, were considered to meet the criteria for inclusion. Included articles had to have assessed at least one of: diuretic use, hypertension, or obesity. There was no restriction on the period of publication or language, with a search on medical literature databases being done. Study had to ask for articles from their respective authors when access to full articles was not available.

Screening process

On removal of duplicates from the initial search, two authors screened the remaining articles focusing on their titles and abstracts. The two authors then independently did a review of the full content for all the qualified articles to determine their inclusion. A third author was consulted in cases where the two authors did not agree on the matter of inclusion.

Extraction of Data and Assessment of Quality

The extraction of data was done on included articles by a single author as well as from an independent subset (50%) by a second author. Where original articles did not have risk estimates, contact was made to the corresponding author for the estimates. The data for the study included author, title of publication, year of publication, method used to diagnose the gout and level of risk to contract gout in relation to the specific exposure, both adjusted and unadjusted values if available, the definition method used and exposure of interest, the setting of the study, the basic demographic of the participants, that is age, ethnicity and gender, number of follow-up years, and the country where the study was conducted. The two authors did an independent assessment of the quality of methodology using the Newcastle-Ottawa Scale (NOS) which is normally used as a template for cohort studies.

Obesity

The inclusion criteria accepted four of the articles for obesity. They were all suitable to be included for pooling having met the definition of obesity as BMI ≥ 30 kg/m². The four articles also entailed the RR necessary for analysis of incident gout. In addition, they had done a multivariate analysis. For the article by Bhole et al., two risk estimates had to be included due to the separate RRs it reported for the men and women who participated in the study. The study identified 2.84 (95%

CI 2.15–3.76) as the shared unadjusted/age-adjusted RR for incident gout for obese individuals in comparison to individuals who were not obese. The study also identified a corresponding 2.24 (1.76–2.86) pooled multivariate-adjusted RR for incident gout.

Hypertension

Ten of the articles met the criteria for inclusion for hypertension. Four of the ten articles provided HRs and four provided RRs which could be used in pooling. Unadjusted/age-adjusted RRs were available in all for the five articles which allowed a meta-analysis to be conducted. However, three of the articles contained multivariate-adjusted RRs. Hypertensive individuals had three times higher unadjusted/age-adjusted RR compared to normotensive individuals for incident gout at (RR 2.98 (95% CI 2.63–3.37)). The risk for incident gout slightly reduces but is still significant when the multivariate RRs are pooled registering (2.11 (1.64–2.72))⁷. Heterogeneity between the risk estimates lacked any statistical significance with ($I^2 = 48.3\%$, $p = 0.122$) being the risk estimates. The incidence is still significant though it slightly reduces when the multivariate HRs are pooled (1.64 (1.34–2.01)) [5]. A ($I^2 = 78.6\%$, $p = 0.001$) was reported by the study which is still a significant heterogeneity based on statistics.

Diuretic use

This study accepted 6 articles to be included for diuretic use. However, only three were eligible for inclusion for meta-analysis. For the purposes of pooling, only two of the studies offered multivariate-adjusted RRs. The two studies offered only three suitable adjusted risk estimates. Incident gout for individuals taking diuretics to treat the condition had a pooled unadjusted/age-adjusted RR of 3.59 (95% CI 3.06–4.21). This was in comparison to individuals with gout but not taking diuretics. A corresponding 2.39 (1.57–3.65) pooled adjusted RR was later realized. A ($I^2 = 79.1\%$, $p = 0.008$) was identified as the shared multivariate-adjusted RRs. However, ($I^2 = 0.0\%$, $p = 0.397$) was the unadjusted/age-adjusted RRs.

Results and Discussion

Based on the systematic review and meta-analysis of cohort studies, use of diuretics, hypertensive, and obesity contribute to the occurrence of gout. The risk of gout occurring for participants in each of these risk

factors was double compared to those without the risk factors. Previous research and reviews support the findings of this study on the risk factors that obesity and the use of diuretics pose on development of gout. There are few reviews and studies on the risk that hypertension poses to developing gout. This study's findings on obesity agree with recent systematic reviews and meta-analyses¹. According to a systematic review published by Hueskes et al., there is a pattern which shows an increase in incident gout in individuals using either thiazide or loop diuretics⁸. Their research analyses incident gout in association with diuretics. However, they also state that there is inconsistency in various studies on the independence and magnitude of this relationship hence no evidence which can support the stoppage of diuretics in those with gout⁹. It is important to note that their outcome made a specific definition that is 'chronic tophaceous gout' or 'acute gouty arthritis' which contrasts with the outcome of this study, incident gout, which is more inclusive. Hueskes et al does not try pooling the risk estimates from various studies which made it impossible for quantification of the risk incurred from the use of diuretics. This study shows that incident gout has the use of diuretics, hypertension, and obesity to be its greatest risk factors. There is an increased prevalence of obesity in both the UK and the USA as well as globally²². This prevalence is associated with mortality and co-morbidities which has made it a serious public health concern. The advantages of reducing weight as an intervention in prevention of gout are demonstrated in previous research and this study adds further evidence on the need to reduce the prevalence of obesity due to its strong relationship with gout. The treatment of hypertension normally occurs through primary care. In addition, the risk of incident gout can further be reduced through carefully selecting therapeutic agents. The study

suggests avoiding diuretics to reduce incident gout and instead, consider the use of alternative medication. The study demonstrates numerous strengths in the manner it was conducted. Among the strengths is the broad search strategy and the literature review process that did not have a restriction on language. Through consideration to only include cohort studies focusing on primary care and are population-based, the study makes sure that the outcomes are applicable to a large percentage of gout patients and who receive treatment in primary care. To reduce biasness from recalled participants which is common studies with case-control and to allow surety of any temporary relationships from the outcome to the exposure, the study only includes cohort studies¹². The last strength of this study is the meta-analyses had adjusted risk estimates, estimates for hypertension were altered for diuretics, and estimates for obesity were adjusted for hypertension, which gives surety of independence of the risk estimates. Therefore, hypertension increases the risk for acquiring gout, with or without the use of diuretics. However, no adjustments were made in the other studies for anti-hypertensive drugs which can cause hyperuricemia. One of the limitations to the study is that some of the sampled studies made use of specific samples like university students or health professionals which made their sampling frames to have low social deprivation hence the likelihood of underestimating the risk of acquiring gout. Another limitation is that a quarter of the articles did not make any specific indications on the exclusion of participants who had previously been diagnosed with gout. The second limitation is that there would be variations among the pooled multivariate relative risks because of modifications on various elements in different studies.

Table 1: Showing the incident gout for obese individuals in comparison to individuals who were not obese

Article	Year	Gender	n
Unadjusted/age-adjusted			
Choi et al.	2005	Men (BMI ≥ 30 at age 21)	47,150
Bhole et al.	2010	Men (BMI ≥ 30)	1951
Bhole et al.	2010	Women (BMI ≥ 30)	2476
McAdams-DeMarco et al.	2011	Men and women (BMI ≥ 30 at age 21)	15,533
Maynard et al.	2012	Women (BMI ≥ 30 at age 25)	6,263

Cont... Table 1: Showing the incident gout for obese individuals in comparison to individuals who were not obese

Subtotal (I-squared = 43.4%, p = .01333)			
Maximally Adjusted			
Choi et al.	2005	Men (BMI \geq 30 at age 21)	47,150
Bhole et al.	2010	Men (BMI \geq 30)	1951
Bhole et al.	2010	Women (BMI \geq 30)	2476
McAdams-DeMarco et al.	2011	Men and women (BMI \geq 30 at age 21)	15,533
Maynard et al.	2012	Women (BMI \geq 30 at age 25)	6,263
Subtotal (I-squared = 21.4% p= 0.278)			

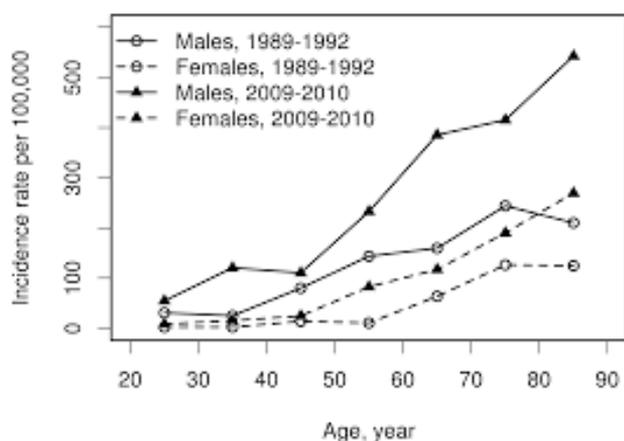


Figure 1. Graph showing incidence rate per 100,000 of different ages for different people from both males and females

Conclusion

Incident gout is elevated by the use of diuretics, obesity, and hypertension. The three are categorized as risk factors which double the incidence of incident gout. They are independent of each other and individuals in these categories have a double risk of incident gout in comparison to individuals outside the categories. Clinicians should recognize these patients to be at a higher risk of incident gout and provide them with proper alternative medication and management. The pathophysiology and epidemiology of gout will further be understood through future research on interaction between these individual risk factors.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health,

Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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Evaluation of the Marginal and Internal Fitness of Monolithic CAD/CAM Zirconia Crowns Using Two Software Design and Different Open System Milling Machines

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Abstract

Objective: This *in vitro* study evaluated the marginal and internal fitness of the monolithic zirconia crowns using one digital intraoral scanner, two different in-lab software design and four different open system milling machines. Sixty-four upper first human premolars were prepared for full anatomical crowns and milled from zirconia blank divided into four groups (n=16) based on the milling machines used as follows: Group A- Sirona in-lab MC X5, Group B- imes-icore CORiTEC 250i, Group C- Charlydental CD 05-S, and Group D- Roland DWX-51D. Each group then divided into two subgroups (n=8) based on the CAD software used: Exocad and 3-Shape in-lab system software design. The marginal and internal fitness of the crowns was evaluated by direct measurement of the cement thickness through the sectioning procedure. The data were analyzed using Two-way ANOVA test. The result of this study revealed that within both software design used in all groups, no significant difference was found in the marginal gap area of the crown ($p > 0.05$), However, the crown did show a highly significant difference in the internal gap area ($p < 0.01$). As a conclusion, Exocad software design and Roland DWX-51D produce a more accurate adaptation of the zirconia crowns.

Keywords: CAD/CAM. Marginal gap. Internal fitness. Milling. Software. Design.

Introduction

Marginal and internal adaptation is a critical issue in dental practice, especially related to the fitness of the indirect restoration, even if production involves using CAD/CAM systems¹. Superior marginal fitness obviously reduces the development of secondary caries, periodontal problem, pulpitis and extends the longevity of dental restoration, while superior internal fitness is necessary to maintain and support the restorations, so the failure of adaptation of this restoration in marginal and internal areas leads to failure of the prosthesis^{2, 3}. The milling process needs to be accurate, as it can have an effect on the marginal and internal fitness of the restoration⁴. However, CAD/CAM technology comprises the following steps: data acquisition, data

processing, and manufacturing⁵, therefore, the fit problem might not be purely from the milling process, it's a combination of multiple factors in CAD/CAM construction steps which may introduce inaccuracies⁴. Inaccuracy may occur during scanning, locating of the margin digitally, software modelling, post data processing and milling step⁴. Therefore, the scanning procedure, the software design, and the milling machines used are equally important factors have a detrimental effect on the fitness of the CAD/CAM restorations and errors in any of these steps may result in distortions of the restoration⁵.

Materials and Method

Non-carious, unrestored sixty-four freshly extracted for orthodontic purposes, upper first human premolars with an age range (18-24) years used in this study to reflect the clinical situation with comparable crown size to reduce variation in the results and stored in deionized distal water to keep hydrated during all the experience stages⁶. All teeth samples were embedded in cold cure

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acrylic resin 2 mm below the cemento-enamel junction according to the level of supporting alveolar bone⁶. All teeth were prepared to receive full anatomical crowns (Fig.1) with supragingival deep chamfer finish line 1.0 mm in depth, axial reduction 1 mm-1.5 mm, total converging angle of approximately 6° and occluso-gingival height of 4 mm, the procedure of the tooth preparation was done by one operator to reduce variables and avoid inter-examiner difference⁷. For standardization, the digital imaging of prepared samples was scanned by the same scanner Trios 3® intra-oral digital scanner (3-shape, Copenhagen, Denmark). 3-Shape (3-shape, Copenhagen, Denmark) and Exocad (GmbH, Darmstadt, Germany) in-lab system software design were used to designate the restoration, 32 samples for each software, both software design version 2016. In the beginning, a reference crown was made and its morphology was applied to all groups to have more reliable results. CAD software design parameters were the same for both software types used in this study, the parameters are: minimum crown thickness all around 1 mm, start fitness 1 mm, the width of margin 100 µm, angle 0 µm, cement gap (occlusal, radial) 80 µm, undercut correction out-correction, margin thickness 100 µm. Full anatomical crowns were milled from Monolithic zirconia incoris TZI C blank using four different milling machines with three milling burs system: Sirona MC X5 (0.5 mm, 1.0 mm, 2.5 mm), CORiTEC 250i (0.6 mm, 1.0 mm, 2.5 mm), Charlydental CD 05-S (0.5 mm, 1.0 mm, 3.0 mm), Roland DWX-51D (0.3 mm, 0.6 mm, 1.0 mm). For standardization, all machines used were Five-axis in-lab open system, milling machines, and calibrated at the processing stage. The crowns of all groups were sintered in Sirona in-Fire HTC furnace following the manufacturer's instructions. A specimen holding device specially designed for this study was used during cementation to secure the zirconia crown on the natural teeth and apply a uniform load of 5 kg ($\cong 50$ N) that is perpendicular to the occlusal surface of the crowns to stimulate average biting force and maintain seating force during the procedure⁷. In the present study, the cross-sectional method was used (Fig.2). In this procedure samples embedding in acrylic resin to reduce the chance of samples destruction during sectioning procedure⁷. The samples were sectioned into two pieces mesially and distally in bucco-palatal direction (Fig.3). A diamond sectioning blade of 0.3 mm in thickness was used with copious water coolant to reduce the chance of the sample destruction. The

marginal and internal fitness of the crown was measured by a digital microscope with magnification power was 320X at eleven different measuring point (Fig.4) at the cement space representing the four different areas for each sectioned sample: 2-marginal (1, 11), 2-chamfer (2, 10), 4-axial (3, 4, 8, 9), 3-occlusal (5, 6, 7) to provide a clear picture of the crown fitness⁷.

Results

The marginal and internal gaps of the investigated crowns were at the level of the clinically acceptable limit for all groups within both software design use. In order to see the influence of the independent variables, including software design and milling machines used on the marginal gap and internal fitness of the experimental groups, a Two-way ANOVA test was performed. Table 1 showed that both main and interaction effects of the types of software design and the milling machines used have a highly significant difference in the internal gap area and no significant difference in the marginal gap area of the crown. A descriptive and statistical test was used to compare the gap between groups in both software design within each measuring area. Table 2 showed that on the marginal and the axial areas no statistically significant difference between groups in both software design ($p > 0.05$). While on the occlusal, chamfer and internal gap areas there was a significantly larger gap when data processed in different software design and milled with different machines ($p < 0.01$). In both software, Group D has the lowest marginal gap and internal gap.

Discussion

From the data obtained in this study, it observed that using different types of the milling machine and CAD software design, produce a highly significant difference in the internal gap area, while no significant difference in the marginal gap area, thus reject the null hypothesis. In this study, the choice of the scanner based on the most accurate intra-oral scanner in order to improve the quality of the crown adaptation because modelling and milling depend on data acquired through the optical impression⁷. The choice of the software design for modelling based on the most two popular in-lab CAD software programs (Exocad and 3Shape) used with the open system due to the data processing has an effect on the crown adaptation like software version and parameters⁵. Five-axis, open system in-lab, and dry milling machines used in this

study because five-axes milling machines produce higher accuracy and fit restoration¹. Open systems were used because they allow the adoption of the original digital data by CAD software and CAM devices from different companies⁸. Dry milling machines were used because providing quicker milling, reduce cutting force, increase the cutting tool life, potentially better surface quality, and no moisture absorption of the zirconia blank, which omits the need for drying the restoration before sintering⁴. Three burs system used in the milling procedure, because this protocol was recommended for milling of the complex restoration⁹. In this study, different levels of adaptation were recorded. For all four groups, the mean value of the marginal gap was smaller than the mean value of the gap in all other internal areas (chamfer, axial and occlusal). This could be explained due to the cement space started 1 mm above the margin according to the design software. The least internal gap in the axial area of each experimental group could be related to one, or a combination, of the followings:

1. The hydraulic pressure developed during the cementation procedure, which forced the material occlusally and cervically allowing its continuous escape as a result of relatively low total axial convergence angled used in this study 6°¹⁰.
2. The precise scanning of the straight plane so provides more accurate captured data that have a good effect on the final results¹¹.
3. The straight plane of the axial wall made the milling process of this area easier when compared with the curved complex planes¹².

On the other hand, the greatest gap at the occlusal and chamfer areas as compared with the other areas could be due to the followings:

1. The hydraulic pressure during the cementation procedure which forces the cement material occlusally and cervically¹⁰.
2. Curved plane provides less accurate captured data. This lead to a phenomenon called "over shoot" and "rounded edges" which occurs during scanning of angled regions⁶.
3. Over-milling of these the complex curved planes that contained small details in the angled area can't produce accurately by the CAM

system because the diameter and design of the milling bur, regarding the bur diameter, may be larger than the small details of the prepared tooth, while about the design, it's ball-end milling burs shapes, which produces round milling in the angled areas, all that lead to the negative fit error and dramatically increase the internal space between the tooth surface and restoration surface^{4,9}.

4. The anisotropic shrinkage of pre-sintered TZI C blanks subject to post-milling sintering. Sintering shrinkage occurs in the crown long axis smaller than that of the horizontal axis⁷.

The above finding is in agreement with Park *et al.* 2015, and 2016, Kim *et al.*, 2017^{2,3}. Regarding the internal fitness, the result of this study showed a pattern of an internal gap which coincides with previous studies dealing with internal adaptation⁹, in which that all groups showed smaller axial discrepancies and that discrepancy tends to become larger at it gets closer to the chamfer and occlusal areas, the largest gap was recorded occlusally. Software CAD design effect could be due to the fit of the restoration is influenced by the quality of the design program, by the translation of the design code into a numerically controlled milling process¹³. Exocad software design produces more accurate seating of restoration than 3 Shape software design, this could be due to Exocad software design is easy to use and have shortened learning curve, that allows the designer to increase the reproducibility and reduce data processing error¹⁴. Exocad open architecture CAD software platform allows is seamlessly coordinated with the other digital software, including scanner software and CAM software¹⁴. All that may be the data processing error in Exocad software less than 3 Shape software that leads to more fitted restoration.

The milling machine effect could be due to the followings:

1- The fit of the crown could be affected by the different construction of the milling machines and different use of the milling strategies¹⁵.

2- The using of different nesting (CAM) program, tool path determination, integral dimension constraints and calibration effects of the individual milling machine could lead to different adaptation result¹⁶.

3- The size of the milling burs and their ability to produce fine detail, as a consequence in the prepared tooth the area that is smaller than the narrowest bur diameter, more material will remove (over-milling), which effect on the fit of the restoration. The same phenomena could happen when selecting between a detailed or regular milling process, as the path of the burs will be determined how the detailed the restoration is going to fit^{4,17}.

So in both software design Group-D produces the least marginal and internal gap, these findings may be contributed to the smallest burs system used (1.0 mm, 0.6 mm, 0.3 mm) in Roland DWX-51D machine and the rotary axis travels angles of it (A axis ± 360°, B axis ± 30°), as the use of the small burs with a higher degree of freedom of the milling axis lead to produce more details in the milling process and small gaps, so all that may be lead to good adaptation in this group^{13, 17}.

Table 1: Two-way ANOVA analysis.

Areas	Independent variable	P
Marginal	Soft wares	> 0.05
	Milling machines	
	Software*machines	
Internal gap	Soft wares	< 0.01
	Milling machines	
	Software *machines	

Table 2: Two-way ANOVA test to compare the gap between groups in both software design within the different measuring area.

Variables	Milling machines	Mean	Software						
			Exocad			3 Shape			
			SE	F	P	Mean	SE	F	P
Marginal	Group-A	68.458	1.906	1.442	0.240 ^{NS}	66.883	1.906	0.088	0.966 ^{NS}
	Group-B	68.287	1.906			66.730	1.906		
	Group-C	71.223	1.906			66.136	1.906		
	Group-D	65.621	1.906			65.655	1.906		
Chamfer	Group-A	115.440	4.103	3.922	0.013 ^{HS}	139.313	4.103	14.805	0.000 ^{HS}
	Group-B	122.342	4.103			148.779	4.103		
	Group-C	130.229	4.103			117.478	4.103		
	Group-D	111.806	4.103			117.590	4.103		
Axial	Group-A	87.673	1.861	1.211	0.314 ^{NS}	87.336	1.861	1.997	0.125 ^{NS}
	Group-B	88.966	1.861			93.054	1.861		
	Group-C	92.477	1.861			89.357	1.861		
	Group-D	89.153	1.861			87.626	1.861		
Occlusal	Group-A	134.323	4.229	6.921	0.000 ^{HS}	133.343	4.229	5.978	0.001 ^{HS}
	Group-B	124.348	4.229			147.336	4.229		
	Group-C	128.336	4.229			127.784	4.229		
	Group-D	108.315	4.229			123.624	4.229		
Internal Gap	Group-A	112.480	2.416	6.921	0.000 ^{HS}	119.998	2.416	5.978	0.001 ^{HS}
	Group-B	111.886	2.416			129.723	2.416		
	Group-C	117.013	2.416			111.539	2.416		
	Group-D	103.092	2.416			109.613	2.416		

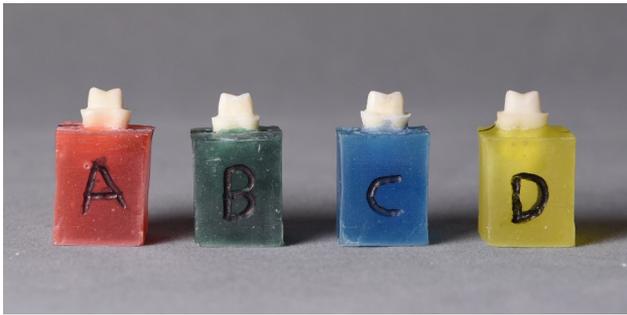


Figure 1. The prepared samples.

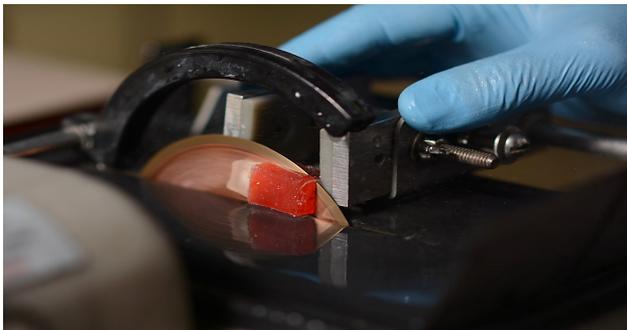


Figure 2. The sectioning procedure.



Figure 3. The section samples.

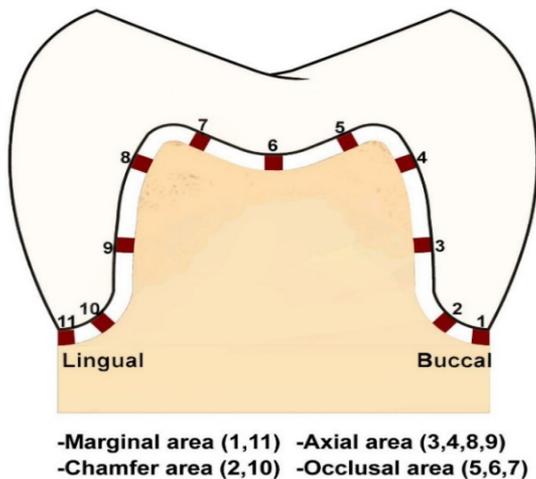


Figure 4. Different measuring point for each sectioned sample.

Conclusion

As a conclusion, the result suggested that the marginal and internal adaptation of the investigated

zirconia crown in all milling machines with both software design was satisfactory for clinical use. The software and the milling machine that produces a more accurate adaptation of the monolithic zirconia crowns were Exocad software design and Roland DWX-51D.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Conservative and Cosmetic Dentistry, College of Dentistry, University of Baghdad, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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A Study of Self-reported Physical Activity and Sedentary Healthy Behaviors among Babylon Nursing Students

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Abstract

Objectives: Aims of the present study were to determine self-reported perceptions toward physical activity and sedentary healthy behaviors among the students. A descriptive analytic design was conducted on a (purposive sample) (250) students at University of Babylon, college of Nursing, A questionnaire has been used as a tool of data collection for the period from January .2017 – June 2018 it consists of four parts ;including : Part one: Sociodemographic characteristics , Physical activities domain related to students' self-report the physical activities and healthy behavior. A descriptive and inferential statistical analyses are used to analyze the data. This study showed that the majority of sample ages (94%) were within age group (19-23) years. (62%) of them were male, and most of them (54%) in grade (4) (60%) of the students were often do engage in physical activity and (62%) of the participants did out sports, (38%) declared that Physical activity improve their health, (38%) of them found that sports are important to physical appearance. Finally results indicated a significant relationship between demographic characteristics and physical activities

Keywords: *physical activities, perception, self-reported*

Introduction

Physical activity has a major impact on people health, it takes place in a wide range of formal settings all over the world, some of its effects are very well known; such as a major element of energy spending ¹. Nevertheless most occupation burdens light, moderate, or strong activities depending on the task at hand. It can be self-possessed as for example how many minutes take each work in day. ¹ Physical activity has a great influence on energy balance and body composition as well as it plays a significant role in minimizing and fighting against some chronic diseases such as coronary artery disease (CAD) ,stroke, diabetes type 2 ,colon ,and cancer of the breast, and also it has a relations with other health problems and their outcomes for example mental health ,injuries and falls ². Access to safe places for performing some physical activities are: schools, and others academic institutions, care

of the child settings, in addition to street-scale design policy are environmental and policy strategies, that can help increase physical activity. ³ There are various types of activities ranging from” light such as walking 30 minutes” which is one of the simple method of exercise can help in maintaining a healthy lifestyle and better quality of life. Spending time walking as daily routine are the most vital steps towards better health status and living. ⁴ However, some physical activities are healthier more than others, both aerobic and muscle strengthening exercises are appropriate. Inactive lifestyle have a higher risk for early development of chronic diseases and death (coronary heart diseases, stroke, diabetes type 2, mental illness), more over physical activity help with weight reduction.⁵ Inactivity should be avoid for all ages groups especially adult people , every adult person should practice for at” least 150 minutes (two hours and 30minutes)a week. Adult should increase their aerobic physical movements to 300 minutes (5 hours) in a week of modest strength or 150 minutes a week of strong –intensity aerobic physical ,as well as muscle –strengthening actions which should be adequate and vigorous in intensity.⁶ In addition, exercising are prescribed for weight maintenance and weight loss, for

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this reason overweight and obese people should follow exercises activities to avoid weigh again and maximize weight loss ⁷ Several Studies have suggested that most exercises for example yoga can improve quality of life and healthy living, increases in body elasticity, stability and degenerations in musculoskeletal system aching and risk of falls and fractures. A commonly reported positive outcome associated with yoga sharing is reduction in tension, stress-related psychological factors such as awareness of anxiety, depression, and fatigue and it thought to be due to the practice of mediation and controlled breathing ⁸ Therefore. People who are active live longer and may have a lower risk for exposing to various health problems, and those who are sustaining regular physical activity will improve their physical, social and mental health and welfare, at the same time exercising will maintain higher levels of self-worth and enhanced overall quality of life.⁸

Methodology

This study is a quantitative descriptive design study which was conducted on nursing students at Babylon University/College of nursing from (1/2017 to 6/2018). Permissions was obtained from the University of Babylon /College of nursing to conduct the study.

Instrument and variables of the study:

Questionnaire was constructed after review the related articles and literatures which included:

Part one: Sociodemographic characteristics such as: Age, Gender, Marital status, Address, Grade, Occupation and Socioeconomic status.

Part two include: - Physical activities domain variables related to participation in healthy activities such as, walk between home and school, and join a fitness center, club, sport center, school, university or work.

Part three include: - Domain related to students' self-report activities and healthy behavior

Sampling

The study population consisted of (250) students of Babylon University/ college of nursing, they were selected randomly to complete the questionnaire from different college levels.

Method of data collection:

All data and information were gathered from the participants after their agreement by using the face to face interview technique. Moreover, the participant has the right to withdraw at any time if he/she cannot complete the questionnaire. Data collections took about 20 minutes for each student to complete the questioner and included both morning and afternoon studies programs. A statistical Analysis were computed using (SPSS)

Results and Discusion

Table no. (1) Showed the socio demographical data, the majority of sample ages (94%) were within age group (19-23) years. (62%) of them were male, and most of them (54%) in grade (4). From the result of the table it is indicated that (50.4%) students studying in the morning program, (52%) living in the rural area; according to student's marital status the majority of them (86%) were single. In regard to working condition (78%) of them were not working and their socioeconomic state showed that (74.1%) were satisfied. Table (2) illustrates that (60%) of the students were often do engage in physical activity; (62%) of the participants did out sports; from the same results it can be concluded that (60%) of them did not perform sporting activity. (35.2%) of the students didn't join a fitness center, sport center, club, university or work; as well as results indicated that (44%) of the participants did walk between home and university, workshops, it's interesting to find out that (46%) of sample agreed that job require physical effort. Table 3 results indicated that (38%) of subjects declared that Physical activity improve the health, (38%) of them found that sports are important to physical appearance, as well as (39.2%) of the participant answered yes to have fun, (47.2%) of them answered yes for the relaxation and to be with friends, however (48%) of the students used the physical activities to meet people from other cultures and help in declines the muscular pain. Same table showed that most of the students (54%) agreed that physical activity control their weight, while high percentage of participants represent (60%) practice the activities to keep them relax and reduce tension. (44%) considered the exercises help in the "protection and prevention of chronic disease" and decrease their fatigue, finally regarding decline the musculoskeletal pain (48%) sample answer yes. Table (4) showed that the majority (72%) of the students their areas where

they live didn't offer opportunities to be physically active, and (66.%) did not agree that the local sport clubs and others local providers offered many opportunities to do physical activity, most of them (75%) being busy and cannot perform physical exercises, in addition most of the study sample didn't have enough time and less concerned about the physical activities they represented (79.2 %) and (78%) respectively. Table (5) indicated that there is a significant relationship between demographics characteristics (gender, age, socioeconomic status) and total scores of physical activities. Regular physical activity is one of the health promotion aspects which affect people health maintenance of wellbeing and important for optimizing physical, social and mental health. The current study discussion presents the demographic characteristics which revealed that the participants were young adult (university students), most of them were male, and at grade four, residence of rural area. In addition, single, working and their socioeconomic state were satisfied. Since the sample under the study was selected from university so it can be logical results as mentioned above. This results agreed with ⁹ who found that most people who wish to exercise were of singles more than the married couples, and in regard to residency the study verified that most of the participants were people who were living in rural areas, due to more facilities and arrangements in their environment people in those areas can exercise more. The majority of the current sample engage in physical exercise, do out sport such as cycling, walking, Walk between home and university, workshops, While most of them did not join a fitness center, club, sport center, university or work. ¹⁰ However, most of the students agreed that activity was used to improve fitness, sport can be great way to get in shape or stay that way and having a specific goal can be great motivator¹⁵. The results also illustrated that majority of the sample exercising to control weight which is supported by¹⁶.who concluded that physical activity is important for weight loss and maintaining weight. In regard to self-esteem high percentage found that activity can improve the student self-esteem which is consisted with (Richard et al. 2014) ¹⁷and Carmeli et al (2014) ¹⁸who revealed that sport can contribute to the development of self-esteem. Nevertheless, about more than half of sample their areas where they live didn't offer them opportunities to be physically active, most of them agreed that the local sport clubs and others local didn't provide opportunities to be physical active, the same table showed that most of the students had

opportunities to be physically active in their areas but do not have time to take advantage of that, and also about more than half of sample did not interested in being active rather than they did something else in their spare time, this result is came along with ¹⁹ who stated that local sport clubs and other local providers offer many opportunities to people to be physically active.

Table (1) Distribution of sample according to the socio demographical data

Socio-demographical data		Freq.	%
1- Age	19-23	235	94
	24-28	15	6
	For the 29	0	0
	Total	250	100
2- Gender	Male	155	62
	Female	95	38
	Total	250	100
3- Grade	3 rd	135	54
	4 th	115	46
	Total	250	100
4- Type of study	Morning	126	50.4
	Evening	124	49.6
	Total	250	100
5- Address	Rural	130	52
	Urban	120	48
	Total	250	100
6- Marital status	Married	33	13.2
	Single	215	86
	Others	2	0.8
	Total	250	100
7- Occupation	Working	55	22
	Not working	195	78
	Total	250	100

Cont... Table (1) Distribution of sample according to the socio demographical data

8. Socioeconomic Status	Satisfy	165	74.1
	Not Satisfy	12	4.8
	Satisfy to some extend	83	33.2
	Total	250	100

Table (2) Distribution of sample according to their physical activity

Physical activity	Always		Sometimes		Never		Total	
	Freq.	Per.	Freq.	Per.	Freq.	Per.	Freq.	Per.
1. Engage in physical exercise	150	60	80	32	20	8	250	100
2. Do out sport such as cycling , walking	155	62	75	30	20	8	250	100
3. Engaging in voluntary work that support sporting activity	45	18	55	22	150	60	250	100
4. Join a fitness center, club , sport center , university or work	77	30.8	85	34	88	35.2	250	100
5. Walk between home, university, and work shops	110	44	55	22	85	34	250	100
6. The job require physical effort	115	46	45	18	85	34	250	100

Table (3) Students self - report physical activities

Students self-report physical activities domain	Yes		Uncertain		No		Total	
	Freq	per	Freq	Per	Freq	per	Freq	per
Physical activity improve the health	95	38	75	30	80	32	250	100
Important to improve the physical appearance	95	38	70	28	85	34	250	100
Have fun	98	39.2	80	32	72	28.8	250	100
To relax	118	47.2	75	30	57	22.8	250	100
To be with friends	118	47.2	98	39.2	34	13.6	250	100
To make new acquaintances	85	34	85	34	80	32	250	100
Meet people from other cultures	120	48	95	38	35	14	250	100
Improve physical performance	110	44	88	35.2	52	20.8	250	100
Improve fitness	95	38	75	30	80	32	250	100
10- Control weight	135	54	87	34.8	28	11.2	250	100

Cont... Table (3) Students self - report physical activities

improve self-esteem	76	30.4	110	44	64	25.6	250	100
keep individual relax and reduce tension	150	60	46	18.4	54	21.6	250	100
Help in protection and prevention of chronic diseases	95	38	110	44	45	18	250	100
Declines in musculoskeletal pain	120	48	55	22	85	34	250	100
Decrease fatigue	110	44	65	26	85	34	250	100

Table (4) Distribution of sample according to opportunities and limitation of physical activities

Opportunities and limitation	Yes		Not sure		No		Total	
	Freq	Percent	Freq	Percent	Freq	Percent	freq	percent
1- Residence lace offers many opportunities to be physically active	35	14	35	14	180	72	250	100
2- Local sport clubs and other local providers offer many opportunities to be physically active	21	8.4	64	25.6	165	66	250	100
3- Being overloaded is forming an obstacle toward engaging in physical exercises	195	75	35	14	20	11	250	100
4. Time shortages reduce the opportunity engaging in the in physical activities	198	79.2	32	12.8	20	8	250	100
5- physically activities take less concern for me	195	78	15	6	40	16	250	100
6. It is better to do things that have more priority in extra time	110	44	90	36	50	20	250	100

Table (5) statistical relationship between the student’s physical activities and their demographic characteristics

Pearson Correlation	Total Score
Age	-.159-* Significant
Gender	-.250-** Significant
Grade	-.063-
Type of study	.019
Address	-.017-
Marital status	.044
Occupation	.001
Socioeconomic	-.282-** Significant

Conclusion

It can be concluded that the sample age group were as a student college ,(19-23), most were from rural areas , satisfy with their socioeconomic state . In addition, all were often engage in physical activity, not all student cannot joined fitness center, or clubs. while majority exerting to improve their health , more over sample doing some sports to be with friends , finally it was found that sport can improve student self – esteem.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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An *in vitro* Study for the Synergistic Cytotoxic Actions of Biological Therapy and Anticancer Chemotherapy

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Abstract

Objective: This study aimed to investigate the increase of the cytotoxic action of a minimal dose of anticancer chemotherapy (temozolomide) in combination with the biological therapy (interferon-alpha-2a). Seven *in vitro* experiments were used in this study. The cytotoxicity of temozolomide, interferon-alpha-2a and the combination of them was measured on melanoma B16 cell line for 24 and 48 hours incubation periods. The cells of these lines were seeded in 96-well plate. Temozolomide was used in a six serial dilutions (6.25, 12.5, 25, 50, 100, 200) µg/ml. Interferon-alpha-2a was also used in a six serial dilutions (37500, 75000, 125000, 250000, 500000, 1000000) IU/ml. The MTT(3-(4,5-Dimethylthiazole-2-yl)-2,5-diphenyl-2H-tetrazolium bromide) assay was used to determine the number of viable cells and the intensity of color was measured by ELISA reader. The combination of temozolomide and interferon-alpha-2a at 48 hours incubation period, there was a significant decrease ($P \leq 0.05$) in the viability percent of melanoma B16 cells for all concentrations of the combination therapy as compared to the control group.

Keywords: temozolomide, interferon, cancer.

Introduction

Cancer is a leading cause of death worldwide, accounting for an estimated 9.6 million deaths in 2018. The most common types of cancers are lung cancer, breast cancer, colorectal cancer, prostate cancer, skin cancer (non-melanoma), and stomach cancer ¹. Cutaneous melanoma is the most deadly cutaneous neoplasm ². Although melanoma is much less common than basal cell and squamous cell skin cancers, it is far more dangerous because it is much more likely to spread to other parts of the body if not diagnosed early ³. The incidence of both non-melanoma and melanoma skin cancers has been increasing over the past decades. Melanoma accounts for only about 1% of skin cancers but causes a large majority of skin cancer deaths ⁴.

There are many types of cancer treatment: Surgery, Chemotherapy, radiotherapy, hormone therapy, targeted therapy and immunotherapy ⁵. Cancer therapy has been

constantly evolving with the hope of finding the most effective agents with the least toxic effects to eradicate tumors ⁶. Temozolomide is approved to treat glioblastoma multiforme, and astrocytomas. Also it can treat brain metastasis from various malignancies, since it can cross the blood-brain barrier ^{7,8}. Traditionally, it is a first-line treatment for patients with metastatic melanoma ⁹. Temozolomide has recently been recommended as the first line chemotherapy in patients with aggressive pituitary tumors and pituitary carcinomas that do not control by standard treatment ^[10]. Interferon alpha (IFN- α) is a wide biological activity cytokine that is used in hepatitis and cancer treatments ¹¹. Recombinant IFN α -2 has been approved for the treatment of chronic viral hepatitis B, chronic viral hepatitis C, chronic myeloid leukemia, Kaposi sarcoma, follicular lymphoma, renal cell carcinoma, melanoma, T cell lymphoma, multiple myeloma and condylomata acuminata ¹².

Despite advances in treatments like chemotherapy and radiotherapy, metastatic cancer remains a leading cause of death for cancer patients, also long term protection against cancer is not achieved, and many patients experience cancer recurrence. Mobilizing and stimulating the immune system against tumor cells

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is one of the most effective ways to protect against cancers that recur and metastasize. So that, cancer immunotherapy is currently among the most promising options, fulfilling this hope in a wide range of tumors¹³. The combination of chemotherapy with immunotherapy is a novel comprehensive treatment model for malignant cancer. Such immunotherapies include tumor vaccines, monoclonal antibodies, cytokines, and immunocompetent cells¹⁴.

The aim of this study is to investigate of the cytotoxic action of a minimal dose of anticancer chemotherapy in combination with biological therapy to improve the anticancer action of the classical anticancer drug and also to reduce the side effects by using low doses of the classical chemotherapy in combination with biological therapy.

Materials and Method

Drugs :

Temozolomide stock solution:

This solution was prepared according to the manufacturer (InvoZenrix)instructions. By using serum-free medium, two-fold serial dilutions for temozolomide from the stock solution was prepared, and six concentrations of 6.25, 12.5, 25, 50, 100, 200 μ g/ml were used in the present study.

Interferon alpha-2a (IFN- α 2a) stock solution:

According to Roche manufacturer information, each ml of IFN- α 2a solution contains (18000000 IU). IFN- α 2a serial dilutions were prepared By using serum-free medium, two-fold serial dilutions of interferon alfa-2a from stock solution were prepared and six concentrations of 37500, 75000, 125000, 250000, 500000, 1000000 IU/ml were used in the present study.

Cell line:

Melanoma B16 cell line in frozen vials were obtained from Tissue Culture Laboratory in the College of Medicine/University of Babylon. This cell line was continuously cultured in RPMI-1640 medium which was prepared according to Gibco manual and supplemented with 5% of fetal bovine serum and 1% penicillin /streptomycin antibiotics.

Experimental design:

MTT assay was used to measure the cytotoxic effect of temozolomide and IFN- α 2a on melanoma B16 cell line. Different concentrations of temozolomide and IFN- α 2a were tested for 24 and 48 hours incubation periods. When the growth in the flask became as monolayer and before it reached the exponential phase, the cell monolayer was harvested and re-suspended with the prepared RPMI-1640 medium and incubated at 37C in a concentration of 5×10^5 cells/ml and seeded in a 96-well cell culture plate. Since the cell growth reaches 80%, the wells were exposed to serial dilutions of temozolomide and IFN- α 2a as in the following experiments:(a)The effect of temozolomide on melanoma B16 cell line at 24 and 48 hours incubation time,(b) The effect of IFN- α 2a on melanoma B16 cell line at 24 and 48 hours incubation time ,and (c) the effect of the combination of IFN- α 2a and temozolomide on melanoma B16 cell line at 24 and 48 hours incubation time.

MTT assay:

At the end of the drug exposure period, the medium was removed from the wells and then the cells were washed with phosphate-buffered saline. A blank control was carried to assess unspecific formazan conversion. MTT reagent (Carl-Roth, Germany) used in a concentration of 0.5 mg/ml. A volume of 200 μ l of the MTT solution was added in each well. The plate was incubated for 3 hours at 37°C until intracellular purple formazan crystals were visible under the inverted microscope. The supernatant was removed and 100 μ l dimethyl sulfoxide was added in each well to dissolve the resultant formazan crystals. The plate was incubated at room temperature for 30 minutes until the cells have lysed and purple crystals have dissolved. Absorbance was measured by a microplate reader at 570 nm.

Ethical approval:

Ethical approval for this study was obtained from research ethical committee in college of medicine, Babylon university-Iraq.

Statistics Analysis:

All data were collected and analyzed by Microsoft Office Excel 2010 and Sigma plot version 12 software. Student T-test was used to assess significant difference among the means of the data, where the P value less than 0.05 was considered to be statistically significant.

Results

The effect of temozolomide on melanoma B16 cell line after 24 hours:

The results showed that there was a significant decrease in the viability percent ($P \leq 0.05$) for all concentrations except with the lowest concentration (6.25 $\mu\text{g/ml}$) which has no significant difference ($p > 0.05$) in comparison with the control group as shown in **figure (1)**.

The effect of temozolomide on melanoma B16 cell line after 48 hours:

The results showed that there was a significant decrease in the viability percent ($P \leq 0.05$) for all concentrations in comparison with the control group as shown in **figure (2)**.

The effect of IFN- α 2a on melanoma B16 cell line after 24 hours:

The results showed that there was no significant difference ($p > 0.05$) for all concentrations in comparison with the control group as shown in **figure (3)**.

The effect of IFN- α 2a on melanoma B16 cell line after incubation for 48 hours:

The results showed that there was a significant decrease in the viability percent ($P \leq 0.05$) for all concentrations in comparison with the control group as shown in **figure (4)**.

The effect of the combination of temozolomide with IFN- α 2a on melanoma B16 cell line after incubation for 24 hours:

The results showed that there was a significant decrease in the viability percent ($P \leq 0.05$) for all concentrations except (6.25 $\mu\text{g/ml}$ + 37000 IU/ml) and (12.5 $\mu\text{g/ml}$ + 75000 IU/ml) which have no significant difference ($p > 0.05$) in comparison with the control group as shown in **figure (5)**.

Comparison the effect of temozolomide and the combination of temozolomide with IFN- α 2a on melanoma B16 cell line after incubation for 24 hours:

The results showed that there was no significant difference ($p > 0.05$) between the two compared

groups for all concentrations as shown in **figure (6)**. The results of this study indicate that a significant decrease in the viability percent of melanoma B16 cells ($p \leq 0.05$) at 24 hour incubation time except with the lowest concentration as shown in figure (1). Also, figure (2) show that all the concentrations caused a significant decrease in the viability percent ($p \leq 0.05$) at 48 hours incubation time. This work agrees with [15] who mentioned that temozolomide had modest antitumor activity as a single agent for the treatment of melanoma brain metastasis and because of the ease of oral administration of temozolomide, this will offer the possible benefits of combination therapy in the treatment of brain metastasis associated with malignant melanoma. Moreover, temozolomide had efficacy equal to the standard chemotherapeutic agent (dacarbazine) for metastatic melanoma and is an oral alternative for patients with advanced metastatic melanoma [16].

In this study, different concentrations of IFN- α 2a showed a non-significant decrease in the viability percent of melanoma B16 cells ($p > 0.05$) at 24 hours incubation time. This result can be explained on the basis that this study is an in vitro study so that the cytotoxic effect of IFN- α 2a depend on direct mechanisms of IFNs to produce an anti-tumor response and these mechanisms require transcription of ISGs [17]. As a result, a significant decrease in the viability percent need more than 24 hours incubation time as expressed in this work. Different concentrations of IFN- α 2a showed a significant decrease in the viability percent ($p \leq 0.05$) at 48 hours incubation time. In recent years, it has been demonstrated that immunotherapy is an effective strategy for the management of solid tumors. The origins of immunotherapy can be traced back to the work of William Coley in 1893 who observed remission of cancer in patients with postoperative bacterial infections and suggested that activation of the immune system must play a role in compacting cancer [21]. Cytokines are major regulators of innate and adaptive immunity that enable cells of the immune system to communicate over short distances. Cytokine therapy to activate the immune system of cancer patients has been an important treatment modality and continues to be a key contributor to current clinical cancer research. IFNs were the first cytokines to be effective in cancer therapy and were among the first recombinant DNA products to be used clinically [22]. IFNs mediate anti-tumor effects either indirectly by immunomodulation

and inhibition of angiogenesis or directly by affecting tumor cells proliferation, differentiation, and migration. IFNs also have a pro-apoptotic effect and many *in vitro* studies reported that IFN- α , IFN- β and IFN- γ could induce apoptosis in cancer cell lines of various origins²⁷. melanoma is a tumor with poor response to chemotherapy and radiation therapy; yet, it has developed into a model tumor for immunotherapy^[28]. The benefits of IL-2 and IFN- α 2 therapy in metastatic melanoma patients have encouraged the researchers to identify further other cytokines that could be used in the treatment of melanoma. These other cytokines are IL-12, IL-15, IL-21, and granulocyte macrophage colony-stimulating factor (GM-CSF) which were evaluated in clinical trials and remain part of certain investigational trials to test the safety and/or efficacy of cytokines and the possibility of their combination with other therapies in the treatment of melanoma²⁹.

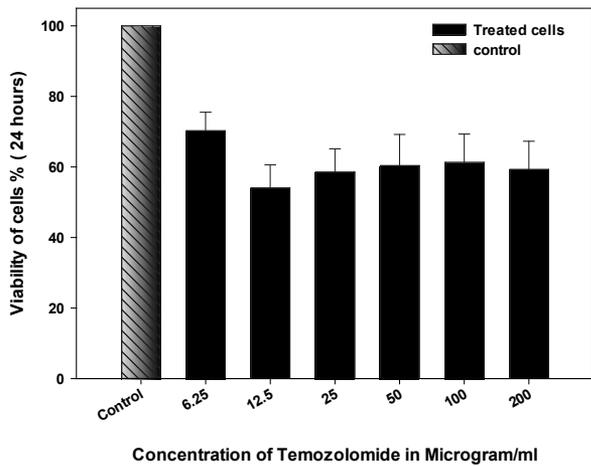


Figure (1): The effect of different concentrations of temozolomide on melanoma B16 cell line after incubation for 24 hours.

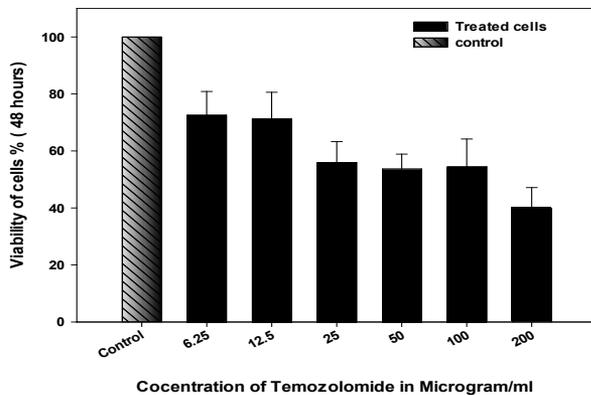


Figure (2): The effect of different concentrations of temozolomide on melanoma B16 cell line after incubation for 48 hours

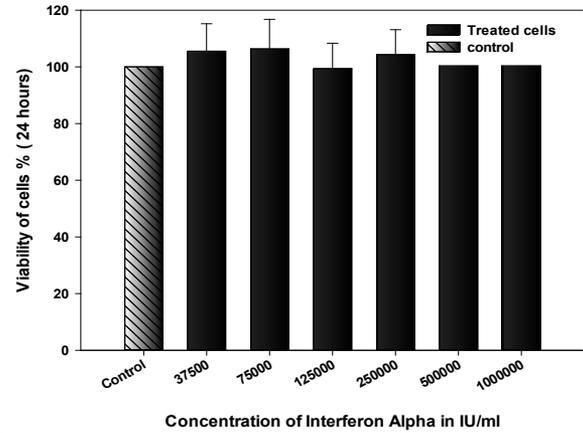


Figure (3): The effect of different concentrations of IFN- α 2a on melanoma B16 cell line after incubation for 24 hours

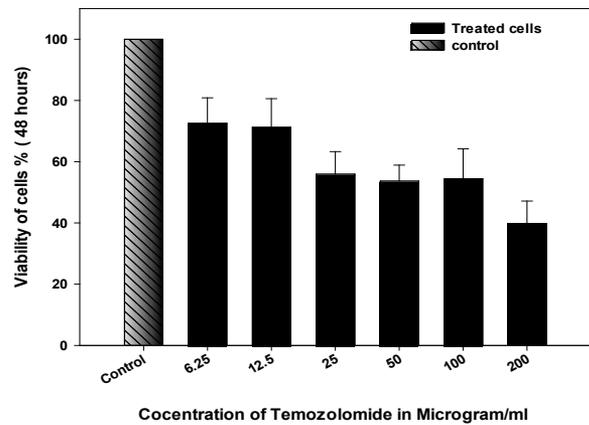


Figure (4): The effect of different concentrations of IFN- α 2a on melanoma B16 cell line after incubation for 48 hours

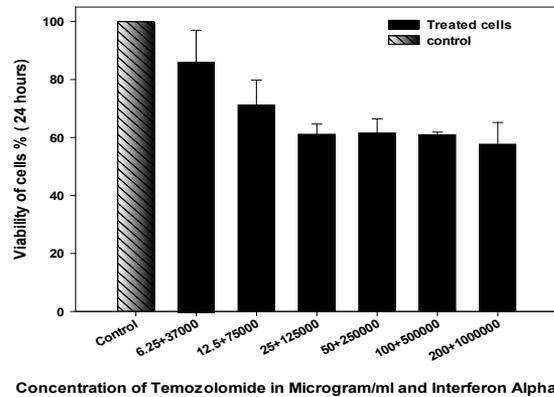


Figure (5): The effect of the combination of temozolomide and IFN- α 2a on melanoma B16 cell line after incubation for 24 hours

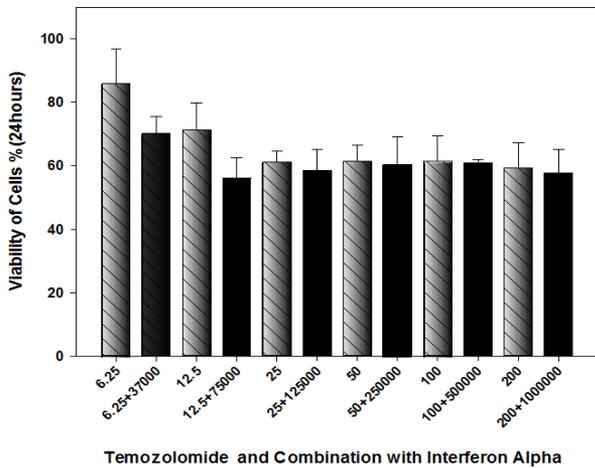


Figure (6): The effect of temozolomide and combination of temozolomide and IFN- α 2a on melanoma B16 cell line after incubation for 24 hours

Conclusion

The combination of temozolomide and interferon-alpha-2a at low concentrations will increase the cytotoxicity of the chemotherapy. Also, temozolomide, interferon-alpha-2a and the combination of both therapies have selective cytotoxicity for cancer cells rather than normal epithelial cells.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, College of medicine, Department of Pharmacology, Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of Metered-dose Inhalers Technique among Patients with Chronic Respiratory Disorders at Al- Hussein Teaching Hospital in Al- Nasiriyah City

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Abstract

Objectives: To evaluate the inhaler technique of MDI in patients with chronic respiratory disorders. A descriptive analytic design was used in order to achieve objectives of this study. The study was conducted in the outpatient clinics / Al-Hussein Teaching hospital at Al-Nasiriyah city, Thi-qar, Iraq from 1st November to 30th December of 2018. A non-probability (purposive) sample of (111) patients was selected. The data has been collected through the utilization of the developed questionnaire based on the standard of an inhaler technique checklist to assess the asthma and chronic obstructive pulmonary disease patients technique by using Meterd inhaler, which consists of 1: demographic data form, 2: clinical Data, 3: patients' practice regarding Inhalation technique of MDI. After getting approval to conduct the research from Al-Hussein Teaching hospital, the validity and reliability of the questionnaire was estimated. Where reliability was determined through a pilot study, while the validity accepted through a panel of experts. The findings of the present study indicate that the showed steps failure assessment are: step 6 [Inhale slowly, actuating once during first half of inhalation (71.2%)], step 7 Continue slow and deep inhalation (73.9)], and step 8 [Hold breath for 5 or more seconds(69.4)].

Keywords: Assessment, Inhaler, Proper technique, Chronic respiratory diseases.

Introduction

Bronchial asthma and chronic obstructive pulmonary disease (COPD), is regarded as a considerable international health problems, regarding escalating frequency resulting in extensive disease load for patients have them and also on community.¹. In addition, the increment of the burden and incidence of COPD and asthma is expected to get higher, taking in consideration the barely altering attractiveness of smoking, high pollution of the air, and universal aging of the population of the world.². Regarding most recent projections, COPD and bronchial asthma will turn into the 3rd important death cause and the 7th source of disability-adjusted life years (DALYs) internationally

in 2030, demonstrating a main increment considering mortality and DALY-resulted levels in 1990, which were 6th and 12th, respectively. COPD-provoked deaths are predominantly higher in middle and low -income countries (LMICs), taking responsibility for over than 90% of the total mortalities of COPD globally indicating that probably higher effort and concentration should be directed toward control and prevention of COPD in these countries.³ In spite of representing an emerging international danger to the health, COPD has already been massively counted as a treatable and avoidable health issue. suggested management of COPD strategies usually entail to utilize inhaled medication.⁴ Inhalation therapy is the favored method of management for patients with chronic broncho-pulmonary diseases like asthma and COPD, both of them is related to large morbidity and mortality globally⁵. The inhalation of medication directly to the location of process of the disease provides contained deliverance of a higher drugs concentration to both lungs with fewer side effects systemically and fast action onset using a smaller dose of the drug.⁶ The

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model of deposition of inhaled medication is affected by various elements including the type of device used, size of particle, spacer use, formulation of aerosol, particularly with MDI (metered-dose inhalers) and the technique of patient inhalation ⁷.

Wrong use of inhalers and incorrect technique of inhalation are the most common noticed in clinical practice and is connected with escalated use of inhaler, decreased bronchodilator, decreased adherence of patients toward regimen of treatment and poorer delivery of drug and control of disease ⁸.

Material and Method

Design of the Study: a descriptive analytic design is used through the present study in order to achieve the study objectives. The period 1st November to 30th December of 2018.

Setting of the Study: the study was conducted at outpatient clinics in Al-Nasiriyah City, of these clinics is located in the Al-Hussein Teaching hospital in Al-Nasiriyah city, Thi-qar, Iraq.

Sample of the Study:

A non-probability (purposive) sample of (111) patients was selected. All the patients are diagnosed with Chronic Respiratory Disorders and they had a medical records and they review outpatient clinics of the AL-Hussein Teaching Hospital.

Criteria of the Sample:

- 1- Adult patients.
- 2- Males and females patients.
- 3- Patients who were in stable medical condition.
- 4- All participants are medically diagnosed as chronic respiratory disorders (asthma and chronic obstructive pulmonary disease and using Metered-dose Inhalers for at least 1 month or more).
- 5- All patient that agree to participate and whom signed informed consent.

The Study Instrument: A questionnaire was designed to assess the technique by an inhaler technique checklist.

Part 1: Demographic Data:

A demographic data sheet, consists of (7) items, which included age, gender, Socio-economic status, level of education, residency, marital status, occupational status.

Part 2: Clinical Data:

The second part of the questionnaire is comprised of items, which are include history of disease: diagnosis, duration of the disease, whether the patients received health education regarding to the therapeutic recommendations or not, sources of received health education.

Part 3: Patients' practice regarding Inhalation Technique of MDI

This part of the questionnaire is comprised of (7) sub-domains.

Remove cap, Shake well, Breathe out normally, Keep head upright or slightly tilted, Seal lips around mouthpiece, Inhale slowly, actuating once during first half of inhalation, Continue slow and deep inhalation, Hold breath for 5 or more seconds.

Data Collection: the data has been collected through the utilization of the developed questionnaire after estimation of validity and reliability, and by means of structured interview technique with the subjects who are individually interviewed.

Conducting Pilot Study: in order to find out the reliability of the educational program and study instruments, A convenient sample of (10) patients were selected from the outpatient clinics for patients who had been diagnosed with chronic respiratory disorder at least three months ago and had medical records. ; it was conducted study at AL Hussein Teaching Hospital during the period from 1st of September of to 28th of the same month, 2018. The sample of the pilot study is excluded from the original study sample.

Validity: validity of the program and the study instruments are determined by the panel of (6) experts, who had more than five years' experience in their fields in order to achieve study objectives.

Reliability: reliability of the questionnaire was determined through the use of test and re-test approach on (10) patients. The results showed very high level of stability and internal consistency of principle parts

concerning item's responses' of the questionnaire, all those were calculated by using the major statistical parameter: Alpha Cronbach, revealed that the person correlation coefficient is (0.73).

Statistical Analysis: the following statistical data analysis approaches is used in order to analyze the data of the study under application of the statistical package (SPSS) ver. (22).

Results and Discussion

The most of the study subjects were male subjects (60%). The educational status of the participants was reported to be as follows: 26.1% were illiterates, 24.3% were read & write, 11.7 up to primary school, 11.7% Intermediate school graduate, 7.2% Preparatory School Graduate, 15.3% Institute graduated, and 3.6% were College or post-graduate Graduated. Concerning residency the study results indicate that the study subjects are urban residents. Regarding marital status the majority of the study subjects (64.9%) are married. The most of patients (80.2%) diagnosed with asthma. For duration of disease the majority the study subject (One year or more) are suffering from a disease since (95.5%). Concerning receive education about inhalation technique, most of participants are receive education about inhalation technique (93.7%). in most of the cases (47.9%), the training was provided by the physician. Table (1) shows the proportion of mistakes made at individual step among the study subjects . The most of the subjects were found to be performing incorrectly were found to , step 1 [Remove cap (0.9%)], followed by step 2 [Shake well (34.2%)], step 3 [Breathe out normally(45.9%)], step 4 [Keep head upright or slightly tilted (38.7%)], step 5 [Seal lips around mouthpiece (15.3%)], step 6 [Inhale slowly, actuating once during first half of inhalation (71.2%)], step 7 Continue slow and deep inhalation (73.9)], and step 8 [Hold breath for 5 or more seconds(69.4)] . Concerning the gender, the study results reveal that the majority of the subject are males. This result agrees with (Nguyen et al., 2010) in their who found that the dominant gender is male. In addition, the differences in sex in the broad scope of wellness and illness have been the matter of general investigation. As expected, there were more male patients due to the high rate of smoking for males⁹ Regarding educational level, the results show that the majority of the study subjects are Illiterate, read & write. This result agrees with (Agh, et al., 2011) whose

study results indicate that most participants are Illiterate or read & write only¹⁰. Concerning the socio-economic status, most of the study participants are presented with barely sufficient to some extent socio-economic status. This result is in the sane line with (Snider, et al., 2011), whose their results indicate that the majority of study participants' monthly income is barely to some extent¹¹. Concerning residency, the study results indicate that the study subjects are urban residents. This result comes along with (Agh, et al., 2011; Snider, et al., 2011), whose their results indicate that the majority of subjects are urban residents rather than the countryside or in big cities. In addition, these results may come because of the bronchial asthma and chronic obstructive pulmonary disease (COPD), refers to modern scourge of industrial society. Furthermore, the bronchial asthma and COPD, may increase in incidence among persons in urban residential areas compared those in rural areas. Also, those persons in urban residential areas often experience less physical exercise and more psychological stress every day compared with those in rural areas, making them more risky for bronchial asthma and chronic obstructive pulmonary disease (COPD)^{10,11}. Regarding marital status, the study results shows that the majority of the study subjects are married. The result is congruent with cultural values of the Iraq community which encourages young people to get married and form a family.

Regarding occupational status, the results show high percentage of study subjects are Jobless. These results agree with (Nguyen et al., 2010) whose results indicate that the majority study subjects are Jobless.⁹ Finally, the results shows no significant relationship between device using technique and selected socio-demographic characteristics (age, level of education, and duration of use) and that may be due to that all of the sample are of adult patients who are divided on deferent educational levels. That may indicates that patients should be on a continuous learning programs and not limited for the first time only. In addition, lack of specialized department that takes care of patient education regarding this subject may affect efficiency in MDI using technique.

Conclusion

It was observed that majority of patients were unable complete of step Metered-dose Inhalers Technique to use their inhalers correctly.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adult Nursing Department, College of Nursing / University of Thiqr / Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of Midwives' Knowledge in Baghdad Governmental Maternity Hospitals Related to Partograph

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Abstract

Objective: To assess Midwives' Knowledge in laboring theaters and perinatal wards in Baghdad Governmental Maternity Hospitals related to Partograph . A descriptive study was conducted, included (100) midwives from different levels of education who they are working in birth theaters to (5) Maternity Hospitals in Baghdad City, from July 5th, 2017 to November 25th 2017, to assess the level of Midwives' Knowledge in Baghdad Governmental Maternity Hospitals related to Partograph by using interview technique and self-reporting technique (format prepare). A non-probability (purposive) sample of (100) midwives as (20) midwives from each hospital were selected. Questionnaire format was used for data collection. The validity of questionnaire was estimated through a panel of experts related to the field of study, and its reliability was estimated through a pilot study conducted included (10) nurses (excluded from the original sample). Data were analyzed through the application of descriptive and inferential statistical analysis. The study reveals that more than half of midwives (52%) their ages were between (20-29) years old, and (66%) of them were secondary midwifery school graduates. Also the study indicated that half of sample study of midwives had (1-5) years of employment.

Keyword: *Assessment, Midwife, Knowledge, Partograph.*

Introduction

The partograph is a pre-printed paper with a visual/graphical representation of observations made on a woman and fetus during the course of labor. The observations are comprised of the progress of labor, maternal vital signs and fetal heart condition. These observations are displayed on the partograph for easy and quick review of on-going labor and timing of management decisions.¹ The partograph is used as a tool for risk assessment and is effective in detecting abnormal labor during the first stage of labor. When used correctly, and helps to identify problems². Partograph provided health professionals with a pictorial overview of labor progress, maternal and fetal condition to allow early identification and diagnosis of pathological

labor. Its use is critical in preventing maternal and perinatal morbidity and mortality.³ The World Health Organization (WHO) recommends partograph with a 4-hour action line from alert line, denoting the timing of intervention for prolonged labor;. This provides a basis of early recognition of any deviation from the normal. Timely detection of delay in progress of labor at one glance, directs in management of dysfunctional labor. It is basically a graphic representation of events of labor plotted against time in hours⁴. The partograph is inexpensive tool to monitor labor in a cost-effective way, it is a suitable method to use in low income countries to improve the maternity care , serves as an "early warning system" and can assist in early decision making on transfer, augmentation, and termination of labor⁵ Physicians, midwives, nurses, all be involved in caring for the woman as she experiences labor and gives birth. Nurses have both the privilege and responsibility of caring for women during labor and birth in the hospital setting⁶ Midwives caring for women during labor and birth should be knowledgeable about the normal and

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abnormal processes of labor and birth; have a mastery of appropriate technical skills ⁷ Poor knowledge and lack of skills in using partograph, has been cited among possible causes of adverse obstetric outcomes ⁸

Methodology

The study is conducted at five maternity hospitals in Baghdad City, (Al-Elwya Maternity Hospital, Ebn-Albaladi Maternity Hospital, Fatimat alzahra hospital, Al-Karkh Maternity Hospital, and Baghdad Teaching Hospital). The study included (100) midwives, (20) midwives from each hospital who they are working in birth theaters, from July 5th, 2017 to November 25th 2017, to assess the level of Midwives' Knowledge in Baghdad Governmental Maternity Hospitals related to Partograph chart. A questionnaire format was used for data collection. The validity of questionnaire was estimated through a panel of experts related to the field of study, and its reliability was estimated through a pilot study included 10 midwives. A questionnaire format consisted two major parts; the first part is concerned with midwives' socio- demographic characteristics, the second part is concerned with midwives' knowledge concerning partograph⁽⁹⁾. The content validity is estimated through a panel study of experts. Reliability of the questionnaire was estimated through the use of Alpha Cronbach for the test-retest approach. Analysis of data was performed through the application of descriptive statistics (frequency, percentage Cum. Percent, Mean of score (M.S.), and Relative Sufficiency (R.S.)) and inferential statistics (Alpha Cronbach, Reliability Coefficient, Chi Square). The items of nursing documentation were rated on three level Likert scales; know, uncertain, and don't know, and scored as 3, 2 and 1, respectively ⁽¹²⁾. Relative sufficiency (RS) Less than (66.66) was considered low level of knowledge, (66.66- 77.77) was considered pass, (77.78-88.88) was considered moderate, while (88.89- 100) was considered high level of knowledge.

Results and Discussion

Highest percentage (52%) their ages were between (20-29) years old, (54%) of them were single, and (66%) of them were secondary midwifery school graduates. Half of sample study of midwives had (1-5) years of employment. Furthermore, (34 %) of sample had no opportunity to be involved in training sessions related to partograph, while two third of them were not using

partograph. Table (3) demonstrate midwives' knowledge related to the components of partograph, indicate there is a weak in nursing knowledge in (8) items from (17) items, with respect to the total the (MS) and (RS) which was low knowledge (1.98); (65.9%) respectively. Table (4) demonstrate the Overall assessment of midwives' knowledge related to the partograph, which indicate there is low knowledge to midwives, with respect to the total the (MS) and (RS) which was (1.97); (65.7%) respectively. Table 6 indicates that there is a significant association between midwives' knowledge and their Training sessions to the partograph.

Regarding age, more than half of midwives (52%) their ages were between (20-29) years old, while (54%) of them were single. This result is disagree with a study done in Egypt revealed that the majority of nurses and midwives were in the age group less than 30 years ¹³. Regarding to the level of education, the majority (66%) of them were secondary midwifery school graduates. This result is disagree with a study done in Egypt to assess the knowledge, attitude and practice of profession (Nurses / Midwives /Physicians) birth attendants regarding the use of partograph, that the great majority of nurses (92.8%) had nursing diploma ¹⁰. Furthermore, the study indicated that half of sample study of midwives had (1-5) years of employment. Furthermore, (34 %) of sample had no opportunity to be involved in training sessions related to partograph, while about two third of them were not using partograph. This result is agree with a study done in Egypt revealed that only one fifth of them (20.3%) had training courses on and used it ¹⁰

Concerning to the Overall assessment of midwives' knowledge related to the partograph, which indicate there low knowledge to midwives, with respect to the total (MS) and (RS) which was (1.97); (65.7%) respectively. The findings of this study is agree with the study done in Egypt that shows the more than half of physicians (55.9%) had a satisfactory score, while majority of nurses/midwives (91.3%) had an unsatisfactory score. Regarding to total knowledge of about method of recording data on partograph, almost nurses and physicians had an unsatisfactory score of total knowledge (97.1 % and 79.1%) respectively. Overall, majority of nurses/midwives (98.6%) and physicians (82.4%) had unsatisfactory score of total knowledge⁽¹⁰⁾. This result is corresponding with the study done among health care providers in peripheral maternity centers in Nigeria, which revealed low level of utilization and poor knowledge of partograph⁽¹¹⁾.

This result similar to the report of Chisembele and Muiva; Which conducted on 1215 labor records and 81 skilled birth attendants midwives and a few clinical officers, participated in two days' training work-shops, and founded that inadequate knowledge on partograph usage particularly plotting and interpretation, this due to lack in-service training.¹² This result is disagree with the scientific literatures which indicated that whenever there is increase in the number of training sessions there

is an increase in nurses' knowledge and practices.¹³ To found interpretation for this result, the reason may be due to the lack of supervision and surveillance as well as a lack of knowledge of nurses and lack of accountability to them, and lack in-service training. Furthermore, the result of this study found that there is a significant relationship between midwives' knowledge and the number of training sessions . It has been considered that the higher level of educational preparation is the better of knowledge acquired.

Table (1): Assessment of Midwives' knowledge related to the definition and purposes of partograph

No	Standard items (9 items)	N =100					
		Know	Uncertain	I do not know	M S	R S	Severity
		F	F	F			
1	a composite graphical record of key data during labor entered against time on a single sheet of paper.	44	16	40	2.04	68.0	P
2	a tool used to evaluate the active phase of the labor and to assess the status of the mother , fetus during labor	52	9	39	2.13	71.0	P
3	The purpose of using partograph is:						
3-1	It provides complete information about the progress of the first stage of the labor	45	5	50	1.95	65.0	L
3-2	Know the deviation from the normal labor	49	8	43	2.06	68.6	P
3-3	Improvement in maternal morbidity and mortality in the perinatal	44	16	40	2.04	68.0	P
3-4	Help in making an early decision	40	8	52	1.88	62.6	L
3-5	To increase the quality and regularity of all maternal ,fetal notes	42	7	51	1.91	63.6	L
3-6	To find out the problems as soon as possible	32	12	56	1.76	58.6	L
3-7	To find out the cephalo pelvic disproportion, leads to dystosia	29	23	48	1.81	60.3	L
	Total	377	104	419	1.95	65.1	L

Table (2): Midwives' knowledge related to partograph chart components

No	Standard items	N =100					
		Know	Uncertain	I do not know	M S	R S	Severity
		F	F	F			
1	Demographic information	44	16	40	2.04	68.0	P
2	Each box indicates to half an hour	61	33	6	2.55	85.0	M
3	Alert line: Line starts at the cervical dilatation 4 cm to full dilatation at a rate of 1 cm per hour	25	7	68	1.57	52.3	L
4	Action line: parallels to the alert line and 4 hours to the right	60	5	35	2.25	75.0	P
5	Recording starts when the cervical dilatation 4 cm	40	8	52	1.88	62.6	L
6	Infant's heartbeat: records every half hour	22	7	71	1.51	50.3	L
7	amniotic sac: Intact membranes code I, liquid is clear C, Liquid bloody B, meconium M	75	15	10	2.65	88.3	M
8	Molding: Separate bones denoted as (O), The sutures are close(+), overlapping ++, Strongly overlapping +++	61	33	6	2.55	85.0	M
9	Cervical dilatation is recorded as ×	32	8	60	1.72	57.3	L
10	Contractions measured , Dotted: A simple contractions, Slashes: Moderate contractions, Black Box: Strong contractions	38	12	50	1.88	62.6	L
11	Vital signs: Pulse, Blood Pressure, Temperature	63	17	20	2.43	81.0	M
12	Measuring protein, acetone in mothers' urine, volume of urine	54	22	24	2.30	76.6	P
13	Registration the drugs that given to the mother, oxytocin	28	4	68	1.60	53.3	L
14	Recorded if the placenta complete / incomplete	20	15	65	1.55	51.6	L

Table (3): Overall assessment of midwives’ knowledge related to the partograph

No	Standard items (41 items)	N =100					
		Know	Uncertain	I do not know	M S	R S	Severity
		F	F	F			
1	Midwives’ knowledge related to partograph and the purpose of use it	377	104	419	1.95	65.1	L
2	Midwives’ knowledge related to the components of partograph chart	1339	449	1412	1.98	65.9	L
	Total knowledge	1716	553	1831	1.97	65.7	L

Table (4): Association between midwives’ knowledge and their Training sessions of partograph.

Training sessions in nursing documentation		Always	Sometime	Never	Total
None	F	558	159	677	1394
	%				100%
One	F	554	182	576	1312
	%				100%
Two	F	456	154	456	1066
	%				100%
Three and more	F	148	58	122	328
	%				100%
Total	F	1716	553	1831	4100
	%	41.85	13.49	44.66	100%
X ² obs= 21.704 df= 6		X ² crit= 12.592		P> 0.05	

Conclusion

In accordance with the results of this study, the researcher can conclude the following: more than half of midwives (52%) their ages were between (20-29) years old, (54%) of them were single, and (66%) of them were secondary midwifery school graduates. and the study indicated that half of sample study of midwives had (1–5) years of employment. Furthermore, (34 %) of sample had no opportunity to be involved in training sessions related to partograph, while two third of them were not using partograph. Concerning to the level of midwives’ knowledge related to partograph birth chart, the results of this study indicate that, their knowledge as

generally was poor (in adequate and weak). There was a significant association between midwives’ knowledge and their Training sessions to the partograph.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Nursing Technology Department, Medical Technical Institute/ Baghdad, Middle Technical University, Baghdad and all experiments were carried out in accordance with approved guidelines.

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Assessment of Secondary Prevention Regarding Dietary Pattern for Patient with Coronary Artery Disease at Al-Nasiriya Heart Center

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Abstract

The study aimed to assessment of secondary Prevention for Patient with coronary artery disease toward dietary pattern. A purposive (non-probability) sample of (100) patients. The study population consisted of a sample of adults from both genders whose ages were 30 years and more, and were newly diagnosed as having CAD by coronary angiography in the cardiac catheterization unit An Nasiriyah heart center. Reliability of the questionnaire form was determined through a pilot study while the content validity of the questionnaire was determined through a panel of experts. And then the Data were collected through the use of the observational tool (questionnaire), which was analyzed through the use of three statistical approaches. They are descriptive statistical analysis (frequencies, percentage, S.D, range of scores, mean of scores and relative sufficiency; inferential statistical analysis (correlation coefficient and chi- square test); and analysis of variance (ANOVA). There is an awareness and commitment towards relatively healthy intake of food except red meat. On the basis of the results of the study, the researcher recommends to conducting educational programs targeting patients and their families about coronary artery disease (severity and risk factors of disease, how the patient can control himself to avoid complications.

Keywords: Effectiveness, Education Program, Patients Compliance, Dietary Regimen.

Introduction

Cardiovascular disease (CVD) is now one of most dominant reason of death in the world. In the nineteenth century, malnutrition and infectious diseases were the causes of greatest deaths and morbidities. Today, CVD accounts for approximately 30% of totally deaths in over 35 years old. According to statistical data at 2008 of mortality, more than 2200 Americans die of CVD every day¹. Cardiovascular disease is the primary reason of death in various developed countries. In 2000, CVD is accountable for more than 1.9 million of death in the European Union, 4.35 million deaths in Europe, responsible for 43% of all deaths in male and 55% of all deaths in female. Cardiovascular disease is

developing and has become the leading reason of death in developing countries². Coronary heart disease is the single leading cause of death in the United States. Cardiovascular diseases are responsible for the lives of 41.4 % of more than 2.3 million Americans who die each year. Nearly 59 million Americans have some form of cardiovascular disease, ranging from congenital heart defects to high blood pressure and atherosclerosis.³ Cardiovascular disease is the common cause of death. Some of the risk factors for heart disease include smoking, high blood pressure, high cholesterol, diabetes and obesity. An additional heart disease risk factors include lack of exercise, an unhealthy diet and stress. The major form of cardiovascular disease is coronary artery disease, manifested by myocardial disease, angina pectoris and sudden cardiac death⁴. Adopting a healthy lifestyle pattern with balanced healthy eating pattern can lower cholesterol, lead increase secondary prevention of CAD⁵. One of the ways to do this is to reduce the amount of saturated fats, salts, and meats consumed.

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American heart association (AHA) guidelines mandate that individuals must have a healthy dietary pattern from all major food groups, maintain a healthy body weight, limit intake of cholesterol raising saturated fats acid and salt⁶. Result of studies have established the benefits of treatment, such as food style modification programs, at reducing level of cholesterol in secondary prevention of CAD 4. Food style modification programs are an integral part of any cardiac rehabilitation program. It increases physical activity, heart functioning, and psychosocial well-being⁷.

Material and Method

Design of the Study: a descriptive study was carried out to assessment of secondary prevention toward dietary pattern for patients with coronary artery disease in An Nasiriyah city. Data collection started from 24th of March to the 6th of May 2017.

Setting of the Study :the study was conducted at cardiac outpatient clinics in in an Nasiriyah city.; one of these clinics is located in the in An Nasiriyah heart center.

The Sample of the Study :A non-probability (purposive) sample of (100) patients was selected. All the patients who diagnosed CAD and they had a medical records and admitted to the Coronary Care Units & cardiac wards An Nasiriyah Heart Center

The Study Instruments :for the purpose of the present study, a questionnaire was constructed by the researcher to study the variable for assessment of secondary prevention for patient with coronary artery disease toward dietary pattern according to medical recommendation. The questionnaire was constructed thorough reviewing of previous literature and related studies for secondary prevention for patient with coronary artery disease toward dietary pattern . The study instrument comprised of (3) parts these parts related to the following:

Part I: Socio- Demographic Data: It consists of (8) items, related to the Socio-demographic characteristics of these patients which include age, gender, diagnosis occupational status, level of education , marital status , monthly income , and residential area.

Part II: Past History: Chronic Diseases (hypertension, diabetes mellitus and others), family history which includes (high blood pressure, diabetes

mellitus, and heart disease).

Part II: Assessment of Secondary Prevention Toward Dietary Pattern

This part was measured through (6) items of food style (vegetables (1 item), fruit(1 item), high-fiber cereals(1 item), red meat(1 tem) such as (beef, lamb), white meat (1tems) such as (fish meat, chicken meat) and dairy (1 items) such as (milk, cream, and butter). All these items were rated and scored by six level types option scale as (take < 1time / week) (0), once a week (1), 2-3 time per week (2), 4-6 time per week (3), ones a day(4), twice or more time a day(5), except the red meat and dairy was rated and scored as (take < 1 time / week) (5), ones a week (4), 2-3 time per week (3), 4-6 time per week (2), once a day(1), twice time or more a day(0). The high score of food style domain obtained, it means higher modification by patients.

Six rating scale were used as follows:

$$= \frac{\text{cut of point}}{\text{no. of scale}} \times 100 = \frac{\text{cut of point}}{\text{no. of scale}} \times 100$$

$$= \frac{2.5}{6} \times 100 = \frac{2.5}{6} \times 100 = 41.67$$

So the interval had been ranged, between (41.67-100) that, represented the rate of the lifestyle modification

$$= \frac{100-41.66}{6} = 9.723$$

$$= \frac{100-41.66}{6} = 9.723$$

Suggestion was made for classifying the early stated interval for food habit into main categories as follows:

$$41.66 + 9.723 = 51.383$$

(41.67 – 51.383) is very low level

(51.384 – 61.106) is low level

(61.107 – 70.829) is moderate level

(70.830 – 80.552) is high moderate level

(80.553 – 90.275) is high level

(90.275 – 100) is very high level

In addition less than 41.66 is no effect

Data Collection: The data has been collected through the utilization of the developed questionnaire

after the validity and reliability are estimated, and by means of structured interview technique with the subjects who are individually interviewed.

Conducting Pilot Study: Before starting the data collection, a pilot study was conducted on (10) patients who have coronary artery disease for the following purposes

Determine the reliability of the questionnaire
 .Estimate the time required for the data collection
 .Obtain the clarity and the content adequacy of the questionnaire and observation
 Identify the barriers that may be encountered during the data collection process.

Validity: The validity of the instrument was established through a panel of (12) experts. who had more than five years' experience in their fields in order to achieve study objectives.

Reliability: results of the reliability showed very high level of stability and internal consistency of principle parts concerning item's responses' of the questionnaire, all those were calculated by using the major statistical parameter: Alpha Cronbach, revealed that the person correlation coefficient is (0.73).

Statistical Analysis: The data analyzed through the application of statistical procedures and using the package of SPSS version (20).

Results and Discussion

The high percentage (26%) of patients ages from (65 years old and more). Most of them (78.0 %) were male. The education level represents (71%) of CAD were low educated (27.0%, 23%, and 21%) of patients were from primary school graduate, illiterate, and read and write respectively. Most of them (84.0%) were married, and (30.0%) were unemployed. The table also shows that a high percentage (40.0%) of sample their monthly income were insufficient, (73%) of patients were living in Rural, and (27.0%) live in Urban. Regarding to smoking and drinking, (53.0%) of CAD patients were smoker ,(28.0%) smoke currently, (25.0%) previous smoking , and (47.0%) not smoke cigarette, while (100%) of patient never drink alcohol.

The result in table (1) shows that, (46%) of the study sample have hypertension, (28%) have hypertension alone and (22%) of the sample had hypertension and diabetes mellitus to gather, while (34%)of study sample have diabetes mellitus, (12%)alone and 22% with hypertension. Regarding to family history of disease, found 15% of sample family had heart disease. From the data analysis of the study sample , table (2) shows the moderate relative sufficiency of the food type eating by the patients was (fiber cereals) and the low and very low relative sufficiency were red meat, vegetables and fruit .While the white meat and dairy products were not affected. Regarding to food style score the table (3), shows that there is no statistical significant difference between angina and MI patients. ($P \leq 0.05$). Through the data analysis of demographic variables, the present study reported that the CAD patients age is the range between (less than 45 years to 65 years and more) and the high percentage of their age is (65 years and more) which accounts for 26 (26 %). Most of the sample are male 78 (78%), 27 (27%) graduate from primary school. Most of the patients, 84 (84%) were married. And highest percentage 30 (30%) of the patients were an employee. The findings of data analysis that are shown in table (1), the present study reported that the MI patients age is the range between (less than 45 years to 65 years and more) and the high percentage of their age is (60 years and more). Most of the sample are male , highest percentage graduate from primary school. Most of the patients were married. And highest percentage of the patients were an employee. Regarding the family income the result indicated of MI patient their income is Barely Sufficient and majority of them were living in Rural. Regarding the family income the result indicated that (40.0%) of CAD patient their income is insufficient and majority (73(73.0%) of them were living in Rural. (Table 1).

These results agree with results obtained from a study done by (Smyth, 2018) which indicated the highest percentages of the sample (52.3%) were noticed among the age group 60 years and more, and the highest percentage (76.2%) of patients are male, and (23.8%) were female .The highest percentage (52.3%) was low educational level, (58.5%) were unemployed, (44.6%) low monthly income⁸.

Table (1) Distribution of CAD Patients according to their Clinical Characteristics n= 100

Variables	Groups	F	%
Chronic diseases	Hypertension	24	24.0
	Diabetes Mellitus	12	12.0
	High BP & DM	22	22.0
	No Past Medical History	42	42.0
Family history of disease	Hypertension	5	5.0
	Diabetes	6	6.0
	Heart diseases	15	15.0
	No	71	71.0
	High BP & DM	3	3.0
Age of disease onset (years)	<45	9	9.0
	45--49	19	19.0
	50--54	20	20.0
	55--59	14	14.0
	60--64	22	22.0
	=>65years	16	16.0
Frequency of occurrence of disease	Once times	30	30.0
	Twice times	17	17.0
	Three times	23	23.0
	Four times	4	4.0
	Five times & more	26	26.0

Table (2) Assessment of Food Style of CAD Patients according to Mean of Scores and Relative Sufficiency for Cutoff Point

Items	Less than 1 /week No(%)	1/week No(%)	2-3 / week No(%)	4-6 / week No(%)	Once/ day No(%)	Twice or more/ day No(%)	M .S	R.S	Level of score
Vegetables	17(17)	5(5)	5(5)	14(14)	46(46)	13(13)	3.06	51	Very low
Fruit	5(5)	11(11)	25(25)	33(33)	16(16)	10(10)	2.74	45	Very low
High fiber cereals	1(1)	1(1)	3(3)	6(6)	8(8)	81(18)	4.62	77	Moderate
Red meat	29(29)	30(30)	23(23)	12(12)	5(5)	1(1)	3.63	60	Low
White meat	5(5)	29(29)	39(39)	23(29)	4(4)	0	1.92	32	No effect
Dairy products	4(4)	6(6)	11(11)	28(28)	46(46)	5(5)	1.79	29.8	No effect

Table (3) Comparison of Food Style Score of Patients according to Disease Diagnosis and Degree of Correlation Significant

Items	Variables	Angina		MI		P-value
		No	%	No	%	
Food style score	Bad	0	0.0	1	1.81	0.650 NS
	Moderate	36	80.0	44	80.0	
	Good	9	20.0	10	18.18	

Conclusions

High percentage (55%) of the study sample have myocardial infarction. The advancing age of the patients (50 years & more) is one of the most common non-modifiable risk factors . Most of the patients 78(78 %) were male .The majority of the patients 84 (84 %) were married. Lower educated patients have a higher risk to develop coronary arteries disease than the Higher educated patients . High percentage (30%) of patients were Unemployed. The result of the present study indicates that most of the patients (40%) were suffering from Insufficient income . The result of the present study indicates that the majority of the patients (78%) were living in rural . There is an awareness and commitment towards relatively healthy intake of food except red meat. There were no statistically significant differences between food style with all socio-demographic characteristic except the patients age and monthly income. p-value (P ≤ 0.05.)

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adult Nursing Department, College of Nursing / University of Thiqr / Iraq and all experiments were carried out in accordance with approved guidelines.

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Determination of Hormone Concentrations in Rats Treated with *Myrtus Communis* Extracts

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Abstract

The study of effects of *Myrtus communis* extracts on rat hormones such as TSH, T3, T4 and Testosterone after serial period times of injection with various concentrations. In general the results showed that there are increase in all of studied hormones (TSH, T3, T4 and Testosterone), and this increasing in the hormones level was greatest with the long time period after injection with *Myrtus communis* extracts and the greatest increasing was recorded in the 15 days after injected with plant extracts, in other view the present study revealed that the highly concentration 1000mg/kg was gave a highly effects on the hormones concentration followed by 750 and then 500 mg/kg. According to statistical analysis, the results illustrate that there are statistical differences between concentrations of all hormones in the studied period times depending on extract concentrations. $P < 0.05$.

Key words: TSH, T3, T4 and Testosterone, rats, *Myrtus communis*

Introduction

Myrtus, with the common name myrtle¹, is a genus of flowering plants in the family Myrtaceae, described by Linnaeus in 1753. *Myrtus communis* L. (Myrtaceae), myrtle, is an evergreen shrub with strong antibacterial, antiinflammatory, antihyperglycemic and antioxidant activities. Also, it is used as a sedative-hypnotic plant in Iranian traditional medicine. *Myrtus communis*, the common myrtle or true myrtle, is native across the northern Mediterranean region (especially in the islands of Sardinia and Corsica, where it is locally known by the name of murta)². The plant is an ever green shrub or small tree, growing to 5 metres (16 ft) tall³. The leaf is entire, 3– 5 cm long, with a fragrant oil⁴. The star-like flower has five petals and sepals, and numerous stamens⁵. Petals usually are white. The flower is pollinated by insects. The fruit is a round berry containing several seeds, most commonly blue-black in colour. A variety with yellow-amber berries is also present. The seeds are

dispersed by birds that eat the berries. It is a traditional medicinal plant for the Tuareg people. Several botanists do not consider *Myrtus nivellei* sufficiently distinct to be treated as a separate species. It is listed as an endangered species⁶⁻⁸. *Myrtus communis*, the Common Myrtle, is widely cultivated as an ornamental plant for use as a shrub in gardens and parks⁹⁻¹¹. It is often used as a hedge plant, with its small leaves shearing cleanly. When trimmed less frequently, it has numerous flowers in late summer. It requires a long hot summer to produce its flowers¹²⁻¹⁷. *M. communis* contained 1, 8-Cineole (28.62%), α -Pinene (17.8%), Linalool (17.55%), and Geranylacetate (6.3%) as the major compounds and Geraniol (1.6%), α -Humulene (1.5%), eugenol (1.3%), isobutyl-isobutyrate (0.8%), and methyl chavicol (0.5%) as minor components. Chlorhexidine had the lowest MIC value among all medicaments tested. *M. communis* oil had less MIC values than NaOCl against both bacteria, but it had more MIC value against *C. albicans*¹⁸⁻²¹. It is believed that the main biologically active components in this herb are semimyrtucommulone, 1,8-cineole, arepolyphenols, α -pinene, myrtucommulone, myrtenyl acetate, limonene, linalool and α -terpinolene⁵. Various parts of this herb such as its berries, leaves and fruits have been used extensively as a traditional medicine for a number of centuries. The herb is used traditionally

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for the therapy of disorders such as hemorrhoid, inflammation, diarrhea, peptic ulcer, skin diseases and pulmonary⁶. It is well known for its therapeutic values as an antiseptic, disinfectant drug and hypoglycaemic agent⁷. The experimental and clinical studies demonstrate that it has a wide range of pharmaceutical and health effects such as anti-bacterial⁸, antioxidant⁹, anti-cancer¹⁰, antidiabetic¹¹, anti-viral, anti-fungal¹², neuroprotective and hepatoprotective¹³ activity. The protective effect of the myrtle berry seed aqueous extract (MBSAE) against esophageal reflux (ER)-induced damage in esophagus mucosa as well as the mechanisms implicated was determined. The results showed, also, that the ER was accompanied by a state of oxidative stress as assessed by an increase of lipid peroxidation, a decrease of the sulphhydryl groups and glutathione levels, as well as antioxidant enzyme activities depletion. It suggest that MBSAE exerted a potential protective effect against ER-induced damage in rat esophagus, at least in part, due to its antioxidant properties⁹. The effect of different quality RWs on physiological and biochemical parameters and the recovery capacity in *Myrtus communis* L. plants was evaluated. The highest salinity levels produced oxidative stress, as seen from the rise in electrolyte leakage and lipid peroxidation. The use of regenerated water together with carefully managed drainage practices, which avoid the accumulation of salt by the substrate, will provide economic and environmental benefits¹⁷. Antioxidant activities of *Myrtus communis* leaf phenolic compounds (McPCs) were investigated on 2,2'-9-azino-bis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS(+)) •. it showed that no synergic or additive effect between α -tocopherol and myrtle extracts or caffeic acid in α -tocopherol-enriched phospholipid/BS dispersion, but myricitrin showed an additive effect and thus promoted the total antioxidant activity. These data showed that myrtle extract could be used as potential natural antioxidants, food stabilizers, or natural health products. besides, myrtle extract may be a source of natural antioxidants to counteract phospholipid peroxidation as well as α -tocopherol³². Essential oils (EOs) from several individuals of *Myrtus communis* L. (*M. communis*) growing in different habitats in Sardinia have been studied. Principal component analysis applied to the chromatographic data confirm a differentiation and classification of EOs from the four groups of *M. communis* plants. Finally, antioxidant activity of the studied EOs shows differences between the various categories of samples⁵. A selected lactic acid bacterium

for increasing the antioxidant features of myrtle berries was used, with the perspective of producing a functional ingredient, dietary supplement or pharmaceutical preparation. No health hazards or side effects are known with the proper administration of designated therapeutic dosages. In rare cases, internal administration of myrtle oil as a drug leads to nausea, vomiting and diarrhoea. Preparations containing volatile oil should not be applied to the faces of infants or small children because of the possibility of triggering glottal spasm, asthma like attacks or even respiratory failure. Overdoses of myrtle oil (more than 10 g) can lead to life threatening poisoning, due to high cineole content. Symptoms include decrease in or loss of blood pressure, circulatory disorders, collapse and respiratory failure²³.

Materials and Method

Laboratory animals

All experiments were performed on 100 albino Rats (male), their ages ranged between 1-2 months with a body weight ranged between 200-225 g. Rats were obtained from animal house of National Center for Drug Control and Researches, Ministry of Health.

Male rats were kept in a room supplied with air conditioner to keep the temperature between (18-24°C), the air of the room was changed continuously by using ventilating fan and light was controlled with range of 12 hours of light and 12 hours of darkness. The Animals were housed in plastic cages (4 rats/cage) with a wire grid covers, supported on ventilated racks.

Hormone kits

The kits used in this study for estimation of TSH, T3, T4 and Testosterone concentrations were supplied by Spectrum co., Netherlands, and the determination of hormone concentrations would done according to supplied company

The plant (*Myrtus communis*)

dried *Myrtus communis* leaves have been prepared

Alcohol extraction

Dry leaves of *Myrtus communis* were put about 50 gm in containers extraction thimbles located in soxhlet extractor then added 500 ml of ethyl alcohol (70%) to the powder and continued recovery for (24) hours and then took the extraction and put in the electric oven with

degree of (40) °C .

The stock solution was prepared by dissolving 15g. of dry extract and in 100ml of alcohol ethanol , therefore the concentration of the stock solution (150 mg / ml) . It was prepared several concentrations involving (500,750 and 1000) mg/kg of body weight .

Experimental Design

The experimental procedure included administrate the rat with different doses of myrtus as follows :60 rats randomly distributed into five groups as follows:

1st group :This group included 12 rats were given only water and pellet was considered as negative control animals , this group also considered control to the second experiment .

2nd group :This group included 12 rats were injected with ethanol subcutaneously twice a week considered as positive control animals .

3rd group : This group included 12 rats were subdivided into 3 subgroups, the 1st was injected myrtus dose of (500 mg/kg of body weight twice a week) for 5 days, the 2nd was injected the same dose for 10 days, and the 3rd was injected the same dose for 15 days.

4th group : This group included 12 rats were subdivided into 3 subgroups, the 1st was injected myrtus dose of (750 mg/kg of body weight twice a week) for 5 days, the 2nd was injected the same dose for 10 days, and the 3rd was injected the same dose for 15 days.

5th group : This group included 12 rats were subdivided in to 3 subgroups, the 1st was injected myrtus dose of (1000 mg/kg of body weight twice a week) for 5 days, the 2nd was injected the same dose for 10 days, and the 3rd was injected the same dose for 15 days.

Collection of blood samples :

Blood was collected from all rat groups (experimental and control) by heart puncture using (3 , 5 ml) disposable syringes, the blood allowed to clot for 30 minutes to be coagulated, serum was separated using centrifuge for 20 minutes at 5000 r/min, obtained sera were frozen in a deep freezer (-20°C) until used for necessary tests.

Statistical Analysis

Results were analyzed using the test T. test use of less significant difference (least significant differences) (LSD) at the level of significance ($P \leq 0.05$, $P \leq 0.01$ and $P \leq 0.001$) to show moral results.

Results and Discussion

In general- the results showed that there are increased in all of studied hormones. (TSH, T3 , T4 and Testosterone) , and this increasing in the hormones level was greatest with the long time period after injection with various concentrations of myrtus extracts and the greatest deceasing was recorded in the 15 days after injected with plant extracts , in other view the present study revealed that the highly concentration 1000mg/kg was gave a highly effects on the hormones concentration followed by 750 and then 500 mg/kg. According to statistical analysis , the results illustrate that there are statistical differences between concentrations of the hormones in the studied period times and depending on extract concentrations. $P < 0.05$. The results of these findings are show in the (Tables 1,2,3,4). Myrtus contain both ascorbic acid and flavonoids that could have contributed to an increase in HDL and Triglycerides concentrations, the mechanisms by which flavonoids elevate plasma HDL cholesterol concentrations remains unclear .^{17,18} One hypothesis is that increase the expression and myrtus causes production of apolipoprotein A1 , the major protein component of HDL , has a role in increasing HDL cholesterol¹⁹. Flavonoids may increase the activity of lecithin acyl transferase (LCAT) which plays an important role in the convert of free cholesterol into HDL, causing an increase in the serum HDL concentration . Other study fed pellet containing 2 % myrtus leaves for 10 weeks to Male and female rabbits causes decline in cholesterol level and increase HDL and triglycerides level , was supported by ^{9,17} myrtus contain saponin be insoluble complexes with cholesterol in the intestinal cavity, which inhibits the re-absorption and thereby increased its transformation in the liver to the new yellow acids . And thus lead to a decline in the level of cholesterol in the blood and increase in HDL and triglycerides .²⁰

Table : 1 .The concentrations of TSH in the male rat blood after serial period times of injection with various concentrations of myrtus extract. P<0.05

TSH				
Concentration	Control	5 Days	10days	15days
500 mg/kg	0.238	0.447	0.727	1.265
750 mg/kg	0.239	0.518	0.927	1.285
1000 mg/kg	0.242	0.568	1.270	2.268

Table : 2 . the concentration of Testosterone in the male rat blood after serial period times of injection with various concentrations of myrtus extract. P<0.05

TESTOSTERON				
Concentration	Control	5 Days	10days	15days
500 mg/kg	0.894	0.906	1.040	1.548
750 mg/kg	0.908	1.111	1.629	1.940
1000 mg/kg	0.892	1.610	2.331	2.838

Table : 3. the concentrations of T3 in the male rat blood after serial period times of injection with various concentrations of myrtus extract. P<0.05

T3				
Concentration	Control	5 Days	10days	15days
500 mg/kg	1.401	1.666	1.992	2.236
750 mg/kg	1.454	1.806	2.334	2.628
1000 mg/kg	1.408	1.957	2.893	3.244

Table : 4 . the concentrations of T4 in the male rat blood after serial period times of injection with various concentrations of myrtus extract. P<0.05

T4				
Concentration	Control	5 Days	10days	15days
500 mg/kg	4.941	5.271	5.709	5.941
750 mg/kg	4.944	5.661	5.910	6.597
1000 mg/kg	4.942	5.773	6.211	6.922

Conclusion

The results showed that there are increase in all of studied hormones (TSH, T3, T4 and Testosterone), and this increasing in the hormones level was greatest with the long time period after injection with *Myrtus communis* extracts and the greatest increasing was recorded in the 15 days after injected with plant extracts, in other view the present study revealed that the highly concentration 1000mg/kg was gave a highly effects on the hormones concentration followed by 750 and then 500 mg/kg. According to statistical analysis, the results illustrate that there are statistical differences between concentrations of all hormones in the studied period times depending on extract concentrations. $P < 0.05$.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of anatomy and histology -College of medicine –university of Babylon and all experiments were carried out in accordance with approved guidelines.

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Identification of Biometrics based on a Classical Mathematical Methods in Forensic Medicine

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Abstract

Biometrics is one of the branches of artificial intelligence as well as one of the most important criteria used to identify and categorize people's identity. It has extensive uses and branches and important, and recently introduced the techniques of intelligence in the forensic medicine, which took all aspects of forensic medicine, for example medical examination and causes leading to death, as well as the identification of bodies is one of the important sections and effective role in forensic medicine. One of the most commonly used identification methods is facial recognition. Biometrics were carried out through a series of sequential steps. On the basis of which the database was extracted, and the preliminary treatment was done on the images based on the Kapoor sports candidate. The most important features were also extracted. The working stages included two methods: First, the traditional mathematical method using linear (KLT) and nonlinear (KPCA) method. Second: the smart method, using the algorithm (CS), the results were the best ever. With the highest acceptance rate reaching (98.25%). Data training and testing were carried out through the implementation of the (MATLAB-2015) program because of its flexibility and speed of implementation.

Keywords: *Biometrics, Feature Extraction, Gabor Filter, Kernel Technology, Karhunen-Lo`eve Transformation, Kernel Principle Component Analysis, Cuckoo Algorithm.*

Introduction

With the increase of biometric identification systems and their development, and therefore the need to identify and distinguish people falls within the security and integrity of the system and enhance its capabilities. [9] And how to benefit from it in the working life. Studying the methods of processing biometric images. And to know the possibility of extracting features and how to employ them in identifying people. In addition to the methods used to distinguish biometric systems, in terms of definition of these methods and how to work on biometric data. [12]

Forensic medicine is one of the most important branches of biometric systems related to people. The

term forensic medicine is a compound word of medicine and justice where medicine means: a reference to all that is scientific and fair: the word justice refers to laws and regulations. More specifically, the study of medicine deals with everything related to the human body, alive or dead. [28]

In recent decades, biometric systems have been developed using the techniques of intelligence, which are considered the most important requirements of life at the present time in how to classify people or their definition based on their biometric properties [8]. The identification of bodies with the use of artificial techniques has become an important aspect of forensic medicine. [29]

A biometric system is a pattern recognition system that uses biometric characteristics to identify individuals. [20] Biometric properties can be divided into two groups in terms of physiological characteristics such as the face, DNA. And identifies what you produce to patterns of behavior called behavioral characteristics,

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such as written signature. [12]

The basic idea of the process of extraction of biometric features through stages, where the first phase includes the sensor that extracts biometric information and the composition of training data according to the biometric characteristic chosen for the definition procedure, and then followed by some mathematical operations for the purpose of composition of what is known as the template through the training or registration of data. [9]

The identification process requires two basic conditions: [27]

1. **Identification.** Is acceptance if the person is in the database. And the rejection if not

2. **Verification** of identity. At this stage, reference templates from biometric samples entered and stored in the database are extracted as templates. [12]

Preprocessing

Is one of the important stages in which the image is examined. The initial processing steps are the possibility of taking and improving the image through the use of optimization techniques and taking advantage of the characteristics of the image when viewed and analyzed. [14] Image processing has played an important role in many applications, whether medical, security, law enforcement, etc. Gabor filters are one of the best filters in primary processing. [11]

Gabor filter

Gabor filters apply to simulate human brain abilities in the recognition process. And it is a set of waves, where each wave of energy is picked up at a given frequency and direction. Gabor's retinal functions are similar in decomposed images to many clean filtered images, each of which has a varying intensity on a narrow range of frequencies and directions. [3] Gabor filters are used in many image analysis applications such as face recognition, image retrieval, etc. [7]

Feature Extraction (FE)

The main idea is to extract features to selection of the best set of biometric features to eliminate unnecessary and repetitive features to reduce dimensions shown in Figure (1). And the work of extracting features is to reduce the dimension of the sample area, which is

the most important goals, so the extraction will lead to savings in memory and consumption in less time. Its second objective is that it also alleviates the worst effects of the so-called dimensional curse. [25]

Karhunen-Loève Transformation (KLT)

Is a widely used technique for reducing dimensions and data compression, in terms of visualizing data and extracting features. It is also an unsupervised method. [10]

The main idea of the (KLT) method is to convert a number of associated variables into fewer non-interrelated variables. (KLT) is expressed as the orthogonal projection of a set of data points on a linear area of lesser dimensions, known as the main subfield, so that the contrast in the projected data is amplified. [15] The aim of projection is to highlight the data points in the new dimensions space, so that the variance in the expected data points is maximized with minimal global loss. [17]

Kernel principle component analysis (KPCA)

The (KPCA) method is based on the conversion of data from primary space to a new space with greater distance through a non-linear application. [19] (KPCA) is a scalable solution through a simple function of the kernel, which essentially builds a non-linear scheme that is from the input area to the feature space. Therefore, (KPCA) performs nonlinear (KLT) in the input area. [24]

The idea is to take advantage of the kernel by making a non-linear copy or by forming a non-linear extension of the written data so that the data could be handled freely. [13] One of the most common uses of nonlinear methods of analysis is the (KPCA). [6] More recently, kernel alignment has been applied to pattern recognition and feature selection. [1] Because it provides an effective way for a non-linear model by mapping from a low-dimensional data entry area to a high-dimensional space. [21] The data is separated from two categories that cannot be separated both in linear by placing them in a larger dimension space that is made up of (hyperplane). [22] Kernel is being a huge shortcut with the enormous ability to quote the required data. This property is called a kernel trick. [18] One of the main reasons for using (KPCA) is the fact that it adds a nonlinear attribute. [26]

Intelligent algorithm

The Cuckoo search algorithm (CS) is one of the most important discovery algorithms inspired by nature, developed in 2009 by Shen-Yang of Cambridge University. The brood snooping is based on some cuckoo species.

Cuckoo birds have an aggressive strategy of reproduction where some species, such as pubic and grouper, lay their eggs in community nests by removing eggs from others to increase the possibility of hatching their eggs. A large number of these species engage in incubation by laying their eggs in the nests of other host birds, which are often other species. [4]

We can use the following three ideal rules:

Each cuckoo puts one egg at a time.

The best nests are transported with high quality eggs to future generations;

The number of available host nestlings can be determined in terms of the detection of the egg that the cuckoo has been placed by host birds with probability. In this case, the host bird is disposing of the egg, or simply abandoning the nest and building a whole new nest. [5]

Algorithm of Cuckoo Search

BEGAN

Input: Matrix.

Outputs: Best Solutions.

START

Insert the matrix with a capacity (N × N) representing the nest.

Determine the number of required features (SF).

Select the Fit function.

Set a counter for iteration = 0.

Generate initial nests from random selection of the row and column of the original matrix.

If (fitt < Fit) replace (fitt) with the new solution.

Choose the best high quality nests for eggs $(x_j^{(t+1)})$ from equation

$$x_j^{(t+1)} = x(t)_j + a \oplus Levy(\beta) \dots (1)$$

The part (pa) of the worst nests is abandoned and new nestlings are built.

Arrange solutions and find the best current solutions.

Pass the best current solutions for the next generation.

Wait until the termination criteria are met.

End

The Proposed Method

In this work, two methods were used to identify people after initial processing using Gabor filter. The first method, the traditional method, included the use of two mathematical algorithms, the first linear algorithm (KLT) and the second nonlinear (KPCA) algorithm for the extraction of features, the real image data has an (ORAL) database of facial images.

The third proposed method involves the hybridization of mathematical algorithm after the preprocessing using Gabor and after extract features using the (KPCA) algorithm. The new addition is the use of Cuckoo search algorithms to effectively and Test reduce and select the number of attributes in specific scope, on the same database. To compute the result, the distance is used. After calculating the similarity matrix, the results are evaluated and displayed. The (U) scale is used to determine the ratio discrimination of the algorithms used. Where (U) represents the number of features selected. The following algorithms are used:

The First algorithm (KLT)

Using (KLT) to extract features on the training data. Followed by a projection on the test data. [15, 17]The discrimination ratio is measured by the variable (U) as shown in Figure (3.a).

Karhunen-Lo`eve Transformation algorithm (KLT)

Step 1: Insert facial image collection data training from base (Oral), the face images is a two-

dimensional matrix with dimensions (N × M).

$$I = [A_{ij}]_{N \times M}$$

$$i = 1, 2, \dots, n$$

$$j = 1, 2, \dots, m$$

(i) Number of rows in the face image matrix

(j) Number of columns in the face image matrix

(N) The number of people.

(M) Number of images per person.

Step 2: Transform each face image in the training group into a vector with dimensions (ij × 1).

Step 3: Create a binary matrix R = [X₁, X₂, X₃, ..., X_M], with dimensions (N × M) that contain all the faces images that have been used in training,

Where a matrix (R) containing vectors is equal to the number of the face images (M), each column within a matrix (X_b) represents a vector of the face image (i) from the training group, the number of rows in the training group (R) is equal to the length of the vector i.e. (N=i × j).

Step 4: Calculate the face vector rate, with dimensions (ij × 1). (Image that represents the rate of all facial images used in training), through the following equation:

$$\phi = \frac{1}{M} \sum_b^M X_b \quad \dots (2)$$

Step 5: Subtract the face vector rate from each vector of faces vectors in the matrix (R), by applying the equation:

$$P_b = X_b - \varphi \quad \dots (3)$$

$$b = 1, 2, \dots, M$$

The resulting is a binary matrix (A), with dimensions (N× M), where each column (b) represents a vector. Resulting from the previous steps

$$A=[P_1, P_2, P_3, \dots, P_M].$$

Step 6: Calculate the Contrast Matrix (S), which have dimensions (ij× ij), of the equation:

$$S = A . A^T \quad \dots (4)$$

Step 7: Use training face images for large dimensional (i× j), when converting to unilateral vectors, they will also have large (ij× 1) dimensions, which will result in a very large contrast matrix (ij× ij), where you need a large memory when calculating them and to create complex calculations because of the huge amount of data.

Therefore, the intrinsic vector of the variance matrix is obtained (ij× ij),

Through the calculation of the **Eigen vector** of the variance matrix which is called (Y), which are of dimensions (M×M).

$$Y = A^T . A \quad \dots (5)$$

The **Eigen values** (e_b) and the **Eigen vector** (v_b) of the variance matrix (Y) are calculated.

Which achieves the equation:

$$Y . v_b = e_b . v_b \quad \dots (6)$$

They is compensate (Y) by equation (4):

$$A^T . A . v_b = e_b . v_b \quad \dots (7)$$

Multiply the two ends of the equation by (A), it produces:

$$A.A^T.A.v_b = A.e_b.v_b \quad \dots (8)$$

$$A.A^T.A.v_b = e_b.A.v_b \quad \dots (9)$$

They is compensate (S) by equation (3):

$$S.A.v_b = e_b.A.v_b \quad \dots (10)$$

Compensation for ($A.v_b$) with the variable (U_b), it produces the following equation:

$$S.U_b = e_b.U_b \quad \dots (11)$$

Of the equation (10), we can infer that (U_b) they are **Eigen vectors** of the matrix (S) which were derived from the **Eigen vectors** of the matrix (Y).

Step 8: The **Eigen vectors** arrangement (U_b) of the variance matrix (S), a descending order based on its **Eigen values**.

Step 9: Take (d) the **Eigen vectors** with the highest values, and find the weight vectors of each face image used in the training by dropping each of them on the **Eigen vectors** by the following equation:

$$W_b = U_b^T.P \quad \dots (12)$$

Where

(P) Represents a face image after subtracting the modified face.

$i=1, 2, \dots, d.$

After applying the equation (11), on all images of the faces used in training, the resulting will be each image will be represented by the weight vector $[W_1, W_2, \dots, W_d]$, Contains a number of values equal to the number of **Eigen vectors** and stored in the database (d).

The test phase involves the insertion of facial images to be classified with dimensions $(i \times j)$, and turned into a vector with dimensions $(ij \times 1)$, and then subtract from the face the rate calculated by the equation (1), followed by projection of the subjective vectors chosen to obtain vector facial image weights selected through the equation (11).

The second algorithm kernel principle component analysis (KPCA)

Use non-linear (KPCA) algorithm. The (KPCA) was used to derive features on training data. Followed by a nonlinear projection procedure on the test data. [16] And then comes the final stage in which the strength and accuracy of the algorithm is known to discriminate through gauge (U). [2, 23] As in Figure (3.b)

Kernel principal component analysis Algorithm

(KPCA) generates a vector matrix and its function is to extract features, where the training data from the Gabor filter were introduced. [

Step 1: Insert training data images:

$$X = [X_{ij}]_{N \times M}$$

$$Y = [Y_{ij}]_{N \times M}$$

$$i = 1, 2, \dots, N$$

$$j = 1, 2, \dots, M$$

Step 2: Calculate the kernel function of the training data from the following steps:

1. Enter the images of the selected training data
2. Determine the size of the kernel parameter:

$$A \leq 0$$

$$B > 0$$

3. Calculate the kernel matrix by one of the following equations:

$$er = (X^T \times Y + A)^B \quad \dots (13)$$

4. Complete the steps.

Step 3: Calculate the kernel center through the following functions:

$$q_{col} = \sum b_{col} \quad \dots (14)$$

$$q_{row} = \sum b_{row} \quad \dots (15)$$

$$J = \frac{[q_{col} \ q_{row}]}{b} \quad \dots (16)$$

$$kc = ker - J \times ker - ker \times J + J \times ker \times J \quad \dots (17)$$

Step 4: Calculate the intrinsic values and the self-vector calculation consisting of the main diameter of the vector matrix (V):

$$|E - \lambda I| = 0 \quad \dots (18)$$

Step 5: Calculate (KPCA) of the intrinsic values:

$$KPCA=E$$

Practical application and discussion of results

After identifying the theoretical side of the algorithms, the practical side is presented in order to highlight the advantages of the proposed algorithm. The code was written using (MATLAB 2015). The general method of measuring the efficiency of any proposed system using the techniques of the intelligence must be based on two phases:

1. Apply the training phase.
2. Apply the testing phase.

Which have been implemented through stages as follows:

Phase 1: Training all algorithms using (5) images per person.

Phase 2: Use the rest of the images consisting of (5) images for each person to test also on all the algorithms. The algorithms used are:

1. A database (oral) was added to the face images on the Gabor filter, followed by division the data into the training and testing as described below.

2. Training data were introduced on the first algorithm (KLT) for the purpose of extracting features, and then the projection on the test data, followed by the test results between the training and test data as shown in Table (1).

3. In order to derive nonlinear features, the training data were introduced on the second algorithm (KPCA), followed by the projection of the training data derived from the (KPCA) algorithm on the test data, and then testing the results between the training and test data shown in Table (1).

4. The proposed algorithm: The training data extracted from the (KPCA) algorithm was applied to (CS) Intelligent algorithm for the purpose of selecting the desired feature, and then the projection on the test data extracted from the (KPCA) algorithm. Followed by test results between training and testing data as shown

in the Table (1).

From Table (1), the proposed algorithm (KPCACS) needs higher space to take up more space in the discriminating process to give better results. It should be noted that the first algorithm did not distinguish as required form, also suffers from fluctuation in the results of discrimination and this is not encouraging its adoption in discrimination, but compared with the second algorithm is the best distinction. When using the proposed algorithm compared to the first and second algorithms, the discrimination rate was raised to a high degree. At the same time, it was observed that the proposed algorithm gave a higher resolution of discrimination when lifting the space used to the maximum.

The results obtained in the application of different values of the variable (U) are shown in Tables (1), where (U) contains the rate of selected feature for a set of different values, and can be determined by represent:

In Table (1), the (AC) Acceptance rate, (TAC) Total acceptance ratio, (RE) Rejection Ratio and (TRE) Total Rejection Ratio. Are used in the following equations:

Table (1): represents the percentage of the amount of acceptance for each algorithm

ALGORITHM										TOTEL
KLT	AC	%92.75	%95.25	%94.50	%95.25	%95.75	%97.50	%97.50	%97.50	%66.00
	RC	%7.25	%4.75	%5.50	%4.75	%4.25	%2.50	%2.50	%2.50	%34.00
KPCA	AC	%91.00	%95.00	%96.00	%96.50	%96.25	%96.50	%96.75	%96.75	%64.75
	RC	%9.00	%5.00	%4.00	%3.50	%3.75	%3.50	%3.25	%3.25	%35.25
KPCACS	AC	%92.50	%94.75	%95.00	%96.25	%97.50	%97.75	%98.25	%98.25	%70.25
	RC	%7.50	%5.25	%5.00	%3.75	%2.50	%2.25	%1.75	%1.75	%29.75



Figure (1): Final Acceptance & rejection ratios

Conclusion

This study suggested after the preprocessing by Gabor filter. The data were divided into training data and test data, and then the advantages were extracted from the training data and the test data was dropped using the non-linear algorithm (KPCA). Adding and (CS) algorithm to select the attributes on the training data followed by projection on the test data. The results of the algorithm (KPCACS) were compared with the first algorithm (KLT). The results were better than the KLT algorithm. The rejection rate for the (KPCACS) algorithm was better than the (KLT) algorithm. The rejection of the (KPCACS) algorithm was also compared with the (KPCA) algorithm where the results were less error relative to the latter algorithm. (As outlined in scheme (1.a))

The results between the proposed algorithm (KPCACS) and the (KLT) algorithm were compared to dependence on the acceptance ratio, and a higher percentage was obtained from the latter algorithm. The (KPCACS) algorithm with the (KPCA) algorithm was compared to the acceptance ratio and the result for the proposed algorithm was high. (As outlined in outline (1.b))

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Dentistry, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Laser application in the Temporomandibular Joints Disorders

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Abstract

The Temporomandibular joint (TMJ) is a union from articulating between the surfaces of the both temporal and the condyle bones. Low-level therapy or LLLT, diode laser bio-stimulation with pain reduction and anti-inflammatory status can be applied in dental fields for different purposes in hard tissues, soft tissues. A total twenty-four subjects were participated in this study with TMJs, according to clinical diagnostic features and CBCT scan for those patients, the mean age (25.6) years and subdivided into two groups: 1). 12 subjects with internal dearrangement of TMJ and 2). 12 subjects with myofacial pain dysfunction syndrome. These results showed all subjects good improved after LLLT applied within 15 sessions; with 3 visits weekly, 5-10 minutes time needed for LLLT applying of TMJ areas. The LLLT action by; reducing of pain and improvement of immunological status with increase dilation of blood vessels will result in suppression of swelling and inflammation then finally increase cell proliferation, collagen synthesis and repair of tissue damage.

Key words: *Laser, Temporomandibular, application.*

Introduction

The Temporomandibular joint (TMJ) is structure formed from articulating the surfaces of the both temporal and the condyle bones. Both bone surfaces are protected by fibrocartilage with dense articular part. The both sided of condyle bone articulates with a large section of temporal bone composed of articular eminence, articular fossa, and finally the preglenoid plane ¹. The TMJ functions including both rotate and translate condylar bone uniquely within the fossa anteriorly moved along the articular eminence. Due to ability of the condyle to translate, the mandible has a much higher maximal incisal opening than possible rotation movement alone. The joint is thus referred to as “gynglimodiarthrodial”: a combination of the terms (ginglymoid) and (arthroidial); that mean both rotation and translation ². The Temporomandibular

joints dysfunction syndrome that mean TMJ disorder which is also named as mandibular pain with dysfunction syndrome, “arthrosistemporomandibularis” TMJ arthrosis, myofacial pain syndrome and Temporomandibular Disorders (TMDs) ³. The signs and symptoms of Temporomandibular disorders (TMDs) may involve impaired jaw function, pain, malocclusion, limited range of motion, deviation or deflection, joint noise, with joints locking, and other neurological and orofacial features or complains like headache, tinnitus, visual changes may also correlated with TMDs. Due to different etiologic factors, the diagnosis and treatment of TMDs patients is complex and multidisplanary approaches. The TMDs can be classified into both muscular and articular parameters. The different aspects between the two categories are sometimes difficult because muscular disorders may trigger articular disorders, and they may coexist between two statements ⁴. The myalgia (myofascial pain and fibromyalgia), splinting, myospasm, and fibrosis /contracture; they considered as types of Myogenic disorders of TMJs. In addition to myogenic disorder, the articular disorders involve joint effusion, synovitis /capsulitis, trauma/fracture, arthritis, internal derangement, and finally neoplasm. The exact diagnosis for these muscular bony

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abnormalities important and allows for appropriate therapy whether it is surgical or nonsurgical⁵. LASER “Light Amplification by Stimulated Emission of Radiation” tools are applied in all sided of physical therapy. The Low level laser therapy (LLLT), also called low-level therapy, laser bio-stimulation or therapy of both soft laser and hard tissues can be applicable in dental fields for different purposes and also in pain reduction⁶.

Materials and Method

A total 24 subjects were participated in this study with TMJs, according to clinical diagnostic features and CBCT scan for those patients, the mean age (25.6) years and subdivided into two groups: (1). 12 subjects with internal dearragment of TMJ and (2). 12 subjects with myofacial pain dysfunction syndrome. The current study applied between period from December -2017 to May- 2018; all these subjects taken randomly from patients attended Oral Medicine clinic / Department of Oral Surgery and Oral Diagnosis / College of Dentistry / Babylon University. All subjects without signs and symptoms of any medical diseases. Epic X Low level laser therapy LLLT or called diode laser with the following specifications: 1- Probes with 830 wavelengths. 2- Energy density with 10J / cm² in average. 3- One KHz diode laser frequency with 80% of a duty cycle of. Low level laser therapy was applied for total (15) sessions of treatment during a period of 5 weeks continuously (three sessions per week),⁷. LLLT tool showed in figures (2-1/A, B, C).

Results and Discusion

These subjects classified into two types: 12 with internal dearragment, and other 12 subjects with myofacial pain dysfunction syndrome with mean age (25.6) years, these results showed all subjects good improved after LLLT applied within 15 sessions; with 3 visits weekly, 5-10 minutes time needed for LLLT applying of TMJ areas by slow motion with direct contact of these applicable areas. All pain and discomfort features are improved. The low-level therapy, considering laser

“bio-stimulation” with “bio-modulation” or also called soft laser therapy can be applied in dental fields for different therapeutic purposes in both soft tissues and hard tissues, and finally the pain reduction. Complex mechanisms associated with low level laser therapy, but it is essentially correlate with the visible red absorption and near-infrared wavelength in photoreceptors in subcellular contents and particularly the electron transport (respiratory) chain within mitochondria membranes⁸. The 3 main benefits of laser light applied in LLLT on tissue include: 1- analgesic mechanism, 2- bio-stimulating effects and 3- anti-inflammatory approaches, these findings agreed with the present study. Pinheiro & Gerbi, 2006 found that low laser therapy increases adenosine triphosphate (ATP) production then rises the cell activity and. It also shows increased growth factors production, cytokines release, and prograded replication mechanisms that important in promotion in cell repair states and reduction the oxidative stress phase, these results agreed with the current data. Giovanni, 2006 showed that the low level laser therapy increases endorphins, acetylcholine, serotonin, and finally cortisol metabolism; it also effects on nerve impulse transmission and stimulation, and decline stimulation and pain perception as its result. Laser therapy improves blood flow and forms angiogenesis, and it increases lymph drainage and consequently inflammation reduced. The biochemical action of the laser light can stimulate vascular endothelial growth factor production and convert adenosine-monophosphates into nitric oxide (NO) that leads to vessel growth stimulation⁹. The bio-stimulation effects of low laser therapy; by changes the pro-inflammatory cytokines as IL- α and IL- β to anti-inflammatory cytokines like platelet derived growth factor, transforming growth factor and also fibroblast growth factor that lead to reduction of inflammation and swelling^{10,11}, these results matched with the present study. Finally; can be concluded that physical therapy has beneficial effects on TMJ disorders. The LLLT application commonly used because it’s safe, comfortable, motivated and modern plan of TMJ structures rehabilitation.



A: Diode laser tool main menu

B: Diode laser tool watt ranges



C: Head of diode laser tool.

Figure (1): Epic X 10 diode laser tool

Conclusion

The LLLT therapy has beneficial, safe, non-harmful effects on TMJs disorder by: Reduction of prostaglandin and cyclooxygenase (COX 2) that leads to reducing of pain and improvement of immunological status with increase dilation of blood vessels will result in suppression of swelling and inflammation then finally increase cell proliferation, collagen synthesis and repair of tissue damage.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of oral surgery and oral diagnosis / college of Dentistry / Babylon University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Pregnant Women Predilection Toward Elective Cesarean Section

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Abstract

Objective: To determine the causes of pregnant women predilection toward elective cesarean section. A descriptive study was carried out on (100) pregnant and post pregnant women in Bint Al-Huda Hospital for the period from (5 February to 12 March 2019). Validity and reliability of questionnaire are determined through pilot study. Descriptive and inferential statistical procedures were used to analyze the data, and the data were collected by using interview technique, constructed questionnaire designed and developed for the purpose of the study. The results of the study show that the highest percentage (24%) of the study sample is within age group (20- 24) years, (23%) of the study sample graduated from college & higher study degree, (36%) of the study sample were multigravida and (24%) and (18%) of study sample predilection elective cesarean section because of fearing to loss their baby and fear from labor pain respectively, while lowest percentage (3%) and (3%) of them their causes due to previous loss baby because of normal vaginal delivery and cesarean section is need short time rather than normal vaginal delivery respectively.

Keywords: Pregnant women, Predilection, Elective, Cesarean Section.

Introduction

Cesarean section a procedure in which a birth doctor delivers an infant through an incision in the mother's abdomen and uterus rather than through the vagina. A cesarean section might be planned ahead of time if you develop pregnancy complications or you've had a previous cesarean section and aren't considering a vaginal birth after cesarean (VBAC). Often, however ¹, the need for a first-time cesarean section doesn't become obvious until labor is underway. ² The worldwide rise in cesarean section rates is becoming a minor public health concern and cause of considerable debate due to potential maternal and perinatal risks, cost issues and inequity in access. The increase in cesarean section rates observed in many developed and middle-income countries contrasts sharply with the very low

rates in numerous low- resource settings, along with lack of access to emergency obstetric care. According to recent data, in Middle Africa, only 1.8% of all live birth deliveries occur by cesarean section, compared to 24.3% in North America and 31% and in Central America. The main determinants of this disparity and specific reasons for the increase in cesarean section rates in most of the world remain unclear ³. The WHO recommendations, saying that cesarean section should not be below 10% or over 15%, are still absolutely valid and not "out-of-date". This new WHO study found that as a country's cesarean section rate goes above 15%, the maternal mortality raises unnecessary cesarean section kills women ⁴. The past 20 years in the US, the maternal mortality rate keeps rising and rising while the rate of cesarean section continues to rise. It can now be reliably calculated that cesarean section is the number one cause of maternal mortality in the U.S. at least 45% of all maternal death is associated with a cesarean section ⁵. Cesarean delivery is defined as the birth of a fetus through incisions in the abdominal wall (laparotomy) and uterine wall (hysterectomy). Cesarean sections increase the health risks for mothers and infants as well

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as the costs of health care when they are compared with vaginal birth. The most common indications for cesarean section are repeat cesarean deliveries and those performed for labor dystocia ⁶. However, the use of cesarean section has increased dramatically worldwide in the past decades despite no evidence showing that the cesarean section without medical justification can reduce the maternal and neonatal morbidity and mortality ⁷. China had the highest rate of cesarean section with around half of babies delivered by CS in the year 2007–2008. Although china’s overall annual cesarean section rate decreased to 34.9% in 2014, there were still around a quarter of Chinese counties with the cesarean section rate exceeding 50% (Li H, et al., 2017) A caesarean section is a major obstetric intervention that may be life – saving or life-enhancing for either the mother or her offspring. Occasionally, it may be life-threatening, or may lead to minor or major short-term or long-term complications. The Term Caesarean Delivery on Maternal Request (CDMR) refers to elective delivery by caesarean section at the request of a woman with no identifiable medical or obstetric contraindications to an attempt at vaginal delivery ⁸. Elective caesarean section give powerful enough evidence of the increased risk of maternal mortality with women’s choice elective caesarean section. Risks that are known to be higher for cesarean deliveries than for vaginal delivery include adverse reactions to anesthesia, breathing problems, bleeding, infection, urinary tract injury, and injury to the baby. In addition, recovery time following cesarean delivery is typically longer than for vaginal delivery ⁹. In an elective caesarean section where the baby is not in trouble, the risks to the baby of doing a caesarean section still exist, meaning the woman who chooses caesarean section puts her baby in unnecessary danger. In this study the researcher search the causes of women prefer Cesarean section and to identify reproductive characteristics for study sampling.

Methodology

Design of the Study:

A descriptive analytic study to determine the causes of women predilection elective cesarean section For the period from 5 February to 12 March 2019. Bint Al-Huda Hospital in Al-Nasiriya City

Settings of the Study:

The present study is conducted in Thi-Qar

Governorate; Bint Al-Huda Teaching Hospital

Sample of the study: which include:-

1- Inclusion Criteria are:

A purposive” Non-probability” sample of (100) pregnant and post pregnant women.

Certain criteria are included for choosing and they are:

Pregnant women who attained to have elective caesarean section.

Post pregnant women who delivered elective caesarean section and receiving care both for mother and her baby.

2-Exclusion Criteria are:

The pregnant women who hadn’t delivered caesarean section.

Instrument that Used for Data Collection:

The study instrument from consisted three parts according to the study’s objectives which were distributed through the following:

Part one: Demographic Characteristics:

This part concerned with determination of the demographical characteristics of the study group which includes the following variables (Age, Education level, Consanguinity, Occupation and socioeconomically Status from their point of view).

Part two: Reproductive Health:

This part concerned with determination of the Reproductive Health of the study group which includes the following variables (Gravid, Para, Abortion, Gestational age, type of previous delivery, period between last child and current pregnancy and previous gynecological history).

Part three: Reasons of Women Performance Cesarean Section.

The questionnaires consist of (9) item about causes of predilection women elective cesarean section women cesarean.

Results and Discussion

Table (1) shows the highest percentage (24%) of the study sample is within age group (20- 24) years while the lowest percentages (16%) of them is less than 20 years. Concerning the wife education level, the highest percentage (23%) of the study sample were graduated from college or had higher study degree, and the lower percentage (10%) of them were graduated from secondary school. Regarding the occupation the highest percentage (82%) of the study sample are housewives, while the lowest percentage (6%) of them are students. Regarding the socioeconomic status the highest percentage (43%) of the study sample have sufficient socioeconomic status, and (31%) of them consider their not sufficient from their point of view, while (26%) of the study sample have barely sufficient socioeconomic status. Table (2) shows that highest percentage 38% of the study sample of the current pregnancy duration were (37wk) while the 10% lowest percentages of them were, (\geq 34) weeks. Regarding the gravidity the highest percentages (36%) of the study sample have gravida (2), while the lowest percentages (13%) of them have gravida, (1). Concerning the Parity the highest percentage (36%) of the study sample were para (2), while the lowest percentages (8%) of them were para (6). Regarding the number of Abortion, the highest percentage (66%) of the study sample has no history of previous abortion, while the lowest percentages (12%) of them have two and more time abortion. Table (3) shows that that the highest percentage (24%) and (18%) of study sample predilection elective cesarean section because of fearing to loss their baby and fear from labor pain respectively, while lowest percentage (3%) and (3%) of them their causes due to previous loss baby because of normal vaginal delivery and cesarean section is need short time rather than normal vaginal delivery

Age:

Figure (1) shows that the highest percentage (24%) of the study sample are within age group (20- 24) years. This result agree with the finding a study held by Amoa and Kluflo (2017) which reported that most of section sample were less than 35 years of age, while a study carried out by Habib and Abdulla (2015) who find that in Iraq percentage is higher (41%) during age from (36-45) years old. Furthermore, pregnant women aged 40 years and above were more likely to prefer cesarean section. Some previous studies consistently reported

that older pregnant women were more likely to have the preference for cesarean section. This result disagree with the finding a study Liang's study showed that more than 60% of women aged 40 years and above delivered by cesarean section. With the implementation of the two-child policy, more women who already have the first child would give birth to the second one at an older age at which the risk of delivery complications increases and the chance of having previous cesarean section is high. Therefore, it is essential to control the cesarean section delivery in the two-child policy era, especially at the first birth

Educational Level:

The results show that the highest percentage (23%) of study sample were graduated from college & had postgraduate degree, as shown in table (1), this results agree with the finding in a study held in Iraq by Habib and Abdulla (2015) which reported that (47.3%) of Iraqi women completed their graduated from college & had postgraduate degree.

Occupation:

The results show that the highest percentage (82%) of study sample were house wife as shown in table (1), this results agree with the finding in a study held in Iraq by Habib and Abdulla (2015) which reported that (87.4%) were house wife.

Socioeconomic Status from their point of view: (43%) of study sample stated that their sufficient socioeconomic status from their point of view as shown in table (1).

Current pregnancy duration (weeks)

(38%) of the study sample show that their gestational age were attempt of c/s or delivery (37 week) as shown in figure As show in table (2)

Number of Gravida:

The results show that the highest percentage (36%) of study sample were multigravida as shown in table (2), this results agree with the finding in a study held in Iraq by Habib and Abdulla (2015) which reported that (38%) of c/s women were multigravida ,and it was similar to the finding that reached by a study held in United State by Riberio (2015) who reported that most mothers with c/s were multiparous . while it was inconsistent with the

finding in a study held in United Kingdom by Ainoa and Kluffo (2017) who reported that most of cesarean section sample were primigravida.

Number of Abortion:

More than half (66%) of the study sample have not abortion previously as shown in table (2)

Number of Parity:

More than one third (36%) of study sample have (2) children as shown in table (2), and it was similar to the finding that reached by a study held in United State by Riberio (2016) who reported that most mothers with c/s were multiparous.

Causes of pregnant women predilection elective cesarean section Cesarean Section:

The study results show that the highest percentage (24%) and (18%) of study sample predilection elective cesarean section because of fearing to loss their baby and fear from labor pain respectively most of study sample answer more than one option or cause as shown in table (1), this results agree with Abouzhar and Wardlaw (2016), who stated that in many cases mothers want C-section as this is safe procedure for the child. It may be caused due to late pregnancy or previous pregnancy failure such as miscarriage or still birth. The fear for labor pain could arise because of woman’s previous experience or fear could also induced in woman through comments made by health professionals, family members or friends.

Table (1): Distribution of Study Sample According to Public Information.

Variables	F *	%*
Age/ years		
<20	16	16%
20 – 24	24	24%
25 – 29	21	21%
30 – 34	22	22%
=>35	17	17%
Wife Education level		
Illiterate	13	13%
Read & Write	12	12%
Primary	21	21%
Intermediate	21	21%
Secondary	10	10%
College & Higher	23	23%
Occupation		

Govern. Employee	12	12%
Housewife	82	82%
Student	6	6%
Socioeconomic from family point of view		
Sufficient	43	43%
Barely sufficient	31	31%
Not sufficient	26	26%

Table (2): Distribution of Study Sample According to Reproductive Characteristics.

Variables	F	%
Current pregnancy duration (weeks)		
≤ 35wk	18	18%
36wk	14	14%
37wk	38	38%
38wk	20	20%
≥34	10	10%
Gravidity		
1	13	13%
2	36	36%
3	15	14%
4	16	16%
=>5	20	20%
Parity		
1	4	4%
2	36	36%
3	24	24%
4	20	20%
5	8	8%
6	8	8%
Number of Abortion		
No	66	66%
One	22	22%
More two	12	12%

Table (3): Distribution of the study sample according to pregnant women predilection causes of predilection elective cesarean section causes.

Causes of Predilection Elective Cesarean Section	F	%
Fear from labor pain.	62	24%
Fear to loss her baby	46	18%
Previous loss baby because of normal vaginal delivery	8	3%
Trust between mother and doctor	22	8%

Cont... Table (3):

Low trust in nursing staff (nurse-midwife)	25	9%
Low labor complications	28	11%
Lack information about normal vaginal delivery	44	17%
Lack information about the complications of cesarean section	19	7%
C/S is need short time rather than normal vaginal delivery	10	3%
Total	257	100

Conclusion

The results of the study show that the highest percentage (24%) of the study sample is within age group (20- 24) years, (23%) of the study sample graduated from college & higher study degree, (36%) of the study sample were multigravida and (24%) and (18%) of study sample predilection elective cesarean section because of fearing to loss their baby and fear from labor pain respectively, while lowest percentage (3%) and (3%) of them their causes due to previous loss baby because of normal vaginal delivery and cesarean section is need short time rather than normal vaginal delivery respectively.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Thi-Qar, College of Nursing, Maternal and Neonatal Health Nursing Department, Iraq and all experiments were carried out in accordance with approved guidelines.

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Role of Nurse in Reducing Stress among Female Patients Performing Magnetic Resonance Imaging

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Abstract

Stress is common during Magnetic resonance imaging. Usually, stress more reported in female patients. The study aims to assess patient knowledge regarding magnetic resonance imaging procedure, and evaluate the effectiveness of nursing instruction program on reducing patients stress level during performing Magnetic resonance imaging. The study design is quasi-experimental. The samples were allocated into either the study (experimental) group (taking the program, n = 30) or the control group (not taking the program, n= 30). The extent of samples anxiety during MRI for both study and control group were measured before applying the education program was measured. The structured teaching program for imparting knowledge about the MRI procedures and methods to cope with anxiety during the procedure of MRI was developed based on an literature review and expert opinion. Post-test assessment performed for both the study and control group after applying for an education program. The results of the study were elicited based on two statistical approaches, first, descriptive statistics and the second is an inferential statistical analysis. A total of 60 female patients have completed a pre and post-test. most of the study and control group were between the ages of 20 - 40 years.

Keywords: *Stress, Anxiety, claustrophobia, education program, MRI*

Introduction

Magnetic resonance Imaging (MRI) has been defined as the most essential medical modernization in the last 25 years. There has been a vast increase in the use of MRI in the clinical setting. More than 80 million MRI procedures are achieved each year in the world. ⁽¹⁾ MRI is a noninvasive imaging technique procedure that adopts magnetic range, waves, and computers to manifest deformity. ⁽²⁾ MRI is the best procedure for recognizing a large number of possible problems or abnormal situation in many varies parts of the body. Generally, MRI builds an image that can display variation between normal and abnormal tissues. ⁽³⁾ MRI uses an electromagnet so that patients with any metal

tools or pacemakers are not preferred to doing MRI. To reinforce the visualization of internal structures, contrast media can be inserted through intravenous. During the MRI procedure, the patient obligates to lie still for 1 to 2 hours and will listen a rhythmic knocking sound. Patients who suffering claustrophobia can be not able to tolerate the confinement of locked MRI tools without given him sedation. ⁽⁴⁾ Anxiety is defined as a situation of emotional distress, which can be demonstrated by nervous behaviour and discomfort, muscular tension as well as some other somatic complaints. ⁽⁵⁾ Anxiety-associated to claustrophobic reactions and some anxiety reduction protocols have been evaluated mainly for MRI tests. ⁽⁶⁾ MRI is familiar as a physiologically non-invasive procedure. Patients being examined, however, occasionally suffering from anxiety as a result of the procedures or settings. Meanwhile, the procedures, 25–37% of patients may happen anxiety to them, and the causes of anxiety are due to the enclosed nature of the scanner leading to claustrophobic feedback. ⁽⁷⁾ Most of

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the patients visiting imaging departments will have a good experience. However, some patients can suffer a wide range of emotions disclose to their scan procedure, including anxiety, fear, and claustrophobia. ⁽⁸⁾ The methods that the patients experience health care widely depends on the actions of the nurse professionals. Actions such as giving information, adapt audiovisual systems, health care team training, and anxiety reduces protocols have all been shown to be useful in reducing anxiety, fear, claustrophobia, and the demand for sedation for patients undergoing imaging. ⁽⁹⁾ Many research examining a different type of interventions to decrease the level of anxiety to minimum level, and to promote patient experience. ⁽¹⁰⁾ Moreover, most previous interventions are time-consuming, and difficult to apply into practice, or may cost too much. Patients experience with the new technology of MRI has demonstrated that the test may induce anxiety in some of the patients. ⁽¹¹⁾ Some female patients who are undergoing magnetic resonance imaging examination cannot complete the test because of anxiety and claustrophobia, so nursing instructions for those are very important, which has an impact on reducing anxiety and claustrophobia associated to MRI examination. ⁽¹²⁾ Magnetic resonance imaging (MRI) has become a common form of examination for patients. Despite, it is non-invasive and has no pain, patients experience anxiety during the procedures. Female patients undergoing MRI test can suffer from anxiety, claustrophobia and fear along the examination and, for some patients, it needs to use medication to sedate the patients. ⁽¹³⁾ For these reasons, this research is conducted to evaluate the role of the nurse in reducing stress among female patients performing MRI.

Methodology

Design and Sample

A quasi-experimental design was applied to achieve the goal of the study. Non-probability, purposive sample, with the use of pre-post test approach for both study and control group. A sample of (60) patient chosen among patients who attended to the MRI unit at Azadi Teaching Hospital in Kirkuk city. The samples were divided into two groups; (30) patient as a study group was exposed to the education program and the other (30) patients are not exposed to the education program, considered as the control group with the same demographic characteristic for both groups.

The Educational Program

A structured teaching program for imparting knowledge related to stress associated with doing MRI and method of who to getting rid of anxiety was developed by the authors. The content of the educational program was designed based on an extensive review of the literature and expert opinion. The program composed of two modules related to stress. Models content was created and edited by the researchers; the first module included nursing instruction about MRI procedures, while the second model is about methods to cope with anxiety. Before the program is finalized, it has been presented to a group of experts. Those experts were asked to review the education program as well as the instrument for their content, clarity, and adequacy. After the review, some items were excluded and some others are added after face to face discussion with experts and the instrument considered valid after taking all the comments and recommendations in considerations.

Procedure

After ensuring informed consent from the patients, they were given the pre-test questionnaire before the administration of the educational program. Each patient was given a serial number to be followed in the second assessment (post-test). After administration of the pre-test questionnaire, the patients were imparted with an education program by face-to-face interview with the primary author. The face-to-face interview lasted '30-35 minute-sessions' by using booklets and short videotapes. As a reminder, each patient was provided with a copy of the education booklet prepared and designed by the primary author and reviewed by other authors. The content of the booklet was similar to that of the educational program and it summarized the most important points in the program. After undergoing the MRI, THE patients were assessed again for the second time (post-test).

Data Analysis

The data were analyzed by applying SPSS, version 22, with using frequency, percentage, distribution, mean, range and standard deviation. The level of statistically significant was considered at $p < 0.05$. T test was used to determine the differences between study and control group.

Results and Discussion

The finding of the study showed that most of the study and control group were between the ages of 20 - 40 years. As for the level of education, the study reveals that the highest percentage of the study and control group were illiterate. The study findings revealed that the majority of the sample were having unsatisfied knowledge regarding MRI procedure, and this can be attributed to that most of the study sample were illiterate. The results in table two showed that both study group and control group were unsatisfied regarding the knowledge related to MRI procedures The study supported by (Selim, 2001)⁽¹⁴⁾ who declared in his study “Effect of Pre-Instruction on Anxiety Levels of Patients Undergoing Magnetic Resonance Imaging examination,” patients who received the designed instructions significantly lower levels of anxiety than the controls group. Revealed a highly significant difference was found between the two groups (study and control groups) in the study group decrease in the level of anxiety than in the control group.

The study findings in table number three showed that there was a higher score of anxiety in female patients in control group more than female patients in the study group as a result of receiving the designed instructions before MRI procedure. There was a

statistically significant difference between pre and post-test for the study group. The study supported by (Mohammed et al., 2013)⁽¹⁵⁾ who concluded that there were highly statistically significant difference among levels of anxiety from pretest and post-test. In the same line (Tischler et al., 2011)⁽¹⁶⁾ revealed that A highly significant difference was found between the two groups when the total anxiety scores were compared after the procedure of MRI examination and after the designed instructions were given.

The findings in table number four showed that the study group reveals high score in term of using different methods to cope with anxiety more than the control group who reveals fewer scores. This also can be attributed to the effectiveness of the education program. Tischler et al., (2008)⁽¹⁷⁾ reported that there was a statistically significant difference between anxiety for patients who received information and who did not. Before a scan, many patients feel a need for information. The patients who received information mainly found it useful or very useful. Medeiros et al., (2012)⁽¹⁸⁾ mentioned that cording to the values of anxiety obtained by both groups in this study, the experimental group showed lower levels of anxiety. providing information prior to the MRI scan has positive effects, which decreases the state of anxiety of the patients.

Table (1): Sociodemographic Characteristics of the Study and Control groups.

Samples Characteristics No.		Study group (n= 30)		Control group (n= 30)		p-value
		%	No.	No.		
Age	< 20 years	3	10.0	2	6.7	0.778
	20 - 40 years	17	56.7	15	50.0	
	> 40 years	10	33.3	13	43.3	
Level of education:	Illiterate	10	33.3	12	40.0	0.234
	Primary school graduate	6	20.0	4	13.3	
	Preparatory school graduate	4	13.3	5	16.7	
	Secondary school graduate	5	16.7	3	10.0	
	University graduate	5	16.7	6	20.0	

Table (2): Study and control group knowledge related to MRI procedure along pre-test.

Level of Satisfaction	Study group(N=30)		Control group(N=30)		P
	Frequency	%	Frequency	%	
Unsatisfied	23	76.6	28	93.3	0.000*
Satisfied	7	23.3	2	6.7	

Statistically significant at $p < 0.05$

Table (3): Study and control group anxiety level after MRI test

Anxiety level	Study group(N=30)				The control group(N=30)			
	Pre-test		Post-test		Post-test		Post-test	
	F	%	F	%	F	%	F	%
Low level of anxiety	16	53.3	28	93.3	17	56.7	20	66.7
High level of anxiety	14	46.7	2	6.6	13	43.3	10	33.3
Mean \pm SD	17.23 \pm 5.57		7.63 \pm 3.02		18.57 \pm 4.82		14.55 \pm 2.34	
P value	0.000*		0.000*		0.000*		0.000*	

F= Frequency, Statistically significant at $p < 0.05$

Table (4): Study and control group methods to cope with anxiety along (pre-post) MRI test.

Anxiety Cope Methods	Study Group		Control group	
	Frequency	%	Frequency	%
Another person accompanying the patient	14	46.7	11	36.7
Close the eyes	5	16.6	4	13.3
Reading some thing	8	26.7	6	20.0
Using relaxation Technique	2	6.7	1	3.3
Using non of them	1	3.3	8	26.7
Total	30	100	30	100

Conclusions

Female patients Knowledge regarding MRI procedure in those patients who take the instructions and guideline from the education program is higher than those who didn't take the education program. Anxiety level was lower in female patients who take instructions and guideline from the education program about MRI procedure. So that the effect of the nursing role is very important in reducing stress among female patients was

performing MRI examination.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Kirkuk, Iraq and all experiments were carried out in accordance with

approved guidelines.

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Screening Methods for Malignant Neoplasm after Renal Transplantation

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Abstract

To assess the screening methods for malignant neoplasm's after transplantation, and to identify the association between screening methods for malignant neoplasm's and sociodemographical characteristics. A descriptive – analytic study was carried out at three teaching Hospitals , Medical city . Al –Karama and Al –Yermok which were responsible for immunosuppressive drugs distribution starting from from (1st Jan.2017) to (end of May 2017) . To achieve the objectives of study, a non –probability (purposive) sample of 100 renal transplantation recipients (RTRs) who were a tending the outpatient clinic of the above listed hospital were selected according to the criteria of the study sample. The finalized questionnaire contained (11) items the contained validity of the instrument was established through a penal of (10) experts. Reliability of the questionnaire was determined by test – retest which was estimated as averages (R=0.93) . Data was gathered by interview technique using the questionnaire formal & data was analyses by application of descriptive & inferential statistical methods. The results of the study indicated that the majority of study sample not follow the screening methods for malignant neoplasm's after renal transplantation.

Key word: Screening, Renal transplant, Malignant neoplasm.

Introduction

One of the main causes of death in kidney transplantation recipients' (KTRs) worldwide is malignancy. Immunosuppression plays a key role in the development of post-transplant malignancies. The development of post- renal transplant malignancies represents a key issue and there is a strong need to have a clear understanding of the challenges that malignancies represent for (KTRs).¹ The incidence of malignancy among kidney recipients is increased compared to the general population. Malignancy incidence is associated with the duration of exposure to immunosuppression rather than with a particular immunosuppression therapy.² The renal transplantation recipients, should follow up a certain program of screening methods

for easily detection of cancer. For this reason the researcher do this study to assess the screening methods for malignant neoplasm after renal transplant by recipients.

Materials and Method

A descriptive design used to assess the screening methods for malignant neoplasm's after renal transplantation. The present study was carried out of two teaching hospitals, surgical specialties and Al-Karama outpatients clinic of renal transplantation recipients (RTR).These hospital were the only governmental medical institutions in which kidney transplantation was performed in Baghdad city. A simple random sample of (100) renal transplant recipients who are studying according to the following criteria (adult patient age (18-60) and free from psychological diseases).

The questionnaire which was used to collect the data are the stander screening methods for detection to malignancy after renal transplantation. Demographic

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characteristic it consisted of (5) items which included: sociodemographical data of the sample (age, gender, marital status, education level and occupation). The screening methods which was used to detect neoplasms malignancy after transplantation which consisted from 11 methods. Content validity of the questionnaire is determined through a panel of (10) experts they are faculty members of nursing college, university of Baghdad. A pilot study was carried out on the 1st December 2016 to the 15th Dec. 2016. Determinate of the reliability of the questionnaire was based upon the (test-retest) which has been (0.90) for (10) kidney transplant recipients. Data was collected from (1st Jan.2017) to (end of May 2017) by utilization of the study instrument and interviewing with renal transplant recipient.

Data analysis:

Data was analyzed through application of descriptive statistical data analysis approaches.

This approach was used for determining the following measurements:

Frequencies (F)

Percentages (%)

% * 100

Results and Discussion

The analysis of the data after being processed and tabulated. Such presentation is systematically oriented relative to renal transplant recipients and their demographic characteristic. The demographic characteristic of (100) RTR_s indicated that the highest percent of RTR_s (33%) were within the age group of (40-49) year. Most of them (82%) were male, the highest percent (20%) were college graduate, and highly percentage (32%) of them had self-employee. Related to the duration of kidney transplantation the result of the study sample indicated that (40%) of the study sample have transplanted the kidney before (1-2) year. The majority 78 (78%) of recipients were early referral to dermatologist for all suspicious skin lesion and 53 (53%) of them were done monthly examination of skin and lips. While the lowest percent of the study sample reveal no compliance to follow-up of screening methods for malignancy items (2,4,5,6,7,8,9,10 and 11). Table 1 indicates that there is no significant association between age of RTRs and screening methods for

malignant neoplasm after renal transplantations. Table 2 indicates that there is no significant association between gender of RTRs and screening methods for malignant neoplasm after renal transplantation. Table 3 indicates that there is no significant association between level of education of RTRs and screening methods for malignant neoplasm after renal transplantation. Table 4 indicates that there is no significant association between duration of RTRs since transplantation and screening methods for malignant neoplasm after renal transplantation. Throughout the present study it has been noticed that the age of highest percent of (100) renal transplant recipient (33%) were within the age group (40-49) years old this results is similar to results obtain from study done by Al- Ani 2008.³ This indicates, the both studies renal transplant recipients are in the middle age group which considered a productive period as far as being establish in their occupation and financially in depended (the researchers).The majority of the recipient 100 (78%) were male. Most of them 100(82%) were married. Regarding their educational status one third of the study sample were college graduate and the lowest percent were read and writes. In relation to occupation more than one third were self-employee and the lowest percent were student. Regarding duration since starting renal transplantation it has been noticed that less than half of RTRs were (1-2) years. These results indicate that the recipients who wear newly transplantation were compliance to the follow – up (the researcher). The study revealed that majority 78 (78 %) of recipient were early referral to dermatologist for all suspicious skin lesions. And 53(53%) of recipients were done monthly – examination of skin and lips. This finding indicated that any lesion appear on the recipients skin wear easy visible by them. Which lead them to attend to the outpatient clinic for follow - up program. This result is supportive evidence is available in the article that showed screening to detect skin tumors is most important. Periodic inspection of the entire skin, with emphasis on sun-exposed areas, by a dermatologist is mandatory (at least at yearly intervals).⁴ While the highest percent of study sample reveal not compliance to follow-up of screening methods for items (2, 4, 5,6,7,8,9,10 and 11). This finding is disagree with the study which is done by (kasiske , et al , 2000) who focus on the follow-up for screening methods for malignant neoplasm after renal transplantation by recipients.^{5,6} The results of the present study showed that there was no significant association between sociodemographical characteristic

(age, gender, level of education, and duration since transplant RTRs and screening methods for malignant neoplasm after renal transplantation. This finding indicated that all the study sample were not compliance to follow – up of screening methods of malignant neoplasm after renal transplantation. In addition to that the risk of skin cancer increases with age (> 50 years), cyclosporine, and duration of immunosuppression. Its incidence rises with time to 5% at 5 years, 16% at 10

years, and 52% at 20 years’ post-transplant. Skin cancer represents 40-60% of post-transplantation tumors, with up to 50% of all skin cancers being squamous cell. The male-to-female ratio is 4.8 to 1.3. It is closely linked to sun and ultraviolet exposure, the presence of HLA-B27 antigen and the degree of immunosuppression.⁷ This finding disagree with literature which was reported that screening methods for malignant neoplasm after renal transplantation should be follow – up by recipients ⁶ .

Table (1) Association between Screening Methods for Malignant Neoplasm after Renal Transplantation and RTRs Age.

Scores Age	Yes	No	Total	X ² obs.	Sig.
	F	F	F		
Less than 20	0	5	5	4. 999	NS
20 -29 year	1	5	6		
30 -39 year	2	13	15		
40 – 49 year	4	29	33		
50 – 59 year	3	26	29		
60 years and more	4	8	12		
Total	14	86	100		
P ≤ 0.05 df=5 X ² crit. = 11.070					

Table (2) Association between Screening Methods for Malignant Neoplasm after Renal Transplantation and RTRs Gender.

Scores Gender	Yes	No	Total	X ² obs.	Sig.
	F	F	F		
Male	10	68	78	0. 410	NS
Female	4	18	22		
Total	14	86	100		
P ≤ 0.05 df=1 X ² crit. = 3.841					

Table (3) Association between Screening Methods for Malignant Neoplasm after Renal Transplantation and RTRs Level of Education

Scores Level of Education	Yes	No	Total	X ² obs.	Sig.
	F	F	F		
Illiterate	2	9	11	1.601	NS
Reads and writes	1	4	5		
Primary	2	20	22		
Intermediate	2	15	17		
Secondary	2	17	19		
College	5	21	26		
Total	14	86	100		
P ≤ 0.05 df=5 X ² crit. = 11.070					

Table (4) Association between Screening Methods for Malignant Neoplasm after Renal Transplantation of RTRs Duration since Transplantation

Scores Duration	Yes	No	Total	X ² obs.	Sig.
	F	F	F		
Less than 1 year	2	2	22	9.193	NS
1 – 2	4	4	40		
3- 4	3	3	25		
5- 6	3	3	8		
7- 8	2	2	4		
11 or more	0	1	1		
Total	14	86	100		
P ≤ 0.05 df=5 X ² crit. = 11.070					

Conclusion

The study indicated that the majority of study sample not follow the screening methods for malignant neoplasm after renal transplantation and no significant association between screening methods and demographical characteristic of study sample (age, gender, level of education, and durations since transplantation. Therefore the researchers recommend that regular screening for cancer being available post – transplantation of all transplant recipients, in order to enable them to early intervention when cancer is detected.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adults Health Department, College of Nursing, Baghdad University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Study of Histological and Embryonic Changes in Chicken Embryos Treated with Hot Water Ginger Extract

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Abstract

In this study, two groups of chicken embryos treated with hot water ginger extract were injected into the airway area using a needle of 1 ml syringe, 13mm length and 30g on the seventh and thirteenth days of incubation respectively, The first group consisted of 30 fertilized eggs treated with hot water ginger extract (50 mg / egg) and 0.1 (0.2) ml. The second group consisted of 30 fertilized eggs treated with hot water ginger extract (100 mg / egg) and 0.1 (0.2) ML was studied histologically as the histological study included the study of the histological structure of the intestine . The results of the anatomical and histological study showed the appearance of deformed embryos where the eye was not completed. The man, the wing, added to the emergence of lower embryos and weight of control embryos for the embryos injected with the ginger extract of warm water as well as slow growth of the small intestine tissue and the damage of the flies and their lack of growth in some areas Fabric. We conclude from this study that the hot water extract of the ginger has a negative impact on the tissue of the small intestine in the chicken embryos, especially the villi.

Keywords : *Ginger extract , chicken embryos , small intestine.*

Introduction

The digestive system of birds is different from other animals by not possessing teeth and there is no chewing process in the mouth. The esophagus empties its contents directly into the crop where it is stored and mixed with mucus until it passes through the real stomach and then passes to the holding. It is a muscular organ containing some gravel and sand that works on Grind and break the food and then transferred to the small intestine and then the cecum and then the large intestine ends at the opening of the cloaca and then the external opening of the body ¹. The small intestine is the longest part of the gastrointestinal tract in birds. It consists of three regions: duodenum, Jejunum and ileum produce digestive enzymes and receive subsequent secretions of the liver glands and pancreatic secretion to supplement digestion ². Ginger is a herbaceous herb belonging to the Zingiber family. Its name is *Zingiber officinale* ¹⁵.

Ginger has a variety of therapeutic effects because it contains effective compounds, such as its effectiveness in the formation of sugar (antihyperglycemic), fat, inflammation and anti-vomiting ³. Ginger contains 34.13% crude protein, 4.02% fat, 4.07% ether extract, 4.02% raw fiber content, 13.75% moisture content, 7.64% ash content, and 1.036% vitamin C. It also contains Ginger on main metals such as Zn 64.0 mg / L Mn, 5.90 mg / L, Fe 279.7 mg / L, Cu 8.80 mg / L, Ca 280.0 mg / L and P 8068.0 mg / L. Ginger usually contains 1 - 3% of volatile oil, and a high amount of fiber, fat / oil, protein and essential minerals along with the therapeutic value of ginger root also contains a strong protein enzyme called zingibain. It has wide application in the field of bio-immunization and for the development of biologically fortified foods. Although ginger root has been used for several years as a medicinal herb to treat cancer cells and many other therapeutic purposes, it has been found without side effect ⁴. Ginger has more than 60 active ingredients, which have been roughly divided into volatile and non volatile compounds. Hydrocarbons predominantly monoterpenoid hydrocarbons and sesquiterpene include volatile compounds in ginger characteristic odor and taste of ginger. On the other

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hand, volatile compounds include gingerols, paradols, shogaols and zingerone. Zingerone is produced by the greenhouse of shogaols or gingerols and also while drying ginger directly(5

Materials and Method

The study was conducted in the laboratories of the Faculty of Education Girls / University of Kufa and Moffis al-Nur in Gammas / Al-Shamiya district / Diwaniyah province. The first experiments were treated with Warm water extract of ginger and the second was control group The incubation of eggs was divided into two groups, in addition to the control group, each group (30) eggs for each concentration placed in a Belgian-type Petersim incubator under temperature (38.5-37) m and relative humidity (85%). The eggs are kept at a temperature of 15 ° C until incubation ⁶. Preparation of the water extract of the roots of the ginger plant depending on the way, where he took 20 g of ginger powder added 200 ml of distilled water temperature of 45 ° C for extraction and then put the mixture in an electric mixer and mix the mixture for 15 minutes after the glass beaker containing ginger powder In a hot water bath to ensure that the distilled water temperature remains within the 40-45 ° temperature range for 24 hours and is filtered with Watman (No.1) filter paper to remove the plankton. The leachate is placed in the centrifuge (3000 cycles / min) for 10 minutes) For the purpose of separating the precipitant and obtaining a pure extract to transfer the leachate into glass containers Of the electric oven drying degree (40-45° C) and leaves the extract to dry then dried powder is transferred to the vial and opaque preserves the refrigerator until use. To calculate the weight of the dry matter, the following equation was adopted:

Dry material weight = Weight of beaker after extraction - The weight of the beaker is empty .

In order to complete the volume of 100 ml, a basic solution was obtained from which 100% 50% was prepared by taking 50ml of the basic solution and completing the volume to 100ml with distilled water. The same method was used in preparing the concentrations Other. The search parameters were arranged as follows:

Group I: Concentration of 50 mg / egg injected 0.1 ml.

Group II: Concentration of 50 mg / egg injected

with 0.2 ml dose. Group III: Concentration of 100 mg / egg injected with 0.1 ml dose.

Group IV: Concentration of 100 mg / egg injected 0.2 ml.

Total control 30 eggs fertilized. The fertilized eggs were injected at the first dose at 7 days of incubation after confirmation of the presence of the embryos, using the candle detector and determining the position of the air sac that represents the injection site. (100, 50) mg / egg and the size of a dose (0.2, 0.1) ml per concentration using a medical syringe with a capacity of (1) ml and a needle length of (13mm) cm and diameter (30g) After the injection of the extract, the hole is covered with wax and the eggs are returned to the incubator. After 48 hours of treatment, the eggs were extracted from the incubator Fetal abscess completely by breaking the egg from the broad side. The fertilized eggs are injected with the second dose again at the age of 13 days of the incubation period after confirming the vitality of the embryos using the light detector, determining the center of the air sac that represents the injection site, sterilizing the airway area with a 70% ethanol solution and punching the eggshell And then inject the water extract of the ginger with concentrations of 100, 50 mg / eggs and the size of a dose 0.2, 0.1 ml / eggs using a medical syringe with a capacity of (1) ml and a needle length of (13mm) cm and diameter (30g), after completion of injection of the extract is covered with wax and return the egg to the incubator After 48 hours of treatment, eggs were extracted from the incubator to extract the embryo Completely by breaking the egg from the wide side by means of scissors, and open the upper part of the egg and fetal extraction with embryonic membranes as the points were observed machines:

A clear examination of the limbs, head, body, and wings to visualize deformities if they exist or not. Histological examination of the delicate intestinal tissue.

Results and Discussion

Table (1) shows the hatching rate of the treated egg with ginger for the warm water of the fertilized egg at the age of 15 days of incubation after 48 hours of injection and the percentage of broiler eggs and mutilated eggs. It was observed that the concentration of 50 mg / egg and a dose of 0.2 ml after 48 hours of injection was found from the following 6 embryos:

The 2 embryos is decomposed, the embryos is similar to the 9-day embryo, the 1 deformed embryo wing The concentration of 100 mg / egg and dose 0.1 ml after 48 hours of injection was found from the following 8 embryos:

1 of the embryos decomposed, the number of embryos 1 did not complete the composition of one eye, 1 fetal deformed embryo(14).

Histological study:

Small intestine tissue changes at 9 days of incubation:

Histological structure of the small intestine in the control group the histological examination shows central venou vein, hepatocyte hepatic cells and blood vessels sinusoids Fig. (1)

Histological structure of the small intestine in the treated group with ginger extract of warm water at a concentration of (50 mg / eggs) and dose (0.1 ml) at 9 days of incubation The results indicated the weak growth of the four layers of the tissue with the lack of clarity of the layers as shown in Figure (2).

Histological structure of the small intestine in the treated group with ginger extract of hot water at a concentration of (50 mg / eggs) and a dose (0.2 ml) at 9 days of incubation Weak growth of the droplets can be observed in comparison to control group with growth of some villains as shown in figure (3). Histopathology of the small intestine in the treated group with ginger extract of warm water at a concentration of (100 mg / eggs) and a dose (0.1 ml) at 9 days of incubation The results of the microscopic examination showed that some of the follicles of the layer did not develop as the thickness of the muscle layer receded compared with the control group and other groups as shown in Figure 4. Histological structure of the small intestine in the treated group with ginger extract of warm water at a concentration of (100 mg / eggs) and a dose (0.2 ml) at 9 days of incubation ¹³. Small intestine histological changes at 15 days of incubation. Histological structure of the small intestine in the control group Histological sections of the intestine of the embryos show the four layers of the mucosa tissue, which is surrounded by epithelium, submucosa and muscularis externa serosa ⁵. 2.2.2: Histological structure of the small intestine in the treated group with ginger extract of warm water at a

concentration of (50 mg / eggs) and dose (0.1 ml) at 15 days of incubation (12) Note that the four layers of the milk tissue treated with the hot water extract of the ginger are marked with a concentration of (50 mg / egg) and a dose (0.1 ml) as shown in Fig. Histological structure of the small intestine in the treated group with ginger extract of warm water at a concentration of (50 mg / eggs) and a dose of (0.2 ml) at 15 days of incubation In this group, deformation and erosion of the tissue layers are shown with a lack of clearness of the villains in some areas compared to the control group as shown in figure (7). Histopathological structure of the small intestine in the treated group with ginger extract of warm water at a concentration of (100 mg / eggs) and dose (0.1 ml) at 15 days of incubation This group also shows the lack of clarity of the tissue layers as in the previous group compared to the control group (8) Histological structure of the small intestine in the treated group with ginger extract (100 mg / egg) and a 0.2 ml dose at 15 days of incubation. The histological section of this group shows general damage to the vesicles.

Conclusion

The results of the anatomical and histological study showed the appearance of deformed embryos where the eye was not completed. The man, the wing, added to the emergence of lower embryos and weight of control embryos for the embryos injected with the ginger extract of warm water as well as slow growth of the small intestine tissue and the damage of the flies and their lack of growth in some areas Fabric. We conclude from this study that the hot water extract of the ginger has a negative impact on the tissue of the small intestine in the chicken embryos, especially the villi.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Education for Girls / University of Kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of Certain Aspects and Health Issues that Encountered by Street Children and Adolescents in Kirkuk City

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Abstract

Street children refer to children who experience homelessness and live on streets. They are the most vulnerable group to political and economic changes. We conducted this study to assess the health problems that face street children in Kirkuk city as well as to identify the demographic characteristics of those children. A cross-sectional study was conducted from June 1, 2014 to April 1, 2015 in Kirkuk-Iraq. Data were collected in various settings including markets, streets, playgrounds, etc., a convenience sample of 150 children was selected by interviewing the children. Data analysis was done via using descriptive statistics, which included frequency and percentages. The findings of the study showed that 50% of the children aged more than 15 years of which, 80.7% were males, and 58% of them were refugees. Because of their being street children, poverty constitutes 81.3%. 50.7% of the children was selling wares, 59.3% of them had faced maltreatment, and 54.3% of the children had received treatment for headache. Poverty, low income, was the main reason that led children to work in streets because most of them were refugees. The children were mainly suffering from headache and back pain.

Keywords: *Street children, Poverty, Refugees.*

Introduction

The most vulnerable group to political and economic changes is children, especially at the state and community level as they cannot react to and interact with these changes in a way that adults can. That is because children need to be taken care of by adults so that they grow physically, develop their personality, progress, and have good health. However, for many reasons, a huge number of children populations of the world are not taken care of by adults. Hence, the majority of these children are obliged to live on the streets⁽¹⁾. Street children used to refer to children who experience homelessness and live on streets. On the other hand, homeless youth are often called street kids and/or street youth. The definition of street children is controversial,

in spite of that, the United Nations Children's Fund (UNICEF) concept is used by many practitioners and policymakers. "Any boy and girl were taken the street as a source of livelihood without care or protection or supervision by officials adults"². The World Health organization classifies street children according to four categories: first, children who reside on street, second children who leave their families and live on streets, hotels, shelters, or abandoned places, third, children who live at protection centers or orphanages, who are at risk of becoming homeless, fourth children who have weak or insubstantial relations with their families whose circumstances force them to spend nights outside their homes. These children live in transitional lifestyle and are susceptible to risk factors including inadequate nutrition, physical injuries, substance use, and sexual and reproductive health problems. These factors diminish the effectiveness of activities which direct street children. Street children are affected by many common diseases such as tuberculosis, skin diseases, dental problems, and parasitic diseases. However, these diseases can be

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prevented by providing basic needs and resources ⁽³⁾. Street children are constantly increasing worldwide ⁴. They have been greatly increasing in Iraq since the U.S.-led occupation began in 2003. According to the NGO Coordination Committee in Iraq (NCCI) ⁵, the main reason behind this huge increase in the number of street children is the deteriorating economic condition of the country. This study was conducted in Kirkuk City for many reasons including lack of specialized studies on issues of street children in Iraq, lack of accurate statistics on the problem size, scarcity of data on the characteristics of children in streets situation (i.e., how they spend their time, why they remain in the streets), neglecting these children, and prevalence of street children phenomenon in the above mentioned city. So that, this study was conducted to assess the health problems that face the street children in Kirkuk city as well as to identify demographic characteristics of those children and to explore some factors of the presence of street children in Kirkuk city.

Methodology

A cross-sectional study was conducted for ten consecutive months from June 1st, 2014 to April 1st, 2015. The current study was conducted in Kirkuk city which is located in the north of Iraq. Data were collected from various settings (locations) including markets, streets, playgrounds, parking, workplace, and abandoned structure. A convenience sample was taken (i.e. all children who were present at the time of conducting the study were invited to participate). Even though 160 children were invited to participate in the survey; however, 150 of them agreed to be enrolled in the study. All participants were informed that their personal information is preserved and the responses they provide remain anonymous. A questionnaire designed by the researchers was constructed after extensive review of related literature and studies ^(6,7) considering the specific aspects of the Iraqi culture. The data were collected by interviewing the children, using the mentioned questionnaire. The questionnaire consisted of five parts, demographic data which was composed of 7 items, conditions of housing and access to basic utilities which was composed of 2 items, involvement of street children in economic activities which was composed of 3 items, difficulties and hazards which was composed of 2 items, and health issues encountered by the children which was composed of 14 health issues. The content validity of the questionnaire was determined through a

panel of 8 experts. The questionnaire was pilot tested on 10 sample to test the readability of the instrument and ease and clarity in answering the survey questions. Participants of the pilot study were not involved in the final study. Data were entered and analyzed by using the statistical package for social sciences (SPSS, version 22). Categorical variables were presented in the form of frequencies and percentages.

Results and Discussion

Table (1). Out of 160 sample, 150 sample agreed to participate in the study with a response rate 93.7%. The mean (SD) age of participants was 14.3 (3.7) years. The finding showed that half (50%) of the study sample aged more than 15 years, while the lowest percentage (13%) aged <5 years, 80.7% of the study sample were males, the majority of them (91.3%) were children on the street and 58% of the study sample were refugees. The findings also showed that 67.3% of both children's parents were alive, while 10% of children had no parents (dead). Concerning the persons who were working in the family, brothers and sisters constitute the majority of them (96.0%). The main reason behind being street children was poverty (81.3%). Table (2) Regarding the place of living, it has shown that most of the children (78.7%) were living in a rented house, only 35.3% of the children live in a house with basic utilities like toilet, water system and electricity. Table 3 shows that around half (50.7%) of the children were selling wares, and 20.7% of them were beggars). The table shows that 30.6% of the children were not satisfied at all with the work they do. Table (4) Furthermore, the findings showed that 59.3% of the children had faced maltreatment, 28.7% of those were people mockery, followed by (24%) with violence. Table (5) The most commonly reported health issues by the students was headache (54.3%) as of children had received treatment for headache, 30.7% of them for back pain, 18.7% of them for dental problems followed by 14% for renal problems. The ongoing wars and blockade conditions have influenced the Iraqi society and its social composition in which hundreds of thousands of fathers have involved in the army and a larger number of them have martyred and captured. These situations had a significant impact on household incomes. The absence of fathers' role in families, which raised many family wise problems, reflected on child-rearing, loss of self-esteem and confidence of others, and sense of exposure to harm which forced many children to work and as a result led

to spread of the phenomenon of street children. In the current study, most of the specified street children were within 16-20 years old. This indicates that the majority of the samples were adolescents. The tasks of this age of people should focus on completing preparation for life's work, internalizing a belief system, finding the meaning of life, participating in the community⁽⁸⁾. However, this age group is deprived of these activities as a result of non-stable conditions through which Iraq has passed. In the developing countries, WHO put a proportion of girls among street children to be less than 30%⁽⁶⁾, the current study reported the same proportion of girls as recorded by WHO. Furthermore, a similar finding was reported from the Lusaka study which puts the proportion of girls at 20%⁽⁹⁾. This could be attributed to the social and cultural composition of Iraqi people, where girls are not allowed to work on streets and their work is limited to domestic works. Majority of children spent most of their time in the street, but who regularly go back to their homes at night. Contrary to that, a study in Zimbabwe conducted by UNICEF⁽¹⁰⁾, showed that the majority of the street children interviewed were children "of the street", who worked and slept on the streets. This may be explained by the fact that most of these children work because there is not enough food at home. More than half of street children were refugees, probably reflecting the observation of Uvin⁽¹¹⁾ who noticed that the number of street children may increase with the existence of violence. In the current study, internally displaced people (IDPs) were included as part of the surveyed children. The reason behind that is that many refugees fled to Kirkuk in summer of 2014, when the Islamic State (IS) occupied most of Iraq's Sunni areas, resulting in a population increase in tens of thousands who fled during the country's sectarian war in the period from 2005 to 2008. Almost two-thirds of the children were living with both parents. The determination of street children status is not just related to time on the streets, it also has a very vital family and collegial component

as suggested by Naterer and Godina⁽¹²⁾. Moreover, the findings of their study that conducted in Makeevka, indicate that the majority of street children had two living parents, but that their parents did not have a lot of authority over them. This indicated that there is no relationship between the absence of one or both parents and the presence of children in the streets. Street children pointed out a number of reasons for being on the streets including parents' death, family problems, and lack of parental care. Nevertheless, poverty appeared to be the basic reason for pushing children onto the streets. This could be attributed to the insufficient economic situation experienced by children as a result of their displacement to Kirkuk. The result of the present study is consistent with findings in the literature⁽¹³⁾. The findings disclosed that majority of children live in rental houses and a small number of these houses contained basic resources such as toilet, water, and electricity system. Most of the children were living in non-hygienic conditions that may affect directly or indirectly the psychological and physical health aspect for children which in turn expose them to health problems. Richard, et.al⁽¹⁴⁾ noticed similar factors in his study thereby predisposing street children that are vulnerable to health problems. Such problems could be reduced or solved by providing street children houses with appropriate resources and assets. A vendor like selling wares, tissues, plastic bag, etc., are the most prominent activities that children were involved in because of poverty which comes out as the most prominent reason for the children being involved in economic activities. This is in accordance with Peter, et.al findings⁽⁷⁾. Begging comes out as the second activity by street children because most of the children were young and they are more successful in arousing the compassion of local residents. About one-third of the children were not satisfied with the work they do. The reason behind this could be the society's perception, they believe that the society has a negative perception towards them (i.e., they perceive that society disrespects them as a result of the type of work they do).

Table (1): distribution of the study sample (N= 150) according to sociodemographic characteristic of Street Children

Characteristics	Frequency	Percent
	F	%
Age (Years)		
(<5) years	2	1.3
(6-9) years	15	10
(10-14) years	58	38.7
(15+) years	75	50
Total	150	100
Gender		
Male	121	80.7
Female	29	19.3
Total	150	100
Category of Street Child		
Children of the street	10	6.7
Children on the street	137	91.3
Home and street	3	2
Total	150	100
Current residence		
From city	63	42.0
IDPs	87	58.0
Total	150	100.0
The Family details of the children		
Both parents alive	101	67.3
Mother alive, father dead	26	17.3
Father alive, mother dead	8	5.3
Both Parents dead	15	10.0
Total	150	100.0
The persons who are working in the family		
Father	39	26
Mother	28	18.7
Father and mother	2	1.3
Brothers and sisters	144	96.0
The Reasons for Being Street Children		
Parents passed away	16	10.7
Family problems	16	10.7
Does not want to	1	0,7
Poverty	122	81.3
Lack of parental care	8	5.3

Table (2): Distribution of the study sample (N= 150) according to conditions of housing and access to basic utilities

The Places of living	Frequency	Percentage
Charitable institutions	3	2.0
In the street	1	0.7
In a mobile house	11	7.3
In a deserted building	17	11.3
Rental house	118	78.7
Availability of basic utilities within places where the children live	Frequency	Percentage
Toilet, water system and electricity	53	35.3
Toilet, water only	14	9.3
Toilet and electricity only	27	18
Toilet only	2	1.3
Water system and electricity only	2	1.3
Water system only	2	1.3

Table (3): Distribution of the study sample (N= 150) according to Involvement of street children in economic activities

Economic Activities of Street Children	Frequency	Percentage
Begging	31	20.7
Guarding Cars	18	12.0
Washing Cars	12	8.0
Selling Wares	76	50.7
Others	13	8.7
Total	150	100
Level of satisfaction by the street children with the work they do	Frequency	Percentage
Totally satisfied	52	34.7
Somewhat satisfied	52	34.7
Not satisfied at all	46	30.6
Total	150	100

Table (4): Distribution of the study sample (N= 150) according to Difficulties and hazards

Difficulties and hazards encountered by the street children:	Frequency	Percentage
Facing difficulties/maltreatment	89	59.3
Not facing difficulties/maltreatment	61	40.7
Total	150	100.0
Types of difficulties faced by street children:	Frequency	Percentage
Violence	36	24.0
People mockery	43	28.7
Health problems	3	2.0
Stresses	2	1.3
Weather conditions	1	0.7
Others	3	2.0

Table (5): Distribution of the study sample (N= 150) according to health issues that encountered by them

Children who received treatment for the various disease symptoms they may have had	Frequency	Percentage
Headache	68	54.3
Back pain	46	30.7
Dental	28	18.7
Renal	21	14
Asthmatic	21	14
Abdominal	19	12.7
Gastric	17	11.3
Hair Lice	7	4.7
Shortening breath	6	4
Cough	5	3.3
Skin Diseases	5	3.3
Chest pain	4	2.7
Other diseases	3	2
Ear	1	0.7
Intestinal	1	0.7

Conclusion

the poverty was the primary reason in pushing children onto the streets, most of these children were refugees. More than half of children faced difficulties

during their presence in the streets like people mockery and violence. The children in the streets were mainly suffering from a headache and back pain.

Financial Disclosure: There is no financial

disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, Kirkuk University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Carbimazole and its Effects on Thyroid Gland of Female Rabbits

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Abstract

The present study aimed to investigate the histological, histochemical changes of thyroid gland in case of induced hypothyroidism by carbimazole in domestic female rabbits. Histological results revealed many histopathological changes compared with the control group there are hyperatrophy of follicular epithelium, hemorrhage, edema and damage in the epithelium lining of the follicles. Histochemical examination of thyroid gland of control rabbits show the intensity and homogenous staining of colloid figure while the thyroid gland of female rabbits treated with CBZ for 30 days show decreased of normal distribution of glycoprotein inside follicles, the non homogenous cord like materials and less intensity of colloid figure, also the thyroid gland of rabbits treated with CBZ for 60 days show less homogeneity of colloid or absence of colloid in some follicles.

Key Word: Carbimazol, thyroid gland, rabbit

Introduction

The thyroid gland is a butterfly-shaped endocrine gland lying in the neck in front of the upper part of the trachea¹. The thyroid gland consists of two lobes connected by a narrow band of thyroid tissue called the isthmus, it is surrounded by a double connective tissue capsule, two pairs of parathyroid glands are located on the posterior surface of thyroid gland². The thyroid follicle or acinus, which is the structural and functional unit of the gland, it consists of a single layer of cuboidal epithelial cells, the follicular epithelium enclosing a central lumen containing a colloid substance rich in thyroglobulin an iodinated glycoprotein³. The follicular epithelium contains scattered parafollicular cells also called C cells contain small cytoplasmic granules representing the stored hormone calcitonin which regulate calcium concentration in blood⁴. Thyroid gland secretes three important hormones triiodothyronine T₃, thyroxine T₄, and calcitonin⁵. The extracellular storage of thyroglobulin in the follicular lumen is essential for maintaining constant

blood levels of thyroid hormones T₃ and T₄. Thyroid function is to synthesize the hormones T₃, T₄ which are important for growth, for cell differentiation and for the control of oxygen consumption and basal metabolic rate of cells in the body. Hypothyroidism is a deficiency of thyroid activity, it results from reduced secretion of both T₃ and T₄⁶. So, this study was carried out in order to demonstrate the histological and histochemical effects of thyroid gland in case of induced hypothyroidism in domestic female rabbits. Carbimazole is an antithyroid drug widely prescribed for treatment of hyperthyroidism. It is a 3-carbomethoxy methimazole derivative, metabolized to methimazole in the liver. Serum thyroxine, thyroid-stimulating hormone and thyrotropin-binding inhibitory immunoglobulins are decreased after 2, 4 and 6 weeks of carbimazole treatment⁷. Frenais et al.⁸ reported that carbimazole is common oral treatment for hyperthyroidism in cats. On the other hand, the use of carbimazole was associated with various adverse effects. Ali et al.⁹ showed that carbimazole produced mild necrosis of renal tubules in rats. Mar Azuela et al.¹⁰ mentioned that carbimazole was capable of inducing acute pancreatitis and cholestasis hepatitis in 33-year old female. Zaidi et al.¹¹ reported that carbimazole administration even in therapeutic dose during pregnancy and lactation resulted into alteration of the thyroid microstructure of

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the newborn. Pulmonary hemorrhage and necrotizing glomerulonephritis were associated with carbimazole therapy¹². Vilchez et al.¹³ reported that carbimazole therapy caused both minor (e.g. pruritus, rash, urticaria, fever and arthralgias) and potentially life-threatening (e.g. agranulocytosis, hepatotoxicity with severe cholestasis jaundice) effects. Carbimazole is an antithyroid medication which is generally used to treat hyperthyroidism¹⁴. Carbimazole is a prodrug of the active structure methimazole which keeps the thyroid peroxidase enzyme from coupling and iodinating the tyrosine deposits on thyroglobulin, consequently decreasing the generation of T3 and T4. Treatment with carbimazole typically proceeded for 12 to year and a half took after by a trial withdrawal. Also treatment with carbimazole was joined by numerous symptoms.¹⁵ observed that carbimazole treatment brought on some symptoms (e.g. pruritus, rash, urticaria, fever, arthralgias, agranulocytosis, hepatotoxicity with extreme cholestasis jaundice). Following treatment of patients with propylthiouracil and methimazole, proliferative cell nuclear antigen (PCNA) expression is markedly reduced, proposing that carbimazole have an antiproliferative effect. The proposed mechanism of methimazole activity is intracellular: it brings down the level of proliferating cell nuclear antigen (PCNA). PCNA advances specific apoptosis in some T lymphocyte clones^{16, 17} recorded that carbimazole has cytogenetic effect and increase the frequency chromosomal abnormalities in peripheral blood lymphocytes of ewe and ram sheep.¹⁸ showed that treatment with carbimazole caused suppression of neurogenesis and enhancement of DNA fragmentation in the hippocampus rat pups.¹⁹ reported that administration of methimazole was associated with agranulocytosis and hepatotoxicity, which are the two most significant adverse effects.²⁰ concluded that carbimazole increased lipid peroxides from both thyroid gland and serum. Large number of plants and their extracts are now used in medicine and treatment of various diseases. Due to the biological effects of these substances which have antioxidant properties, they are important in medicine. The roots of ginger (*Zingier officinal*) is an example of botanicals which play an important role in pharmacology and treatment of various diseases.²¹ showed that *Zingier officinal* improved the results in animals injected intraperitoneally by 5mg/kg busulfan solution.²² demonstrated that treating animals with deltamethrin and ginger revealed an improvement in the histological changes observed in animals treated

with deltamethrin. Examination of liver sections of ginger and metalaxyl treated animals revealed reduction of box and preservation of nearly normal histological structure with slight congested blood vessels and few cellular infiltration²³. revealed that ginger extract has protective effect against cyclophosphamide which cause induction of chromosomal abnormalities in somatic cells of mice.²⁴ showed that ginger has anti-mutagenic action against the anti-cancer drug Taxon genotoxicity. Ginger exhibit antioxidant properties formalin by the increase of SOD and CAT activities^{25,26}.

Materials and Method

The studied animals included 32 female mature rabbits were divided into four groups: two control groups for 30 and 60 days, two hypothyroidic groups for 30 and 60 days of treatment which were bred in the same Environmental condition. Hypothyroidism was induced by using carbimazole (5 mg/kg bw) dissolved in water and given orally by stomach tube daily through out the experiment while the control groups received normal saline.

Histological study :

Tissue samples were taken of thyroid gland, these specimens were placed in fixative 10% buffered formalin immediately upon removal from the body, after tissue processing and embedding in paraffin section were cut at 6 microns thickness then the slides were stained with hematoxylin and eosin stain.

Histochemical study :

Paraffin section 6 microns thickness stained with periodic acid-Schiff's reagent to demonstrate glycoprotein of thyroid follicles.

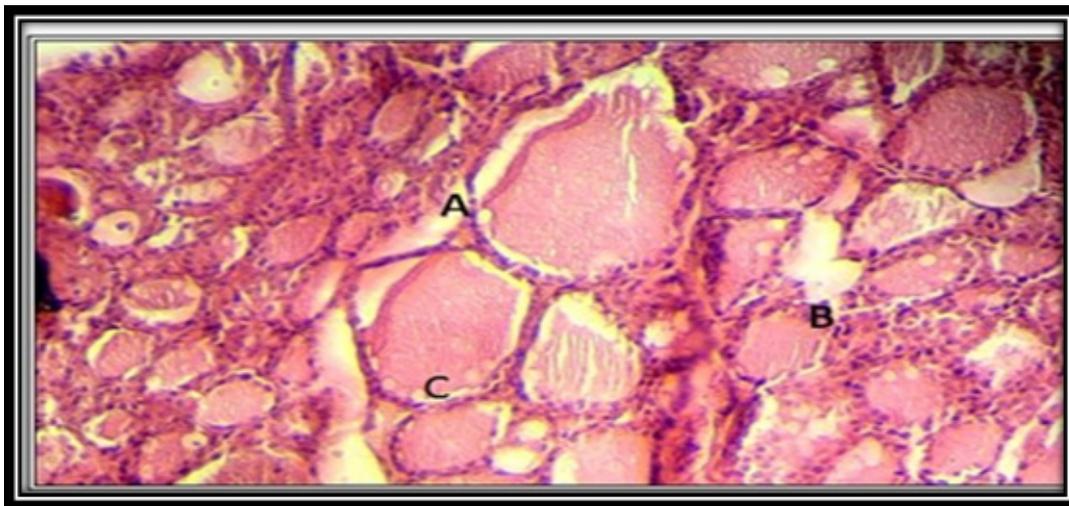
Results and Discussion

The results of histological study revealed histopathological alterations in thyroid gland in comparison with the control group figure (1) in case of hypothyroidism for 30 days of treatment with carbimazole figure (2) there is hyperatrophy of follicular epithelium and non homogenous colloid or cord like materials inside follicles, congested blood vessels and hemorrhage, however in case of hypothyroidism for 60 days of treatment with carbimazole figure (3) there is hyperatrophy of cell lining epithelium or follicular epithelium and infiltration of inflammatory cells with

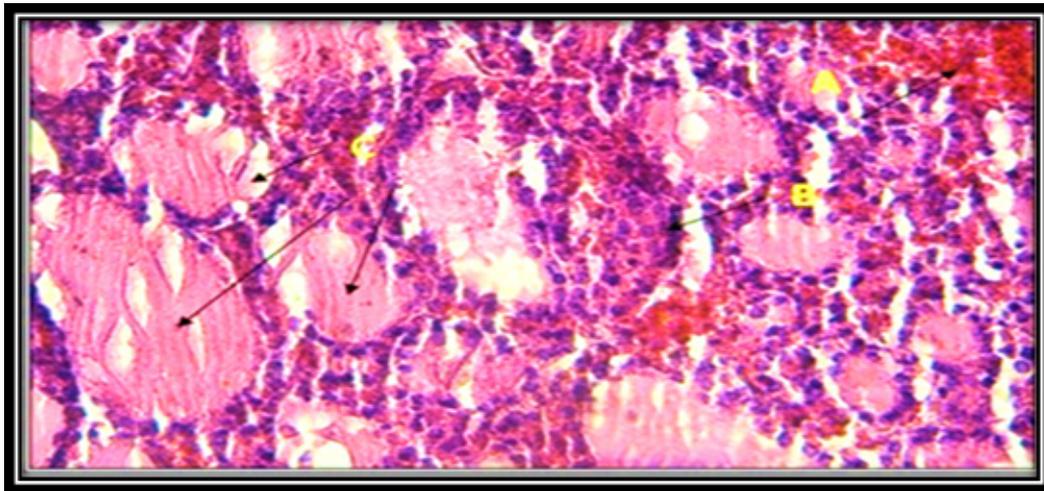
edema between connective tissue septa of thyroid gland and damage in the epithelial lining follicles, some follicles enlarged.

Histochemical examination of thyroid gland of control rabbits show the intensity and homogenous staining of colloid figure (4) while the thyroid gland of female rabbits treated with CBZ for 30 days show decreased of normal distribution of glycoprotein inside follicles, the non homogenous cord like materials and less intensity of colloid figure (5) also the thyroid gland of rabbits treated with CBZ for 60 days show less homogeneity of colloid or absence of colloid in some follicles figure (6) The histological results of thyroid gland after induction hypothyroidism for 30 and 60 days by CBZ reveal hyperatrophy of follicular epithelium²⁷ mention that CBZ which is anti thyroid drug inhibit the formation of T3 and T4, which stimulate the anterior pituitary gland to secrete more TSH and this hormone stimulate the growth of thyroid gland, results hyper atrophy of follicular epithelium, these results are in agreement with²⁸ found that induce hypothyroidism in mice by sodium fluoride characterized by follicular cells hyperaplasia and hyperatrophy and increase in vascularity also the results are in agreement with²⁹ induce hypothyroidism in virgin and lactating rabbits by CBZ, and agreement with³⁰⁻³² induce hypothyroidism in male rats stimulate

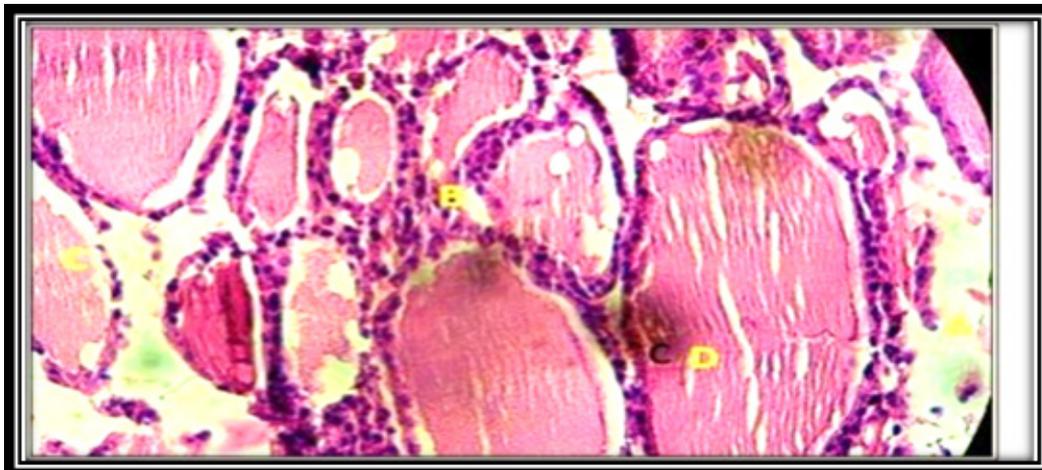
secretion of TSH which cause hyperatrophy of follicular cells, also agreement with³³ CBZ in human cause hyperatrophy of follicular cells. On the other hand the results reveal congested blood vessels in 30 days of treatment and hemorrhage in 60 days of treatment in thyroid tissue³⁴ mention that because inhibit T3, T4 secretion from thyroid gland in case of hypothyroidism is made to exert a negative feedback of TSH synthesis and increase secretion, this hormone stimulate the vascularization of thyroid gland and consequently the gland enlarged, TSH increase blood flow to thyroid gland and other organs and tissues³⁵ so this may cause destruction to the blood vessels results hemorrhage in thyroid tissue. Low level of T3 T4 lead to hypoxia that result bloody congestion hepatic dysfunction lead to blood congestion due to hypoxia³⁶. The results show edema in thyroid gland in female rabbits treated with CBZ for 60 days, because of the destruction of large follicles of thyroid gland due to induction of hypothyroidism for long period, some follicles appear empty with out colloid which may accumulated in thyroid tissue, in which there is increase the filtration of fluid out of the capillaries and edema due to accumulation of osmotically active mucopolysaccharides in the interstitial fluid³⁷ or due to change in the permeability of congested blood vessels resulting edema. low level of T3 T4 cause hepatocytes damaged lead to adema appearance³⁸.



Fig(1) section of thyroid gland control female rabbit showing, A=follicles B=parafollicular cells, C=colloid (H&E stain, 400x)

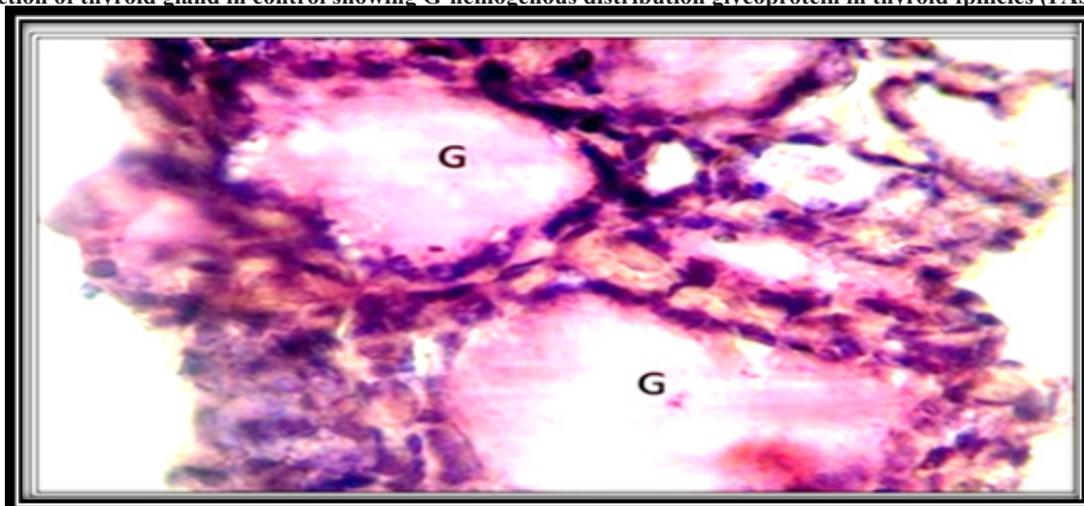


Fig(2) section of thyroid gland treated of female rabbit for 30 days showing A-hemorrhage B-hyperatrophy of follicular epithelium C-cord like colloid .(H&E,400X)

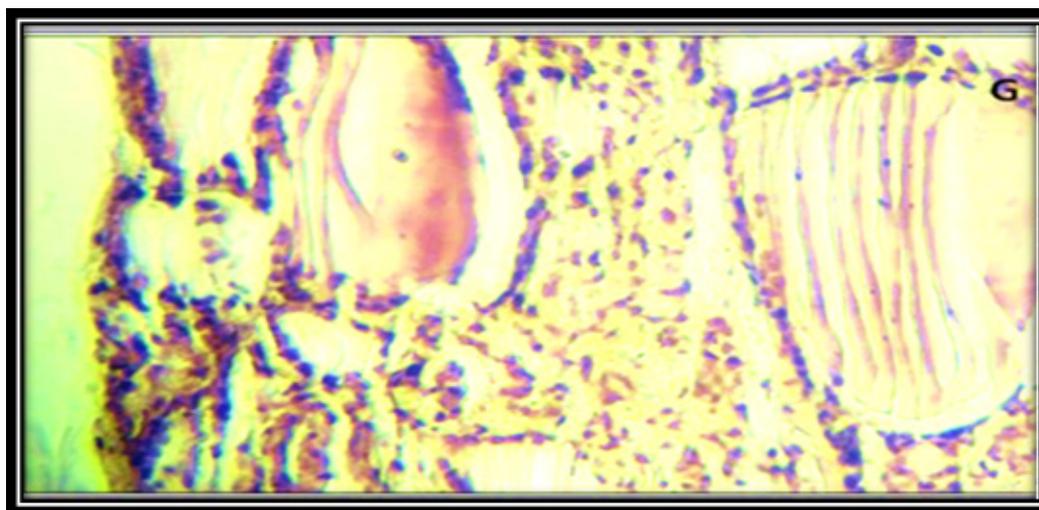


Fig(3)Section of thyroid gland of female rabbit treated for 60 days showing A-edema B-hyperatrophy of follicular cell ,C-damage of follicular epithelium ,D-cord like colloid (H&E stain 400X)

Fig(4) Section of thyroid gland in control showing G-hemogenous distribution glycoprotein in thyroid follicles (PAS stain400X)



Fig(5)Section of thyroid gland of treated female rabbit for 30 days showing G-cord like colloid (PAS stain 400X)



Fig(6) section of thyroid gland treated female rabbit for 60 days showing G-colloid less homogeneity AG-absent of colloid in some follicles (PAS stain ,400X)

Conclusion

Histochemical examination of thyroid gland of control rabbits show the intensity and homogenous staining of colloid figure while the thyroid gland of female rabbits treated with CBZ for 30 days show decreased of normal distribution of glycoprotein inside follicles, the non homogenous cord like materials and less intensity of colloid figure, also the thyroid gland of rabbits treated with CBZ for 60 days show less homogeneity of colloid or absence of colloid in some follicles

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of biotechnology/Al-Qasim Green University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Eating Disorders and its Related Factors among Adolescents at Secondary Schools in Al-Basra City

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Abstract

Objectives: To assess the prevalence of eating disorders and the related factors among adolescents at secondary schools in Al-Basra city. Also to determine the gender differences of eating disorders and to find out the relationships between the prevalence of eating disorders and adolescents' demographic characteristics such as: age, gender, and socioeconomic status. A systematic random sample of (520) student's is selected throughout the use of probability approach. The study is carried out at secondary schools in AL-Basra City. A questionnaire designed by researcher, scales were adopted and modified through extensive review of relevant literature. Several related factors also were assessed. (66.7%) of secondary school students have anorexia nervosa moderately, (47.9) bulimia nervosa moderately, (30.2%) have binge eating moderately. The prevalence of anorexia nervosa was higher in female than male. Anorexia nervosa is moderately prevalent among secondary school adolescents in Al-Basra City. Incidence of anorexia nervosa in female is greater than in male. There were several biological, psychological, emotional and social factors that related with eating disorders among secondary school adolescents in Al-Basra City. There is strong positive relationship between anorexia nervosa and students' gender While there is no significant relationship between gender and other eating disorders.

Keywords: eating disorders, adolescent.

Introduction

Eating disorders considered serious medical conditions characterized by a lot of changes in eating behaviors, those changes such as food obsessions, change in body weight and shape. Physical and mental health may be affected by those disorders: sometimes, they may be fatal ¹. Eating disorders are complicated and influence a wide range of individuals. The risk factors of eating disorders are biological, psychological, and sociocultural factors. Each person has different factors and different interaction, so two persons with the similar eating disorder may have exceptionally different points of view, encounters, and side effects. Nonetheless, researchers have located huge similarities in understanding a portion of the main dangers for growing eating disorders ². They're most public in

societies that emphasis on body image and weight and can influence individuals of all sex, raceway, ages, and ethnic background knowledge ³. The term 'anorexia nervosa' (AN) was first introduced into medical literature in 1874 by Dr. William Gull, reports of self-starvation may date back to times of early Christianity ⁴. The term anorexia comes from 2 Latin words that mean "nervous inability to eat."⁵. Anorexia nervosa is considered to be one of the highest mortality rates than other psychiatric diseases ⁶. Bulimia nervosa is an eating disorder usually characterized by periods of bingeing—or excessive overeating—followed by some kind of compensatory behavior. ⁷. There are two common kinds of bulimia nervosa, and they are (Purging and Non-Purging) ⁸. Individuals with binge eating disorder eat uncommonly a lot of food in a brief timeframe and feel lost control and blame over these bingeing experiences. Researchers gauge that up to (60%) of individuals who fight with BED are female. Without assistance, the long-term results of binge eating like: increase in weight, hypertension, coronary illness, and diabetes ⁽⁹⁾. Studies in the literature list some risk factors of behaviors that may

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lead to eating disorders in adolescents, such as: a) body dissatisfaction – a profound dislike of one’s own body¹⁰, b) inadequate nutritional status¹¹. Individual risk factor researches concentrating on explicit eating disorders diagnosis have recognized a few risk factors for each eating disorder. For instance, anorexia nervosa has been related with “childhood feeding problem and premorbid perfectionism”^{12,13}. Although some proof recommends couple of little differences among anorexia nervosa and Bulimia nervosa and among bulimia and binge eating disorders on this characteristic¹⁴. Personality traits, for example, “novelty-seeking and neuroticism” likewise seem to be related in the etiology of bulimia nervosa and binge eating disorders¹⁵. Eating disorders don’t have a solitary, identifiable reason. There are mental, biological and social risk factors which may increase the probability of developing an ED. Eating disorders can happen over all ages, sex, and socio-economic groups¹⁶.

Materials and Method

A descriptive study is carried to assess the prevalence of eating disorders and to identify the factors related to eating disorders among adolescent at secondary schools in Al-Basra city. The study is carried out at secondary schools in AL-Basra City Center for the morning and academic year (2018-2019). A systematic random sample of (520) student’s is selected throughout the use of probability approach. There are selected (9) schools of the total number of schools, (5) schools for female and (4) schools for male and selected (60) students for the purpose of the study. Select (10) students from each class from first to sixth stages. A questionnaire designed by researcher, scales were adopted and modified through extensive review of relevant literature The questionnaire consists of three parts for data collection include the following:

Part I: This part contains the demographical data which include (age, gender, stage, income, height and weight).

Part II: This part contains 3 axes about eating disorders test

- A. Anorexia Nervosa Test
- B. Bulimia Nervosa Test
- C. Binge Eating disorder test:

Part III: This part contains the Factors Associated

with Eating Disorders divided in to two Dichotomous scales and scored as follow: (1 for yes or 0 for no) and consists of 3 parts include:

Axis 1: Biological factors from item (1to 5)

Axis 2: Psychological factors from item (6 to 20)

Axis 3: Social factors from (21 to 30).

A Probability random sample of (60) male student for pilot study of one secondary school in the Center of AL-Basra City. The collected questionnaire was analysed to determine whether the data collected helped the researcher in meeting the objectives of the study apart from testing the reliability and validity of the questionnaire put across to the target group

The validity of the questionnaire was adjudged using Cronbach’s coefficient alpha calculated to test the reliability and internal consistency of the responses obtained from the respondents. The data is collected through the use of a developed questionnaire (Arabic version) and an interview with student’s self-administration as a mean for data collection. The information was analysed in this study by using social of statistic concerning background it called (SPSS -version 24). The following statistical information analysis approaches are used in arrange to analyse and estimate the consequences of the study (A. Descriptive Data Analysis Approach Such approach a consisted of the following:(Statistical tables:Frequencies and percent, Mean, Standard Deviation)B. Inferential Data Analysis: (A.Cronbach Alpha Correlation Coefficient, B.Independent t-test, C. Body Mass Index (BMI)

Results and Discusion

The results show that more than half of sample was female students (57.7%) while male students were 42.3%, the distribution of the sample according to their age; the finding reveals that students’ age of 12-14 years was 33.1%, and students with age group of 15-17 years were represent 47.1of sample, while those with age group of 18 years and more were represent 19.8%. 69% of the students were live in family with sufficient monthly income, 20.8% were associated with barely sufficient income, and only 10.2% of them were associated with insufficient monthly income. Students were selected equally according to the scholastic level; 15.4% was selected from the first intermediate and fourth secondary class; 90% was selected from second - third

intermediate and fifth –sixth secondary class. (27.7%) of the students were underweight, 11.2% of them were overweight, while those who are obese represent 1.7% obesity I and 0.4% obesity II. Table 1 shows the prevalence of anorexia nervosa among secondary school adolescents; the findings indicate that anorexia nervosa is prevalent severely among students with percentage of (21.5%). About two third of sample has the disorder of anorexia nervosa moderately (66.7%), and the remaining are haven't such disorder (Mild=11.7%). Table 2 indicates that 51.2% of the students are haven't bulimia nervosa as eating disorders, and 47.9% of them were showing they have bulimia nervosa moderately, while only 1% have severe disorder. Table 4 is showing that only 4.2% of adolescents are having binge eating as eating disorder, and 30.2% of them are experiencing the disorder moderately, while the remaining are haven't binge eating (65.6%). The results present the biological factors related with eating disorders among secondary school students; the table indicates significant factors that may contribute an eating disorder which they related to 'doing a diet regimen' and 'getting digestion disorders related to appetite and hunger' while remaining biological factors are showing no significant. The results indicate that psychological and emotional factors are more commonly related with eating disorders among secondary school students evidenced by significance of factors; the factors that are showing highly significant are related to 'Are you satisfied with the image or body that your body looks like?', 'Are you worried and sometimes depressed?', and 'Do you feel difficulty expressing your feelings and emotions, especially negative emotions such as fear, anger, sadness, and anxiety? The results present the social factors that are related with eating disorders among adolescents; the findings show that social factors may not contribute to eating disorder except the factor of 'Did you suffer from harassment about your weight from others?' that is showing a significant, that mean getting harassed through social contact has impact on adolescents and may contribute to eating disorders. Table 4 reveals that there is high significant difference between male and female adolescents regarding prevalence of anorexia

nervosa as eating disorder ($p= 0.004$) while there is no significant difference regarding other eating disorders (bulimia nervosa and binge eating) ($p= 0.269$ and 0.868). Table 5 presents the relationship between eating disorders and students' gender; the table indicates that there is strong positive relationship between anorexia nervosa and students' gender at $p\text{-value}= 0.001$. The highest percentage of sample (57.7%) is female. These result are consistent with the study of ⁽¹⁷⁾ in Iran their result indicate that most of the study subjects (52.2%) is female. Regarding age, the highest percentage of students (47.1%) are within age (15-17) years old. A study in Addis Ababa has supported the current finding that found the highest percentage of students (66.1%) within age (16–18) ⁽¹⁸⁾. Concerning monthly income, (69%) of the students are live in family with sufficient monthly income whereas another study revealed that (98%) of students belonged to middle class family ⁽¹⁹⁾. Regarding Scholastic Stage, the result indicate that students were selected equally according to the scholastic level; 15.4% was selected from the first intermediate and fourth secondary class; 90% was selected from second - third intermediate and fifth –sixth secondary class. This results were disagreeing with a study in Iran that show that the highest percentage of students (36.3%) were in 9th grade ¹⁷. The finding reveal that the highest percentage of students (59.0%) have normal body, this finding was agree with a study that found that (71.9%) of adolescent are normal too.¹⁸ The results show that two third of sample has the disorder of anorexia nervosa moderately (66.7%). This result is in contrast with Souto and other in their research they found that (33%) of sample have anorexia nervosa ²⁰, and another previous studies in Jordan that show there is no anorexic cases were found ⁽²¹⁾. One purpose behind such a difference could be because of the use of various instruments or utilization of clinical examinations in different studies. The results show that highest percentage of students (51.2%) are haven't bulimia nervosa as eating disorders. Like in a study on adolescents in Spain show the prevalence of bulimia nervosa (0.57%).²², And the same as in Maroc study show that the prevalence of bulimia was (0.8%) (1.2% in female and 0.1 in male subjects)²³.

Table (1): Prevalence of Anorexia Nervosa among Students

Anorexia Nervosa	f	%	M	SD
Mild	61	11.7	2.10	0.569
Moderate	347	66.7		
Severe	112	21.5		
Total	520	100		

Table (2): Prevalence of Bulimia Nervosa among Students

Bulimia Nervosa	f	%	M	SD
Mild	266	51.2	1.50	0.519
Moderate	249	47.9		
Severe	5	1		
Total	520	100		

Table (3): Prevalence of Binge Eating among Students

Binge Eating	f	%	M	SD
Mild	341	65.6	1.39	0.568
Moderate	157	30.2		
Severe	22	4.2		
Total	520	100		

Table (4): Significant Differences between Students' Gender and Prevalence of Eating Disorders among them (N=520)

Gender Eating Disorders		No.	M	SD t-value	Independent Test		
					P ≤ 0.05	Sig.	
Anorexia Nervosa	Male	220	40.30	9.66	-2.948	0.004	H.S
	Female	300	50.74	9.01			
Bulimia Nervosa	Male	220	37.41	7.93	-0.484	0.269	N.S
	Female	300	37.78	8.94			
Binge Eating	Male	220	16.98	6.07	-0.166	0.868	N.S
	Female	300	17.07	6.30			

Table (5): Correlation among Eating Disorders with Students' Gender (N=520)

Correlation		Gender	Anorexia Nervosa	Bulimia Nervosa	Binge Eating
Gender	Pearson Correlation	1	0.128**	0.021	0.007
	Sig. (2-tailed)	--	0.003	0.629	0.868
Anorexia Nervosa	Pearson Correlation	0.128**	1	0.220**	0.007
	Sig. (2-tailed)	0.003	--	.000	.870
Bulimia Nervosa	Pearson Correlation	0.021	0.220**	1	0.430**
	Sig. (2-tailed)	0.629	0.000	--	.000
Binge Eating	Pearson Correlation	0.007	0.007	0.430**	1
	Sig. (2-tailed)	0.868	0.870	0.000	--

Table (6): Correlation among Eating Disorders with Students' Age, scholastic stage, monthly income (N=520)

Correlation		Age	Anorexia Nervosa	Bulimia Nervosa	Binge Eating
Age	Pearson Correlation	1	0.019	0.024	0.079
	Sig. (2-tailed)	--	0.667	0.589	0.071
Anorexia Nervosa	Pearson Correlation	0.019	1	.220**	0.007
	Sig. (2-tailed)	0.667	--	0.000	0.870
Bulimia Nervosa	Pearson Correlation	0.024	.220**	1	0.430**
	Sig. (2-tailed)	0.589	.000	--	0.000
Binge Eating	Pearson Correlation	0.079	.007	0.430**	1
	Sig. (2-tailed)	0.071	0.870	0.000	--
Correlation		Stage	Anorexia Nervosa	Bulimia Nervosa	Binge Eating
Stage	Pearson Correlation	1	-0.038	-0.045	0.040
	Sig. (2-tailed)	--	0.384	0.301	0.366

Table (6): Correlation among Eating Disorders with Students’ Age, scholastic stage, monthly income (N=520)

Anorexia Nervosa	Pearson Correlation	-0.038	1	0.220**	0.007
	Sig. (2-tailed)	0.384	--	0.000	0.870
Bulimia Nervosa	Pearson Correlation	-0.045	0.220**	1	0.430**
	Sig. (2-tailed)	0.301	0.000	--	0.000
Binge Eating	Pearson Correlation	0.040	0.007	0.430**	1
	Sig. (2-tailed)	0.366	0.870	0.000	-

Conclusion

Anorexia nervosa is moderately prevalent among secondary school adolescents in Al-Basra City. Incidence of anorexia nervosa in female is greater than in male. There were several biological, psychological, emotional and social factors that related with eating disorders among secondary school adolescents in Al-Basra City. There is high significant difference between male and female adolescents regarding prevalence of anorexia nervosa while there is no significant difference regarding other eating disorders. There is no significant relationship between eating disorders and secondary school students’ Age, scholastic stage, and monthly income. Other studies of eating disorders of different age groups and more emphasis on the effect of eating disorders among a large segment of society. Future studies about eating habits in adolescents in Al-Basra City are required.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Basra /College of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

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Histopathological Study for Experimentally Induced *Malassezia* Causing Pityriasis Versicolor in Laboratory White Rats (*Rattus Norvegicus*)

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Abstract

The study aimed to evaluate histopathological changes associated with pityriasis versicolor by animal models experimentally injected with *Malassezia* species spores isolated from patients of Basra province and variable injecting pathways (intradermally, spotted and scratching injection) was applied. Histopathological findings of skin specimens related to the infected rats with *Malassezia furfur* by intradermally method showed severe infiltration of inflammatory cells on superficial layer, the epidermis with moderate hyperkeratosis while the dermis appeared as dense connective tissue with large amount of irregular collagenous fibers interspersed with fibroblasts and variable number of hair follicles with associated sebaceous glands. Recent findings referred to severe histological alterations in skin sections related to infected rats with *Malassezia* species by scratching method, include activated keratinocytes, destruction of epidermal barrier, heavy proliferation of keratinocytes, no dermal papillae observed, the infection was specific for keratin layers, but inflammation extend to dermis and subcutaneous layers through invasion the hair follicles. Sections from shoulder and back of infected rats showed destruction and maceration of epidermis start from stratum corneum, spinosum showed proliferation and acanthosis. Moreover, results revealed to the *M.furfur* as lipophilic yeast colonized around the sebaceous glands, the destruction and atrophied sebaceous glands associated with changes in hair follicles diameter.

Key words: *Malassezia*, pityriasis versicolor, histopathology

Introduction

Among lipophilic dimorphic yeasts, *Malassezia* are part of the microbiota (microorganisms found on normal skin), that are colonizing the human skin as normal flora which can affect and change their saprophytic state, enabling them to invade and penetrate the stratum corneum layer of the skin and behave as pathogens under certain condition, e.g. a hot climate, perspiration a lot, and a weakened immune system¹. Now a days, it

is very well documented that the colonization of skin by *Malassezia* spp. can cause various type of skin diseases, e.g. pityriasis versicolor, *Malassezia* (Pityrosporum) folliculitis, seborrheic dermatitis, dandruff, steroid acne, atopic dermatitis and psoriasis²⁻⁴. The macroscopic features of the predominant colonies of *Malassezia* species are focused on the shape, size, color, texture, and the characteristics of the medium around them⁵. Various skin structures may harbor their own type of microbes such that the stratum corneum, keratinocytes, hair shaft, follicles, sweat glands, apocrine glands and sebaceous glands may each have their own type of unique microorganisms which colonize there, *Malassezia* yeasts reside mainly in the stratum corneum, though some authors suspect their presence in the hair follicles which could act as a reservoir and thus accounts for the

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recurrence of PV after treatment^{6,7}. Pityriasis versicolor is a common yeast infection of the skin, characterized by the appearance of flaky discolored patches. It is the prototype *Malassezia* infection. Pityriasis versicolor is sometimes called tinea versicolor, although the term tinea should strictly be used for dermatophyte fungus infections⁵. Study by⁸ confirmed earlier research in which no difference in number of melanocytes between PV skin whether hypo pigmented or hyper pigmented and normal skin was found but rather observed a difference in the dispersion and arrangement of melanosomes by the melanocytes. Moreover the microscopic observations on the PV scales adds a distinguishing features to its diagnosis and helps differentiate it from the various skin disorders that may have similar clinical features to PV. Pityriasis versicolor is a superficial chronically recurring fungal infection of the stratum corneum layer of human skin, characterized by scaly, dyspigmented irregular macules most often occurring on the trunk and extremities¹. Microscopy of the cultured yeasts that is a colony also referred to varies species.

Materials and Method

Study group

Ninety five patients (40 females and 55 males) suffering from pityriasis versicolor skin disease who attended dermatology outpatient department (DOPD) of Al-Sader Teaching Hospital, Al-Basrah Teaching Hospital and Al-Faihaa Hospital were included in this study (from January 2016 to November 2018). Medical ethics requirements are fully followed during this study especially the collection of the samples under the supervision of the dermatologist and the approval of the patients. The demographic characteristics include gender, age, smoking, nutrition, marital state, education level and residency was recorded, clinical characteristics features of the disease sub divided into severity as mild with few macules(3-5)at one site, moderate more than 5 macules localized at certain area and sever that multiple patches involved large percentage of body surface, this decision had been taken under the supervision of the dermatologist.

Sample Collections

Ninety five samples were collected from patients with pityriasis versicolor in the form of skin scrapings took by sterile surgical blade, then transported in sterile containers and processed at the Mycology

section of the Department of Microbiology. Direct and indirect methods were applied for diagnosis¹. Direct examination was done under microscope (40X) AL-Hammadani, (1997). Indirect exam done with suitable steps depend on Shokohi, (2009). Microscopical features of *Malassezia* cells according to the ellipsoidal to short cylindrical shape, diameter(4–5 × 2–2.5) mm and monopolar budding on a broad base was recorded so the diversity of *Malassezia* species was assessed. This include *M. furfur*, *M. sympodialis*, *M. slooffiea*, *M. globosa* and *M. restricta*⁵.

In Vivo study

The in vivo study was suggested necessary and useful to prove the germ theory and to document any suggestions that interest in relation between pityriasis versicolor and their possible yeast as causative agents, as well as to identify the possibility of experimentally induce of pityriasis versicolor (human being origin)in animal model and to determine the similarity between human PV and rat PV. The animals used was the rats (*Rattus norvegicus*) about (20)rats , aged between (1) months, weighted (150-200) gm grew under standard conditions, subdivided into three groups (6) rats for each group except 2 rats for control group. First group infected by Intradermal injection , second infected by Spot technique and third group Infected by Prick technique (scratching) (streaking the epidermal layers) Fig (2). Control group injected by normal saline. All above mentioned groups divided into subgroups and each one infected (except control group) separately by:

(1)ml of *Malassezia furfur* suspension (10^8 - 10^9 cells) of culture overnight.

2- (1) ml of *Malassezia globosa* suspension (10^8 - 10^9 cells) of culture overnight. The pathogenicity and clinical complications of the rats skin were observed after two weeks of infection.

Results and Discussion

For histopathological study, skin samples from each rat related to experimental and control group with oval shaped, 10mm diameter was cut off, Fixed in 10% formalin, processed for light microscopic exam, sections stained by Hematoxylin- Eosin stain.

Intradermal injection

Histopathological findings of skin specimens

related to the infected rats with *Malassezia furfur* by this method showed severe infiltration of inflammatory cells on superficial dermis layer, the epidermis with moderate hyperkeratosis while the dermis appeared as dense connective tissue with large amount of irregular collagenous fibers interspersed with fibroblasts (only their nuclei) noticed and variable number of hair follicles with associated sebaceous glands, moreover, results revealed to follicular abnormalities included atrophy hair follicles, degeneration, pigmentation, some with keratotic plugs, large number of pigment-containing cells also shown in connective tissue surrounded the skeletal muscles beneath the hypodermis, large blood vessels were located in the basal region of hypodermis while congested capillaries were found through this layer (Fig1, 2).

Spot technique:

Light microscopic examination on skin sections regarded to infected rats with *Malassezia furfur* by this method at variable sites of leg, shoulder and back showed the changes tend to be minimal or reside in epidermis layer, most changes was focal aggregate of inflammatory cells near the superficial layer of epidermis, hyperplasia with vacuolated keratinocytes, inflamed dermis, mild perivascular and infiltration of macrophage, neutrophils and number of mast cells, mild hyperkeratosis and acanthosis with regular deposition collagenous fibers and atrophy in most hair follicles and shrinking of sebaceous glands (Fig 3,4).

Prick technique (scratching)

Recent findings referred to severe histological alterations in variable skin sections related to infected rats with *Malassezia* species by scratching method (fig 1), these changes include activated keratinocytes, destruction of epidermal barrier, heavy proliferation of keratinocytes, infected hair follicles, no dermal papillae observed, the infection was specific for keratin layers, but inflammation extend to dermis and subcutaneous layers through invasion the hair follicles, destruction and maceration of epidermis start from stratum corneum, moreover acanthosis, neutrophils and macrophages with non-specific defense cells like mast cells also shown at different sites of infected region (Fig 5,6).

Control group without any infection

Observations on normal skin sections related to

control rats showed that the skin consist of surface epidermis and dermis layers, the epidermis extend downward to form the dermal papillae which regarded the junction between the two layer, beneath the dermis, hypodermis or (subcutaneous) layer located composed of loose connective tissue and pads of adipocytes. The epidermis was stratified squamous keratinized epithelial while the dermis of normal skin was more cellular, vascularized with coarse bundles of collagenous fibers distributed in regular orientation, the epidermal derivatives like hair follicles with root sheaths appeared normally, sebaceous glands with their excretory ducts located in the dermis, in addition to large number of blood vessels and capillaries, this layer rested on bundles of smooth muscles. The present study revealed to the hyperkeratosis, parakeratosis with wavy stratum corneum, vacuolation of keratinocytes and epidermal cells extend to the external root sheath cells. These results related to the reaction between the fungus when attached to the upper surface layer and the host skin, which agreed with ^{14,11} that showed the same reports and related it to the host reaction with *Malassezia* species especially *M.furfu*. Heavy infiltration of inflammatory cells in the upper of dermis layer are more obvious in biopsy from rat skin infected with *M.furfur* through scratching and intradermal injection pathway with *Malassezia* yeast than that infected by spot method, this result clarified the effect of spores and the action of agent reaction in the host the infection start always by adherence of the fungal to the surface layer. Other studies showed that adherence of spores followed by the spread within the tissue, this process accompanied by fungal enzymes secretion and other pathogenic factors. Moreover, our results clarified that keratinocytes hyperplasia, proliferation at the surface layer, around infundibulum and hair follicles, this may be related to the tissue immune response or to the activation of keratinocytes and other epidermal cells caused by attachment of fungus, these results agreed with others who clarified that *Malassezia* species infection caused destruction to skin barrier, specific immune responses was initiated, moreover the infiltration of inflammatory cells included the lymphocytes, neutrophils, polymorphonuclear cells (PMN), macrophages and mast cells. Microscopic observations showed that the fungus penetration appeared obvious and first occur at the stratum corneum, then reached the dermis and dermo-epidermal junction layer in most infected rat skin, this may be resulted through hair follicles invasion

that lead to host response, or to the virulence of fungus, species and strain, finally to the host defense itself. Furthermore, the results of infected rats with scratching method showed that most histopathological changes occur with maceration of skin, then severe changes take place, this may be illustrated that the beginning of infection start with the ability of yeast to attach to stratum corneum and the defect of superficial layer facilitate the penetration and accelerate the fungus reached to the lower layer of stratum corneum. Result was confirmed variability in keratin deposition pattern and highly keratinocytes proliferation, may regarded to the adherence of fungus with these cells directly and the finding agreed with studies revealed to the alteration of the keratin deposition and to a grave changes of their cornified envelope. Observations showed that any part of the rats body either shoulder, back or legs have the ability to be infected with *Malassezia* species, the scratching and maceration incision in the skin was suitable to establish the infection, this may be due to wide regions which offer more appropriate area for fungus to entry and growth that appeared more suitable than the spot skin. This result is agreed with Kaya, *et al.*, (2009) who found that these methods offered more entry points that originating from the infundibulum follicular epithelium, various patterns of hair involvement can develop depending on the fungus species. Our results showed that the infection extend to the hair follicles and adjacent sebaceous glands, this may be considered that *M.furfur* was lipophilic yeast and implicated in the pathogenesis of seborrheic dermatitis and *Malassezia* folliculitis¹¹. Other investigators described that the hair follicles can serve as points of entry for fungi into deep layer, sometimes the rupture of hair follicles caused granulomatous inflammatory reaction with necrotic materials contain fungal elements, neutrophils and macrophages¹².

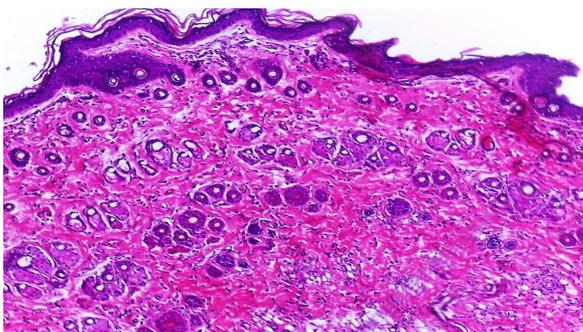


Figure (1). Section on infected rat skin with *Malassezia furfur* showing moderate hyperkeratosis, sever sign of inflammation(), dilatedirregular rete ridge, hair follicles with variable size, collagenous fibers and fibroblast. H&E stain (10X).

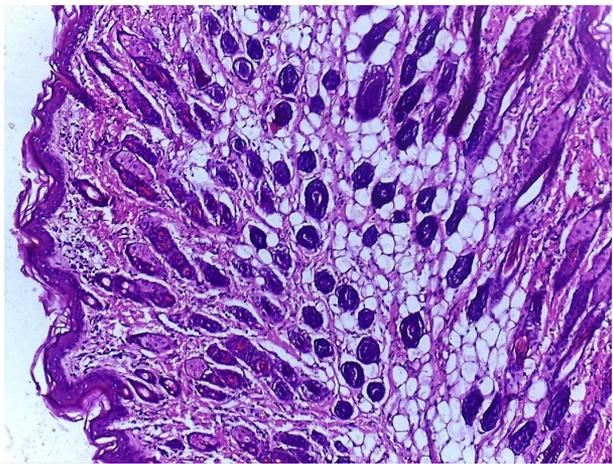


Figure (2) Infected rat skin with *Malassezia furfur* showed thin epidermis, sever dermatitis ,congested hair follicles, simple alveolar shrinkage sebaceous gland with large amount of adipose tissue and strand of collagen fibers distributed randomly. H&E stain (10X).

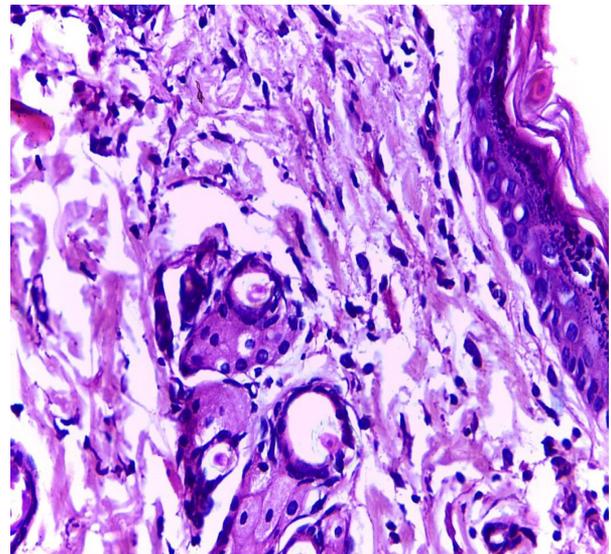


Figure (3) Infected rat skin with *Malassezia furfur* showed thin epidermis, H&E stain (40X).

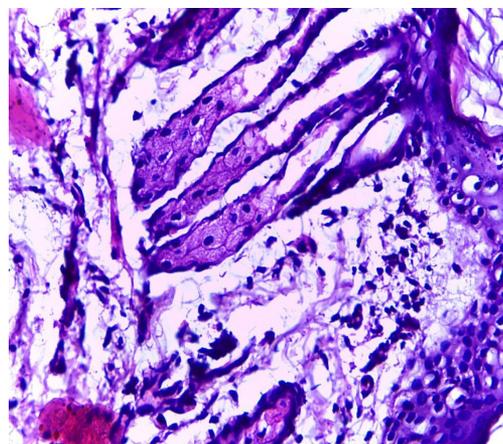


Figure (4). Section in infected rat skin with *Malassezia furfur* showed focal aggregation of inflammatory cells , vacuolated keratinocytes,shrinking sebaceous glands. H&E stain(40X).

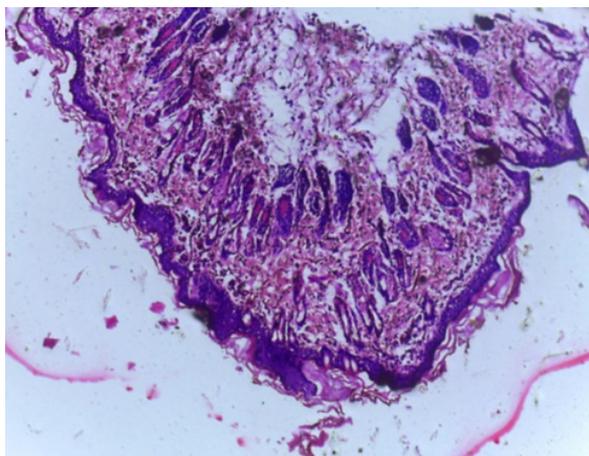


Figure (5). Section on infected rat skin with *Malassezia furfur* showed destruction of epidermis, sever inflammation (dermatitis) extended to the deep layer, deposition of degenerated and atrophied most of hair follicles. H&E stain (10X).

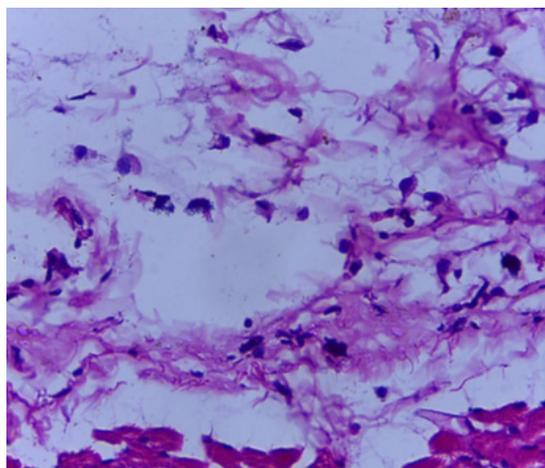


Figure (6). Section on infected rat skin with *Malassezia furfur* showed the subcutaneous layer with variable inflammatory cells, mast cells, loose connective tissue and sections of smooth muscle. H&E stain (40X).

Conclusion

Recent findings referred to sever histological alterations in skin sections related to infected rats with *Malassezia* species by scratching method, include activated keratinocytes, destruction of epidermal barrier, heavy proliferation of keratinocytes, no dermal papillae observed, the infection was specific for keratin layers, but inflammation extend to dermis and subcutaneous layers through invasion the hair follicles. Sections from shoulder and back of infected rats showed destruction and maceration of epidermis start from stratum corneum ,spinousum showed proliferation and acanthosis. Moreover, results revealed to the *M.furfur* as lipophilic yeast colonized around the sebaceous glands ,the destruction and atrophied sebaceous glands associated

with changes in hair follicles diameter.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Microbiology, Collage of Medicine, University of Basrah, Basrah., Iraq and all experiments were carried out in accordance with approved guidelines.

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Histopathological Study of Infection with helminthic parasites Intestinal of Fishes Culture in Tikrit City, Iraq

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Abstract

Collected in the period between September 2017 to March 2018 a total of 120 *Cyprinus carpio* fishes from one of fish farms in Tikrit city. These fishes were examined to reveal that infected worm intestinal. It has been recorded the total percentage infection 6.6%. The results find out that three species of worms involving two cestoda *Eubtherium salvelini*, *Schyzocotyle acheiognathi* with percentage of infection (1.6,3.3)% respectively. One specie acanthocephalan *Neoechinorhynchus iraqensis* with percentage of infection 1.6%. The current study included histopathological changes on the intestine which infected with parasitic worms (cestoda and acanthocephalan). It has been distinguished the intestinal villi appeared with epithelial degeneration and cellular debris in the lumen of intestinal, also the basement membrane of this epithelium was displaced from the core of villus, cavation in muscular layer, complete sloughing of epithelium in intestinal cavity and white blood cells infiltration especially in lymphocyte cells with slough cells of intestinal cavity in the case of infection with acanthocephalan.

Keywords: fishes, worms, histopathology, parasite.

Introduction

The activity of bring fish up has been beginning since 1955 in Iraq, *Cyprinus carpio* were brought to Zafaranya 's farm in Baghdad¹. still care of farming *Cyprinus carpio* prevalent, they have described much specification, such as early maturity, high fertility respectively, quick growth and resist to parasites, and diseases². It considered that farming of fish is from yield activity which is fulfilled by human in tenets to get food requirement meat fish³, meat fish involves a high rate of protein has essential amino acid as well as having mineral elements such as (calcium, phosphorus, iron, iodine), vitamins (A,D,E,K,B12) and includes high rate of fatty acid polyunsaturated, which contribute to decrease cholesterol level in the blood human⁴, in addition to protect from cancer especially in colon and prostate⁵. There are great problems of parasites encounter fish such as lack of food value and material lead to kill them⁶. These lacks cause harms, indicate that there are different

harms such as lack of host food or food on tissues and mechanical harm such as closing channels, causing wound if it is chemical harms resulted from secretion of toxic materials or resistance that the reaction which causes to kill fish⁷. *Cyprinus carpio* fish come at the initial fish in highly resisting different condition and quick adaptation⁸. The importance of the current study is to examine intestinal parasites infections are exposed by fish in culture fish as well as studying changes tissues of infected fish

Materials and Method

A total 120 fishes were collected during the period from September 2017 to March 2018 from fish cultures in Tikrit city. The samples were transmitted to the laboratory parasites in college of science Tikrit university to examine them.

Isolated parasites

Fishes were dissected as mentioned (9). The method is the that splitting linear at media ventral line from head to anus then opened from first splitting to cover gills on length line side of fish. After that this piece was removed to appear internal parts to examine

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the body cavity by eyes in order to notice worms. The gastrointestinal tract was dissected out from the rectum to the esophagus, opened longitudinally and examined carefully.

Fixation, Preservation and Staining

Samples have been preserved in 70% alcohol, they were transmitted to stain A cetocarmin was not more 15 minutes, dehydrated in an ethanol series (70%, 80%, 90%, 100%), cleared in Xylene mounted with Canada balsam¹⁰.

Section tissues

It has been prepared section tissues from intestine infection parasite were passed by Histokinate then embedding of paraffin, were cut thickness five microns, stained with hematoxylin and eosin (H&E) and examined under microscope^{81,12}.

Results and Discussion

Concerning with the current study is collected and examined 120 fish of *Cyprinus carpio* from fish culture in Tikrit city as shown in table(1). The data found out that infection with three species of worms including two cestoda: *Eubothrium salvelini* with percentage of infection 1.6% and *Schyzocotyle acheiognathi* with percentage of infection 3.3%. One specie acanthocephala *Neoechinorhynchus iraqensis* with percentage of infection (1.6%) as shown in table (2). This study also involves the effects pathogenic tissue are caused by parasite worms following:

1. cestoda: *Eubothrium salvelini*. Distinguished tissue changes that the intestinal villi were lined by simple columnar epithelium, with presence of microvilli on its surface, goblet cell also demonstrated between epithelial cells. The lamina propria was formed by loose connective tissue mixed with sub mucosa which are containing blood vessels and lymphocytic aggregation (fig 4). It also appears that the epithelium was containing basal cells near by the basement membrane, present micro blood vessels and individual lymphocytes (fig 5).

- *Schyzocotyle acheiognath*

The intestinal villa revealed that the presence of hyperplasia of the epithelium and there are certain area without epithelial continuation, also the lymphocytes were involved the basal layer of

epithelium from the adjacent lamina propria (fig 6). The intestinal villi in certain places of intestinal mucosa showed desquamation of epithelial cells and the luminal surface of these villi were thickened and appeared as dark zone (fig 7).

2-acanthocephala: *Neoechinorhynchus iraqensis*

Observably, the sub mucosa of intestine was also contains white blood cells infiltration, and the muscles coat was formed by smooth muscle fibers, in these fibers there are cavitation without any structures (fig 8). The result found out that the other villi showed transformation of simple columnar epithelium into transitional epithelium like with presence of parasitic mass beneath the basement membrane of this epithelium, surrounded by individual white blood cells infiltration (fig 9). The current study has been recorded that percentage a total infection with intestinal worms in *Cyprinus carpio* in culture fishes is 6.6%. whereas pathogenic tissue changes of infection tissues with cestoda: *Eubothrium salvelini* and *Schyzocotyle acheiognathi* occurs mechanical damages in intestinal walls of *Cyprinus carpio*, whereas it is noticed that infiltration of intestinal layers principally two layers mucosa and sub mucosa in inflammatory cells. This infiltration is represented as immune reaction against the process of parasitizing¹³. principally, inflammatory cells concentration has been in the layers are more contact with parasite when it tries to alder to intestinal walls. Because the size of cestoda is relatively may lead the result pressure to stick intestinal walls to loose goblet cells from epithelia intestinal. involving the damages are resulted from cestoda worms gets necrosis, desquamation, sloughing and other cases as haemorrhagic enteritis. Worm is possible to secretion toxin effects on tissues cause defect in organisms function¹⁴. Generally, damages are in the worm connected area with mucosal layer in intestinal, may be obtained peritonitis or haemorrhagic enteritis¹⁵. The result indicates that pathogenic tissue changes to infection intestinal with acanthocephalus (*Neoechinorhynchus iraqensis*) it represents strongly cellular destruction of epithelium intestinal with reducing villus attached desquamation and sloughing because being stucked proboscis parasite in epithelial layer and makes a cute irritation in the place of presence parasite is being space occupied lesion. Besides, making acute response inflammatory locally because of being the presence of parasites worms, these finding are also agreed with¹⁶⁻¹⁸. According to) that infiltration two

layers such as mucosa and sub mucosa in inflammatory cells is from type of lymphocytes, it has been got in the current study whereas infiltration of all intestinal layers in lymphocytes. this is represented as reaction host into fixing worms or trying to fix. known acanthocephalus which penetrates either some or all intestinal walls

layers in infected fishes if their long proboscis¹⁹. The previous studies revealed that penetration of parasite is difference according to the hosts (fishes)²⁰. in the acute cases, it has been recorded that peritonitis is resulted from a hole in host gut, cystacanths properly reaches liver and spleen²¹

Table 1. A total number of fish examined according to month

Month Fish	September	October	November	December	January	February	March	Total
<i>Cyprinus carpio</i>	15	15	15	25	15	15	20	120

Table 2. Recorded worms species in fish, prevalence and Average of violence infection

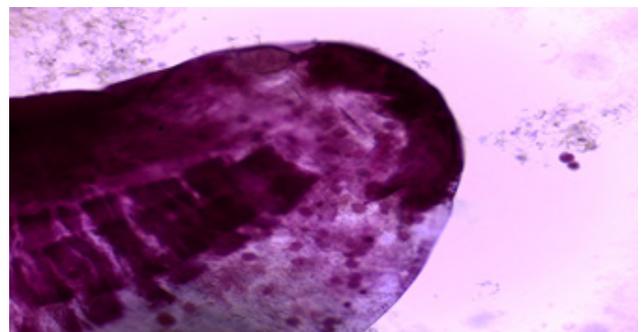
Worms species	Hosts	Number of fishes		Number of isolated worms	Prevalence (%)	Mean intensity of infection
		Examined	Infected			
<i>Eubothrium salvelini</i>	<i>Cyprinus carpio</i>	120	2	2	1.6	1
<i>Schyzocotyle acheilognathi</i>		120	4	12	3.3	3
<i>Neoechinorhynchus iraqensis</i>		120	2	2	1.6	1



Fig.(1): *Eubothrium salvelini* (10x)



Fig.(2): *Schyzocotyle acheilognathi*



Fig(3): *Neoechinorhynchus iraqensis*(40x)

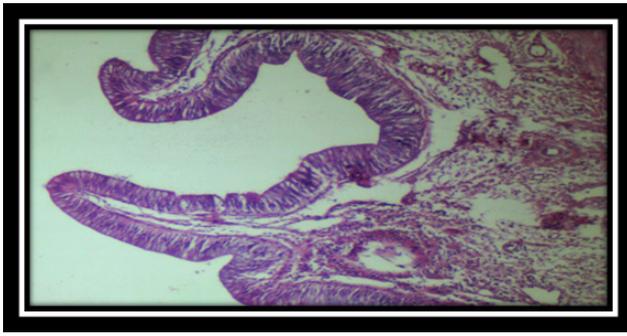


Fig.(4): tissue section to intestinal infected *Eubotherium salvelin* explains the intestinal villi, covered with simple columnar epithelium (A), lamina propria(B) (H&E X10)

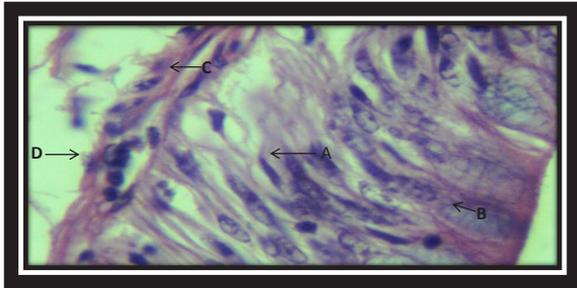


Fig.(5): tissue section to intestinal infected *Eubotherium salvelin* explains the epithelium of villi (A), microvilli (B), basement membrane (C), blood capillary (D) (H&E X40)

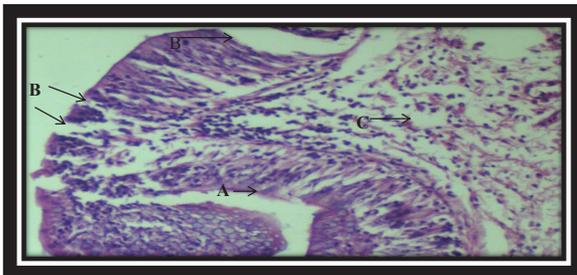


Fig.(6): tissue section to intestinal infected *Schyzocotyle acheilognathi* explains hyperplasia of epithelium (A), discontinuation of epithelium(B), lymphocytic aggregation in the lamina propria(C) (H&E X10)

Conclusion

The current study included histopathological changes on the intestine which infected with parasitic worms (cestoda and acanthocephalan). It has been distinguished the intestinal villi appeared with epithelial degeneration and cellular debris in the lumen of intestinal, also the basement membrane of this epithelium was displaced from the core of villus, cavation in muscular layer, complete sloughing of epithelium in intestinal cavity and white blood cells infiltration especially in lymphocyte cells with slough cells of intestinal cavity in the case of infection with acanthocephalan.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science–University of Tikrit, Iraq and all experiments were carried out in accordance with approved guidelines.

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Incidence Rate of Mortality form Massive Pulmonary Embolism in Al-Diwaniyah Province, Iraq, During the Period from January 2011 Through December 2018

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Abstract

Aim of the study: to estimate the annual incidence rate of mortality caused by massive pulmonary embolism in Al-Diwaniyah province. This hospital based study was carried out by retrospective review of the records of two major hospitals in Al-Diwaniyah province in the Mid-Euphrates region of Iraq. The hospitals are Al-Diwaniyah Teaching Hospital and AL-Diwaniyah Maternity and Child Hospital. The review aimed at estimating the total number of cases admitted to these hospitals from January 2011 to December 2018. In addition, the records of the Forensic Department, Al-Diwaniyah Directorate of Health, were also reviewed to report the total cases referred from the above mentioned hospitals. Total pediatric deaths during the same period was 413 from a variety of causes and pulmonary embolism accounted for 3 cases only so that the annual mortality rate is going to be 0.4 per 100000 hospital admission and 0.7 % out of all death cases. On the other hand the total adult admission to maternity wards and the general hospital wards during the period of study was 432701 out of which 5894 has died and the number of reported dead cases due to pulmonary embolism was 119.

Keywords: Pulmonary embolism, annual mortality incidence rate

Introduction

Pulmonary embolism is a serious complication of deep venous thrombosis, since detachment of venous thrombi and their embolization often cause fatal outcome. Pulmonary arterial circulation gets obstructed leading to impairment of gas exchange. Larger emboli cause obstruction of the pulmonary trunk whereas smaller ones pass to downstream branches according to their sizes ¹. Rough worldwide estimation of the annual incidence of pulmonary embolism is in the range of 60 to 70 / 100000; however, exact epidemiologic data are rarely available ^{2,3}. Indeed, according to The European guidelines for the diagnosis and management

of PE, the annual incidence of pulmonary embolism is estimated to be around 5 to 10 per 10000 inhabitants ⁴, but the actual incidence may really more because many cases may pass unnoticed if the case is mild and asymptomatic ⁵ Moreover, according to autopsy reports, 30 up to 45 % of hospital mortality are due to pulmonary embolism ⁶. Indeed, the third common cause for mortality worldwide, following ischemic heart disease and cerebrovascular accidents. Clinical reports have indicated that the 7th decade is the most common age for pulmonary embolism; however, according to autopsy findings, the 8th decade ranks the 1st. The mortality rate associating pulmonary embolism is estimated to be 30 % and sudden death rate due to pulmonary embolism is about 10 % ². Although pulmonary embolism is rare in pediatric age group; however, it is associated with high rate of mortality. There evidence that the incidence of pulmonary embolism in pediatric age group is rising; however, there is no accurate estimation of the incidence rate ⁷. Risk factors of pulmonary embolism

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may be different from the traditional ones in adults^{8,9}. The data regarding epidemiology of pulmonary embolism in children as well as clear guidelines about clinical diagnosis and management in that specific age group are actually scarce¹⁰. In general acute pulmonary embolism is often difficult to diagnose as well as difficult to treat. The clinical course is no constant with some cases are asymptomatic, some case are fatal due massive pulmonary embolism and a range of outcomes between these two extremes exists³. Several medical conditions are associated with pulmonary embolism such as ischemic heart disease and malignant neoplasms^{6,11}. Due to the inconsistent data about the true incidence of pulmonary embolism worldwide^{12,13}, and because of the rarity of Iraqi literatures dealing with the exact incidence of pulmonary embolism, the present hospital based study was carried out aiming at estimating the annual incidence of pulmonary embolism among hospitalized patients.

Methodology

This hospital based study was carried out by retrospective review of the records of two major hospitals in Al-Diwaniyah province in the Mid-Euphrates region of Iraq. The hospitals are Al-Diwaniyah Teaching Hospital and AL-Diwaniyah Maternity and Child Hospital. The review aimed at estimating the total number of cases admitted to these hospitals from January 2011 to December 2018. In addition, the records of the Forensic Department, Al-Diwaniyah Directorate of Health, were also reviewed to report the total cases referred from the above mentioned hospitals. Data about the causes of death were reported. The study was approved by the institutional approval committee. Data were transformed into a Microsoft Office Excel 2010 sheet. Data were present as number and percentages. Incidence rate was calculated out of 100000 hospital admission or as a percentage out of total death cases.

Results and Discussion

Total number of admitted cases per year, according to hospital, is shown in table 1. In addition, total number of deaths was shown. Annual mortality rates were ranging between a minimum of 134.1 / 100000 admission up to 184.1 / 100000. The minimum rate was observed during 2015; whereas, the maximum rate was seen during 2012, as shown in table 1 and figure. The average annular mortality rate during the whole period

extending from January 2011 through December 2018 was 152.3 per 100000, as shown in table 1 and figure 1. Table 2 shows the annual mortality rate in pediatric as well as in adult age groups. The total admission to pediatric wards during the entire 8 years period of the study was 84914. Total pediatric deaths during the same period was 413 from a variety of causes and pulmonary embolism accounted for 3 cases only so that the annual mortality rate is going to be 0.4 per 100000 hospital admission and 0.7 % out of all death cases. On the other hand the total adult admission to maternity wards and the general hospital wards during the period of study was 432701 out of which 5894 has died and the number of reported dead cases due to pulmonary embolism was 119. Thus, the annual (adult) mortality rate will be 3.4 per 100000 hospital admission or 2 % out of all reported death cases. Table 3 shows the distribution of death cases according to age and gender. Children accounted for a minority, 3 out of 121 (2.5 %), whereas adult cases were the predominant (97.5 %). In pediatric age group 2 cases were females and one case was a male; in adult age group women accounted for 77 out of 119 (64.7 5) while men accounted for 42 out of 119 (35.3 %), as shown in table 3. During age interval 20-44 women were the predominant over men, 77.8 % versus 22.2 %, respectively; however, during the age interval 45-64 men were predominant over women, 66.7 % versus 33.3 %, as shown in table 3. An autopsy finding of pulmonary embolism is shown in figure 2. Current study has shown that the annual incidence rate caused by pulmonary embolism to be 0.4 and 3.4 per 100000 hospital admission in children and adult respectively and that pulmonary embolism is responsible for 0.7 % and 2 % of all causes of death, in children and adult, respectively. Thus, pulmonary embolism is rare in children as a cause of death and is relatively more frequent in adult. Indeed, the current study showed a trend for pulmonary embolism to be higher with increasing age. Actually, most of published literatures mention increasing age as one of the risk factors associated with deep venous thrombosis and pulmonary embolism^{14,16}. One of the major limitations of the current study is that it was a hospital based rather than a population based study. In addition, other causes of death were difficult to identify because of some obstacles regarding the registration system adopted by the enrolled hospitals. On the other hand, the current study included only fatality cases due to pulmonary embolism and not all cases of pulmonary embolism. Therefore, we believe that the true incidence

rate of pulmonary embolism whether symptomatic, mild cases and fatal cases is far more than that reported in the current study. The present study showed that pulmonary embolism, fatal cases, is more common in women than in men during reproductive age interval. There is a consensus that pulmonary embolism is more common in women during reproductive age interval, in

agreement with our findings, because of the correlation between the pregnancy and pulmonary embolism, and the higher risk caused by the use of oral contraceptive pills^{17,18}. However, in patients older than 45 years, the pulmonary embolism becomes more frequent in men, according to the present study, a finding that agrees with other authors¹⁹.

Table 1: Annual Admission and Mortality rates in Al-Diwaniyah Teaching hospital and Al-Diwaniyah Maternity and Child Hospital

Year	Number of Deaths	Maternity and child hospital		General hospital	Total admission	MR during total period	AMR
		Pediatric admission	Women admission	Adult			
2011	751	14458	19089	32771	66318	1132.4	141.6
2012	851	10940	12721	34120	57781	1472.8	184.1
2013	774	12822	21614	34369	68805	1124.9	140.6
2014	782	12219	20700	39252	72171	1083.5	135.4
2015	759	9034	20918	40808	70760	1072.6	134.1
2016	757	6421	21468	33556	61445	1232.0	154.0
2017	853	9095	15913	34184	59192	1441.1	180.1
2018	780	9925	17574	33644	61143	1275.7	159.5
Total	6307	84914	149997	282704	517615	1218.5	152.3

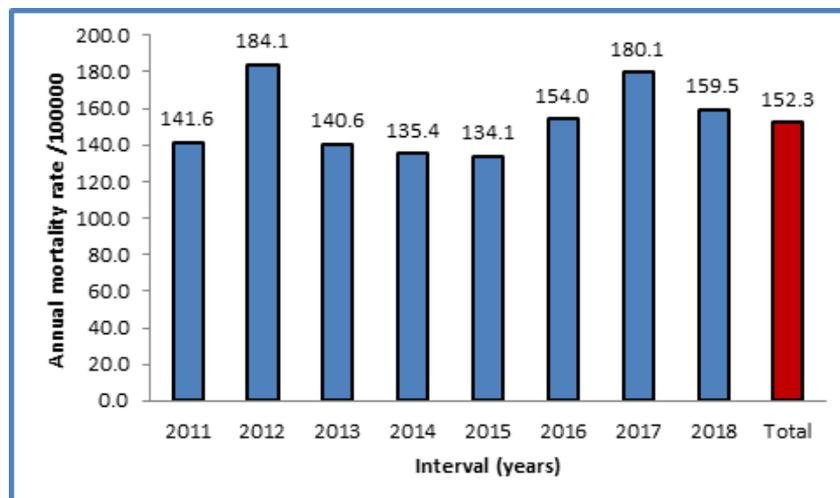


Figure 1: Hospital based annual mortality in AL-Diwaniyah province during the period extending from January 2011 to December 2018

Table 2: Annual mortality rate due to pulmonary embolism in pediatric and adult age groups

Age group	Total admission	Total number of deaths	Number of deaths due to PE	AIR/Admission /100000	AIR/Deaths %
Pediatric < 15 years	84914	413	3	0.4	0.7
Adult ≥ 15 years	432701	5894	119	3.4	2.0

Table 3: Total number of deaths according to age intervals and gender

Age interval	Total	Male			Female		% out of age interval	% out of all females
		n	% out of age interval	% out of all males	n			
< 1 year	0	0		0.0	0		0.0	
1-4 year	2	1	50.0	2.4	1	50.0	1.3	
5-9 year	1	0	0.0	0.0	1	100.0	1.3	
10-14 year	0	0		0.0	0		0.0	
15-19 year	4	2	50.0	4.8	2	50.0	2.5	
20-44 year	81	18	22.2	42.9	63	77.8	79.7	
45-64 year	30	20	66.7	47.6	10	33.3	12.7	
≤ 65 year	3	1	33.3	2.4	2	66.7	2.5	
Total	121	42	34.7	100.0	79	65.3	100.0	



Figure 2: a case of death due to pulmonary embolism. The embolus was massive and caused obstruction of the pulmonary trunk

Conclusion

The present study showed that the incidence rate of mortality due to pulmonary embolism ranges between 0.4 and 3.4 per 10000 hospital admission,

pulmonary embolism is more frequent in women during reproductive age and is rare in pediatric age group.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Diwaniyah teaching hospital / Department of surgery / Al-Diwania / Iraq and all experiments were carried out in accordance with approved guidelines.

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Isolation and Antibiotic Susceptibility of Anaerobic Bacteria of Periodontitis in Diabetic and Non-Diabetic Patients in Basrah Province, South of Iraq

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Abstract

Periodontitis considered as polymicrobial disease since that the primary etiologic agents is sub gingival plaque bacteria, while the specific pathogens interaction is more relevant in the progress of the disease than are individual's species. Samples resulted in isolation of 66 bacterial isolates include 38 isolates were diagnosed with bacteriological methods belong to 10 species of 6 genera confirmed by Vitek 2 Compact System, *Anaerococcus prevotii*, *Lactobacillus fermentum* *Bifidobacterium spp*, *Peptophilus asaccharolytiucs*, *Actinomyces israelii*, *Actinomyces odontolyticus*, *Lactobacillus plantarum*, *Lactobacillus parcasei* and *Actinomyces naeslundii*. The Epsilometer-test reveal that the species *Anaerococcus prevotii*, *Lactobacillus plantarum* and *Actinomyces israelii* showed resistance to Tetracyclin, while *Anaerococcus prevotii* showed resistance to Clarithromycin, Nalidixic Acid and Tetracyclin. The species *Anaerococcus prevotii* was sensitive to Ciproflaxacin, while *Peptophilus asaccharolytiucs* was sensitive to tetracycline and resistant to Nalidixic Acid. Samples were collected during the period between May 2016 and April 2017. GCF was collected by absorbent paper points from a total 73 patients suffering from periodontitis comprised 41(56.16%) specimens of diabetic patients and 32(43.83%) specimens of non-diabetic patients. No significant differences were observed ($p>0.05$), including 32 male represent (43.38%) and 41 female represent (56.16%) with no significant differences in the percentages of isolation between the sexes ($p>0.05$).

Keywords: Anaerobic Bacteria, Periodontitis, Diabetic, Vitek, Antibiotic susceptibility

Introduction

The oral cavity can be considered as a diverse or heterogeneous environment in terms of the microbiological contents that colonize different surfaces, gum, cheeks, hard and soft palate, teeth, tonsils and tongue^{1,2}. More than 700 different phylotypes or 300 bacterial species colonize oral cavity have been detected and identified, the majority of them implicated with dental plaque in addition to fungi and protozoa^{3,4}. Periodontitis is an inflammatory response of the host to plaque biofilm results in destruction of soft and hard tooth-supporting tissue due to interaction in its pathogenesis by a microbial agents, immune response

and genetic risk factors⁵. Since the bacterial plaque or microbial biofilm is the main inducing factor for gingivitis, gingival inflammation is considered to be the key risk factor for the initiation of periodontitis; for that reason the controlling of gingival inflammation is very important in preventing progressive attachments loss or periodontitis⁶. It is noteworthy that not every gingivitis case develops into periodontitis since a patient can turn back to health condition, but a patient with periodontitis remains suffering from periodontitis throughout his life^{7,8}. According to periodontal disease classification (1999), there are two common differing forms of periodontitis, that is chronic and aggressive periodontitis due to the age of initiation and the rate of disease progression⁹. The 2017 world workshop reclassified and grouped periodontitis to a single class «periodontitis»¹⁰. Diabetes mellitus and chronic hyperglycemia are considered as metabolic and endocrine disorders associated with prevalence and severity of periodontitis^{11,12}. Anaerobic

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and facultative bacteria prefer subgingival environment which includes members of genera *Bifidobacterium* spp, *Veillonella* spp, *Actinomyces* spp, *Fusobacterium* spp and *Peptostreptococcus* spp. Nevertheless, anaerobic bacterial species recognized to be as causative agents for periodontitis and harbor periodontal pocket such as, *Fusobacterium* spp, *Actinomyces* spp, *Facklamia hominis*, *Aerococcus viridans*, *Pepidiococcus pentosaceus* and *Gemellamorbillum*¹³.

Methodology

Sample Collection and Processing

For the current study, a total of 73 patients were selected and divided into two groups of diabetic and non-diabetic patients; patients who belong to the age category of 15 to 73 years and having periodontitis from AL-Shaheed Qais Specialized Dental Teaching Center, and Dental Teaching Clinics in College of Dentistry during the period from May 2016 to April 2017. With dentist aid, Sample of gingival crevicular fluid (GCF) was collected by sterile absorbent paper point (size 30-45 mm), periodontal pocket with depth 3 was chosen and paper point inserted inside it until mild resistance was sensed and is left in place for 60 sec. to obtain sufficient absorption of GCF sample, then inoculated immediately into Thioglycollate broth.

Culture of Sample

One loopful from the developed bacteria in thioglycollate broth was inoculated on schaedler agar slant flushed by sterile copper needle with filtered CO₂ and N₂ to replace O₂; the lid was closed tightly and sealed with paraffin film¹⁴ with modification. The inoculated media were incubated anaerobically in anaerobic environment (anaerobic jar) generated with the anaerogen gas pack (Oxoid Ltd., England) at 37°C for 3-7 days¹⁵.

Identification of Bacterial Isolates

Basically bacterial isolates were identified according to culture characteristics, Gram staining properties and confirmed with the automated microbiological vitek2 compact system ANC REF 21347 ID kit. (BioMérieux, France)¹⁶.

Processing of Bacterial Isolates with Vitek2 System

Suspension of anaerobic bacterial isolate is prepared by transfer a sufficient number of colonies of a pure young culture and suspend the microorganism in 3 ml of sterile saline (aqueous 0.45% to 0.50% NaCl, pH 4.5 to 7.0) in a 12 x 75 mm clear glass test tube, 2.70 - 3.30 McFarland by using a turbidity meter DensiChek turbidity meter. Identification ANC cards are inoculated with microorganism suspensions. A test tube containing the microorganism suspension is placed into a special rack (cassette) and the identification ANC card is placed in the neighboring slot while inserting the transfer tube into the corresponding suspension¹⁷.

Antibiotic Sensitivity Test

McFarland Standards (0.5)

McFarland standards (0.5) was used to standardize bacterial suspension, two solutions are used to prepare it by adding 99.5 ml of Sulfuric acid (H₂SO₄ 1%) solution and mixed with 0.5 ml of Barium chloride (BaCl₂.2H₂O) solution¹⁸.

E-test strip manufactured by BioMérieux is a manual in vitro diagnostic device used to determine the Minimum Inhibitory Concentration (MIC) and whether or not a specific bacterium is susceptible to the action of a specific antimicrobial. The surface of schaedler agar plates was swabbed in three directions with a sterilized cotton swab that had been submerged in a bacterial suspension standardized to match the turbidity of the 0.5 McFarland standard. The MICs for the antimicrobial agents were recorded and translated into interpretative categories of susceptible or resistant according to the guidelines of National Committee for Clinical Laboratory Standards^{19,20}.

Statistical Analysis

Statistical analysis was accomplished by Chi-square (X²) test; the mean difference is significant at the 0.05 level (P ≤ 0.05) was considered statistically insignificant at (P > 0.05).

Results and Discussion

In the present study, 66 anaerobic bacterial isolates were obtained from 73 samples which represent diabetic and non-diabetic patients; 38(57.6%) bacterial isolates were isolated from diabetic patients and 28(42.4%) from non-diabetic ones. The distribution of total categories: diabetic patients represent 41(56.16%) and non-diabetic

represent 32(43.83%) with no significant differences ($p>0.05$), a total of 32(43.8%) males, and a total of 41(56.2%) females; however, there is no significant differences ($P > 0.05$) among both groups. In the age group(15-25) years, the highest detection of 5 patients recorded(100%). Statistically there are significant difference in all age groups ($P < 0.05$) with a superiority in age groups (46-55),(36-45)and (56-65) which showed iterative equal 25,15,13 respectively.

Bacteriological Investigation of Microbial Isolates

The number of bacterial isolates comprising 10 species belong to 6 genera were identified with bacteriological methods, results included (26) isolates of Gram positive cocci, (37) isolates of Gram positive anaerobic bacilli, and (3) isolates of Gram negative anaerobic cocci.

Vitek 2 Compact System Results for Identification of Bacterial Isolates

Thirty two anaerobic bacterial isolates randomly selected from a total of 66 isolates are confirmed by Vitek 2 compact system, the Vitek 2 reports revealed 26 anaerobic bacterial isolates belong to 10 species in addition to 6 un- identified ones.

Frequency Distributions of Bacterial Isolates in Diabetic and Non- Diabetic Patients

The present study has shown that *Anaerococcus prevotii* recorded 14(36.8%), 8(28.6%) which are the highest rates in both groups, followed by 12(42.8%) 10(26.3%), 7(25%), then *Biofidobacterium spp.* 3(7.9%). 5(17.85%), then *Lactobacillus salivarius* 3(7.9%), 4(14.3%), then *Peptophilus asaccharolytiucs* 3(7.9%), 2 (7.1%), and finally *Actinomyces israelii* which are 1(2.6%), 2(7.1%) in diabetic and non-diabetic patients respectively. Additional rates which are specific to diabetic patients are *Enterococcus fecalis* 2(5.3%), *Actinomyces odontolyticus* 3 (7.9%), *Lactobacillus paracasei* and *Actinomyces naeshundii* 1(2.6%), as shown in table (1).

Epsilometer Test (E- test)

Anaerobic bacterial isolates *in vitro* have shown either susceptibility or resistance to antibiotic. *L. salivarius* was susceptible to Ciprofloxacin (MIC=0.064 $\mu\text{g ml}^{-1}$), *Veillonella Spp.* was susceptible to Clarithromycin

(MIC=0.023 $\mu\text{g ml}^{-1}$) and *S. mutans* was susceptible to Tetracycline (MIC=0.19 $\mu\text{g ml}^{-1}$) but resistant to Nalidixic Acid (MIC=32 $\mu\text{g ml}^{-1}$); however, *Lactobacillus plantarum*, *S. salivarius* and *Veillonella Spp.* were resistant to Tetracycline (MIC=6 $\mu\text{g ml}^{-1}$, MIC=256 $\mu\text{g ml}^{-1}$, MIC=6 $\mu\text{g ml}^{-1}$); *L. salivarius* was resistant to Clarithromycin, Metronidazole, Nalidixic Acid and Tetracycline (MIC= 256 $\mu\text{g ml}^{-1}$, MIC=6 $\mu\text{g ml}^{-1}$, MIC=256 $\mu\text{g ml}^{-1}$, MIC=16 $\mu\text{g ml}^{-1}$) as shown in figures(1,2,3,4). The GCF sample chosen and collected in this study in order to isolate the anaerobic bacteria from patients suffering from periodontitis. It is well-known that GCF is a serum transudate emerging from post capillary veinules of the gingival plexus of blood vessels in the sulcus^{21,22}, and from both resident and emigrating inflammatory cells²³. In periodontal disease, deep pockets may act as a good reservoir for pathogens and consequently a risk factor for a systemic diseases²⁴. In the current study, the use of the Roll tube method¹⁴ with modifications involving the flushing a mixture of CO₂ and N₂ by a copper needle directly towards the bottom of the screw cap tube that contain Schaedler agar slant. Although anaerobic bacteria are considered as a key pathogens for periodontitis, microbiota are also considered as a main causative of periodontitis because of their etiological role this view drew the attention of researchers for decades; the last view revolves around the idea which came from numerous studies which concluded that there is a wide range of diversity in the bacterial composition of sub-gingival niche. The current study has shown that there is a difference in the frequency of anaerobic bacteria in periodontal pockets. The predominant anaerobic bacteria represented by *Anaerococcus prevotii* is more frequent and was isolated in high rate 14(36.8%) in diabetic patients and 12(42.8%) in non-diabetic patients, followed by *Lactobacillus fermentum* 10(26.3%) in diabetic patients and 7(25%) in non-diabetic patients, *Biofidobacterium spp.* 3(7.9%) in diabetic patients and 5(17.85%) in non-diabetic patients, *Peptophilus asaccharolytiucs* 3(7.9%) in diabetic patients and 2(7.1%) in non-diabetic patients, *Actinomyces israelii* 1(2.6%) in diabetic patients and 2(7.1%) in non-diabetic patients. Meanwhile the bacterial species *Actinomyces odontolyticus*, *Lactobacillus plantarum*, *Lactobacillus paracasei* and *Actinomyces naeshundii* are 3(7.9%), 2(5.3%), 1(2.6%) and 1(2.6%) respectively in diabetic patients. These results almost differ from a study which concluded that the common bacterial species were *Veillonella spp.*, *Gemella*

morbillosum, *Prevotella intermedia*, *Streptococcus consellatus*, *Fusobacterium*, *Peptostreptococcus spp.* and, *Staphylococcus saccharolyticus*. Results of current study reveal a clear difference from a study accomplished recently that showed the most common bacterial isolates ; *Aggregatibacter actinomycetemcomitans* recorded (26.8%), *Porphyromonas gingivalis* (21.9%), *Campylobacter spp.* (16.7%), *Eikenella corrodens* (13.2%), *Prevotella intermedia* (10.5%), *Prevotella disiens* (3.1%), *Peptostreptococcus micros* (2.9%), *Campylobacter gingivalis* (2.2%), *Prevotella corporis* (1.8%), *Peptostreptococcus magnus* (1.3%) and *Fusobacterium nucleatum* (0.4%). Moreover, a new study found out that the most common species of anaerobic bacteria which is isolated from patients suffering from periodontitis were *Peptostreptococcus prevotii* recorded 15(8.3%), while *Bifidobacterium spp.*, *Peptostreptococcus tetradius*, *Prevotella melani*, *Fusobacterium mortiferum*, *Prevotella intermedia* *Wolinella spp.* and *prevotella disiens* represented 1(0.5%)⁷. Furthermore, last study reported that *Fusiformis spp.* 2(4.5%) in diabetic and 1(1.88%) in non-diabetic patients, *Actinomyces spp.* 2(4.5%) in diabetic and 2(3.7%) in non-diabetic patients, *Facklamia hominis*, *Aerococcus viridians*, *Peptococcus pentosaceus* and *Gemella morbillorum* 1(1.88%) in non-diabetic patients¹³.

Samples were collected from the deepest pockets of patients revealed that anaerobic bacteria were isolated from 83% of the patients with periodontitis represented by *Porphyromonas gingivalis* 48%, *Fusobacterium nucleatum* 24%, *Peptostreptococcus micros* 36%, *Prevotella spp.* 8%, *Veillonella spp.* 10% and, *Actinomyces viscosus* 12%. The study concluded that there was a diversity of anaerobic bacterial species in periodontal patients. According to the results of the present study, the bacterial species *Anaerococcus prevotii*, *Lactobacillus fermentum*, *Peptophilus asaccharolyticus*, *Actinomyces israelii*, *Actinomyces odontolyticus*, *Lactobacillus plantarum*, *Lactobacillus parcasei* and, *Actinomyces naeslundii* are the same in diabetic and non-diabetic patients, but differ in the number of isolates in both groups. These results are in the same line with a study done by Al-Abdul and Hussein¹³. This as Mandell said may be due to the diabetes mellitus which weakens the adherence function of neutrophil cells in addition to phagocytosis and chemotaxis which facilitate the invasion of bacteria that

result in progress and proliferation inside periodontal pocket and finally deterioration of the periodontal condition. The results of the current study and previous studies indicate that there is diversity in the types of bacterial species that have been isolated from patients with periodontitis. This may be due to geographical differences in living areas, ethnic differences, inheritance and family history, possibly chronic diseases such as diabetes and hypertension, nutrition, alcohol abuse and smoking.

Table (1): Frequency distribution of bacterial isolates in diabetic and non-diabetic patients.

Anaerobic bacterial isolates	Diabetic patients (%)	Non-diabetic patients (%)
Anaerococcus prevotii	14 (36.8%)	12 (42.8%)
Lactobacillus fermentum	10 (26.3%)	7 (25%)
Bifidobacterium spp	3 (7.9%)	5 (17.85%)
Peptophilus asaccharolyticus	3 (7.9%)	2 (7.1%)
Actinomyces israelii	1 (2.6%)	2 (7.1%)
Actinomyces odontolyticus	3 (7.9%)	-
Lactobacillus plantarum	2 (5.3%)	-
Lactobacillus parcasei	1 (2.6%)	-
Actinomyces naeslundii	1 (2.6%)	-
Total	38 (57.6%)	28 (42.4%)



Figure (1): Ciprofloxacin stripe for E-test to detect antibiotic susceptibility and MIC value in *Anaerococcus prevotii* isolate

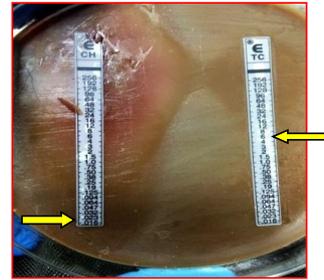


Figure (2): Clarithromycin, Tetracycline stripes for E-test to detect antibiotic susceptibility and MIC value in *Actinomyces israelii* isolate

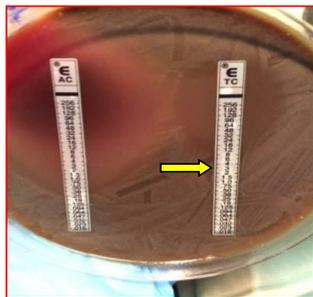


Figure (3): Tetracycline stripes for E-test to detect antibiotic susceptibility and MIC value in *Lactobacillus plantarum* isolate



Figure (4): Tetracycline and Nalidixic Acid stripes for E-test to detect antibiotic susceptibility and MIC value in *Peptophillus asaccharolyticus*

Conclusion

Anaerococcus prevotii, *Lactobacillus fermentum* and *Bifidobacterium spp.* in the onset of Periodontitis. Anaerobic isolates shows a susceptibility in E-test. The use of a Roll tube method with modification for anaerobic bacterial culture consider as a golden method to recovery of anaerobic isolates in microbiology laboratories. Schaedler agar can be used as a suitable media to detect anaerobic susceptibility with E-test.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science, University of Basrah, Basrah, Iraq and all experiments were carried out in accordance with approved guidelines.

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Knowledge and Attitudes of Patients with Urolithiasis among Lithotripsy in Kirkuk City

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Abstract

Objective: To assess urolithiasis patients knowledge and attitude toward lithotripsy in Kirkuk city as well as to find out the relationship between patients knowledge, attitude and some socio-demographic characteristic such as such as age, gender ,educational level , address and job. The non- experimental approach and descriptive design was used the study. The study was conducted at Kirkuk general hospital (Lithotripsy unite) in Kirkuk city and during the period from unite from 5th July 2017 to the 27nd of April 2018. Purposive sample consist of (100) definitely diagnosed with urolithiasis and needed for lithotripsy. Patients selected from adult patients who were attended to Azadi Teaching Hospital and Kirkuk General Hospital in Kirkuk city(Lithotripsy unit). For the purpose of data collection, a questionnaire was constructed. which contain of (55) items, the demographic data, medical data, knowledge and attitude of the Patients. The data were collected through the use of interview. The findings of the study indicated that (37%) of the patients were in age group between (21-30), (56%) were females, (66%) living in urban. (59%) were married , (27%) were house wife, (20%) were an able to read and write, (33%) had middle monthly income(employed)

Keywords: Knowledge, Attitude, Urolithiasis, Lithotripsy

Introduction

Urolithiasis is a common disease, representing a relevant public health problem worldwide with a prevalence of 8.8% in the USA and annual health care costs of USD 3.8 billion ¹ Although kidney stones initially often remain asymptomatic, treatment is frequently performed to prevent future problems associated with the disease (e.g. renal colic, urinary tract infections and impairment of kidney function) ² Shock-wave lithotripsy (SWL) is a popular, non-invasive and effective method for treatment of renal and ureteric stones who less than 2.5 cm. Although its adverse effects are infrequent; blood in urine for 72 hours and temporary pain are more common as the fragments pass out⁽³⁾ .Other adverse effects may include: urinary tract infection due to bacteria released as stone breaks,

bruising or blistering of skin, the need for further SWL treatment, failure to break stone(s) which may need alternative treatment especially for hard stone(s) or recurrence of stone(s) ⁴ Stones larger than 5mm or stones that fail to pass through should be treated by some interventional procedures such as extracorporeal shock wave lithotripsy (ESWL), ureteroscopy (URS), or percutaneous nephrolithotomy (PNL) . Unfortunately, the propensity for stone recurrence is not altered by removal of stones with ESWL and stone recurrence is still about 50%. In addition, ESWL might show some significant side effects such as renal damage, ESWL induced hypertension or renal impairment Although there are a few recent reports of beneficial effects of medical treatments in enhancing clearance of stones in the distal ureters ⁵

Methodology

The present study was carried out through the application of quantitative design (descriptive study) was conducted for urolithiasis patients from 5th July 2017 up to the 21 April 2018 .To assess knowledge and attitude of patients with urolithiasis about lithotripsy in

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Kirkuk city. The present study was conducted at Kirkuk general hospital (lithotripsy unit) which are receiving large number of urolithiasis patients from Kirkuk city. A non-probability (purposive) sample of (100) definitely diagnosed urolithiasis , selected from adult and young child patients who were attended to Kirkuk general hospital(lithotripsy unit) in Kirkuk city according to following criteria young child and adult patient more than 11 years old , definitely diagnosed with urolithiasis and need for lithotripsy and agreed to participate in the study . Through extensive review of relevant literature, a questionnaire was constructed for the purpose of the study with interview technique. Overall items included in the questionnaire were (58) items , The questionnaire consists of four parts, demographic data which is composed of (6) items , medical data (8) items ,knowledge of patients (35) items and attitude which comprised of (10) items .

All items were measured on three rating scale, I know (3), Un certain (2) and I don't know (1). Content validity was determined by presenting the questionnaire to a panel of (10) experts in different specialties :four physicians experts in uro surgery , four experts in adult health nursing, two experts in statistic .Those experts were asked to review the questionnaire for content clarity, relevancy , and adequacy .Their responses indicated that minor changes should be performed on few items. All modifications were made relative to their recommendations. Data were collected through the use of the constructed questionnaire and the interview technique as a means of such collection, the period of the study was from 25th July 2017 up to the 15th of November 2017 .The data analyzed through the application of descriptive statistical analysis (frequency and percentage) and inferential statistical data analysis (chi-square , T, test and Anova) by using the statistical package of social science (SPSS) version (20) .

Results and Discussion

The result of table (1) show that urolithiasis is more common in female and constitute (56.0 %) from total sample. Madbouly and others (2005) disagreement with our study conducted their study about slow versus fast shock wave lithotripsy rate for urolithiasis: a prospective randomized study The study included 114 male (73.1%) and 42 female patients (26.9%)⁸. Worceste and Coe (2008) Epidemiological studies revealed that nephrolithiasis is more common in men (12%) than in

women (6%)⁶ With regard to their address (66.0%) were living in urban areas The explanation may be that the faraway of the town narrowed down the numbers for visiting the hospital in the city. Smatiou and Karanasou (2006) about prevalence of urolithiasis in rural area and concluded (85 %) in urban and (15 %) in rural area ⁹ .Wood and Shoskes (2006) disagreement in our study and mentioned the Men are more commonly affected than women, with a male to female ratio of 3:1. The difference between the sexes is gradually being eroded. This is thought to be due to lifestyle-associated factors, such as obesity and a Western diet ⁷. The findings in table (1) high percentage of patients was married and constitute (59.0 %) because our communities focus on marriage, so we find that most of the elderly clients are married . Hirvonen and others (2010)mentioned study about Nutrient Intake and Use of Beverages and the Risk of Kidney Stones among Male Smokers and agreement in our study and find most of patients married (88 percent)¹⁰ .With regard to the job (33.0 %) of the sample were employed . Atan and others (2005) To study the incidence of urinary lithiasis and metabolic alterations among male employees from a steel industry who were exposed to high temperatures in the work environment Of the 10,326 workers, 181 (1.75%) had presented with at least one episode of urinary stones. of these, 103 were among the hot-area workers (8.0%) and 78 among the room-temperature workers (0.9%; $P < 0.001$). The metabolic evaluation showed that the hot-area group (group 3), compared with the room-temperature group (group 4), presented more frequently with hypocitraturia (55.8% versus 28%, $P = 0.03$) and low urinary volume (79.4% versus 48%, $P = 0.01$).and conclude Workers exposed to high temperatures presented with a ninefold risk of lithiasis. Hypocitraturia and low urine volumes were the metabolic alterations observed⁽¹¹⁾ . With regard to the educational level It is obvious from the table that most of the patients were un able to read and write and constitute about (20.0%)from total patients, the reason of this marked proportion is that lack of social knowledge. Table (2) about general knowledge this table indicates that the mean of score was no highly significant in items and moderate significant in items (1,4,7) and low significant in items (2,3,5,6) .Krambeck and others (2012) about use Shock wave lithotripsy employs high energy acoustic pulses (shock waves) generated outside the body to break stones within the kidney and ureters. As such SWL is the only non-invasive method available to remove stones. In the early

years following its introduction SWL was considered an option for the treatment of virtually any stone type in any anatomical location. Urologists soon learned, however, that the urinary tract has a limited ability to clear stone fragments and that ureteral obstruction could occur if the mass of stone debris was too high⁽¹²⁾. Table (3) about complications of lithotripsy This table indicates that the mean of score was no highly significant in items and moderate significant in items (2,3,4,5,7,) less significant (1,6,8,9). Beatrice and others (2017) mentioned Tissue damage in SWL most often involves trauma localized primarily to the region where the focal zone is targeted (i.e. the renal calyceal system), but can include injury to surrounding organs as well. Understandably, injury to the kidney has received considerably more attention than extrarenal effects. However, reports of damage outside the kidney are noteworthy and may be additional cause for concern. Table (6) This table indicates that the mean of score was high significant in item(4) and moderate significant in items (3,4) and low significant (2,6,7). the explanation of this result related to the inadequate knowledge of patients about lithotripsy.

Table (1) Demographic characteristics of the study sample (No= 100)

Variables	No.	%
Age		
11-20 years	26	26.0
21-30 years	37	37.0
31-40 years	12	12.0
41-50 years	9	9.0
51-60 years	11	11.0

61 and more	5	5,0
Total	100	100%
Gender		
Male	44	44,0
Female	56	56,0
Total	100	100,0
Residence		
Urban	66	66,0
Rural	34	34,0
Total	100	100,0
Marital status		
Single	36	36,0
Married	59	59,0
Divorced	2	2,0
Widow	3	3,0
Total	100	100,0
Job		
Retired	7	7,0
Civil work	19	19,0
Employed	33	33,0
Housewife	27	27,0
Functionless	14	14,0
Total	100	100,0
Educational levels		
Unable to read and write	20	20,0
read and write	11	11,0
Primary school	17	17,0
Intermediate school	14	14,0
Secondary school	6	6,0
Institution	13	13,0
College and more	19	19,0
Total	100	100,0

Table (2): Mean of Scores for general knowledge items with frequency, percentage, severity and Chi-square .

General knowledge	Yes		Un certain		No		MS		Severity
	F	%	F	%	F	%			
Lithotripsy is a non-invasive alternative to surgery for the treatment of kidney stones	49	49,0	18	18,0	33	33,0	2.16	MS	
The first Lithotripter was produced by the German Aircraft manufacturer Dornier	11	11,0	15	15,0	74	74,0	1.37	LS	
The first patient was treated in a prototype machine in February 1980 in Munich, Germany	29	29,0	22	22,0	49	49,0	1,8	LS	
It uses carefully focused, high-energy shock waves to disintegrate the kidney stones	59	59,0	20	20,0	21	21,0	2,29	MS	

Cont... Table (2): Mean of Scores for general knowledge items with frequency, percentage, severity and Chi-square .

Lithotripsy may be recommended when a kidney stone is too large to pass	20	20,0	25	25,0	55	55,0	1,65	LS
The full medical term for the procedure is extracorporeal shock wave lithotripsy (ESWL), meaning that the shock wave is generated outside of the body.	25	25,0	33	33,0	42	42,0	1,83	LS
Lithotripsy is usually not recommended when the kidney stone is greater than 2-3cm in diameter	65	65,0	15	15,0	20	20,0	2,45	MS

Table (3): Mean of Scores for Complications of lithotripsy items with frequency, percentage and severity and Chi-square.

Complications of lithotripsy	Yes		Un certain		No		MS	Severity
	F	%	F	%	F	%		
Bleeding leads to hematuria	29	29,0	33	33,0	38	38,0	1,91	LS
Pain	53	53,0	26	26,0	21	21,0	2,32	MS
Increase body temperature	46	46,0	35	35,0	19	19,0	2,27	MS
Low blood pressure	37	37,0	29	29,0	34	34,0	2,3	MS
Nausea and vomiting	43	43,0	26	26,0	31	31,0	2,12	MS
Retroperitoneal hematoma	15	15,0	31	31,0	54	54,0	1,61	LS
Urinary tract obstruction: Fragments of desintegrated stones may obstruct the ureters	50	50,0	26	26,0	24	24,0	2,26	MS
Urinary tract infection with fever	30	30,0	29	29,0	41	41,0	1,89	LS
Renal Failure	22	22,0	32	32,0	49	49,0	1,79	LS

Table (4) One –way analysis of variance for the difference between General information , indications of lithotripsy, patient preparation ,contraindications and Complications of lithotripsy on patients and their age.

Categories	S.O.V	S S	M S	F.Obs
General information	Between Groups	85.978	17.196	2.506 S
	Within Groups	645.062	6.862	
	Total	731.040		
Indications of lithotripsy	Between Groups	61.495	12.299	2.145 NS
	Within Groups	539.015	5.734	
	Total	600.510		
Patients Preparation	Between Groups	94.044	18.809	2.410 S
	Within Groups	733.716	7.805	
	Total	827.760		

Cont... Table (4) One –way analysis of variance for the difference between General information , indications of lithotripsy, patient preparation ,contraindications and Complications of lithotripsy on patients and their age.

Categories	S.O.V	S S	MS	F.Obs
Contraindications of urolithiasis	Between Groups	204.385	40.877	4.342 S
	Within Groups	884.925	9.414	
	Total	1089.310		
Complications of urolithiasis	Between Groups	137.864	27.573	2.632 S
	Within Groups	984.886	10.478	
	Total	1122.750		

Table (5): T-test for comparison for the difference between clients General information, indication, patients preparation Contraindications ,Complications and of lithotripsy, regarding to their gender.

Categories	Sex	No.	X	S.D	T.obs	P≤ 0.05
General knowledge	Male	44	14.1364	1.95996	1.723	1.9 NS
	Female	56	13.2500	3.15220		
Indications of lithotripsy	Male	44	11.8636	2.38787	1,533	NS
	Female	56	10.1964	2.28369		
Patients Preparation	Male	44	14.1364	2.68147	1,426	NS
	Female	56	13.3214	3.02178		
Contraindications of lithotripsy	Male	44	13.7273	2.80667	1,658	NS
	Female	56	12.6607	3.62455		
Complications of urolithiasis	Male	44	18.3409	2.87688	1,893	NS
	Female	56	17.1071	3.64157		

Table (6): Mean of Scores for attitude items with frequency, percentage, severity and Chi-square.

Attitude	Yes		Un certain		No		MS	Severity
	F	%	F	%	F	%		
Lithotripsy is boring procedure	58	58.0	14	14.0	28	28.0	2.3	MS
Lithotripsy is coasty procedure	32	32.0	27	27.0	41	41.0	1.91	LS
Lithotripsy complication cannot be controlled	42	42.0	29	29.0	29	29.0	2.13	MS
Psychological status is affected by lithotripsy	47	47.0	20	20.0	33	33.0	2.14	MS
Lithotripsy is a main cause of hematuria	62	62.0	16	16.0	22	22.0	2.4	HS

Cont... Table (6): Mean of Scores for attitude items with frequency, percentage, severity and Chi-square.

Lithotripsy is best method for treatment of urolithiasis	42	42.0	14	14.0	42	42.0	1.96	LS
Recurrent Urolithiasis is main cause for renal failure	3	3.0	28	28.0	69	69.0	1.34	LS

Conclusion

The findings are based on the results of data analysis. According to the objectives of this study, the conclusions are: Most of the urolithiasis patients were between (21-30) year's old represent (37%), large number from patients were female and represent (56%) and majority of the patients were from urban area and represented (66%) Large number of the urolithiasis patients were married and constitute (59%) , while (33%) of the urolithiasis patients were employed , the medical data of urolithiasis patients shows (52,0 %) of the patients had stone in the kidney while (46,0 %) of the samples had less than one year's duration. The result shows that urolithiasis patients has inadequate knowledge regarding to general knowledge , indications and contraindications of lithotripsy. The result shows highly significant relation between urolithiasis patients knowledge and their age and duration of treatment. The result shows most of the samples had negative attitude about lithotripsy .

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Kirkuk, Iraq and all experiments were carried out in accordance with approved guidelines.

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Nutritional Status in Patients with Congenital Heart Diseases Tikrit Teaching Hospital

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Abstract

This is an observational cross-sectional study has been conducted in Tikrit Teaching Hospital in which a total (204) CHD cases. The questionnaire was developed to collect all personal and demographic data relevant to the objectives of study. The study includes interviewer administration of questionnaire, anthropometric measurements, CXR, ECG and Echo finding. All cases of CHD which were diagnosed by echocardiography. Results: the total No. of cases were 204 case, female was 106 case, male 98 cases, most common defect was VSD, male: female ratio 1:1.08. Most of cases were VSD 72 case (35.2%) and most common was large VSD, followed by TOF, 29 case (14.2%), least CHD, TAPVR and AP window. Total cases of VSD was (72). The frequency of types of VSD were as follows; small VSD (24 cases), moderate VSD (22 cases), and large VSD (29% cases). The age distribution of CHD was as follows; neonate (11%) , infants (18), (1-5 years) (44%), and children > 5 years (27%). The sex distribution of CHD was as follows; CHD in female was (106 case), in males (98 case), with male to female ratio =1:1.08 (table 3). Most of cases were underweight [127of cases (62.25%) underweight, 77 (37.75%) normal weight].

Keywords: Nutritional, Patients, Congenital Heart Diseases.

Introduction

Congenital heart defects (CHD) are prevalent defects in live births and represent the main cause of death among congenital malformation¹. Malnutrition represents an important public health problems with high rate of morbidity and mortality.² Malnutrition affect the health system, and the entire socio-cultural aspect of the community.³ Malnutrition is a state of nutrition where the weight for age, height for age and weight for height indices are below -2 Z-score of the NCHS reference.⁴ It form a big public health problem in developing world and represent an important risk factor for disease burden in children. Malnutrition affect children with congenital heart disease, regardless the nature of the heart defect and the presence or absence of cyanosis⁽⁵⁾ Pediatric patients with CHD are liable for malnutrition for different factors; low energy intake, high energy requirements, or both.⁶ Malnutrition in children because ventricular

septal defects (VSD) have been shown to have a 40% increment in total energy expenditure (TEE). Children with congestive heart failure due to CHD in frequently present with increased energy expenditure.^(7, 8) This make the heart must work more harder to pump an adequate blood for body metabolism. Increased body composition is another cause for the increased metabolic rate encountered in children with CHD. Consequently, they will have a raised frequency of lean body mass which tends to increase their basal metabolic rate.⁽⁹⁾ Chronic hypoxaemia affects growth by causing anorexia which causes ineffective dealing with nutrients at the level of cell.⁽⁵⁾ Other cause of malnutrition in children with CHD is pulmonary hypertension, and children age at presentation.^(10, 11) Nutritional status assessment of children with CH) is a very important issue often neglected in pediatrics practice and in Iraq. This study was aimed at determining the effect of CHD on the nutritional status. The results will help us to improve on nutritional counseling and early surgical correction to optimize the growth of children with CHD. This will also enable us to establish a baseline data where other related issue will hinge on. We are not aware of any

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study of this nature from this environment.

Patient and methods: written ethical approval, & study execution permission were gained from Committee of Iraqi Board for medical specializations. Parental consent before data collection and assessment of baby was taken. The study has been conducted in Tikrit Teaching Hospital in which all cases with CHD were included during the study period. This is an observational cross-sectional study which was conducted during the period extending for 6 months. A Convenient sampling technique which has been used to collect samples from those patients with CHD attending pediatrics clinic with regular working hours within 2 days per week. During the study period the total (204) cases. The questionnaire was developed to collect all data relevant to the objectives of study. The questionnaire include information about sex, age, address, family history, consanguinity, sign & symptom of CHD, growth & developmental parameters, socioeconomic status and ECG, chest x-ray finding. The study includes interviewer administration of questionnaire, anthropometric measurements, CXR, ECG and Echo finding. All cases of CHD (newly and old diagnosed) which were diagnosed by echocardiography. The following age groups were considered: newborns, infant, preschool children, schoolchildren. The following conditions were excluded: cardiac arrhythmias, PDA in premature newborns and newborns, bicuspid aortic valve, MVP, mirror-image dextrocardia, patent foramen ovale and right sided aortic arch. Examination: each child was assessed for; general and specific cardiac examination. Any child showing an abnormal heart condition was checked by a 12-lead electrocardiogram, and chest X-ray, and complete echocardiography examinations. Echocardiography examination was conducted using M-mode, two-dimensional and color, pulse and continuous wave doppler echocardiogram. Exploratory data analysis was performed using descriptive measures. Data put in tables and figures, statistical analyses was done by Chi- square using p-value. P-value less than 0.05 considered significant .

Results and Discussion

the total No. of cases were 204 case, female was 106 case, male 98 cases, most common defect was VSD, male: female ratio 1:1.08. Most of cases were VSD 72 case (35.2%) and most common was large VSD, followed by TOF, 29 case (14.2%), least CHD, TAPVR and AP

window as in table (1,2). Total cases of VSD was (72). The frequency of types of VSD were as follows; small VSD (24 cases), moderate VSD (22 cases), and large VSD (29% cases). The age distribution of CHD was as follows; neonate (11%), infants (18), (1-5 years) (44%), and children > 5 years (27%). The sex distribution of CHD was as follows; CHD in female was (106 case), in males (98 case), with male to female ratio =1:1.08 (table 3). Most of cases were underweight [127 of cases (62.25%) underweight, 77 (37.75%) normal weight]. (table 4). CHF was present in 65 patients (31.86%), recurrent chest infection in 42 patients (20.5%), and FTT in , 20 patients (10%) as in table 6. The mechanism behind growth retardation in children with CHD is multifactorial including insufficient intake, elevated oxygen consumption, increased average total daily energy expenditure, incompetent absorption secondary to chronic venous bowel congestion, and ineffective tissues utilization of nutrients. ^{2, 12, 13} Long and frequent stay in hospital is an important causative factor to the deterioration of the nutritional status ⁽¹⁴⁾. Drugs used for treatment of heart failure can also affect the nutritional status through different mechanisms ⁽¹⁵⁾. Malnutrition was associated with CHF, higher complications rate and repeated hospital admission. This was previously reported by other investigators. ¹⁶ The explanation is that patients with FTT have depressed immunity made him liable to infection or that the severity of FTT is a result of the complications. Clinical conditions related to malnutrition were; CHF was present in 65 patients (31.86%), recurrent chest infection in 42 patients (20.5%), and FTT in , 20 patients (10%) as in table 6. CHF and repeated chest infection are the most common clinical findings children with acyanotic CHD and consequently feeding difficulty, tachypnea, sweating and subcostal retraction contribute to malnutrition. ^(1, 17) Infections may complicate the underlying CHD leading to additional burden on the body and cause additional loss of weight like neonatal sepsis which is (clinical syndrome of bacteremia with systemic clinical features of infection in 1st 28 days of life and is 1st cause of neonatal deaths.) ⁽¹⁸⁾ Malnutrition often associated with micronutrient deficiencies (like vitamin D deficiency and others which found to be associated with recurrent UTI in children) and infectious diseases which exhibit complicated interactions causing a vicious cycle of malnutrition and infections specially in children of preschool age. ^(19, 20) In conclusion, in children with acyanotic CHD, malnutrition represent

serious complications. Screening this group for nutritional problems and sound counseling. Prevalence of underweight was found to be present in 62.25% of the studied population, like other studies like Krieger I, Forchielli ML, Pittman JG, which also demonstrate same results (11-13). Results of previous researches have stated different malnutrition rates in children with CHD which ranged from 15%-90.4%. (21-25) Prevalence was very low from western countries like France, where Blasquez et al. 26 reported a percent of 15%. While, Vaidyanathan et al. 22 reported a high prevalence of underweight (59.0%) in children with CHD in South India. In African countries like Nigeria, Okoromah et al. (23) described a prevalence of 90.4%. Tokel et al. 24 described a prevalence of 85% in Turkey, while Hassan et al. 14 reported a rate of 84% in Egypt. The wide spectrum of variation is due first to the different study population sample whether cyanotic, acyanotic or both types of CHD. The 2nd cause of variation may include hospitalized children or those with delayed intervention. High prevalence rate in this research may be attributed to the fact that our center is the largest tertiary pediatric cardiac center in Salah Al-Deen governorate receiving the most difficult and complicated patients with even delayed surgical interventions. Children with CHD with a delay in surgical repair are more prone to malnutrition and growth delay than others (15). Further studies including larger sample size are required to put special nutritional guidelines to be part of the medical care presented to children with CHD.

Table (1) Shows types and distribution of CHD.

Type of malformation	No. of cases	%
VSD	72	35.2%
TOF	29	14.2%
ASD	28	13.7%
PDA	15	7.35%
PS	11	5.4%
TGA	10	4.9%
COA	7	3.4%
AVSD	6	2.95%
Miscellaneous	26	12.7%
Total	204	100%

Table (2)-Frequency of 26 miscellaneous types of CHD.

Type of malformation	No. of cases	%
Aortic stenosis	4	1.96%
ASD+PS	3	1.47%
VSD+PS	3	1.47%
DORV	3	1.47%
Dilated CMP	3	1.47%
Pulmonary atresia	2	0.98%
Truncous arteriosus	2	0.98%
Single ventricle	2	0.98%
VSD+PDA	1	0.49%
TAPVR	1	0.49%
Hypertrophic CMP	1	0.49%
Aortopulmonary window	1	0.47%
Total	26	12.7%

Table (3) Distribution of CHD according to sex with male to female ratio

Type of malformation	Sex		M/F Ratio
	M	F	
VSD	30	42	1:1.4
TOF	19	10	1.9:1
ASD	9	19	1:2.1
PDA	5	10	1:2
P S	6	5	1.2:1
TGA	6	4	1.5:1
COA	4	3	1.3:1
AVSD	3	3	1:1
Miscellaneous	16	10	1.6:1
Total	98	106	1:1.08

Table (4) Effect of CHD on nutritional status.

Type of malformation	Under weight	%	Normal weight	%
VSD	47	23.4	25	12
TOF	17	8	12	5.8
ASD	15	7.4	13	6.4
PDA	9	4	6	3
PS	6	3	5	2.5
TGA	7	3.4	3	1.5
COA	5	2.5	2	1
AVSD	4	2	2	1
Miscellaneous	17	8	9	4
Total	127	62.25%	77	37.75%

Table (5) Effect of CHD on nutritional status.

Type of malformation	Under weight	%	Normal weight	%
VSD	47/72	65.3%	25/72	34.7%
TOF	17/29	58.6%	12/29	41.4
ASD	15/28	53.5%	13/28	46.5%
PDA	9/15	60%	6/15	40%
PS	6/11	54.5	5/11	45.5%
TGA	7/10	70	3/10	30
COA	5/7	71.4	2/7	28.6
AVSD	4/6	66.6	2/6	33.4
Miscellaneous	17/26	65.3	9/26	34.7

Table (6) .Symptoms in cases of congenital heart disease.

Symptoms	No. of Cases	Percentage
Heart failure	65	31.86%
Recurrent Respiratory Infections	42	20.5%
Developmental Delay	12	5.8%
Congenital Abnormality	5	2.45%
Palpitations	4	1.96%

Dyspnoea	22	10.78%
Squatting	13	6.4%
Fatigue	7	3.43%
Found on RE	8	3.92%
Increased sweating	4	1.96%
Chest Pain	2	1%
FTT	20	10%

Conclusion

All cases of CHD which were diagnosed by echocardiography. Results: the total No. of cases were 204 case, female was 106 case, male 98 cases, most common defect was VSD, male: female ratio 1:1.08. Most of cases were VSD 72 case (35.2%) and most common was large VSD, followed by TOF, 29 case (14.2%), least CHD, TAPVR and AP window. Total cases of VSD was (72). The frequency of types of VSD were as follows; small VSD (24 cases), moderate VSD (22 cases), and large VSD (29% cases). The age distribution of CHD was as follows; neonate (11%) , infants (18), (1-5 years) (44%), and children > 5 years (27%). The sex distribution of CHD was as follows; CHD in female was (106 case), in males (98 case) ,with male to female ratio =1:1.08 (table 3). Most of cases were underweight [127of cases (62.25%) underweight, 77 (37.75%) normal weight].

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit Medical College, Iraq and all experiments were carried out in accordance with approved guidelines.

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Pb and Cr Concentration in Eggs of Urban Birds in Basrah City

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Abstract

The present study assessed heavy metals content in the eggs of the (house sparrows (*Passer domesticus*) and laughing dove (*Spilopelia senegalensis*) to give baseline data about metals concentration in two species from urban environments in the Basrah city(south of Iraq). The house sparrow is strappingly connected with human surroundings, and be able to live in urban or rural locations. Laughing dove live successfully in the urban environment . Although, it is one of the great inhabitants of the avian world. However, using common species with broad allocations prevents disagreeable effects on an endangered species population and may permit comparing concentrations of metals gathering between different environments. Concentrations of pb and cr in eggs of the birds were determined using Atomic Absorption spectrometry. Result established that eggshell in two birds species were collected high concentrations of lead metal arrived at (25.6,18.6ug/g) respectively, while, egg content was accumulate lowest level of lead ranged between (3.5 ug/g)and (2.5ug/g), respectively . Conversely , level of chromium was low in eggshell and egg content of two birds species. Positive relationships were observed between pb and cr level in eggshell and egg content in house sparrow.

Key words: lead, chromium, urban, birds.

Introduction

Birds utilize dissimilar resources of food and water in big area and thus the level of trace elements in birds' organs and eggs may make known the levels of toxic constituents in their environment ¹. As well, Birds are useful biomonitors for a number of reasons: they are perceptible, sensitive to environmental change, and they play an important role in the food chain, make them proper for studying bioaccumulation ². Metals are unalterable in environment and can accumulate in organism particularly those that are long-lived and high on the food chain or in those that are close to industrialized areas ³. Lead is an important environmental pollutant that is present in nature due to natural and anthropogenic sources ⁴,so existence of pollutants, such as heavy metals in the environment in attendances big risks for all living organism as well as

humans . Fraser et al. ⁵ have reported that lead exposure causes neurotoxicity, which is typify by histological, ultrastructural and neurochemical changes in the central nervous system, on top of behavioral shortfalls. In addition, lead exposure grounds morphological, physiological and behavioral troubles in young and adult avian, demonstrating that lead poisoning affects the growth, locomotion, balance, food scavenging, feeding, thermoregulation, depth perception, and cognition ⁶, however, increased bioavailability of heavy metals to all organisms, connected with industrial agriculture and urban activities. The number of studies making use of non-destructive methods, like measuring the concentrations of heavy metals in egg, feathers, and faeces, has increased over the years ⁷. Acquaintance of the mineral composition of avian eggs is ever more necessitated for different reasons; these comprise the evaluation of accumulation of toxic and heavy minerals in the egg from the feed and the environment ⁸. In urban environments, The laughing dove (*Spilopelia senegalensis*) is a small pigeon that is a resident breeder in Africa, the Middle East and the Indian is actually member of the birds of Iraq, they have well adapted in Basrah areas, nesting on the top of buildings, window,

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palm tree, and any other place they can build a stable nest. The laughing dove and collared dove, is one of the great colonizers of the avian world. Its creative range was warmer temperate areas from southeastern Europe to Japan⁹, the female laying two eggs, however, a female put down her eggs in the nest of another pair, top to three or four eggs in the nest. The eggs are white, 2.57–2.96 cm in long, 2.06–2.30 cm in wide, 6–7 g at laying (5–6% of female body mass). Both sexes incubate, the male of birds incubate the eggs at day, and the female at night and some of the day. Conversely, the house sparrow (*Passer domesticus*) is a bird of the sparrow family Passeridae, set up in nearly all parts of the world. A small bird, it has length of 16 cm (6.3 in) and a mass of 24–39.5 g (0.85–1.39 oz). Females are colored brown and grey, and males have brighter black, white, and brown markings. The house sparrow is associated with human dwellings and can live in urban or rural places. The eggs are white, bluish white, or greenish white, spotted with brown or grey. Its length variety from 20 to 22 mm and width 14 to 16 mm, egg weight of 2.9 g. The house Sparrow one of the most applicants for urban biomonitoring of heavy metals because it inhabits houses, ranches, rural communities, manufacturing services, its profusion, non-migratory way of life and close connection with humans^{10,11}

Materials and Method

Sample collection

A total of 20 eggs of The laughing dove and house sparrow were collected from nests in different regions of Basrah city in urban areas between July and September(2017), house sparrow egg average weight (2.5 g ±0.6), laughing dove weight 5.7g ±0.97. These samples were stored in metal-free polyethylene bags until chemical analysis. Before analysis, eggs were washed alternately for 1 min with deionised water, and for 1 min with acetone to remove loosely adherent exogenous contamination. The eggs were open, eggshell were put in 4 ml metal-free polyethylene vials, egg content were put in Petri dishes and dried in an oven for 24 h at 70 C. Balance to the nearest 0.5 g of Samples were digested in a 1:1 mixture of 70% HNO₃ and 30% H₂O₂ the digested completed in block thermostate(150)C for 4h when solution were clear. After cooling, samples were diluted to 5 ml with de ionized water, then were filtrated. The solutions were stored at 4C for later metals analysis. Concentrations

of pb and cr were determined using Atomic Absorption spectrometry (AA-700,shimADZU). The certified values of the reference material and the percentage of recovery obtained are shown in Table 1.

Statistic Analysis

The normality of data was tested using Explore (Kolmogorov–Smirnov). Data were subjected to one way ANOVA with post-hoc tests, followed by Tukey's HSD ($p < 0.05$) to determine whether heavy metals significantly varied between the eggshell and egg content. An independent sample t-test was used to assess whether the heavy metals significantly varied between the egg of two birds. All statistical calculations were achieved with SPSS 20 for Windows 2007. A Spearman association test was carry out to investigate the correlations between metals level between eggshell and egg content.

Results and Discussion

The analysis of metals levels in egg shell and egg content were showed in fig 1, The minimum and maximum pb content in the analyzed samples were found (25.6 and 18.6ug/g) in egg shell of two birds species(house sparrow and laughing dove) were collected from urban habitat, Result of study were found to be statistically significant at $p < 0.05$ differences in pb level at eggshell and egg content. whereas egg content of two birds were have lowly levels of lead ranged between (3.5 ug/g) and (2.5ug/g), respectively. The chromium content of the eggs studied are presented in fig 1, the chromium concentration in eggshell sample in the recorded:1.83,2.79ug/g in house sparrow and laughing dove respectively. As well, chromium levels in egg content was 1.03,1.73ug/g of two bird respectively. Results recorded in fig 1 reveal that the mean concentration of chromium were found lower than the concentration of lead in two birds eggs. in general Egg contents did not display unusual metal concentrations, in contrary, Egg shell, contained more as much Pb as egg contents. Lead and chromium level in the house sparrow egg shell and egg content showed in fig 2, pb was higher concentration significantly($P < 0.05$) than cr concentration, in addition, cr concentration was lowest than pb in eggshell and egg content of laughing dove fig 3. Spearman correlation demonstrated their is a positive one between pb and cr levels in egg shell and egg content of house sparrow ($r = 0.60$) fig 4. even as

,a weak correlation was founded between pb, cr level in eggshell and egg content in laughing dove fig 5. Attention in the trace element levels of eggs relates to research by environmental scientists on the embryo toxic effects of various trace elements on birds. Lead pollution is one of the most urgent dilemmas in Iraq similar to other world and causes serious outcomes to humans and animals. Heavy metal contamination resulted from the human activities particularly the cultivation processes, decomposition of the garbage, sewage, and polluted air. The contamination of Pb is caused by agriculture operations : (fertilizers, pesticides and herbicides), sewage, and polluted air ¹⁷ . There are not many studies that have accounted concentrations of metals in eggshells and egg of urban bird ,besides ,it is first study recorded concentration of metals in egg of urban birds in Basrah city, for this reason the current study is done. Result of present study detected that eggshell of house sparrow and laughing dove that collected from urban region were gathered elevated concentration significantly ($p < 0.05$) of lead get to 25.6,18.6 ug/g compare with concentration of chromium, these level may reflecting its abundance as an urban pollutant in Basra city . Conversely ,concentrations of Pb were clearly higher than those reported in the literature ¹¹, they repotted 3.3ug/g in eggshell of house sparrow in urban area and 1.6 ug/g in egg content. Alternatively , Kekkonen et al., (18),reported high level of lead in house sparrow liver in urban than rural habitats. As well , our results demonstrate that concentrations of lead in egg content that be in concord with ¹⁹. Lead (Pb) is a main pollutant in environment and toxic for birds particularly at the early period of their development ²⁰, so heavy metal concentration and heavy metal appraisal indicate that industrial activities and traffic emission are the most essential sources for Pb. Mora ²¹ found concentrations of As, Ba, Ni, Pb, Sr, and V were 2–35 times greater in eggshells than in egg contents of two passerine birds from Arizona, he mentioned to the substantial transport of eggshell solids and minerals into the embryo occurs during the latter half of incubation therefore, there is a possible for toxic minerals in the shell to become mobilized and possibly affect later stage embryos, including critical strength of the embryo itself needed for hatching success. In addition, A very important factor could cause Cr deficiency in birds species, and that factor is stress, it indicates that animals exposed to stress conditions need more Cr and that can create a Cr deficiency ^{22,23} found that supplementing

chromium improved weight of eggs, however slight decreased strength as well as thickness of eggshell and the combination of Cd and Cr had negative effect on the quality of Japanese quail eggs. Metals stored in tissues of birds female bodies may be transferred to the eggs, and then in small amounts are taken by the embryos from the yolk and albumin. As females mobilize calcium from medullary bone for eggshell formation, the intestinal absorption of calcium (and alongside lead) increases, resultant in elevated bone lead concentrations in females ^{24,25}. Birds can accumulate metal like in their bodies that may cause pathological changes and physiological dysfunctions of their organs, reduction of clutch size, elevated embryonic and bird mortality, decrease in haemoglobin and hematocrit levels ¹⁹. Burger ²⁶ establish that concentrations of pb, and cr were significantly higher in egg contents than in eggshells of Herring gulls (*Larus argentatus*), this result is opposite with present result, which recorded high levels of pb and cr in eggshell than egg content of birds. Conversely ,Dauwe et al ²⁷ referred that some passerine species sequester non-essential heavy metals in the eggshell. Morera et al ²⁸ found that concentrations of elements such as Zn, Cu, Mn, and Hg were 80–99% greater in egg contents than in eggshells of Audouin’s gulls (*Larus audouinii*). Heavy metal toxicities are of major concern in wild avian species. Once a metal has entered the body it can be accumulated, or it can be excreted. Eggs are a good indicator of local exposure, as most tropical and temperate birds spend many weeks on the breeding grounds before laying their eggs, obtaining sufficient supplies to produce them. ^{29,30}

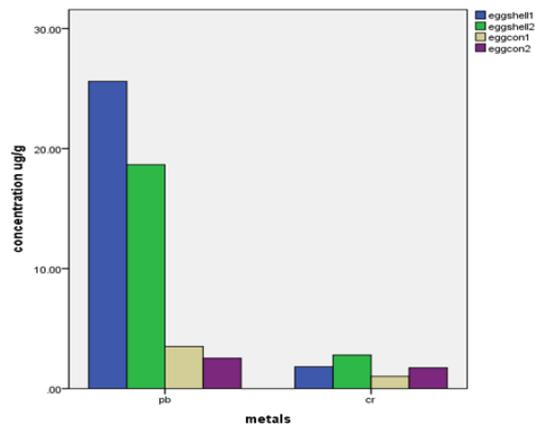


Figure 1: mean of metals levels (ug/g dry weight) in eggshell(1) and egg content (1)of house sparrow, and eggshell(2) and egg content(2) of laughing dove .

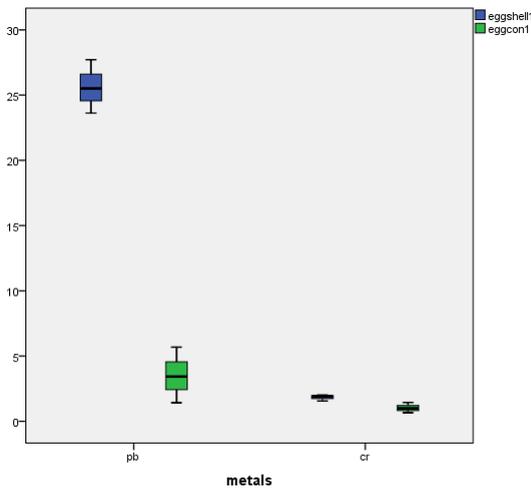


Figure2: Box plots representing metals concentration (ug/g) in egg shell and egg content of house sparrow.

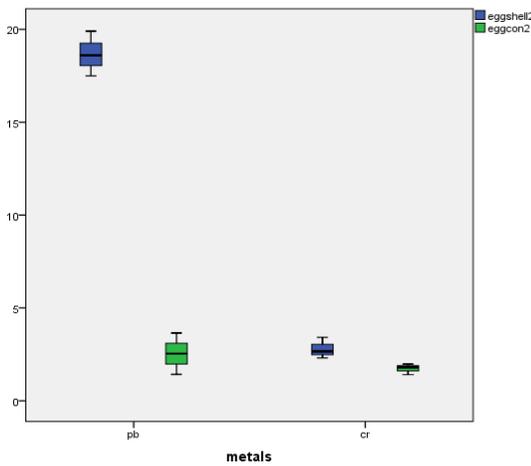


Figure 3: : Box plots representing metals concentration (ug/g) in egg shell and egg content of laughing dove.

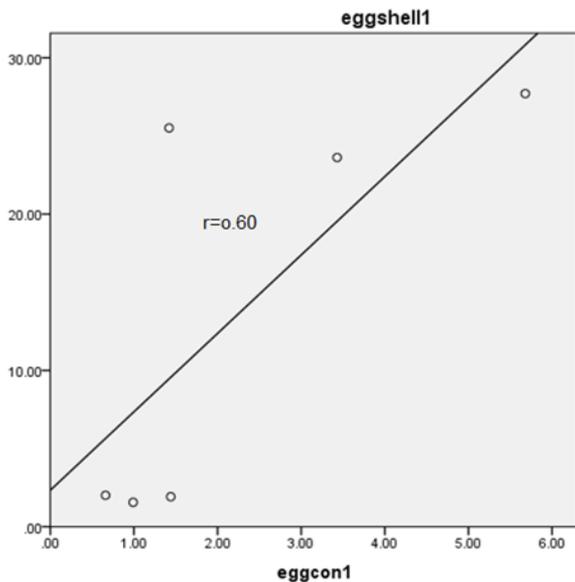


Figure 4: correlation between metals concentration (ug/g) in egg shell and egg content of house sparrow, r=(0.60).

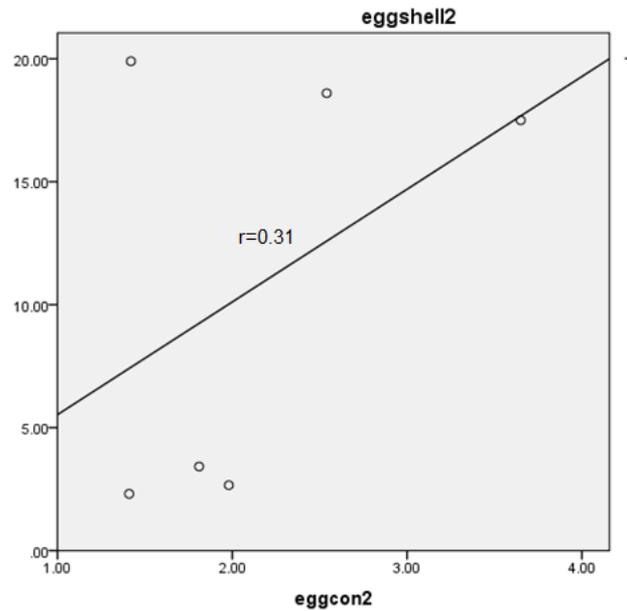


Figure 5: correlation between metals concentration (ug/g) in egg shell and egg content of laughing dove , r=0.31

Table 1. Analytical results for the Certified Reference Materials (CRM) and its certified Values for each metal (µg/g dry weight)

Metals	Measured value	Certificate value	Recovery %
Cr	0.774 ± 0.025	0.77 ± 0.15	100.6 ± 3.281
Pb	0.375 ± 0.015	0.35 ± 0.13	107.3 ± 4.16

Conclusion

The concentration of essential trace metal chromium was found within the permissible limit, however lead found in high concentration in egg of house sparrow and laughing dove , this found may reflex the concentration in urban . Birds use different resources of food and water in a relatively large area and, therefore, the concentration of trace elements in their eggs can reveal the classification of toxic elements in their habitat.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of biology, faculty

of science, Basrah University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Potential Effect of Green Zinc Oxide Nanoparticles against X-ray on Kidneys of Albino Male Rats

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Abstract

Zinc is a one, of important, trace, element for all organisms: humans, animals, plants, and microbes, and in recent decades, it has, been extensively studied for, determine its biochemical and physiological functions. The study, used 20, adult male rats that distributed to four groups (each group consist 5 rats); control group, that received normal saline, rats group that exposure to X ray for two weeks, rat group that, exposure to X ray, and received, 50mg/kg of green zinc oxide nanoparticles for two weeks, rats group that exposure to X ray and received 100mg/kg of green zinc oxide nanoparticles for two weeks. The results show significant increased ($P < 0.05$) in levels of creatinine, urea and uric acid compared with the control group. Also, The results show high significant increased ($P < 0.05$) in levels malonedialdehydied, (MDA) and significant decreased ($P < 0.05$) in levels glutathione (GSH), catalase and total antioxidant capacity compared with control group. The results showed non-significant changes ($P < 0.05$) in all parameters compared with the control group when using green zinc oxide nanoparticles.

Keywords: *green zinc oxide nanoparticles; X-ray; kidneys functions; oxidative stress.*

Introduction

Zinc may be a one, of necessary, trace, part for all organisms: humans, , animals, plants, and microbes, and in recent decades it's, been extensively studied to, verify its organic chemistry and physiological functions., Additionally, zinc element, enter in structure of more than 300 different enzyme types, , cell-signaling proteins and transcription factors that maintain the body's normal immune functions, maintain cell-membrane integrity, adjust its protein metabolism and help regulate cell proliferation and its differentiation¹⁻². The use of plants in process of nanoparticlensis synthesis novel and provides a cheap and environmentally friendly different to chemical and physical synthesis. As well as, use of plants during this field are often simply scaled up for large-scale synthesis while not the employment of nephrotoxic materials and chemicals or the requirement for temperatures, high

pressures, energy³. Also, Nanoparticles that produced by different types of plant are more stable, and the percent of synthesis is faster than that in the case of other organisms and techniques⁴. Nanoparticles present a higher surface area to volume magnitude relation to decrease in size, distribution and morphology of the particles⁵. So the aim of the study is to show the potential role of zinc oxide nanoparticles against of X-ray, and the results of the present study were compared with other studies that performed by different investigators to show the reasons that lead to increase the levels of kidney function parameters when exposed rats to X-ray and the role of ZonNPs in treatment. Also, the results were analyzed by using a statistical Minitab program to show the significant changes between groups of study.

Materials and Method

Animal model

In this study 20 adult albino male rats, (Wt. 200-250 mg with age4-6 month) obtained from Veterinary college/ Kirkuk University, and kept on a standard pellet diet and water.

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Preparation of Water Extract

Twenty grams of *Crataegus azarolus* fruit were placed in (160 ml) distilled water and left for 24 h, the mixture was filtered, then filtration was placed in an incubator at (40 °C). The mixture has evaporated and extract powder was storage until use ⁶.

Green synthesis of zinc oxide nanoparticles

(20 ml) of extract was heated at (50 °C) for ten min and (50ml) of (91 mM) of metal acetate answer (1 gm) of metal acetate was dissolved in (50 ml) of distilled water) was additional drop knowing it underneath stirring. The reaction mixture became yellow and cream colored precipitate of metal hydroxide was fashioned. Then the precipitate was collected by activity at 16000 rate for ten min at (4 °C). The precipitate was vacuum dried at (30 °C) and also the sample (PZN30) was hold on for any studies ⁷.

Characterization of nanoparticles UV-visible Spectroscopy

Analysis wonderful technique for activity nanoparticles concentration in pure nanoparticles suspensions with comparatively low detection limits (g/L range). Contains data on size, aggregation and surface chemistry since the height shifts in response to changes in these parameters. We used this technique for measurement the peak shifts of silver and zinc oxide nanoparticles, the measured begin with 300 to 800 nm.

X-ray machine

X-ray instrumentality includes x-ray imaging systems, process instrumentality and instrumentality directly associated with the assembly of pictures for diagnosing or directly associated with irradiation with x-rays for medical care. X-ray machine that utilized in this gift study was created in Japan.

Experimental design

Twenty adult male rats are exposed X-ray at (80 kvp) and at 0.32 second/day for two week and divided as follow (each group consist five rats):

Control group: rats were received normal diet only for two weeks and then killed (without any exposure).

Positive group: rats were exposed X-ray for two weeks, and then killed.

Third group: rats were exposed X-ray for two week and administrated with 50mg/kg ZonNPs at same time, and then killed.

Fourth group: rats were exposed X-ray for two week and administrated with 100mg/kg ZonNPs at same time, and then killed.

Prepare of blood solution

Blood samples are collected from rat heart, under anesthesia, then put in test tubes. Then, tubes were centrifugation for 10 min to obtain serum that stored by deep freezing until used.

Serological tests

Malonedialdehyied (MDA) was measured according to colorimetric reaction with thiobarbituric acid (TBA) using spectrophotometer. Glutathione (GSH) level estimated by mixed 2.3 ml buffer with 0.2ml of the sample and then added (0.5ml) of 5,5'-Dithiobis (2-nitrobenzoic acid) (DTNB). The mixture was analyzed by spectrophotometer ⁹.

Statistical analysis

The Data were analyzed using a statistical Minitab program. A statistical difference between the means of the experimental groups was analyzed using one way analysis of variance (ANOVA).

Characterization of ZnO NPs

Characterization of ZnO NPs using UV-Visible Spectroscopy ZnO NPs were characterized by UV Visible spectroscopy. The UV-Visible absorption spectra of the ZnO NPs were measured in the range of 300-800 nm using a UV-Visible spectrophotometer. UV-Visible spectroscopy is an important and valuable technique for the characterization of nanoparticles. A strong and broad, surface plasmon peak located at 360 nm was observed for the ZnO NPs prepared using dried extracts of *C. azarolus* as shown in figure (1).

Kidney function tests

The levels of urea (74.67 ± 4.39 mg/dl), creatinine (2.92 ± 0.23 mg/dl) and uric acid (8.65 ± 0.92 mg/dl) in rats exposure to X rays show significant increased ($P < 0.05$) compared with control rats (18.14 ± 2.3 ; 0.78 ± 0.34 and 2.67 ± 0.21 respectively). The levels of urea (28.2 ± 2.73 ; 16.34 ± 1.76 respectively), creatinine (1.4

± 0.31 ; 0.82 ± 0.21 respectively) and uric acid (3.92 ± 0.21 ; 2.29 ± 0.43 respectively) in third and fourth groups show non-significant changes ($P < 0.05$) compare with control rats as shown in figure (2).

Oxidative stress parameters (MDA, GSH and catalase)

The levels of MDA (2.45 ± 0.11), GSH (0.316 ± 0.013), catalase (0.72 ± 0.09) and TAC (0.423 ± 0.028) in rats exposure to X rays show significant increase ($P < 0.05$) compared with control rats (1.83 ± 0.04 ; 0.483 ± 0.03 ; 1.34 ± 0.05 and 0.652 ± 0.03 respectively). The levels of MDA (1.91 ± 0.04 ; 1.79 ± 0.06 respectively), GSH (0.438 ± 0.04 ; 0.503 ± 0.063 respectively), catalase (01.03 ± 0.05 ; 1.42 ± 0.04 respectively) and TAC (0.562 ± 0.03 ; 0.643 ± 0.05 respectively) in third and fourth groups show non-significant changes ($P < 0.05$) compare with control rats as shown in figure (3).

In kidneys

The levels of MDA (2.13 ± 0.07), GSH (0.187 ± 0.04), catalase (0.21 ± 0.09) and TAC (0.321 ± 0.02) in rats exposure to X rays show significant increase ($P < 0.05$) compared with control rats (1.2 ± 0.11 , 0.312 ± 0.09 ; 0.36 ± 0.07 and 0.552 ± 0.03 respectively). The levels of MDA (1.78 ± 0.03 ; 1.28 ± 0.08 respectively), GSH (0.262 ± 0.07 ; 0.308 ± 0.05 respectively) catalase (0.29 ± 0.04 ; 0.37 ± 0.03 respectively) and TAC (0.457 ± 0.08 ; 0.548 ± 0.04 respectively) in third and fourth groups show non-significant changes ($P < 0.05$) compare with control rats as shown in figure (4). The present study show that the UV spectroscopy analysis showed maximum absorption at about 360 nm that is in agreement with Shah et al. (2015) who found by using UV spectroscopy analysis showed maximum absorption at about 330 nm for green ZnO NPs [10]. On the otherwise, the results show harmful effects of X-ray in kidney functions and lead to increase the levels of oxidative stress and decrease the antioxidant factors. Where, the exposure of radiation lead to form free radicals that generated by the radiolysis of water molecules. free radicals were interact with different biomolecules in cells and tissues and they lead to different changes in their structures and functions ¹¹. The cell damages and injures formed according to radiation dose and times of exposure ^{12,13}. On other hand, Al-Bazii (2014) referred that the X-ray lead to different physiological changes in mice including decreased in glutathione levels and

serum proteins that is in agreement with results of present study ¹⁴. The present study reveal to the highly negative effect of X-ray irradiation, and the mechanism of effect of cellular ionization by X-ray, this ionization interfere with cells bioactivity and cause different histopathological changes in different organs ¹⁵. About the role of antioxidant properties of ZonNPs in this study, Rajakumar et al. (2018) referred that the zin oxide nanoparticles that synthesis by biological method (using *Andrographis paniculata*) possess strong biological activities regarding anti-oxidant, anti-diabetic, and anti-inflammatory potentials ¹⁶ that is in agreement with results of present study. Also, Nagajyothi et al. (2015) referred that the zinc oxide nanoparticles (ZnO NPs), were synthesized using the root extract of *Polygala tenuifolia*, has been Anti-inflammatory activity and antioxidant activity ¹⁷. So, the present study suggest that ZnO NPs has been free radical scavenging activities that explain the role of ZnO NPs ¹⁸.

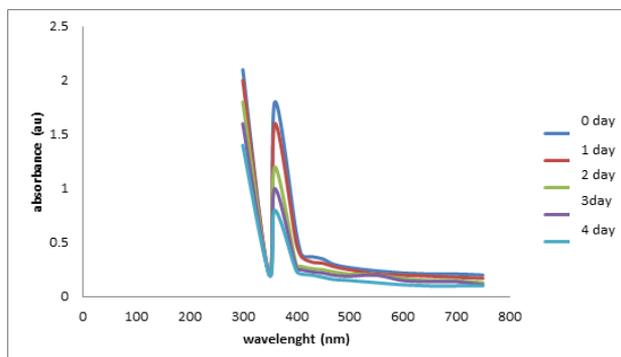


Figure (1): Strong beak within the range of 300- 800 nm

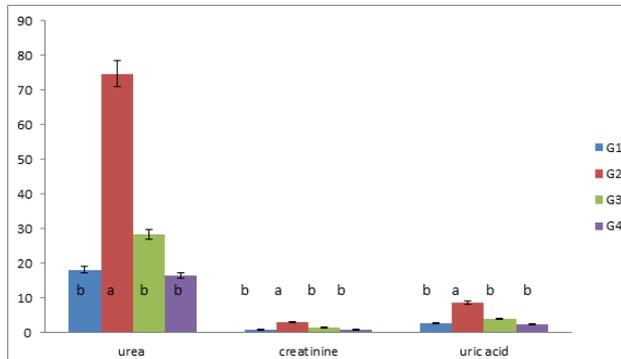


Figure (2): The levels of urea, creatinine and uric acid in serum

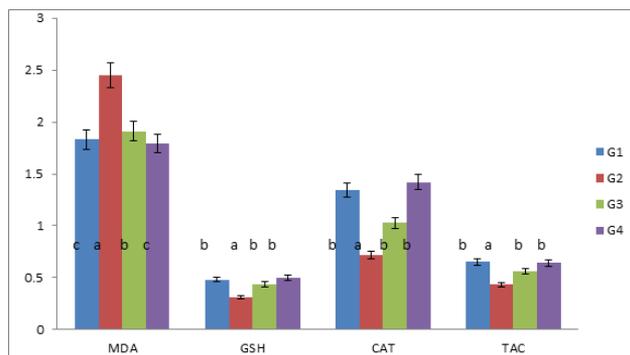


Figure (3): The levels of MDA, GSH, CAT and TAC in serum

Figure (4): The levels of MDA, GSH, CAT and TAC in kidneys

Conclusion

After induce kidney dysfunctions by exposure rats to X-ray and treated by using zinc oxide nanoparticles. It was concluded that green zinc oxide nanoparticles has been potential role against the toxic effects of X ray in adult male rats.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Nursing department/ Instituted Kirkuk Technical /North Technical University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Risk Factors for Developmental Delay among Children in Ba'aquba-Iraq

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Abstract

This study aims at studying the most common risk factors of delayed developmental milestones in children under 3 years of age attending Al-Batool Teaching Hospital in Ba'aquba-Iraq. A cross sectional descriptive observational study done on a randomly selected sample of (200) children of age between (6-36) months who present with suspected developmental delay. The male were 88 (44%), and 112 (56%) female. The prevalence of suspected developmental delay was 16 (8%). The prevalence of different risk factors for developmental delay were: problems during pregnancy 4 (9.1%), hospitalization 8 (18.2%), severe jaundice 1 (2.3%), serious disease 11 (25%), and family history of mental or congenital disorder 5 (11.4%). From children with suspected developmental delay, there was higher male to female ratio of 1.2:1.

Keywords: prevalence of developmental delay risk factors in children in Ba'aquba-Iraq, risk factors for developmental delay in children in Iraq.

Introduction

Globally, 5% of the under 5-year children of below 5 years of age are at risk of delayed developmental milestones ^{1, 2} Children development is described by a dynamic and continuous process and interaction between biology and experience and stimulation. ⁽³⁾ Human developmental pathways in life are affected by interactions in between risk factors that, on a hand, increase the possibility of a poor result and on another hand are protective factors that increase the probability of a positive results. ⁽⁴⁾ American Academy of Pediatrics recommends that screening and following up instruments for delay in developmental are used to identify children at risk and to introduce stimulation measures in a timely manner. There is evidence that early intervention can reduce the risk of developmental delay in older children ^{2, 5, 6} This study gained its importance, from that there were a lot studies of children development comes from developed countries; few studies are conducted in underdeveloped settings ⁷ Patient and Methods:

written approval for the study was gained from pediatric department in Tikrit Medical College. A cross sectional descriptive observational study has been conducted on children attended AL-Batool teaching hospital who are aged between (6–36) months to assess the developmental milestones and identify the prevalence of developmental delay among children in such area. Children included in this study were assessed by a prepared questionnaire containing demographic and personal information; drug history. The questionnaire covers the five developmental milestones; gross motor skills, fine motor skills, communication skills, problem solving/cognition skills and social/ personal interaction.

Results and Discussion

Two hundred child was investigated in PHCC, 88 (44%) of them were male, versus 112 (56%) female, & 171 (85.5%) from urban area and 29 (14.5%) from rural area.. The mean age group was 19.7±9.6 months. Nearly 50 % of the sample aged 6-21 months, 5-9 months 32 (16%), 9-13 months 38 (19%), 13-17 months 25 (12.5%), 17-21 month 24 (12%), 21-25 month 23(11.5%), > 29 month 47 (23.5%). Children with delayed milestones was 19 (43.2%) aged less than 1 year, & 25 (56.8%) aged 13-29 months. Children with normal milestones was 41 (32.6%) aged less than 1 year,

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115 (67.4%) aged 13-29 months. The classification of developmental milestone were as follows: the normal was 122 (61%), 34 (17%) was normal development with risk factor, 28 (14%) with developmental alert, and 16 (8%) with suspected developmental delay. Regarding developmental milestone were as follows: 44 (22%) of the sample with delayed milestones, and 156 child displayed all milestones regardless presence of risk factor. From children with delayed milestones, 20 (45.5%) was male versus 24 (54.5%) was female, while gender distribution among normal children it was 68 (43.6%) male versus 88 (56.4%) female. From children delayed milestones 34 (77.3%) of them was from urban versus 10 (22.7%) from rural, while among normal children it was 137 (87.8%) from urban versus 19 (12.2%). From the children with delayed milestones 7 (15.9%) had OFC <-2SD and 1 (2.3%) > +SD versus 36 (81.8%) had normal O.F.C, while among normal children non had had OFC <-2SD or > +SD versus 156 (100%) had normal OFC, this relation was statistically significant ($X^2=29.54, df=2, P \text{ value} < 0.05$). Weight and Developmental Milestone: From the children with delayed milestones 14 (31.8%) had body weight < 3rd percentile versus 30 (68.2%) had normal weight, while among normal children 9 (5.8%) had had body weight < 3rd percentile versus 147 (94.2%) had normal weight, this relation was statistically significant ($X^2=22.88, df=1, P \text{ value} < 0.05$). Height and Developmental Milestone: From the children with delayed milestones 12 (27.3%) had height < 3rd percentile versus 32 (72.7%) had normal height, while among normal children 2 (1.3%) had height < 3rd percentile versus 154 (98.7%) had normal height, this relation was statistically significant ($X^2=35.6, df=1, P \text{ value} < 0.05$). Most of mothers of children with delayed milestones had primary school 16 (36.4%), secondary school 12 (27.3%), 10 (22.7%) read and write, and college 6 (12.6%), versus primary school 46 (29.5%), secondary school 45 (28.8%), college 42 (26.9%) and 23 (14.7%) read and write. Most of children with delayed milestones were bottle feeding 27 (61.4%), mixed 8 (18.2), breast feeding 9 (20.5) while in normal children bottle feeding 70 (44.9%), mixed 52 (33.3), breast feeding 34 (21.8). The Odds Ratio for Developmental Delay Regarding Different Factors: the risk to have delayed milestone was OFC <-2SD 5.3, weight less than <3rd percentile 7.62, height less than <3rd percentile 28.9, if mother read and write 3.04, these relations was statistically significant as shown in table (14). Regarding risk factors for developmental delay

were as follows in table 1: thirteen children (6.5%) had problems during pregnancy, 31 (15.5%) hospitalized, 5 (2.5%) had premature & low birth weight, 10 (5%) had severe jaundice, had serious disease 16 (8%), 10 (5%), had mental or congenital disorder in family, 12 (6%), had phenotypical alteration. Problems during pregnancy: present in 4 (9.1%) of the children with delayed milestones, these results near to Shaima Hussein study (14.7%)⁽⁸⁾, and lower than Valsamma study (22.4%)⁽⁹⁾, and Kyungsook study (23.5%)⁽¹⁰⁾. This is may be explained by improper antenatal care for some women in our society. Hospitalization During Neonatal Period occur in 8 (18.20%) of the child with delayed milestones, these results nearly approximate to Shaima Hussein study (21.4%)⁽⁸⁾, Masiri (Jordan) study (17.4%)⁽¹¹⁾, but it is more than what was reported in Valsamma study (10.3%)⁽⁹⁾, and lower than Paramleen study result (54%)⁽¹²⁾, these differences may be explained by geographical variations. Most common neonatal hospitalization causes are: Respiratory Distress Syndrome, Pneumonia, Sepsis, Hypoglycemia, Necrotizing Enterocolitis, Metabolic disorders, Nosocomial infection, C.N.S infection and I.C.H. None of them were hospitalized due to severe jaundice, premature and low birth weight because these causes discussed in this study. Severe Jaundice in the neonatal period occur in 1 (2.3%) of the children with delayed milestones, these nearly approximate to Shaima Hussein study (2.7%)⁽⁸⁾, and is near to Masiri study (5.5%)⁽¹¹⁾, and lower than Ebtessam study (9%)⁽¹³⁾, but it is not reported in both Chun study⁽¹⁴⁾, and Roshan Koul study⁽¹⁶⁾. This may be explained by that medical advice is sought more rapidly well developed countries. Premature and Low Birth Weight: occur in 5 (2.50%), this disagree with other studies of screening for developmental delay, this study showed relatively low percent of premature and low birth weight as a risk factor, and this may be due to; small sample size, so we could not cover the largest possible cases of target group. The prematurity and low birth weight may cause serious long-term effects on child, so the child will need to visit the hospital and emergency department more than PHCC which all the cases of this study collected from it. Prematurity was significantly associated with hypothermia, hypoglycemia, hypocalcaemia, respiratory distress syndrome, kernicterus and intraventricular hemorrhage with serious long-term effects, all of these will increase risk for developmental problems⁽¹⁸⁾. Family history of mental or congenital disorder was present in 5 (11.40%), which is lower than Shaima Hussein study

(14.7%)⁽⁸⁾, and Valsamma study result (14.7%)⁽⁹⁾, and this is may be due to small sample size and presence of other risk factors as an initiative to developmental delay. Serious diseases that may affect to the development: this study showed 11 (25.00%), which is lower than Shaima Hussein study (43.9%)⁽⁸⁾, Ebtessam study (36%)⁽¹³⁾, and Chun study (35.2%)⁽¹⁵⁾. This low percentage may be due to that this study was concerned primarily with prevalence of developmental delay among children, so it did not take the causes and diseases that may lead to developmental disability in details. Unwillingness of parents to tell the researcher the true story of their child disease, or might have given inaccurate information. This study showed that 10 (22.7%) of children's mothers could read and write, 16 (36.4%) of them pass the primary school, 12 (27.3%) of them had secondary school, and 6 (12.6%) of them had college and high education, these results near to Shaima Hussein study which was showed; read and writer (18.7%), primary school (48%), secondary school (24%), and college and high education (9.3%)⁽⁸⁾, and Valsamma study which was showed; read and write (17.3%), lower percentage of primary school (13.7%), higher for secondary school (62%), and college and high education (7%)⁽⁹⁾. it is unlike to Eun study which show; read and write (0%), primary school (9%), secondary school (32.8%), and college and high education (46.3%)⁽¹⁷⁾. also it is unlike Kyungsook study which revealed, read and write (0%), primary school (0%), secondary school (64.7%), and college and high education (35.3%)⁽¹⁸⁾. These results differences may be explained by the differences between societies. Maternal education has significant effect on birth weight and gestational age, also affect potential channels by which birth outcomes are improved such as the use of potential care, so it may affect to the development of child⁹. This study showed that 7 (15.9%) had O.F.C <-2SD from the children with delayed milestones, these results near to Palestinian study (15%)⁽¹⁹⁾, in England (19%)⁽²⁰⁾, and lower than in Iraq (28.5%)⁽²¹⁾. Head circumference (HC) reflect growth and development of the brain in early childhood So, the importance of measuring (HC) is due to its direct correlation with the brain size and, it has a role in detecting anomalies besides being used as a nutrition

indicator⁽²⁹⁾. Also the study showed 1 (2.3%) had O.F.C > +2SD from the children with delayed milestones, & this low percentage may be explained by small sample size and that children with large head visits hospitals not PHCC. This study showed that, from the children with delayed milestones 14 (31.8%) had body weight < 3rd percentile, this results proximal to Shaima Hussein study which showed that the children with body weight < 3rd percentile were (34.6%)⁽⁸⁾, and near to study in Switzerland which showed (41%) body weight < 3rd percentile⁽³⁰⁾.

Table 1: Risk factors for developmental delay of study group.

		Frequency	Percent
Type of feeding	Bottle feeding	97	48.5
	Mixed	60	30
	Breast feeding	43	21.5
Problems during pregnancy	Yes	13	6.5
	No	187	93.5
Hospitalization	Yes	31	15.5
	No	169	84.5
Premature & low birth wt	Yes	5	2.5
	No	195	97.5
Severe jaundice	Yes	10	5
	No	190	95
Serious disease	Yes	16	8
	No	184	92
Mental or congenital disorder in family	Yes	10	5
	No	190	95
Pheno-typical alteration	Yes	12	6
	No	188	94
	Total	200	100

Table 2: Relation between risk factors and developmental milestone.

Risk factors	Delayed milestones		Normal milestones		Total		P value
	No.	Percent	No.	Percent	No.	Percent	
Problems during pregnancy	4	9.10%	9	5.80%	13	6.50%	>0.05
Hospitalization	8	18.20%	23	14.70%	31	15.50%	>0.05
Premature& low birth wt.	0	0.00%	5	3.20%	5	2.50%	>0.05
Severe jaundice	1	2.30%	9	5.80%	10	5.00%	>0.05
Serious disease	11	25.00%	5	3.20%	16	8.00%	<0.05 S
Mental or congenital disorder in family	5	11.40%	5	3.20%	10	5.00%	<0.05 S
Phonotypical alteration	12	27.30%	0	0.00%	12	6.00%	<0.05 S

Conclusion

The male were 88 (44%), and 112 (56%) female. The prevalence of suspected developmental delay was 16 (8%). The prevalence of different risk factors for developmental delay were: problems during pregnancy 4 (9.1%), hospitalization 8 (18.2%), severe jaundice 1 (2.3%), serious disease 11 (25%), and family history of mental or congenital disorder 5 (11.4%). From children with suspected developmental delay, there was higher male to female ratio of 1.2:1.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit College of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

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Estimation of the Success of Male STR Analysis based on the Number of Visible Sperm Detected Under the Microscope

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Abstract

A chance to obtain an autosomal STR complete profile of a rapist from vaginal swabs of a victim has been evaluated in this study. Two-hundred vaginal swabs were retrospectively examined. The samples were tested for acid phosphatase (AP) activity before being equally separated into two groups. Those in the first group were used for sperm count by which both estimation and total count of the sperm were conducted. The samples were then graded into six levels (0-5) based on the sperm count. Meanwhile, the samples in the second group were subjected to sperm estimation count and STR profile analysis. Samples graded level 5 were 100% AP positive. The number of detected alleles obviously depended on the sperm grade. The percentage of the full profile was found highest (85%) in the grade 5 group and gradually declined with the decrease in sperm grade. Remarkably, the chance to get the full STR profile of the perpetrator fell below 50% when there were fewer than 60 sperm cells in the sample based on the estimation count. This study could help guide the decision made by a forensic DNA examiner concerning evidence gathered from a rape case.

Keywords: DNA, Sexual assault, Seminal stains, Autosomal STRs

Introduction

Autosomal short tandem repeat (STR) has been used as a DNA marker for human identification as its sequence is polymorphic containing repeated units of 1-6 nucleotide core sequence. For human identification, a number of autosomal STR loci are examined to increase individualizing potential. These STR loci are universally standardized for deposition in the DNA database where DNA profiles could be statistically compared. The existence of autosomal STR database gives them an advantage over mitochondrial or Y-STR analysis^[1].

The STR profiles of biological evidences are generated by the following process, DNA extraction,

DNA quantification, multiplexed PCR amplification, and fragment separation and detection^[2]. However, at times, failures of forensic STR analysis caused by the quantity and quality of DNA in the samples have been reported^[3]. The reduction in the number of detectable loci in STR analysis depended on the degradation rate of genomic DNA in bloodstain samples^[4]. This incident was also observed in seminal stain^[5] and hair^[6] samples.

No standardized procedure to evaluate the efficiency of STR analysis based on the detected sperm number in rape evidence has been proposed. Hence, this study was conducted to investigate the relevance between the number of detectable alleles in the STR profiles and the number of detected sperm under the microscope. Our findings will support routine work in forensic DNA examination helping to estimate the success of STR analysis from rape evidence.

Materials and Method

Vaginal swabs

Two-hundred cotton-tipped vaginal swabs from

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rape victims sent to Srinagarind Hospital, Khon Kaen University during 2010-2014 were retrospectively examined. The samples were tested for acid phosphatase activity as described by Peonim et al^[7], and then divided into two groups (100 each). The first group was subjected to both sperm total and estimation count to assess the number of the sperm in each sample and assign it a grade accordingly. Samples in the second group were firstly subjected to sperm estimation count and then to STR analysis. This study was conducted with the permission from the Khon Kaen University Ethics Committee in Human Research (HE581403).

Sperm count

Vaginal swabs were soaked in normal saline containing 1% ammonium hydroxide (1:1) for 24 h. After the swabs were removed, the solution was spun at 10,000 rpm for 5 min. The supernatant was discarded and the cell pellet containing spermatozoa was resuspended in 60 µl normal saline. Twenty microliters of the suspension was smeared onto a microscopic slide, dried and stained with hematoxylin-eosin. The number of spermatozoa was determined under light microscope (40x). For sperm estimation count, 30 fields were randomly chosen while the sperm total count was performed over the entire area.

DNA extraction

For samples in group 2, the rest of the cell suspension (40 µl) was used for DNA extraction. Sperm DNA was isolated by differential extraction^[8]. The cell suspension was immersed in 0.5 ml lysis buffer solution 1 (TNE buffer: 10 mM Tris-HCl pH 8.0, 10 mM EDTA, 100 mM NaCl with 1% SDS and 100 µg/ml Proteinase K) for 1 h at 37°C. After incubation, the solution was transferred to a new tube and then centrifuged at 13,000 rpm for 3 min. The supernatant containing vaginal epithelial cell DNA was removed. The sperm pellet of 5 µl was taken for sperm estimation count by microscopic examination. DNA extraction from the rest of the sperm pellet was performed by QIAamp DNA micro kit (Qiagen, Germany) according to the manufacturer's instructions. The quantity and quality of DNA extracts were measured by Nanodrop Spectrophotometer.

STR typing

The STR profiles of sperm DNA fraction were amplified using the AmpFLSTR® Identifier plus kit

(Applied Biosystems, UK). The PCR products were separated by ABI 3130 Genetic Analyzer (Applied Biosystems). The resulting DNA profiles were analyzed using GeneMapper® ID v3.2.1. The results of the STR profiles were classified into three groups according to the integrity of the profiles including full profile (1 or 2 alleles at each locus), mixed profile (presence of allelic drop-in) and partial profile (presence of allelic drop-out).

Findings

Sperm grading

Vaginal swabs of each group (100 samples) were tested for acid phosphatase activity. The percentage of positive results in the first and second groups was 86% and 88%, respectively. Samples in the first group were taken for sperm approximate and total count. The samples were graded based on the results from both counts (Table 1).

Table 1. Sperm grading of samples in group 1.

Grade	Sperm number		Percentage share (%)
	Estimation count	Total count	
0	0	0	2
1	1-9	1-99	25
2	10-59	100-999	44
3	60-89	1,000-3,999	9
4	90-399	4,000-9,999	13
5	(≥)	(≥)10,000	7

Sperm estimation count

The sperm numbers from the vaginal swabs in group 2 were examined by estimation count before being analyzed for their DNA profiles. The samples were subsequently graded according to the criteria determined earlier. In order of percentage share, samples were classified into grade 2 (42%), followed by grade 1 (25%), 4 (17%), 3 (8%), 5 (7%) and 0 (1%).

AP examination

The AP results of the samples in both groups were considered and classified according to the sperm grading (Table 2). Interestingly, the percentage of AP positive

samples was directly proportional to the sperm grade in which 100% AP positive samples were observed in grade 3 and 5. The grade 4 group missed the 100% AP positivity achieved by the grade 3 and 5 groups, because 1 out of its 30 samples was found to be negative.

However, its percentage of AP positive samples was superior to those of grade 0, 1 and 2. Therefore, it seems that the AP results depended on the number of detected sperm in the sample.

Table 2. The AP results of samples in both groups at each sperm grade.

Grade	Number of samples	AP Positive		AP Negative	
		No.	%	No.	%
0	3	1	33	2	67
1	50	40	80	10	20
2	86	78	91	8	9
3	17	17	100	0	0
4	30	29	97	1	3
5	14	14	100	0	0
Total	200	179		21	

DNA quantification

To compare with the STR profile results, the isolated DNA from sperm pellet on both sperm and epithelial cell fractions was quantified. The results showed that DNA concentration of the sperm fraction increased with the sperm grade (Figure 1). The higher amounts of DNA may have resulted from the higher number of sperm cells where DNA is present. At the highest sperm grade (5), the DNA concentration of the female epithelial cell fraction was found to be less than that of the sperm fraction. It is worth noting that the reduction of female epithelial DNA observed in this study was also related to the fullness of the STR profiles from sperm fraction.

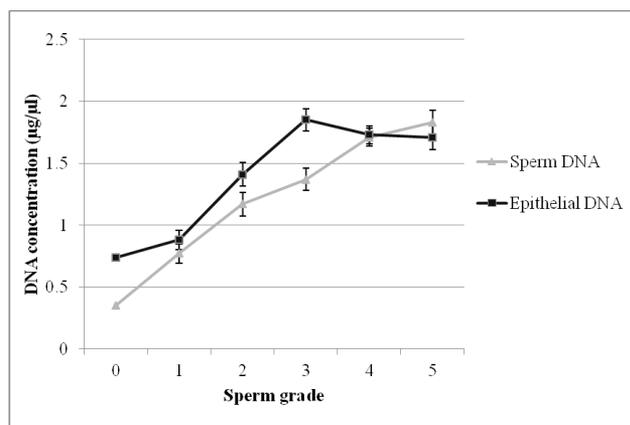


Fig. 1. The quantity of DNA isolated from sperm and epithelial cell fractions.

Autosomal STR profiles

The STR profile of each DNA sample reported

according to the number of allele(s) that could be detected as described earlier. It can be seen that samples of grade 5 had the highest numbers of full profile (86%), followed by those of sperm grade 4 (71%), 3 (50%), 2 (33%) and 1 (6%). Interestingly, samples graded as 0 showed only mixed profile results. The percentage of mixed profiles decreased with increasing sperm number, i.e. sperm grade, indicating that the number of detected sperm influences the fullness of the DNA profile (Fig.2).

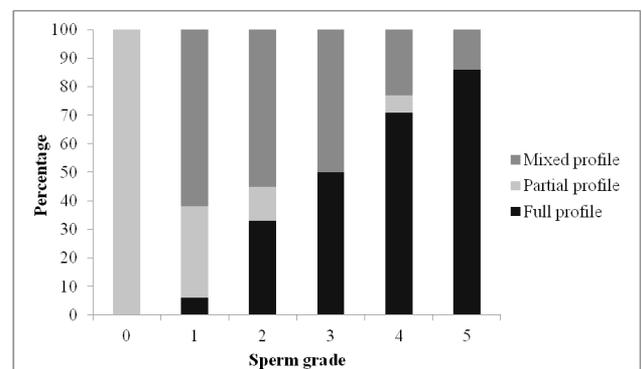


Fig. 2. The percentage of each STR profile type detected from the samples at each sperm grade.

Discussion

For forensic DNA analysis, human DNA contamination and bad quality of evidence’s DNA are the major causes of STR analysis failure [9,10]. This study was conducted in order to evaluate the success rate of autosomal STR analysis from rape evidence by detection of sperm number under the microscope which

will be useful for forensic routine analysis. Two-hundred vaginal swabs were presumptively tested for their AP activity. In spite of old samples, AP positive results were spotted. Related finding has been previously reported^[11].

For sperm grading, the sperm number determined by both estimation and total counts could be grouped into 6 grades. The majority of the samples were assigned a grade 2. AP negative results were mostly observed in samples of the lower sperm grades. Comparison studies between the enzyme activity and the amount of DNA extracted from enzyme producing cells in forensic investigation, like amylase, had been reported earlier^[12,13]. Despite the fact that amylase activity was found to be unrelated to the DNA amount, amylase positive samples regularly had a full DNA profile, hinting the success of DNA analysis^[13].

DNA from sperm and epithelial cells were separately extracted by DE method^[14]. The quantity of DNA extracted from sperm cells gradually increased with the sperm grade. The amount of epithelial DNA in samples graded 0-4 was higher than that of sperm DNA. This may be the reason why Y-STR analysis is more preferable than autosomal STR analysis especially when mixed male and female DNA samples are examined^[15,16,17].

The completeness of STR profiles of sperm DNA proportionally increased with sperm grade. A related study had also shown that the chance to detect locus DYS393 depended on the amount of sperm cells in a specimen^[18]. The number of detected alleles on Y-STR analysis correlates with the results of sperm cytology test^[19]. Moreover, full STR profiles were observed from rooted hair samples with at least 50 nuclei^[6]. These studies have confirmed that the opportunity to have a full STR profile depends on the amount of cells in the evidence.

The separation potential ratio of the extraction differential (SPRED) was recently proposed^[20]. This value indicates the separation potential of sperm DNA from unwanted female DNA carried over from the extraction process. Our results supported this proposition in which the number of complete male STR profile depended on the quantity of male DNA in the sperm fraction. Mixed STR profiles (14%) that were observed from samples of grade 5 were possibly caused by contaminated female DNA. However, the

number of mixed profiles was not related to the sperm grade. Unexpectedly, some alleles were produced from samples with no detected sperm. This effect may have been explained by the contamination of female DNA. Furthermore, male DNA may have come out from other cells like epithelial cells and leukocytes suspended in seminal fluids^[21,22]. In addition, sampling error and sample heterogeneity that may have occurred during sperm detection may lead to misinterpretation of no detected sperm^[22]. For analysis of non-detected sperm samples, the success of Y-STR analysis had also been elucidated^[17,22,23].

In this study, the autosomal STR analysis was our only focus. Therefore, in the case of mixed stains samples, male allele may have been masked by female allele in some loci. In this case, it is hard to determine male STR profiles, particularly when there are no female reference DNA profiles for comparison. Thus, Y-STR analysis is a better choice to determine male DNA in rape evidence^[1,9,24]. For further analysis, the correlation between the sperm grade and the integrity of Y-STR profile will be extremely useful for forensic DNA analysis in rape evidence.

Conclusion

It is distinctively clear that the opportunity to achieve the perpetrator's autosomal STR profiles depends on the number of detected sperm in the vaginal swabs. The vaginal swabs, which are examined by estimation count and assigned a grade 5 in terms of the number of sperm detected (>400 sperm cells) will produce a full STR profile in as many as 80% of the samples. In contrast, fewer than 50% of the samples will exhibit a full profile in vaginal swabs whose sperm grade is below 3 (<60 sperm cells). For vaginal swabs with non-detected sperm cells, it is unlikely that a full profile of autosomal STR can be had in which case Y-STR rather than autosomal STR analysis should be considered.

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Ethical Clearance: Khon Kaen University Ethics Committee in Human Research (HE581403).

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Effectiveness of Qigong Gymnastics on Decreasing Blood Glucose in Patients Diabetes Mellitus Type 2, Indonesia

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Abstract

Background: Many diabetes mellitus sufferers prioritize the handling of diet, and consume drugs rather than physical activity. However, handling the diet does not guarantee the control of blood glucose levels. One physical activity that can be used is with Qigong Gymnastics. Qigong Gymnastics traditional fitness methods originating from ancient China, combine body movements, meditation guidelines, respiratory regulation, and so on. This combination of elements achieves physical and mental adjustment effects. Qigong can help maintain neuroendocrine balance and blood glucose control. The purpose of this study was to analyze the effectiveness of qigong gymnastics on reducing blood glucose in patients with type 2 diabetes mellitus. **Material and Method:** The type of research is *quasi* experimental with *nonequivalent* control group design. Sample in this research is patient of patients Diabetes Mellitus Type 2 that is 48 people. Data analysis was performed by using Wilcoxon and Kruskal Wallis test with $\alpha = 0.05$. **Results:** The results of statistical test analysis using Wilcoxon test obtained glucose levels before and after p-value $0.12 > 0.05$ means that there is a significant decrease in blood glucose levels. Data analysis was performed using the Kruskal Wallis test explaining that blood glucose levels before and after Qigong Gymnastics in the experimental group 1, 2 and 3 times a week blood glucose levels before gymnastics had a p-value of $0.0433 > 0.05$ and after gymnastics obtained p-value $0.018 < 0.05$ means there are differences in blood glucose levels in the three study groups. **Conclusion.** The conclusion of the results of the study is that intervention with Qigong Gymnastics twice a week is more effective in reducing blood glucose levels in Patients Diabetes Mellitus Type 2. Therefore it is recommended for patients with Type 2 Diabetes Mellitus Patients to always perform physical activities such as Qigong Gymnastics and check blood glucose levels to health workers regularly so that blood pressure can be controlled.

Keywords: Diabetes Mellitus Type 2, Blood Glucose, Qigong, Gymnastics, physical activities

Introduction

Diabetes mellitus (DM) is a chronic disease that occurs because the pancreas cannot produce enough insulin or because the body cannot effectively use insulin produced by the pancreas. Hyperglycemia or increased blood glucose levels are frequent effects in DM patients. Blood glucose levels that are not controlled from time to time can cause serious damage to the body system, especially the nerves and blood vessels. Type 2 diabetes

mellitus occurs due to a decrease in sensitivity to insulin or due to impaired insulin secretion. ^[1]

The number of cases of diabetes mellitus increases yearly with the increasing world population and this increase in prevalence is related to the progressive transformation of a traditional lifestyle into a modern standard of living due to urbanization, the increase of obesity prevalence and the decrease of physical activity. Therefore, the incidence and prevalence of diabetes mellitus should be regularly monitored as this disease is progressively chronic and has potential negative impacts. ^{[2], [3], [4]}

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World Health Organization (2010) states that 60% of causes of death of all ages in the world are due to non-communicable diseases. The global prevalence rate of DM patients in 2014 was 8.3% of the total population in the world and experienced an increase in 2014 to 387 million cases. People with diabetes mellitus in south east in 2015 reached 415 million adults with diabetes, a 4-fold increase from 108 million in the 1980s. By 2040 it is estimated that the number will be 642 million people. Indonesia ranked seventh in the world in 2015 for the prevalence of diabetes mellitus patients along with China, India, the United States, Brazil, Russia and Mexico with an estimated 10 million people. [5], [6]

The American Diabetes Association (2006) explained that to improve blood glucose control, maintain ideal body weight, and reduce the risk of cardiovascular disease, two types of physical exercise walking programs were carried out. First, walk with moderate intensity (moderate-intensity aerobic exercise), which must be achieved 50-70% Maximum Pulse Rate (DNM) (50% VO₂-max). Second, vigorous aerobic exercise, which must be achieved > 70% DNM (60% VO₂-max). Both programs must be done at least 3 times a week on a regular basis (no more than 2 days without doing moderate or high intensity walking. [7], [8]

Based on the IDF statistical trend predicts that Indonesia will be ranked sixth with the number of patients reaching 12 million by 2030, an increase in the number of diabetics 90% to 95% are type II diabetes mellitus. Diabetes mellitus in southeast Sulawesi was ranked 3rd with a total of 2,963 cases. The cause of type 2 diabetes mellitus because insulin produced by the pancreas is insufficient to bind the sugar in the blood due to eating patterns or unhealthy lifestyles like lacking. Type 2 diabetes mellitus has a very dangerous effect because it can cause complications. Therefore, efforts are needed to control type 2 diabetes mellitus. Control of diabetes mellitus requires four supporting pillars, namely education, diet, exercise, and medicine. Many DM sufferers are more focused and only prioritize handling the diet, and consuming drugs. However, regular diet management does not guarantee the control of blood sugar levels, but this must be balanced with physical exercise. [9], [10], [11], [12], [13]

One of the physical activity exercises that can be used with qigong gymnastics. The gymnastics is a

traditional fitness method originating in ancient China, combining body movements, mediation guidelines, respiratory regulation, and so on. The combination of these elements achieves physical and mental adjustment effects. Furthermore, Qigong can help maintain neuroendocrine balance and blood sugar control such as diabetes mellitus. [14]

Material and Method

This study was conducted on May 2st - August 9th, 2018. The type of this study was quasi experimental with nonequivalent control group design. The sample in this study was the patients Diabetes Mellitus Type 2, 48 people consisting of 3 experimental groups and 3 control groups. Each experimental group consisted of 8 people who were given qigong gymnastics interventions 1 time a week, 2 times a week, and 3 times a week, while each control group consisted of 8 people who were not intervened. Data analysis was performed by using Wilcoxon and Kruskal Wellis test with $\alpha = 0.05$. This research uses purposive sampling technique.

Results

Total sample that would be analyzed in this study was 48 samples. Based on bivariate analysis in the Table 1, analysis of qigong gymnastic with Diabetes Mellitus Type 2 (p value < 0.005).

Table 1. Analysis Wilcoxon of Qigong Gymnastic Effectiveness once a Week, Twice Weekly and Three Times a Week on Decreasing Blood Glucose in Patients Diabetes Mellitus Type 2

Group	Blood Glucose - After Blood Glucose - Before
Gymnastics 1 times a week p-value	-2.527 .012
Control group 1 p-value	-1.224 .345
Gymnastics 2 times a week p-value	-2.621 .008
Control group 2 p-value	-1.409 .159
Gymnastics 3 times a week p-value	-2.540 .014
Control group 3 p-value	-2.041 .081

Table 2. Analysis Kruskal Wallis test Blood Glucose before and after Qigong Gymnastic Exercise on Decreasing Blood Glucose in Blood Glucose (experimental group)

	Intervention	Frek	Mean Rank	p-value
Blood Glucose pre-test	1 time a week	8	12.56	0.433
	2 time a week	8	14.75	
	3 time a week	8	10.19	
Blood Glucose post-test	1 time a week	8	14.75	0.018
	2 time a week	8	15.00	
	3 time a week	8	7.75	

Table 3. Analysis Kruskal Wallis test Blood Glucose before and after Qigong Gymnastic Exercise on Decreasing Blood Glucose in Blood Glucose (control group)

	Intervention	Frek	Mean Rank	p-value
Blood Glucose pre-test	1 time a week	8	10.69	0.111
	2 time a week	8	10.06	
	3 time a week	8	16.75	
Blood Glucose post-test	1 time a week	8	10.31	0.084
	2 time a week	8	9.62	
	3 time a week	8	15.56	

Discussion

Table 1 describes based on the analysis using Wilcoxon test in gymnastics group 1 time a week, the results of glucose levels before and after intervention p-value 0.012 <0.05 means that there is a significant decrease in blood glucose levels. Physical exercise results in a decrease in blood glucose levels, increased insulin sensitivity, reduce the risk of cardiovascular disease and prevent obesity, blood lipid disorders, increased blood pressure, and blood hypercoagulation. In addition, weight loss of 5-10% accompanied by regular physical exercise can reduce the risk of Type 2 Diabetes Mellitus by 58% while the use of drugs (such as metformin, thiazolidindion, acarbose) can only reduce the risk by 31%. As for according to research conducted in the USA, it was stated that cases of diabetes mellitus type 2 were higher in groups that did physical exercise less than 1 time per week compared to groups that did physical exercise 5 times per week. Physical exercise must be endurance (aerobic), such as walking, jogging, swimming, and cycling with moderate or high intensity.

[15], [16]

Exercise in patient diabetes mellitus type 2 is a therapeutic tool for patients with or at risk of developing diabetes and playing a major role in regulating blood glucose levels. In this type of insulin production is generally not disturbed, especially in the beginning of this disease. The main problem of diabetes mellitus type 2 is the lack of insulin receptor response to insulin, so that insulin cannot enter the body’s cells and actively contracting muscles do not need insulin to enter glucose into the cell because the active muscle insulin receptor sensitivity increases, therefore exercise in diabetes mellitus tipe 2 will reduce the need for exogenous insulin. [17]

Table 2 explains that the results of statistical tests using the Kruskal Wallis test have blood glucose values after qigong exercise in the experimental class I times a week, 2 times a week and 3 times a week for blood glucose levels before exercise has a p-value of 0.0433 > 0.05 and after exercise obtained p-value 0.018 <0.05 means there are differences in blood glucose in the three study groups. Whereas in the control group without

intervention, $p\text{-value } 0.084 > 0.05$ means that there is no difference in blood glucose levels.

Continuous exercise is not free from active body muscles in general. The existence of a series of movements in gymnastics which include heating, core, and cooling stimulates the body's muscles in general to move so that it will provide a physiologically adaptive response to the musculoskeletal system. The success of achieving fitness is largely determined by the quality of the exercise which includes the purpose of the exercise, the selection of the exercise model, the use of training facilities and more importantly the exercise dose, frequency, intensity and time. The right frequency and time result in significant reductions in blood glucose and exercises and movements can be carried out properly and regularly. Gymnastics that is done in the morning is better because the air is still rich in oxygen so it can maximize oxygen supply to the brain. ^[18]

Table 3 explains that blood glucose levels before and after in the control group 1 time a week, 2 times a week and 3 times a week have $p\text{-value } 0.433 > 0.005$ meaning that there is no difference in blood pressure in the control group 1 time a week, 2 times a week and 3 times a week. Each control group conducted a study with a period of 3 weeks and no intervention was given. Respondents who did not experience a decrease in blood glucose levels caused the respondents to never change their lifestyle and diet during the study. Respondents prefer to maintain a lifestyle and diet that is not suitable for health recommendations such as smoking, eating sugar, salt more than 2 teaspoons, excessive consumption of salt fish and lack of physical activity. Blood sugar levels can be controlled from several factors such as body weight, education and age, diet, health knowledge, providing exercise with phytic diabetics. ^[19]

When a person does physical exercise, the body's fuel needs increase by active muscles and complex body reactions include the function of circulation, metabolism, and autonomic nervous muscle structure. Blood glucose levels are stored as glycogen in the muscles and liver, glycogen is quickly accessible to be used as a source of energy in physical exercise, especially at the beginning of physical exercise, after 10 minutes of physical exercise, there will be an increase in the need for cell glycos 15 times of normal needs, after 60 minutes, it will increase up to 35 times. Several interventions have been carried out to reduce blood

sugar levels in the elderly. Based on research conducted by Rahmawati (2010) on the relationship of physical exercise to blood glucose levels of patients with type 2 diabetes mellitus. Decrease in blood sugar levels showed a decrease namely a decrease in average before physical exercise 141.02 and after physical exercise is 127.81. From the results of Wilcoxon test, it was found that $p\text{-value } 0.000 < 0.05$, thus indicating that there was a decrease in blood sugar levels. ^{[20], [21]}

The results of this study are in line with the research conducted by Sri Anani (2012). Proving that there is a relationship between physical activity and blood glucose levels, the results obtained are from 52 respondents there are 93.80% less physical activity and 60.70% physical activity is enough ($p\text{-value } 0.012$). In addition Sri Anani also proved that there was a relationship between exercise and blood glucose levels, the results obtained were from 52 respondents. The results of this study stated a significant relationship between exercise and blood glucose levels. Another study conducted by Ariani, the results of the study showed that after ergonomic exercise in the elderly accompanied by researchers influenced the decrease in blood sugar levels in the elderly. This statement can be seen from the value of $p\text{-value } 0.000 \leq 0.05$ which means that there are significant differences in decreasing blood sugar levels before and after ergonomic exercise. The author analyzes that judging from the results and supported by related journals, ergonomic exercises are effective for lowering blood sugar levels in the elderly in Wonosari Urban Semarang. This ergonomic gymnastics is a physical activity that can to smooth blood circulation and increase pulse and can burn fat. ^{[22], [23], [24]}

Conclusion

The conclusion of the results of the study is that intervention with Qigong Gymnastics twice a week is more effective in reducing blood gluosa levels in Patients Diabetes Mellitus Type 2. Therefore it is recommended for patients with Type 2 Diabetes Mellitus Patients to always perform physical activities such as Qigong Gymnastics and check blood glucose levels to health workers regularly so that blood pressure can be controlled

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Own cost

Ethical Considerations: Ethical clearance was obtained from Institute of Health Science “Maluku Husada”, Ambon, Indonesia; with number” RK.03/KEPK/STIK/I/2018. Just before the interview, written (or thumb impression) consent was obtained from each participant in Institute of Health Science Ambon guidelines.

Conflicts of Interest: The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

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Effect of Supervisory Drink Drugs (SDG) on Decreasing Blood Pressure Reduction in Hypertension Patients, Indonesia

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Abstract

Background: Supervisory Drink Drugs (SDG) is one of the strategies DOTS (Directly Observed Treatment Shortcourse) used to assess the success of tuberculosis patients treatment, but the strategy can be used in hypertensive patients because hypertension disease also requires treatment in the long term. Advantages family as Supervisory Drink Drugs (SDG) is a stay at home with the patient so that a more optimal monitoring and direct, requiring no transportation costs. Patients with hypertension require motivation so that the drug given is in accordance with the doctor's recommendation. The purpose of analyzing the influence of Supervisory Drink Drugs (SDG) on Decreasing Blood Pressure Reduction in Hypertension Patient in the Village District Lampenai Wotu, Indonesia. **Material and Methods:** The type of study was quasi experimental with a nonequivalent control group design. The samples in this study were 44 people with 22 experimental group and 22 control group. This study was conducted on June 3st - August 6th, 2018. The sampling technique used purposive sampling. The statistical test used is the test of Wilcoxon and Kruskal Wallis. **Results:** The results of Wilcoxon analysis showed that the experimental group who were given the supervisor taking SDG with systolic blood pressure p-value $0.000 < 0.05$ and diastolic blood pressure p-value $0.002 < 0.05$, then for the control group without supervisor taking medication SDG with systolic blood pressure p-value $0.049 < 0.05$ and diastolic blood pressure p-value $0.546 > 0.05$. **Conclusion:** Administration of medication in patients with hypertension affects the success rate in reducing blood pressure. Therefore, it needs to be applied in every health service, especially in health centers so that it can help health workers to reduce the incidence of hypertension.

Keywords: Supervisory Drink Drugs (SDG), Hypertension, Blood Pressure, Drug, Motivation

Introduction

Supervisory Drink Drugs (SDG) is one of the strategies DOTS (Directly Observed Treatment Shortcourse) used to assess the success of tuberculosis patients treatment, but the strategy can be used in hypertensive patients because hypertension disease also requires treatment in the long term. Advantages family as Supervisory Drink Drugs (SDG) is a stay at home with the patient so that a more optimal monitoring and direct, requiring no transportation costs. Patients with hypertension require motivation so that the drug given is

in accordance with the doctor's recommendation.

Hypertension is one of the many degenerative diseases occur and have a fairly high mortality rate and affects the quality of life. One of the major risk factors of hypertension is stroke, heart failure, chronic kidney disease, and visual impairment. Increased age is one factor causing the occurrence of hypertension, this is due to the increasing age of organ function decreased marked by decreased elasticity of the arteries and stiffness occurs blood vessels so vulnerable to an increase in blood pressure. Hypertension is a condition in which systolic blood pressure > 130 mmHg and diastolic pressure > 80 mmHg. Hypertension does not provide typical complaints and symptoms that many people who do not realize it. Hence hypertension is said

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to be The Silent Killer. [1], [2], [3], [4], [5], [6]

Globally World Health Organization estimates non-infectious diseases account for about 60% of deaths and 43% of morbidity worldwide. Changes in community structure from argument to industry and lifestyle changes, socio-economic societies are suspected as a backdrop to the increasing prevalence of non-communicable diseases, so that the incidence of non-communicable diseases varies greatly in epidemiological transitions. One of the diseases included in the group of non-infectious diseases is hypertension. [7], [8]

Hypertension is one of the deadliest diseases in the world, as many as 1 billion people in the world or 1 in 4 adults suffer from this disease, even in the estimated number of people with hypertension will increase to 1.6 billion by 2025. Indonesia is in the row of 10 countries with the highest prevalence of hypertension in the world, with Myanmar, Sri Lanka, India, Bhutan, Thailand, Nepal, Maldives. [9]

Hypertension cases in Indonesia at the age of 18 years and over in 2007 amounted to 31.7%. In 2013 there was a decrease of 5.9% (from 31.7% to 25.8%). Whereas in 2016 hypertensive patients experienced an increase of 30.9%. The prevalence of high blood pressure in women (32.9%) was higher than that of males (28.7%). Urban prevalence is slightly higher (31.7%) compared to rural (30.2%). Data from the district health office of eastern luwu reported that the number of hypertension prevalence in 2015 was 7,596 cases, 2016 new cases were 4,902 the old cases were 7.097. [10], [11], [12], [13], [14]

The preliminary study results obtained from Puskesmas Wotu on March 1, 2018 obtained data from a number of hypertension surveillance programs as many as 369 cases, namely: degree 1 in 162 cases, level 2 of 153 cases, urgency of 38 cases, and emergencies as 16

cases, data on January 2018. [15]

The success of treatment in hypertensive patients is influenced by several factors, one of which is compliance in taking the drug, so that hypertensive patients can control blood pressure within normal limits. However, 50% of hypertensive patients do not adhere to the advice of health workers to take drugs, which causes many hypertensive patients who cannot control blood pressure and lead to death of the patient. Then it needs to be in the form of SDG program that can help the therapeutic process of treatment of hypertension patients so that the success of therapy can reach the optimal level. [16]

The role of the family as a supervisor for taking medication for hypertensive patients is the main factor in the disease, but there are still many families and hypertensive patients who do not know the risk factors that will occur as a result of hypertension, if hypertension is left without rapid and appropriate treatment then it will experience: jatung disease, setroke, gizal damage, decreased vision, and death. [17]

Material and Method

The type of study was quasi experimental with a nonequivalent control group design. The samples in this study were 44 people with 22 experimental group and 22 control group. This study was conducted on June 3st - August 6th, 2018. The sampling technique used purposive sampling. The statistical test used is the test of Wilcoxon and Kruskal Wallis.

Results

Total sample that would be analyzed in this study was 44 samples. Based on bivariate analysis in the Table 1, Analysis Wilcoxon of the effect of SDG on hypertension blood pressure reduction drop (p-value < 0.005).

Table 1. Analysis Wilcoxon of the effect of SDG on hypertension blood pressure reduction

	Systolic-After Systolic-Before	Diastolic-Aftre Diastolic-Before
Eksperimental p-value	-3.938 ^a .000	-3.745 ^a .002
Control tanpa p-value	-3.162 ^a .049	-577 ^a .564

Table 3. Analysis Kruskal Wallis of SDG differences on systolic and diastolic blood pressure reduction before and after SDG intervention in hypertensive patients

	Group	Mean Rank	p-value
Systolic pre-test	Experimental	21.73	
	Control	23.27	0.658
Systolic post-test	Experimental	13.32	
	Control	31.68	0.000
Diastolic pre-test	Experimental	20.34	
	Control	24.66	0.209
Diastolic post-test	Experimental	14.09	
	Control	30.91	0.002

Discussion

Based on the results of the analysis in the experimental group, namely blood pressure before intervention in Supervisory Drink Drugs (SDG) of 160 mmHg and after intervention 134 mmHg with a difference of 26 mmHg, diastolic blood pressure before intervention the supervisor took 95 mmHg of SDG and after the intervention becomes 88 mmHg difference of 7 mmHg. The results of this study were a decrease in systolic blood pressure by 26 mmHg and diastolic by 7 mmHg, this was due to the presence of SDGs in family members which aimed to keep an eye on and ensure that patients in anti-hypertension treatment therapy were recommended by the doctor.

Notoatmojo (2007) explained that the role of SDG in the healing process of disease, hypertension sufferers gave a positive response and attitude to take medication regularly for the cure of the disease, by taking medicine regularly hypertension sufferers can avoid the risk of resistance, namely failing to take medication and avoid from the risk of complications. ^[15]

Based on the results of the analysis in the experimental group control of preelless blood pressure of 162 mmHg and after 154 mmHg by difference of 8 mmHg, diastolic blood pressure before without SDG sebnyak 97 mmHg and after being 96 mmhg difference 1 mmHg. Respondents who experienced a decrease in systolic blood pressure of 8 mmHg and diastolic 1 mmHg, this is because patients with hypertension in the control group less attention to the process of therapy

therapy, and never pay attention to diet and bad habits by consuming foods high in fat and high salt content in food that causes high blood pressure tetep and can increase.

Suharjono (2008) explained that non-adherence in hypertensive patients by not taking antihypertensive drugs can lead to complications in hypertensive disease that can cause organ damage including the brain, because uncontrolled hypertension can increase the risk of stroke and then damage to the heart, hypertension increases the heart workload to be causes enlargement of the heart thereby increasing the risk of heart failure and heart attack. ^[15]

Based on the results of statistical analysis using the Wilcoxon test in Table 1 systolic blood pressure before and after the intervention (SDG) for the experimental group p-value 0.000 <0.05 so it can be concluded that there is a significant effect between blood pressure before and after intervention. Diastolic analysis results obtained p-value 0.002 <0.05 means there is influence of blood pressure between diastolic blood pressure before and after intervention.

The decrease in systolic and diastolic blood pressure in patients with hypertension by intervention (SDG) in the experimental group for 4 weeks is very influential on the decrease in blood pressure, this is because the patient is able to self-manage to obedient and keep the disease to stay in a setabil position with the routine of taking the medicine and comply with recommendations from SDG and doctors.

Nurul (2009) explains that people with hypertension who adhere to taking drugs and obedient in the examination can prevent the occurrence of komplikasi that may occur in these patients. Therefore, SDG needs to get counseling along with the patient so that treatment can reach the target set. And reduce the risk of complications hypertension can be pressed for mortality and morbidity decreased due to hypertension. [4], [18]

Based on statistical analysis using Wilcoxon test on systolic blood pressure before and after without intervention (SDG) for control group p-value 0.049 <0.05, so it can be concluded that there is little influence between blood pressure before and after intervention. Diastolic analysis results obtained p-value 0.564 > 0.05 means no effect of blood pressure between diastolic blood pressure before and after intervention. The decrease in blood pressure in the control group without intervention (SDG) has an effect on systolic blood pressure while there is no effect for diastolic blood pressure, this is because patients tend to ignore their treatment and patients often change their prescriptions at will and they take medication only when they feel pain head and feel weak. Mohani (2014) explains that if a hypertensive patient passes a dose of hypertension or does not take it as recommended by a doctor, it's not just your blood pressure that is getting out of hand but doubling your risk for complications that can be fatal. [19]

Based on statistic analysis with kruskall wallis test on Table 2 systolic and diastolic blood pressure before and after intervention (SDG) intervention in experimental group and control group without SDG with p-value 0.000 <0.05 and diastolic p-value 0.002 <0.05 means there is a difference blood pressure after intervention (SDG) in the experimental group with the control group without (SDG).

SDG is someone who is appointed and trusted to supervise and monitor hypertensive patients in taking medication regularly and thoroughly, biases from family, neighbors, cadres, community leaders or health workers. SDG is an activity carried out to keep patients taking medication regularly. [18], [20]

Surafino (2006) explained that individuals need other people to provide support to get their comfort. Individuals with high levels of family support as SDG have a strong feeling that the individual is valued and loved. Individuals with family support as SDG make

individuals feel that other people care and need these individuals, so this can lead individuals to a healthy lifestyle in terms of taking care of anti-hypertensive medication therapy. [9], [21]

Drugs are compounds or mixtures of compounds to prevent, alleviate symptoms or cure disease, injury or bodily and spiritual disorders in humans. Provision of safe and accurate drugs is an important responsibility for all health workers. Even though the drug is beneficial, it does not mean without an adverse reaction. The first responsibility for correct drug therapy is the doctor and pharmacist who writes and gives the prescribed medication. The final responsibility of giving the right medicine to the patient lies in the nurse who administers the drug to the patient, as well as the family out of the responsibility of the supervisor taking medicine that has been prescribed by the doctor so that drug therapy can run properly. All antihypertensive drugs work on one or more anatomical control sites and these effects occur by influencing the normal mechanism of blood pressure regulation. This drug works by preventing calcium into the heart cells and blood vessels muscle. Thus causing the heart cells and muscle vessels to relax, not tense. [22]

Conclusion

Administration of medication in patients with hypertension affects the success rate in reducing blood pressure. Therefore, it needs to be applied in every health service, especially in health centers so that it can help health workers to reduce the incidence of hypertension.

Financial support and sponsorship: Own cost

Ethical Considerations: Ethical clearance was obtained from Institute of Health Science "Maluku Husada", Ambon, Indonesia; with number" RK.03/KEPK/STIK/I/2018. Just before the interview, written (or thumb impression) consent was obtained from each participant in Institute of Health Science Ambon guidelines.

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Effectiveness of Foot Soak Therapy with Warm Water on Decreasing Blood Pressure in Patients with Stage One Hypertension, Indonesia

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Abstract

Background: Hypertension is one factor causing stroke and heart attack. Hypertension is often called the silent killer. In addition to pharmacological therapy, the management of hypertension can also be done through non-pharmacological therapy. One of them soak foot therapy with warm water that was useful for widening blood vessels and accelerate blood circulation. The purpose of analyzing the effectiveness of foot soak with warm water to decreasing blood pressure in patients with stage one hypertension at Banua Sendana village Sendana district Majene regency. **Material and Method:** The type of study was quasi experimental with a nonequivalent control group design. The samples in this study were 44 people with 21 experimental group and 21 control group. This study was conducted on July 4st - Sep 5th, 2018. The sampling technique used purposive sampling. The statistical test used is the test of Wilcoxon and Kruskal Wallis. **Results.** The results showed that foot soak therapy experimental group 1 and 2 times a week systolic value p-value 0.018 <0.05 diastolic p-value 0.017 <0.05, Foot Soak therapy group 3 times a week systolic p-value 0.017 <0.05 diastolic p-value 0.008 <0.05. Prolanis exercise group 3 times week systolic p-value 0.005 <0.05 diastolic p-value 0.012. **Conclusion:** Foot soak therapy with warm water at 3 times a day more effectively on decreasing blood pressure. Therefore, it needs to be applied in every health service, especially in health centers so that it can help health workers to reduce the incidence of hypertension.

Keywords: Foot Soak, Therapy, Warm Water, Hypertension, Blood Pressure.

Introduction

The World Health Organization (WHO) estimates that non-communicable diseases account for around 60% of deaths and 43% of morbidity worldwide and are the third largest cause of death in the world. Changes in the pattern of people's lives from arguments to industry, changes in lifestyle and socio-economic communities are thought to be the cause of the increasing prevalence of non-communicable diseases so that the incidence of non-communicable diseases varies in epidemiological transitions. One of the diseases included in the group of non-communicable diseases is hypertension. ^{[1], [2]}

WHO (World Health Organization) 2011 data shows that 1 billion people in the world suffer from

hypertension, 2/3 of them are in developing countries with low and middle income. The prevalence of hypertension in the People's Republic of China (PRC) is similar to the prevalence that occurs in several other countries. The Fourth Health and Nutrition Survey (2002) states that the prevalence, treatment and level of control for hypertension are 18.8%, 24.7% and 6.1%. ^{[3], [4]}

The prevalence of hypertensive patients in Indonesia aged ≥ 18 years in 2007 was 31.7%. In 2013 experienced a 5.9% decrease (from 31.7% to 25.80%) while in 2016 hypertension patients increased by 30.9%. The prevalence of hypertension in women is 32.9% and men are 28.7%. The prevalence of urban hypertension is slightly higher (31.7%) compared to rural areas which only 30.2%. The number of people who checked blood pressure in Majene Regency in 2017 was 4,884 people and it was found that from 100% found 62.5% had

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hypertension with details of 1,253 men or 25.7% and 3,631 women or equal to 74.3%. [5],[6],[7]

The incidence of hypertension during the last 3 years ie 2015, 2016 and 2017 in Sendana district based on data obtained from Puskesmas Sendana I continues to increase. Hypertension is a condition in which systolic blood pressure >130 mmHg and diastolic blood pressure >80 mmHg. Hypertension is one of the many degenerative diseases occur and have a fairly high mortality rate and affects the quality of life. One of the major risk factors of hypertension is stroke, heart failure, chronic kidney disease, and visual impairment. Increased age is one factor causing the occurrence of hypertension, this is due to the increasing age of organ function decreased marked by decreased elasticity of the arteries and stiffness occurs blood vessels so vulnerable to an increase in blood pressure. Hypertension is a condition in which systolic blood pressure > 130 mmHg and diastolic pressure > 80 mmHg. Hypertension does not provide typical complaints and symptoms that many people who do not realize it. Hence hypertension is said to be The Silent Killer. Hypertension is a major problem in developing countries. Some complications that may occur if hypertension is not addressed immediately i.e. stroke, heart failure, chronic kidney disease, pulmonary embolism and visual impairment. The risk factors that affect the occurrence of hypertension is genetic, obesity, gender, salt consumption patterns, smoking habits, lack of physical activity and stress. [3],[4],[8],[9],[10],[11], [12],[13],[14],[15],[16]

Hypertension therapy can be done in two ways, namely pharmacologically and non-pharmacologically. Pharmacological therapy usually uses drugs that have side effects. Hypertensive patients receiving pharmacological therapy by 60%. Non-pharmacological treatment can be done by changing a healthier lifestyle and doing therapy by soaking the feet using warm water that can be done at any time. The therapeutic effect of foot bath uses warm water, just like walking without using footwear for 30 minutes. The working principle of this therapy is to use warm water temperatures of 38-40 ° C for 20-30 minutes in conduction where the transfer of heat from warm water to the body will cause dilation of blood vessels and can reduce muscle tension. [10]

Warm water has a physiological impact on the body, precisely on blood vessels where warm water makes blood circulation smooth, stabilizing blood flow

and cardiac work and loading factors in the water that will strengthen the muscles and ligaments that affect the joints of the body. [17]

Material and Method

This study was conducted on July 2st - Sep 4th, 2018. The type of this study was quasi experimental with nonequivalent control group design. The sample in this study was the first stage hypertension patient, 42 people consisting of 3 experimental groups and 3 control groups. Each experimental group consisted of 7 people who were given foot soak therapy interventions 1 time a week, 2 times a week, and 3 times a week, while each control group consisted of 7 people who were not intervened. Data analysis was performed by using Wilcoxon and Kruskal Wellis test with $\alpha = 0.05$. The population and sample of the study were all first stage hypertension patients of 127 people. This research uses purposive sampling technique.

Result

Table 1 Wilcoxon analysis of the effectiveness of foot soak therapy with warm water 1 times a day, 2 times a day and 3 times a day against decreased blood pressure in patients with hypertension stage one

	Sistolic_after Sistolic_before	Diastolic_after Diastolic_before
Eksperimental Group 1 times a day <i>P-value</i>	-2.384 .018	-2.375 .017
Control Group 1 <i>P-value</i>	-1.000 .317	-1.000 .317
Eksperimental Group 2 times a day <i>P-value</i>	-2,371 .018	-2.388 .017
Control Group 2 <i>P-value</i>	-.816 .414	-2.207 .027
Eksperimental Group 3 times a day <i>P-value</i>	-2.375 .017	-2.646 .008
Control Group 3 <i>P-value</i>	-1.000 .317	-2.388 .017

Table 2 Analysis Kruskal Wallis Test Systolic and Diastolic Blood Pressure before and after Therapy on Decreasing Blood Pressure in Patient with Stage One Hypertension (Eksperimental Group)

	Intervention	Frek	Mean Rank	p-value
Sistolic pre test	1 times a day	7	10.21	
	2 times a day	7	13.5	0.309
	3 times a day	7	9.29	
Sistolic post test	1 times a day	7	15.21	
	2 times a day	7	12.93	0.003
	3 times a day	7	4.86	
Diastolic pre test	1 times a day	7	12.29	
	2 times a day	7	10	0.739
	3 times a day	7	10.71	
Diastolic post test	1 times a day	7	17.14	
	2 times a day	7	11.43	0.000
	3 times a day	7	4.43	

Table 2 Analysis Kruskal Wallis Test Systolic and Diastolic Blood Pressure before and after Therapy on Decreasing Blood Pressure in Patient with Stage One Hypertension (Control Group)

	Intervention	Frek	Mean Rank	p-value
Sistolic pre test	1 times a day	7	8.50	
	2 times a day	7	12.86	0.191
	3 times a day	7	11.64	
Sistolic post test	1 times a day	7	8.29	
	2 times a day	7	12.07	0.160
	3 times a day	7	12.64	
Diastolic pre test	1 times a day	7	10.43	
	2 times a day	7	11.21	0.931
	3 times a day	7	11.36	
Diastolic post test	1 times a day	7	14.57	
	2 times a day	7	10.93	0.092
	3 times a day	7	7.50	

Discussion

The results of statistical analysis using the Wilcoxon test in Table 1 found systolic before and after in the experimental group 1 time a day and twice a day had a p-value of 0.18 <0.05 and diastolic blood pressure had a p-value of 0.17 <0.05. The experimental group 3 times a day had a p-value of 0.017 <0.05 meaning that there was a significant decrease in blood pressure. The significance value of diastolic analysis results before and after p-value 0.008 <0.05 means that there is a therapeutic effect of soaking the feet with warm water on decreasing blood pressure.

It happens that warm water has a physiological impact on the body. Warm water first affects blood vessels that make blood circulation smooth, stabilize blood flow and work of the heart and the content factors in water that will strengthen ligamentous muscles that affect the joints of the body. According to Asian Traditional Chinese Medicine (2013) explains that soaking the feet with warm water a day to improve blood circulation. Foot bath therapy with warm water achieves a series of efficient health care through heating, medical and water chemistry as well as medicinal steam healing and fumigation effects. This study is in line with research conducted by Nurul Solechah, et al (2017) which states that there is a decrease in blood pressure both systolic and diastolic after 3 feet of soaking therapy with warm water. ^[18]

The results of this study are also in line with research conducted by Jiang et al (2016) entitled Composition of Chinese Medicine and Application Methods for External Treatment of Hypertension. One respondent who suffered from hypertension over the past 14 years with a blood pressure of 145/90 mmHg, which is a first-degree hypertension. The doctor suggested that he take medication. But given his age, he decided to try a mild treatment method. He therapy soak the feet with warm water every day for 20-30 minutes then measure his blood pressure. After one treatment, blood pressure basically becomes normal, but remains unstable. He continues to apply this therapy 3 times a day and his blood pressure is up to 120/80 mmHg. ^[19]

Table 2 explains that systolic blood pressure before and after therapy with foot soaking with warm water in the experimental group 1 time a day, 2 times a day and 3 times a day has a p-value of 0.003 <0.05 means there is a difference or decrease in blood pressure before

the foot is done with warm water in the experimental group 1 time a day, 2 times a day and 3 times a day. Diastole results before and after therapy obtained p-value of 0.000 <0.005 means that there is a difference or decrease in blood pressure after the feet are soaked with warm water 1 time a day, 2 times a day and 3 times a day. The majority of respondents in this study were active and disciplined respondents in doing foot therapy with warm water.

This is in accordance with the theory that explains that warm water with conduction occurs heat/the transfer of warm water into the body causes dilation of blood vessels and decreased muscle tension so that blood circulation can accelerate which will affect arterial pressure by baroreceptors in the sinus cortex and the aortic arch that will deliver impulses carried by nerve fibers that carry signals to all parts of the body to inform the brain of blood pressure. Blood volume and special needs of all organs are delivered to the sympathetic nerve center and then to the medulla so that it stimulates systolic pressure from the ventricular muscle strain to contract immediately. At the beginning of the contraction, the aortic valve and semilunar valve have not opened, to open the aortic valve, the pressure inside the ventricle must exceed the pressure of the aortic valve. Circumstances where ventricular contractions begin to occur so that with dilation of blood vessels, blood flow will be smooth and will easily push blood to the heart, thereby reducing the systolic pressure. In diastolic pressure, the ventricular state of isovolemia when the ventricle relaxes, the pressure inside the ventricle drops dramatically, smooth blood flow by dilation of blood vessels thereby reducing diastolic pressure. ^[20]

The results of this study are in accordance with the previous research presented by Dewi, E.U (2015) which states that there is an effect of therapy of foot bath with warm water on changes in blood pressure in hypertensive patients in Wonotôgen, Wonokromo sub-district, Surabaya Regency. Santoso, D. (2015) also states that there is a therapeutic effect of warm water foot baths to reduce blood pressure in elderly people with hypertension. ^{[21], [22]}

Conclusion

The research result is intervention 3 times a day foot soak therapy with warm water more effectively on decreasing blood pressure in patients with stage one hypertension. Therefore, it needs to be applied in

every health service, especially in health centers so that it can help health workers to reduce the incidence of hypertension.

Financial support and sponsorship: Own cost

Ethical Considerations: Ethical clearance was obtained from Institute of Health Science “Maluku Husada”, Ambon, Indonesia; with number” RK.03/KEPK/STIK/I/2018. Just before the interview, written (or thumb impression) consent was obtained from each participant in Institute of Health Science Ambon guidelines.

Conflicts of Interest : The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

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Bone Age Estimate based on the Epiphyseal Scar of the Knee

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Abstract

The determination of age is an important issue in forensic anthropology. The main purpose is to verify the applicability of a method of determining the biological age of the living being in our area of practice.

This is a retrospective study on a consecutive series of archives, carried out at the emergency services at the General Hospital of Grand-Yoff (HOGGY) in Dakar.

The study looked at a total of 442 subjects with a majority of males at 71,72%. The interpretation by Obs 1 of the x-rays of the 442 subjects during the first week, showed that in 71% of cases, that is in 314 a.p x-rays of the knee, the epiphyseal scar of the distal femur was not visible. There was no difference between the two-interpretation series and a good agreement according to the Fleiss classification. There was no statistically significant difference between the proportion of the presence of epiphyseal scar in the interpretation by observer 1 and the one by observer 2.

The result of our study shows that the scar remains up until at least the 6th life decade and consequently, the persistence of an epiphyseal scar on an AP x-ray is not an indicator of a recent knee fusion and may not be correlated to the biological age.

Keywords: age estimation, knee, scar, anthropology, femur

Introduction

The determination of age is an important issue in forensic anthropology. The issue came about with the increase of migratory flow and the arrival in European countries of young foreigners claiming to be minors upon entering the territory. In forensic clinical medicine, the doctor is required to determine the age of a living subject in the context of penal procedures. Several methods may be used to estimate bone age.^{1,2,3,4,5,6}

For the purpose of this research the age estimation will be based on a bone age estimate from the observation of the persistence of the epiphyseal scar on the knee. An epiphyseal scar is a thin layer of dense bone localized

at the place where the growth plates existed, resulting from the fusion between epiphysis and metaphysis. The main purpose is to verify the applicability of a method of determining the biological age of the living being in our area of practice, in sub Sahara Africa.

Materials and Method

This is a retrospective study on a consecutive series of archives, carried out at the emergency services at the General Hospital of Grand-Yoff (HOGGY) in Dakar, Senegal (West Africa). The study took into consideration a negroid population who had an AP x-ray of the knee with no history of bone damage, endocrine pathologies, tumorous or infectious pathology of the knee, or lower knee fracture. The x rays were taken between January 2014 and December 2015.

We have included all the AP knee x-rays which can be read, from patients of the HOGGY emergency services for the study period and aged 14 to 57. The main information collected were the civil status parameters

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(age, sex, race). We retrospectively examined AP x-ray image photographed with a 16 MP camera used by one single operator. The digital documents were read with the program Adobe Photoshop CS5 version 12.0 x64. The x-rays were read directly on screen by two doctors. The main observer (Obs 1), general practitioner, did two successive readings eight days apart. The second observer (Obs 2), a medical examiner, did one reading. Each observer made a statement on whether there was a visible epiphyseal plate scar of the distal femur on each of the observed x-ray images without knowledge of the age or the sex of the corresponding patient. The data entry was completed with Microsoft Word et Excel 2007. The Analysis of the data was conducted with the program Epi info version 7.2.0 and R 3.3.3. The averages and percentages were compared with the McNemar test. A non-parametric test (Mann-Whitney) was chosen to compare the average age of the groups without scars and the ones with visible scars. The whole sample was used to check for any intra- and inter-observer variations. The Wilcoxon test (kappa test) was used to measure the inter- and intra-observer variability, according to the circumstances in which they should apply. The threshold of significance (*p-value*) is 5 %.

Findings

Population description

The study looked at a total of 442 subjects with a majority of males at 71,72%.

The average age was 29.4 with a standard deviation of 10.8 years of age and a median of 28 years of age.

Table 1: Distribution of the interpretation of x-rays by observer 2

Obs2	Frequency	(n)	Relative frequency (%)	Confidence interval (%)
No scar	309		70	65.5 – 74.0
Visible scar	133		30	26.0 – 34.5
Total	442		100.0	

Intra observer variability

The proportion of the visibility of the epiphyseal scar for the first week’s interpretation was 29%. For the second week’s interpretation (one week later) it was 26%. This difference is not statistically significant with a McNemar *p-value* (0,1366) superior to 5%.

The modal age was 30 years old (Fig. 1).

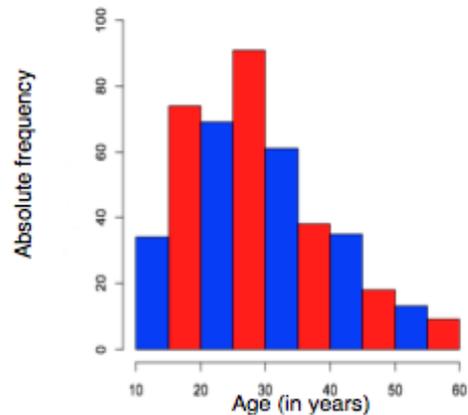


Figure 1: Histogramme age distribution of the study population

Description of the interpretations of AP knee x-rays

The interpretation by Obs 1 of the x-rays of the 442 subjects during the first week, showed that in 71% of cases (314 AP x-rays of the knee) the distal epiphyseal scar of the femur was not visible. One week after the first reading, the same observer on the same x-rays did a second interpretation. The epiphyseal scar was not visible in 74% of cases.

The interpretation carried out by the second observer (Obs 2), a medical examiner, showed that out of the 442 x-rays, 70% did not have a visible epiphyseal scar of the distal femur (Table 1).

Consequently, there was no difference between the two-interpretation series and a good agreement according to the Fleiss classification with a Fleiss kappa coefficient at 63,2 % (Table 2).

Table 2: Distribution of x-rays by observer 1 according to the two interpretations

		Obs1 2 nd reading			
		Visible scar	No scar	Total	
1 st reading	Obs1	Visible scar	89	39	128(29 %)
	No scar	26	288	314	
	Total	115(26 %)	327	442	

Inter observer variability

Despite a moderate agreement with a kappa coefficient at 54.8 %, there was no statistically significant difference between the proportion of the presence of epiphyseal scar in the interpretation by observer 1 (29%) and the one by observer 2 (30%) with a McNemar p- value of 0.66 (Table 3).

Table 3 : Distribution of the interpretation of x-rays between observer 1 and 2

		Observer 2		
		Visible scar	No scar	Total
Observer 1	Visible scar	89	39	128 (29 %)
	No scar	44	270	314
	Total	133 (30 %)	309	442

Study of the relation between age and the epiphyseal scar of the distal femur.

There was a statistically significant difference between persons with an epiphyseal scar who were of an average age of 26 and persons without an epiphyseal scar who were of an average age of 30.1 with a non-parametric p-value of the lower levels at 0.001 (Fig 2). The absence of a scar was noted on persons of all ages and 12 persons had the minimal age of 14. However, the visibility of the scar was noted on all ages between 14 and 38 after which it became irregular up until the age of 55.

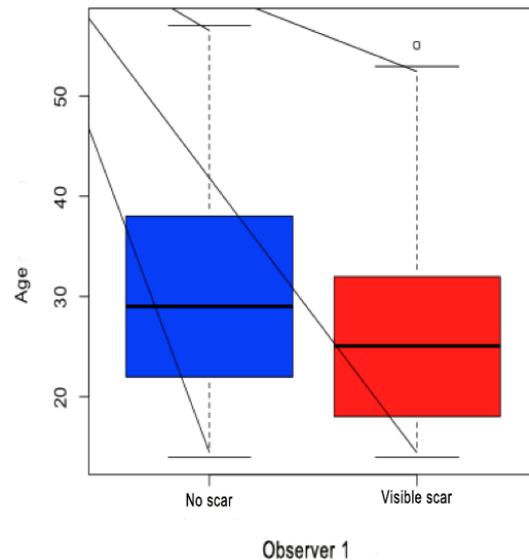


Figure 2 : Distribution of the interpretation of x-rays according to age.

Study of the relation of age and the distal femoral epiphyseal scar according to sex

The stratification according to sex showed that for females the minimum age for the two groups (presence or absence of the scar) was the same, that is a minimum age of 14. The maximum age for females with a visible scar was 40 versus a maximum age of 57 for the group with no visible scar. The average age for females with an epiphyseal scar was 23.5 and the average age for those without a scar was 32.7. This difference was statistically significant with a Wilcoxon p-value inferior to 0.001. The minimum for males was the same as the minimum for females in the two groups. The maxima for males were respectively 55 years old for the group with a visible scar and 57 for the group without a visible scar. The average age of males without an epiphyseal scar (30.1 years old) was statistically superior to the average age of males with a visible epiphyseal scar (26.7 years old) with a parametric p-value inferior to 0.01.

Discussion

These studies showed that there was no difference between the two series of interpretation. This supports the Faisant⁷ and al study. The epiphyseal scar is one of the characteristics that can be observed with an x-ray image⁸. Even though the presence of scars can be noted in radiographic age estimation methods such as the Greulich and Pyle atlas², Pyle and Hoerr atlas⁹ and Hoerr and al.¹⁰, it has generally been reported that epiphyseal scars disappear with time¹¹. As specified previously, we chose the negroid population because the actual data concerning bone age for different ethnical groups is available only periodically and can not be applied to the current migrant population.

However, the variability according to the geographic origin and the socio-nutritional conditions is not well-known. A recent study showed a stronger correlation between the bone age and the civil age in the French and Quebecois populations than in the Moroccan population¹². Two papers concerned Sub-saharan Africa and show an evident inadequacy with the western standards as well as an overall slower maturation process^{13,14}. The first question concerned the relevance of the comparisons. Can the different studies be transposable to the various socio-ethnic groups? The existence of significant differences in bone growth for different ethnical groups has been demonstrated¹⁵. It seems that it is not the ethnic origin that effects the bone growth but rather the socio-economic level of the individual^{4,16} and the level of modernization of the

populations from which he/she comes¹⁷. A poor socio-economic level slows the bone growth¹⁸.

Other authors have suggested that this scar may be visible for several decades. This is the case for Cope who noted a persistence of the epiphyseal line distal end of the femur and the proximal end of the tibia up to the age of 60, reaching even the age⁸ of 70. De Weiss and al. studied the growth of the first metatarsal and didn't see a correlation between the persistence of the epiphyseal line and the chronological age²⁰. De Baumann et al. observed epiphyseal scars in individuals over the age of 30 and an absence of such scars in individuals ages 16 to 18, in a study on the growth of the distal epiphyses of the ulna and radius on 842 x-rays of hands from individuals ages 10 to 30 (554 males and 288 females).²¹

As for the distal end of the tibia, Hoerr and Pyle suggest in their *Atlas of the foot and ankle*¹⁰ that the epiphyseal line lasts the whole life. A recent study²² in the same line of thought, showed that an epiphyseal scar was present in more than 92% of the x-rays of the tibia for individuals aged 20 to 50.

Faisant and al.⁷ also showed that if the knee epiphyses were classified according to a visible scar and no scar, all the individuals with no scar on the distal femur were aged 18 or under. Cameriere and al.²³ studied a radiology analysis epiphyseal fusion of the knee and its relation to the age of 18. He used different stages of fusion: Stage 1 the fusion is incomplete; stage 2 the fusion is complete; stage 3 the fusion is complete and the scar is not visible. They applied this method in a concomitant way on three epiphyses from 215 knee x-rays taken on a group of Italians aged 14 to 24. A total score corresponded to the sum of the results for each epiphysis.

However, our study suggests that the longevity of epiphyseal scars of the knee is not useful for age estimation and this is for two reasons. The first and main reason is that a scar was visible in all subjects, male or female, of all ages. This implies that the persistence of an epiphyseal scar on a knee epiphysis cannot be an indicator of a recent fusion.

Conclusion

The observation of an epiphyseal scar has traditionally been associated with individuals with a young chronological age because of the expected

disappearance of the x-ray visible dark line by bone remodeling. The result of our study shows that the scar remains up until at least the 6th life decade and consequently, the persistence of an epiphyseal scar on an AP x-ray is not an indicator of a recent knee fusion and may not be correlated to the biological age. The analysis of the disappearance of the scar in this anatomical region showed that there was no statistically significant relation between the disappearance of the epiphyseal scar of the femur and the chronological age.

Conflict Interest: I certify, Pr Mohamed Maniboliot Soumah, that this article is a personal work. It has not been proposed to another scientific magazine. This study is not sponsored by any organization. I submit this article Indian Journal of Forensic Medicine & Toxicology in conformity with the rights transferred to the journal.

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Role of Copper, Magnesium, and Zinc in Pathogenesis of Hepatocellular Carcinoma and Cirrhosis

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Abstract

The present study aimed to estimate the level of copper, magnesium and zinc in patients of cirrhosis and hepatocellular carcinoma (HCC) to determine their correlation to pathogenesis of these diseases. A case-control study was conducted on thirty subjects that were included as control (group I) obtained from blood transfusion donors healthy subjects. All patients whose coming to the specialized medical hospital Mansoura University from January 2016 till January 2017 were clinically evaluated and investigated to select 70 subjects ; twenty-five patients with cirrhosis (group II), and forty-five patients with HCC (group III). The levels of copper, magnesium and zinc were assessed in all participants. Copper level showed significantly increased values while magnesium and zinc were significantly decreased comparing to control group in both cirrhosis and HCC groups. There were significant increase in zinc level and significant decrease in magnesium and copper levels in comparison to HCC and cirrhotic groups. Also, a significant negative correlation between zinc and magnesium levels and the advances in liver condition, advances in spleen condition and presence of ascites was observed, while there is non-significant negative correlation between Child-Pugh classification and the levels of zinc and magnesium in cirrhosis and HCC groups. There was a significant positive correlation between the copper level and the advances in liver condition, advances in spleen condition presence of ascites and Child-Pugh classification. In conclusion, there is association between copper, magnesium and zinc and the severity of the cirrhosis and HCC.

Keywords: Trace elements, HCC, Cirrhosis, Copper, Zinc, Magnesium.

Introduction

Metabolism of trace metals occurs in the liver and their levels indeed changed with variable causes of liver disease⁽¹⁾. Copper (Cu) acts as a cofactor of

hepatic fibrosis in chronic liver diseases so the sickness advances from hepatitis to liver cirrhosis in relationship with expanded Cu levels in biological fluids⁽²⁾. It was anticipated that the elevated copper level can harm the liver parenchyma via lipid peroxidation that leads to dysfunction in the cell membrane, decreased fluidity, inactivation of enzymes and changes ion permeability⁽³⁾.

Zinc protects against carcinogenesis as it is also help activation of DNA repair enzymes. Also it is a component of superoxide dismutase (SOD), an enzyme that removes free radicals⁽⁴⁾. Liver is the main organ responsible for the zinc metabolism, and various liver diseases may be influenced by zinc deficiency⁽⁵⁾.

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There are little studies on magnesium status in patients with cirrhosis (6). The present study aimed to estimate the level of copper, magnesium and zinc in patients of cirrhosis and HCC to determine their correlation to pathogenesis of these diseases.

Subjects and Method: A case-control study was conducted on patients presented at the specialized medical hospital Mansoura University from January 2016 till January 2017 who were clinically evaluated and investigated to select 70 cases; 25 patients with cirrhosis (group II) and 45 patients with HCC (group III). Thirty subjects were included as control (group I) with matched age and sex obtained from blood transfusion donors healthy subjects.

The diagnosis of liver cirrhosis and HCC based on clinical features, laboratory tests (liver function and alpha fetoprotein), and abdominal ultrasound. The Child-Pugh score used to assess the severity of liver cirrhosis. Child-Pugh system includes bilirubin levels, albumin levels, prothrombin time, and presence of ascites and presence of encephalopathy. Each one is given a number score that classifies cases to class A (normal liver), class B (mild to moderate illness) and

class C (severe liver damage) (7).

Patients with cirrhosis or/and HCC associated with other etiologies such as alcoholic or congenital disorders were excluded from the study.

From each subject 10ml blood were collected, separated to; one aliquot was used for liver function tests: alanine aminotransferase (ALT), aspartate aminotransferase (AST), albumin and total bilirubin by autoanalyzer (Dialab 450 system) and International normalized ratio (INR) measurement by enzyme linked immunosorbent assay (ELISA - DRG). The second blood aliquot was used for analysis of zinc, copper (µg/dl) (8) and magnesium (mg/dl) (9) by spectrophotometre. All kits were supplied by Crest Biosystems (Gitanjali, Tulip, India).

Statistical analyses were performed using SPSS 16.0 (Chicago, IL) with significance threshold of $p < 0.05$. Continuous data was expressed as mean \pm SD and compared between groups using Student's *t* test. Categorical data was analyzed using a two-sided *Chi-squared* test.

Results

Table (1): Age and sex of the studied groups.

	Control group (n.= 30)	Cirrhosis group (n.= 25)	HCC group (n.= 45)	p value
Female / Male	17/13	11/14	8 /37	Chi-square=12.74 $p < 0.001^*$
Age (y) (mean \pm SD)	50.30 \pm 6.31	58.04 \pm 8.53	55.98 \pm 7.59	ANOVA=15.92 $p < 0.0001^*$

*Significant, n= number.

In tables 2 and 3, findings confirmed the diagnosis of chronic decompensated liver. Cases having Child-Pugh classification grade C were 9 and 21 in cirrhotic and HCC groups respectively. Spleen was enlarged in 11 and 36 cases in cirrhotic and HCC groups respectively. Marked ascitis presented in 14 and 10 cases in cirrhotic and HCC groups respectively.

Table (2): Laboratory tests in the studied groups.

Variables (Mean ± SD)	Control group (n. = 30)	Cirrhosis group (n. = 25)	HCC group (n. = 45)
ALT (U/L) p1 p2	28.27±4.799	64.60±77.236	52.40±21.366
		0.005*	0.043*
			0.711
AST (U/L) p 1 p 2	37.50±56.327	72.92±38.746	62.00±23.472
		0.004*	0.030*
			0.816
INR p 1 p 2	1.19±.145	1.40±.344	1.29±.186
		0.003*	0.227
			0.159
Albumin (g/dL) p 1 p 2	3.89±.505	2.30±.590	3.06±.616
		0.001*	0.001*
			0.001*
Bilirubin (mg/dL) p 1 p 2	0.82 ± .110	5.64± 6.271	1.72±.945
		0.001*	0.691
			0.001*
Alpha-Fetoprotein (ng/ml) p1 p2	8.1± 3.4	10.7 ±10.4	104.1± 114.9
		<0.0001*	<0.0001*
			<0.001*

p1: difference between both cirrhotic and HCC groups and control group.

p2: difference between cirrhotic and HCC groups.

Table (3): Radiological findings and Child-Pugh classification in cirrhosis and HCC groups.

	Cirrhosis group (n. = 25)	HCC group (n. = 45)	Chi- square p value
Liver			
Average coarse	2		10.83 p<0.001*
Early cirrhotic	4		
Shrunken cirrhotic	19	45	
Spleen			
Normal	3	1	12.31 p<0.001*
Mild enlargement	4	3	
Moderate enlargement	7	5	
Marked enlargement	11	36	
Ascites			
No ascites	2	23	12.15 p<0.001*
Mild	2	8	
Moderate	7	4	
Marked	14	10	
Child-Pugh classification			
A	8	10	20.0 p<0.001*
B	8	14	
C	9	21	

In comparison to the control group, Copper level showed significantly ($p < 0.001$) increased values while magnesium and zinc were significantly ($p < 0.001$) decreased in cirrhosis and HCC groups. There were significant increase in zinc level and significant decrease in magnesium and copper levels in comparison between HCC and cirrhotic group (Table 4).

There was a significant negative correlation between zinc and magnesium, zinc and copper while; there was a significant positive correlation between copper and magnesium. Levels of AST, ALT, INR, albumin and bilirubin showed significant negative correlation with zinc, significant positive correlation with copper and non-significant positive correlation with magnesium (Table 5).

Table (4): Levels of zinc, magnesium and copper in the studied groups.

Variables (Mean ± SD)	Control group (n.= 30)	Cirrhosis group (n.= 25)	HCC group (n.= 45)
Zinc (ug/dL) <i>p</i> 1 <i>p</i> 2	8.62 ± 2.89	5.18 ± 2.55	6.25 ± 3.25
		<0.001*	<0.001*
			<0.001*
Magnesium (ug/dL) <i>p</i> 1 <i>p</i> 2	3.49 ± 0.37	1.87 ± 0.33	1.48 ± 0.39
		<0.001*	<0.001*
			<0.001*
Copper (ug/dL) <i>p</i> 1 <i>p</i> 2	106.98 ± 2.15	206.28 ± 8.48	164.65 ± 3.87
		<0.001*	<0.001*
			<0.001*

Table (5): The correlation between the studied metals (zinc, magnesium and copper) and levels of ALT, AST, INR, albumin, bilirubin and creatinine in cirrhosis and HCC groups.

		Zinc	Magnesium	Copper	ALT	AST	INR	Albumin	Bilirubin
Zinc	Pearson Correlation	1	-0.399**	-0.803**	-0.162	-0.214	-0.238*	0.423**	-0.444**
	<i>p</i> value		0.001	0.001	0.181	0.075	0.047	0.001	0.001
Magnesium	Pearson Correlation	-0.399**	1	.465**	0.019	0.008	0.144	-0.207	0.128
	<i>p</i> value	0.001		0.001	0.876	0.946	0.233	0.091	0.295
Copper	Pearson Correlation	-0.803**	0.465**	1	0.079	0.150	0.215	-0.519**	0.455**
	<i>p</i> value	0.001	0.001		0.514	0.215	.074	0.001	0.001

Table (6) showed a significant negative correlation between zinc and magnesium levels and the advances in liver condition (shrunken cirrhotic), advances in spleen condition (marked enlarged) and presence of ascites, while there is non-significant negative correlation between Child-Pugh classification and the levels of zinc and magnesium in cirrhosis and HCC groups, meanwhile copper showed significant positive correlation with all these signs.

Table (6): The correlation between the studied metals and condition of the liver, spleen, presence of ascites and child-pugh classification in the cirrhosis and HCC groups.

		Advances in liver condition	Advances in spleen condition	Presence of ascites	Child-pugh classification
Zinc	Correlation Coefficient	-0.460*	-0.249*	-0.460*	-0.096
	<i>p</i> value	0.001	0.001	0.001	0.313
Magnesium	Correlation Coefficient	-0.566*	-0.603*	-0.153*	0.015
	<i>p</i> value	0.001	0.001	0.04	0.879
Copper	Correlation Coefficient	1.000	0.443*	0.221*	0.386*
	<i>p</i> value	.	0.001	0.004	0.001

* Significant.

Discussion

Trace elements may be involved in the pathogenesis of liver disease. They may produce direct hepatic toxicity or impaired liver function⁽¹⁰⁾. Reactive copper may stimulate Kupffer cell's leading to direct or indirect liver damage⁽¹¹⁾. Magnesium may be depleted in cirrhosis but there are not enough evidences on that. Patients with liver cirrhosis showed considerably reduced muscle strength and muscle magnesium so it may have a role in hepatic encephalopathy and muscle cramps⁽⁶⁾. Many researchers still study the possible connection of zinc, copper, and magnesium in pathogenesis of chronic liver diseases and its progress⁽¹²⁾.

Because of the high prevalence of hepatic diseases in Egypt, the effect of these metals should be known and well-studied to take scientific steps for prophylaxis and avoidance of disease deterioration. So the current work was designed to estimate the level of copper, magnesium and zinc in patients of cirrhosis and HCC to determine their correlation to pathogenesis of these diseases.

In the current study, copper level showed significantly increased values in cirrhosis and HCC groups while magnesium and zinc were significantly decreased comparing to control group. Many studies demonstrated a marked decrease in zinc levels in HCC tissue^(13 & 14). Others⁽¹⁵⁾ reported a zinc increase in HCC, which was subsequently reversed in researches by the same researchers⁽¹⁶⁾ and others⁽¹³⁾ who confirmed decrease in zinc in HCC. Moreover, an association between the decreased levels of zinc in HCC and the degree of advancing malignancy was recorded^(17, 18).

This research confirms that serum copper level is significantly higher and zinc level is significantly lower in cirrhotic patients than healthy controls as previously detected⁽¹⁾. While others⁽¹⁹⁾ did not find that difference. As explanation for the decreased zinc levels, it was stated that the malignant cells are developing certain mechanisms to decrease the cellular accumulation of zinc to levels that are not cytotoxic, but still support their development, growth, proliferation, and malignant activities. For example, HCC tissue tries to decrease zinc levels in hepatoma cells by alteration of expression and abundance of zinc transporters⁽²⁰⁾.

Zinc has significant negative correlation with AST, ALT, INR, albumin and bilirubin while copper has significant positive correlation and Magnesium has non-significant positive correlation with the same parameters. This proves the direct correlation between the levels of these trace element and the changes in liver function parameters.

Studies showed significant negative correlations between serum zinc level and AST, albumin⁽²¹⁾ and INR. But in disagreement with our results, zinc level showed no correlation with bilirubin, ALT, AST, or albumin⁽²²⁾, others showed non-significant correlations between them⁽²³⁾.

This study confirmed significant negative correlation between zinc and magnesium, zinc and copper; and significant positive correlation between copper and magnesium which was previously detected⁽¹²⁾. Moreover advancement of patient's condition had a significant negative correlation with zinc and magnesium levels but significant positive correlation with copper

level. Child-Pugh classification showed non-significant negative correlation with zinc and magnesium and significant positive correlation with copper level. Other studies^(12 & 24) observed significant increase in copper level with advancement of liver disease. Zinc was significantly lower in Child's Class B than Class A⁽²⁵⁾, and in decompensated than compensated cirrhosis⁽²⁶⁾.

It was stated that the copper concentration increased in advanced liver maladies, as it is responsible for production of the toxic hydroxyl radicals⁽¹¹⁾. Also, increased copper may be due to increased uptake from the gut, diminished excretion by the liver, with tissue breakdown and consequent release from copper stores⁽²⁷⁾.

While the current study showed Zinc and magnesium levels significantly decreased with advancement of liver disease and significantly negative correlated with Child-Pugh Score, other studies observed no significant changes in magnesium in liver cirrhosis patients⁽¹¹⁾ and it was suggested that magnesium levels are not depending on the degree of severity of liver diseases⁽²⁶⁾.

Conclusion

There is association between copper, magnesium and zinc and the severity of the cirrhosis and HCC. Further studies are needed to determine effects of supplementation of zinc and magnesium on the clinical course of liver cirrhosis and HCC.

Ethical Clearance- The research protocol was approved by the Ethical Committee of Faculty of Medicine, Mansoura University (proposal code: R. 17.10.44).

Source of Funding- Self- funding.

Conflict of Interest - Nil.

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Role of Agropyron Repens Extract in Treatment Renal Calculus in Pediatric Group

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Abstract

Background: Renal, urologic, endocrine, and metabolic disorders can lead to the progress of crystallized substance in the urinary system. Infected stones may produce renal colic, hematuria and sepsis. Agropyron repens has pharmacological action as soothing mild diuretic, demulcent, antimicrobial, antioxidant **objective:** a prospective randomized controlled study the efficacy of Agropyron repens in decrement number and size of renal calculus and its clinical feature in pediatric group. **Patients and Method:** 50 Child between 5 to 14 years old suffering renal calculus from 3 September 2017 to 24 march 2019 in the salahaldeen hospital and personal doctor's office, 25 case as Agropyron group and 25 case as control group. Agropyron repens extract (capsule) 5 mg /kg as single dose every other day for 60 days dissolved in water while control group given supportive treatment. Guide by sequential ultrasonic urinary examination every 14 days liver function with renal function and hematological study were done and evaluated for any abnormality and/or side effect. **Results:** Agropyron repens group were demonstrate significantly decline in number and size of stones 22 (88%)± 2.12 (P= 0.001) , 23 (92%)±1.031 (P=0.003) more than control group 2 (8%)±1.02 (P = 0.12), 4 (16%)±1.41 (P = 0.11) respectively and Agropyron group was illustrating mean±SD significantly reduction in renal colic was (77.6%) (19.4 ± 1.72) which was more than in control group (16 %) (4.1 ±1.02) (P= 0.003). The mean±SD significantly higher reduction in hematuria of Agropyron group (85.96 %) (21.49±1.03) which was more than in control group (24.16%) (6.04±1.06) (P= 0.002). The mean±SD reduction in Sepsis of Agropyron group (88.8%) (22.2 ±1.9) which was more than in control group (12.8%) (3.2± 1.02) mg/dL (P = 0.001). **Conclusions:** This study indicates importance of Agropyron repens in decrement number and size of renal calculus and diminishes of renal colic, hematuria and sepsis without any side effect in pediatric group

Key word: renal calculus, Agropyron repens extract, pediatric group, hematuria.

Background

Renal, urologic, endocrine, and metabolic disorders can lead to the progress of crystallized substance in the urinary system ⁽¹⁾kids with stones currently report for 1 in 685 pediatric hospitalizations and more than half are younger than 13 years at hospitalization ,infected stones may produce renal colic, hematuria and sepsis ⁽²⁾.

Couch grass (Agropyron repens) extraction of silicon-containing compounds⁽³⁾, (volatile oil constituent, 95%), mucilage, thymol, menthol, iron, and other minerals has pharmacological action as anti-inflammatory plus antioxidant⁽³⁾ property of An ethanolic extract be found to reveal strong inhibition (14%) of carrageenan-induced inflammation in the rats ⁽⁴⁾. Antimicrobial effects of Agropyren's essential oil and oxidation product have been used as a preparation for treat urinary tract infections. Demulcent effects of the polysaccharide of mucilage found in Couch grass (Agropyron repens) may help soothe inflammation and irritation. Therefore, it is useful in easing painful spasms in the bladder and urinary system. The existence of mannitol, saponins, and

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vanillin be claim to exhibit diuretic activities in Couch grass (*Agropyron repens*)⁽⁵⁾. the review is to recognize changeable risk factors and abnormalities for which remedy can be given⁽⁶⁾. the goals of medical treatments are to abolish the trouble of urinary stones⁽⁷⁾

Aim of study: a prospective randomized controlled study the efficacy of *Agropyron repens* in decrement number and size of renal calculus and its clinical consequence in pediatric group

Patients and Methods

The entire ethical and lawful issues taken from families and acceptances from local health salahaldeen authority in written papers before starting the study.

50 Child between 5 to 14 years old suffering renal calculus from 3 September 2017 to 24 march 2019 in salahaldeen teaching Hospital and personal doctor's office, 25 case as *Agropyron* group and 25 case as control group. 25 case as *Agropyron* group and 25 case as control group. *Agropyron repens* extract (capsule) 5 mg /kg⁽⁸⁾ given as single dose every other day for 60 days dissolved in water, while control group given supportive treatment only. Effect of *Agropyron repens* was evaluate by both serial ultrasonic urinary

examination every 14 days for decline number and size of stones and clinical evaluation for decrement renal colic, hematuria and sepsis complication within the *Agropyron* group and control groups. Patient of both groups advised to encourage liquid intake

Laboratory Procedures: liver function with renal function and hematological study done and evaluated for any abnormality and/or side effect.

Statistical analysis: It was done by SPSS statistics and analysis compared by rate (percent %) mean±SD and P value decline number and size of stones. The clinical diminish of renal colic, hematuria and sepsis complication in both group were through rate (percent %) mean±SD and P-value for each group⁽⁹⁾.

Results

The study results showed the following:-

Agropyron repens group were demonstrate significantly decline in number and size of stones 22 (88%)± 2.12 (P= 0.001) , 23 (92%)±1.031 (P=0.003) than control group 2 (8%)±1.02 (P= 0.12), 4 (16%)±1.41 (P = 0.11) respectively presented in Table (1-2) & Figure (1-2).

Table (1): Comparisons in both patient and control groups Decline number of stones

Decline number of stones	patients(<i>Agropyron</i>) (n=25) Percent%	Control (n=25) Percent%	P value
Yes	22 (88%)± 2.12	2 (8%)±1.02	0.001*
No	3 (12%)±1.021	23 (92%)±2.01	0.12

$p < 0.05$ is consider significant *

Table (2): Comparisons in both patient and control groups Decline Size of stones

Decline Size of stones	patients(<i>Agropyron</i>) (n=25) Percent%	Control (n=25) Percent%	P value
Yes	23 (92%)±1.031	4 (16%)±1.41	0.002*
No	2 (12%)±1.09	21 (84%)±1.021	0.11

$p < 0.05$ is consider significant **

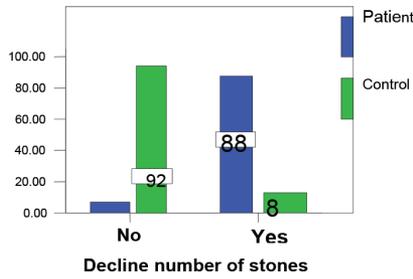


Figure -1-

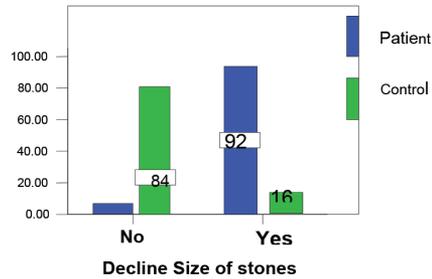


Figure -2-

Agropyron group was illustrating mean±SD significantly reduction in renal colic was (77.6%) (19.4 ± 1.72) which was more than in control group (16%) (4.1 ± 1.02) (P= 0.003). The mean±SD significantly higher reduction in hematuria of Agropyron group

(85.96%) (21.49±1.03) which was more than in control group (24.16%) (6.04±1.06) (P= 0.002). The mean±SD reduction in Sepsis of Agropyron group (88.8%) (22.2 ± 1.9) which was more than in control group (12.8%) (3.2± 1.02) mg/dL (P = 0.001) as in Table (3) & Figure (3).

Table (3): Estimation of total reduction in clinical consequence in both groups

total reduction in clinical consequence	patients(Agropyron) (n=25) Percent% /mean±SD	Control (n=25) Percent% /mean±SD	P value
Renal colic	19.4(77.6%) ±1.72	4.1(16.4%) ±1.02	0.003*
Hematuria	21.49(85.9%) ±1.03	6.04±(24.1%) 1.06	0.002*
Sepsis	22.2±(88.8%) 1.9	3.2(12.8%) ±1.02	0.001*

p < 0.05 is consider significant

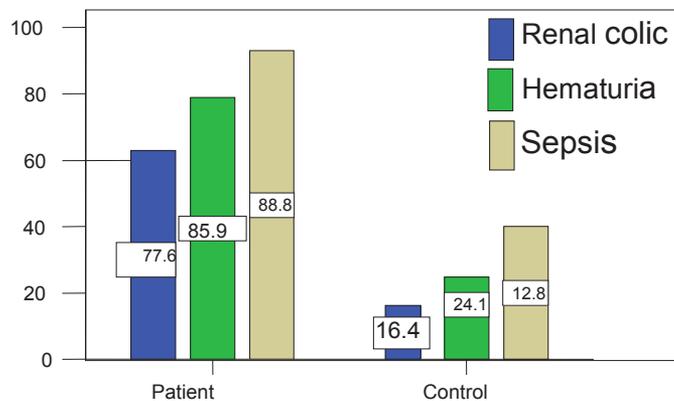


Figure -3-

Figure (3): Estimation of total reduction in clinical consequence in both groups

Discussion

This is original a prospective randomized controlled research in Iraq prove the efficacy of Agropyron repens in decrement number and size of renal calculus and its clinical consequence in pediatric group

There is no comparable study of Agropyron repens extract in treatment of renal stone in **pediatric age group** in medical journal and /or web site but extremely little number of research in adult for that actually be apologize to compared for agreement or disagreement

Agropyron repens is native from temperate Europe to Central Asia and is now found in Africa as soothing diuretic and for calming pain and spasm in the urinary tract ⁽¹⁰⁾

Agropyron repens group significantly diminish number and size of renal calculus (P= 0.001) (P=0.003) more than control group (P = 0.12), (P = 0.11) respectively, This can be due to effect as demulcent, emollient, hypoglycemic, hypolipidemic, anti-inflammatory and diuretic effects. It was also affected motility, cured urinary tract infection and induced many other effects ⁽¹⁰⁾⁽¹¹⁾.

Agropyron repens group significantly diminish in renal colic, hematuria, Sepsis than in control group (P= 0.003) ,(P= 0.002), (P = 0.001) correspondingly, This can be due to Significant anti adhesive activity against the bacterial attachment to human T24 bladder cells⁽¹²⁾ by identification of (E)-hexadecyl-3-(4-hydroxyphenyl)-acrylate (hexadecyl-coumaric acid ester) **1** as the compound responsible for inhibiting the UPEC adhesion to T24 bladder cells interacting with bacterial outer membrane proteins, which was shown by treatment of uropathogenic Escherichia coli (UPEC) ⁽¹³⁾, in additional to its effect in calming pain and spasm in the urinary tract ⁽¹⁰⁾

Neither side effect nor complication encounter in study period for Agropyron repens group ,the limitation of study is small size and biochemical study of dissolve renal stone is unavailable.

Conclusion

This study indicates importance of Agropyron repens in decrement number and size of renal calculus and diminish of renal colic, hematuria and sepsis without any side effect in pediatric group

Acknowledgment: express gratitude for all pediatric Department salahaldeen teaching Hospital, thankfulness to the children and family whose collaboration made this study possible.

***Conflict of Interest -** (nil – There are “NO Conflict of Interest”).

Source of Funding - By all researchers (self). **

Ethical Clearance: Committee members are approved to perform a study about ***

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An Unusual Foreign body in Esophagus; Report of a Case

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Abstract

Foreign body (FB) ingestion, a common and serious problem in children, can present with a wide variety of symptoms. This case report describes an unusual esophageal foreign body (EFB), in which the patient presented with dysphagia, odynophagia, vomiting, and regurgitation with history of ingesting her mother's pin. Plain radiograph of the soft tissue neck revealed the presence of a radio-opaque ingested foreign body (the pin) that located at the lower level of cricopharynx. We performed rigid esophagoscopy under general anesthesia. On esophagoscopy the pin was visualized in lower border of the cricopharynx trapped by the cricopharyngeal sphincter at its base. It was hard metallic in consistency and of approximately 2 cm in size.

Keywords: cricopharynx, dysphagia, foreign body, esophagoscopy.

Introduction

Foreign body ingestion is common in children, but frequently seen among adults also¹. The natural inclination of children to explore their environment orally makes the ingestion of FBs common, especially in those less than six years old. Foreign bodies (FBs) in the esophagus are considered to be a serious clinical condition, both in adults and children, due to the possible complications (esophageal perforation, mediastinitis, fistulization, airway obstruction) with a high mortality and morbidity^{2,3}.

The common signs and symptoms of EFB are odynophagia, dysphagia, or simply pain and tenderness in the neck or chest. Most foreign objects will pass through the pylorus, although on occasion, some objects may remain in the stomach for a long period^{4,5}. The diagnosis can be missed or delayed when the presenting symptoms are mainly respiratory⁶. Non contrast CT scan is indicated for diagnosing suspected upper esophageal foreign bodies not expected to be visible on

plain radiography and in order to rule out perforation^{7,8}. The best method of removing impacted foreign body remains controversial. Rigid endoscopic removal of foreign body was developed by Chevalier Jackson about a century back but it is associated with the hazards of general anesthesia. Flexible fiberoptic endoscopic removal, which can be done under local anesthesia in outpatient department has gained great popularity over the past decade^{4,5}.

Case Report

A 2 years and eight-month old girl was referred to the our emergency department of Emam Khomeini Hospital of Ahvaz Jundishapur University of Medical Sciences in November 2017, with dysphagia, odynophagia, vomiting, and regurgitation with history of ingesting her mother's pin when playing with it since 1 hour back. She had not fever, tachycardia, difficulty in breathing, chest pain and other sign of mediastinitis. We performed an indirect laryngoscopy and found pooling of saliva in both pyriform fossae. Then patient admitted. We performed radiologic imaging. Plain radiograph of the soft tissue neck revealed the presence of a radio-opaque ingested foreign body (the pin) that located at the lower level of cricopharynx (2 x 2 cm) (Fig. 1). The routine preoperative lab tests was within normal limit. We waited six hours to complete the NPO

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time. Then the patient was taken to the operating room. And rigid esophagoscopy under general anesthesia was performed. On esophagoscopy the pin was visualised in lower border of the cricopharynx trapped by the cricopharyngeal sphincter at its base. With the help of a forceps, the pin was grasped and removed. It was hard metallic in consistency and of approximately 2 cm in size (Fig. 2). There was no erosion of the wall of the oesophagus, so the patient was kept nil orally 6 hour as a routine. Intravenous antibiotics and steroids was given. Then, liquids were started, followed by semisolids and a normal diet. The patient was discharged on the following day postoperatively, with totally relieved of symptoms without any complications.

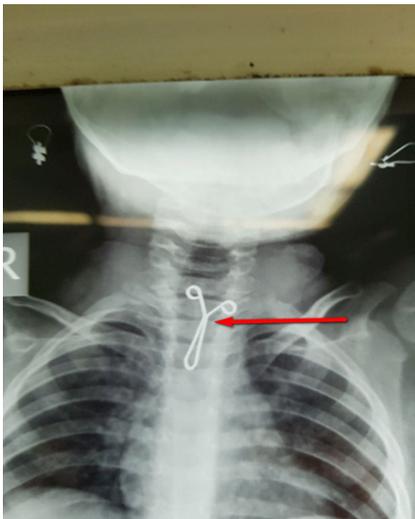


Fig 1. Horizontal arrow shows the foreign body (pin)



Fig 2. Pin removed

Discussion

The majority of FB ingestions occur in the pediatric population, with a peak incidence between six months and six years of age. This is due to increasing curiosity and because of hand-mouth interactions with a natural

instinct to place everything in the mouth⁹. The majority of impacted FB tends to be found just under. The foreign body forced out: a pistachio shell. Neath the cricopharyngeal muscle because of the weak peristalsis in that region¹⁰. The rest are found in the physiological narrowing of the esophagus at the level of the aortic arch, the left main stem bronchus and the lower esophageal sphincter. Sharp objects have a tendency to get stuck at the level of upper esophagus. A foreign body impacted in the esophagus requires immediate attention and treatment. Review of literature reveals that dysphagia (92%) and tenderness in neck (60%) are the most common clinical features. Majority (89%) patients come to the hospital within 24 hours. X-ray of the neck (lateral view) is the most useful investigation with presence of air in the esophagus being a significant finding¹¹. Delay in diagnosis can be the result of several factors such as unwitnessed or initially asymptomatic FB ingestion and in cases of radiolucent objects^{12,13}. The vast majority of foreign bodies pass through the gastrointestinal tract uneventfully and no medical/surgical treatment is necessary. Endoscopic treatment or surgical intervention are necessary in 20% and 1% of cases, respectively¹¹. Rigid esophagoscope is routinely used as an effective tool to remove foreign body. Today the methods available for extraction are diverse, including flexible fiberoptic endoscopy and other non-endoscopic approaches. Removal of foreign bodies by using a Foley catheter was reported in 1966. It has been used for extraction of large radiopaque foreign bodies but is of no use in the majority of instances. The flexible fiberoptic instrument was developed during 1970s and 1980s. Most diagnostic esophagoscopy is now performed with flexible instruments for which they are vastly superior. Use of rigid instrument can be difficult and dangerous, especially in aged persons with hypertrophic changes in the cervical spine or with limited spine mobility or in thick-neck person with full set of teeth^{14,15,16}. The success rate with the use of rigid instrument ranges between 94 and 100%. The estimated incidence of esophageal perforation is 0.34% with a 0.05% mortality rate. The success rate with the flexible esophagoscopy ranges between 76 and 98.5%, and the morbidity (perforation) rate between 0 and 0.5%^{17,18}.

Conclusion

Pin is a common household material which makes it easily available to children and can easily be ingested and gets impacted in the esophagus. We recommend

that the parental should be aware of this issue and keep away this material of children.

Funding: The authors have no conflicts of interest to disclose.

Conflicts of Interest: The authors have no funding, financial relationships.

Ethical Issue: It is certified that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research. Informed written consent was obtained from all participants and the Ethical Committee of Ahvaz Jundishapur University of Medical Sciences approved this study at 2015. The study protocol conforms to the ethical guidelines of the 2008 Declaration of Helsinki.

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Idiopathic Nasal Septal Abscess in Patient with Thalassemia Major: A Case Report

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Abstract

A nasal septal abscess (NSA) is an unknown disease and is a rhinology emergency. The most common etiology is trauma related and in many times idiopathic. The most common presentation of NSA is obstruction and pain. This case report is presented a patient with spontaneous NSA who complicate with thalassemia major without any history of trauma. Prompt diagnosis and immediate therapy are mandatory to avoid not only cosmetic nasal deformity but also life-threatening intracranial infection. We present the first case report of spontaneous NSA in patient with thalassemia major without history of trauma. In summary, this case didn't have known risk factors of NSA but we presented this case for the suggestion the research on (the relation between thalassemia major and NSA) is significant or not. And if is significant with which mechanism

Keywords: *nasal septal abscess, thalassemia major*

Introduction

Nasal septum is a basic structure for the shape and function of the nose. Nasal septal abscess (NSA) is a condition in which there is a collection of pus between the mucoperichondrium and cartilage of nasal septum. This disease often occurs in a previous nasal septal hematoma, which usually has a history of nasal trauma. The most common presentation of NSA is obstruction and pain^{1,2,3}. This case report is presented a patient with spontaneous NSA who complicate with thalassemia major without history of trauma.

Case Report

A 21 year old man with known chronic illness as thalassemia major from born was referred to emergency department of Imam Khomeini Hospital of Ahvaz Jundishapur University of Medical Sciences, with Two weeks history of common cold and bilateral nasal obstruction. This obstruction get raised in second week. He denied any history of trauma or sinonasal injury on physical examination he had bilateral swelling of the mucosa of nasal septum obstructing nasal cavity (Fig.

1, A, B). He get 2 unit of packed red blood cell every months as thalassemia major.

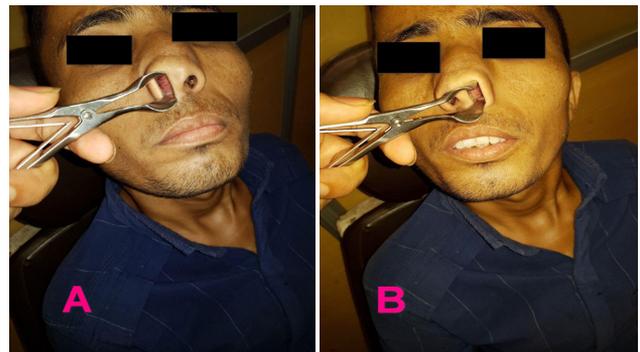


Fig. 1. Right view (A) and left view (B) of nasal septal abscess in patient with thalassemia

His White blood cell was $7.41 \times 10^9/L$ with a neutrophilia of 57.9%, Hb was 8.8 g/dl, ESR was 72 and random blood glucose was 124 mg/dl. The HIV test and other viral marker was negative. Needle aspiration after using lidocaine spray revealed pus collection which confirmed the diagnosis. The sample was sent for smear and culture.

Immediately, under general anesthesia, incision and drainage was performed on the left anterior septum. There were deficient areas of necrotic cartilage which allowed communication on the left-side. All anterior of septum had necrotic cartilage. *Pus and necrotic cartilage was removed by suction .Penrose drains were inserted in left side.* Following drainage, nose is packed on both side to prevent reaccumulation. The incision was left open and bilateral nasal packs were removed 3 days later. He was given intravenous ceftazidime and cloxacillin which resulted in improvement of his condition. Following 6 days his symptoms resolved. He was discharged on oral cefixime and ciprofloxacin for 10 days.

Discussion

The Incidence of NSA is so rare. Major centers reported fewer than 10 cases per year^{1,2} this entity what first reported in 1810 by Arnal³ Predisposing factors include nasal trauma in up to 75% of cases⁴. Other causes are nasal surgery, furuncle of nasal vestibule, acute sinusitis, dental infection, and Immunodeficiency⁵. Cartilage death may cause septal perforation or saddle nose deformity that are aesthetic problems⁶ apart from aesthetic aspect there is also the risk of potentiality life-threatening complication such as orbital cellulitis and abscess by contagious spread. The most common isolated pathology is *Staphylococcus aureus*.

In the patient with nasal deformity septal reconstruction of the nasal septum may be preforming immediate after drainage of the abscess as primary treatment. Or secondary treatment after the resolution of the infection .Reconstruction of septal cartilage may be used by residual septum cartilage or autologous cartilage from tragus or auricle.

Conclusion

We present the first case report of spontaneous NSA in patient with thalassemia major without history of trauma. In summary, this case didn't have known risk factors of NSA but we presented this case for the suggestion the research on (the relation between thalassemia major and NSA) is significant or not. And if is significant with which mechanism.

Funding

The authors have no conflicts of interest to disclose.

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Cholesteatoma Presenting with Post Auricular Abscess, is Drainage and Mastoidectomy at the Same Time or with Time Interval? (Case Report with Clinical Challenge)

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Abstract

Cholesteatoma is a destructive and expanding growth consisting of keratinizing squamous epithelium in the middle ear and/or mastoid process. The authors report a case of a 31-year-old man with chronic otitis media of his left ear for many years with a positive history of partial mastoidectomy in 10 years ago. His presentation was as follows: otorrhea as a funky pus from the left ear for 10 days, tenderness, Erythema, and fluctuation in the left postauricular ear and general appearance was ill and feverish. In The laboratory evaluation C-reactive protein (CRP) was 2+ and Erythrocyte sedimentation rate (ESR) was 55(mm/h).after that the Computed tomography scan (CT) was taken and incision and drainage of abases was done. Two weeks later mastoidectomy for cholesteatoma was done. We raised the case for discussing the time of cholesteatoma surgery and its time interval with cholesteatoma complication. And with the case, we can propose that if there is a definite time interval between the two surgeries due to the better field of surgery and reduce inflammation. So Second surgery was easier and less risky and with better results. We prepared the operating room for incision and derange.

Keywords: *post auricular abscess, cholesteatoma, otitis media, drainage, mastoidectomy*

Introduction

Otitis media is a group of inflammatory diseases of the middle ear. The two main types are acute otitis media (AOM) and otitis media with effusion (OME)¹. Chronic suppurative otitis media (CSOM) is middle ear inflammation of greater than two weeks that results in episodes of discharge from the ear². Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear and mastoid cavity that is characterized by discharge from the middle ear through a perforated tympanic membrane for at least 6 weeks. CSOM occurs following an upper respiratory tract infection that has led to acute otitis media. This progresses to a prolonged inflammatory response causing mucosal (middle ear) edema, ulceration, and perforation. The middle ear attempts to resolve this ulceration by the production of granulation tissue and polyp formation. This can lead to increased discharge and failure to arrest the inflammation, and to development of CSOM, which is

also often associated with cholesteatoma. Cholesteatoma is a destructive and expanding growth consisting of keratinizing squamous epithelium in the middle ear and/or mastoid process³.

Case Present

A 31-year-old man was referred to our tertiary medical Centre Emam Khomeini hospital that he reported having had chronic otitis media of the left ear for the previous many years with the positive history of partial mastoidectomy in 10 years ago. The chief complaint was otorrhoea as a funky pus from left ear for 10 days. The other complains were tenderness, Erythema, and fluctuation in left postauricular ear. His general appearance was ill and feverish. In examination there was a swelling measured 2*3 cm in left postauricular ear that was erythematous, fluctuated and pushed the auricle toward (Fig.1).In the examination of the external auditory meatus, there was full of pus

and a erythematous and Polypoidal mass appeared after drainage the pus (Fig.2). There were two perforations in the other ear .In The laboratory evaluation C-reactive protein (CRP) was 2+ and Erythrocyte sedimentation rate (ESR) was 55(mm/h). The diagnostic acting started immediately after his reference. Computed tomography scan of the mastoid was suggesting the presence of soft tissues inside the mastoid cells and the tympanic cavity of left ears (Fig.3). All the evidence of the image was in favor of the Cholesteatoma. And then prepared the operating room for incision and drainage of abscess that be done.



Fig 1. The patient with left post auricular abscess



Fig 2. Endoscopic photographs of the left external auditory canal. Aural polyp at the posterior wall of the left external auditory canal.

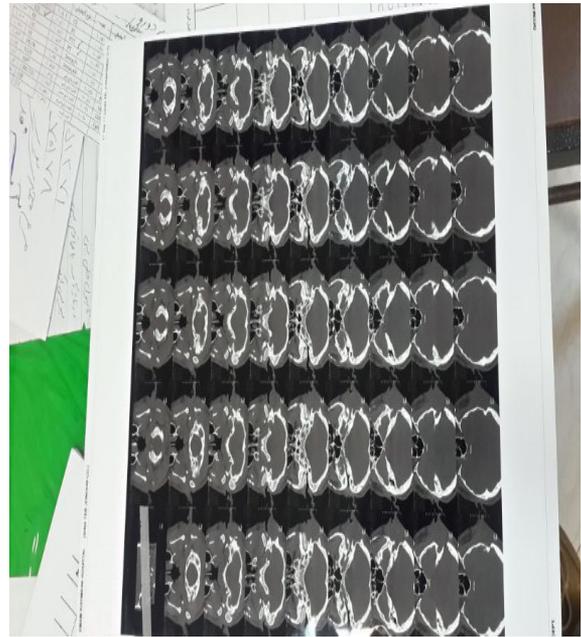


Fig 3. Axial Temporal Bone Computed Tomography scan of Patients revealed structural changes of median ear include widening of aditus, and erosion of scutum; erosion of malleus and tegmen. All the evidence of the image was in favor of the Cholesteatoma.

The patient remained in the hospital for one week and received intravenous antibiotics and washed abscess site three times a day. During this time, the patient's abscess completely recovered. But the most important issue for the patient's prognosis was the problem of the time of mastoidectomy surgery. Was this surgery to be carried out simultaneously with drainage or with the interval between these two operations?

We discharged the patient with oral medication. After reducing the inflammation, we restored the patient three weeks later and were ready to mastoidectomy. The patient was again taken to the operating room. A total mastoidectomy was performed for the patient. After three days, he remained in the hospital and was discharged. To this day, the patient has completely improved and has no recurrence or other symptoms.

Discussion

The complications of otitis media are broadly categorized into extra cranial and intracranial complications. Extra cranial complications (such as mastoiditis, sub periosteal abscess, facial paralysis, cholesteatoma and labyrinthitis) and intracranial complications (such as cerebral or extradural abscess, meningitis, focal encephalitis, lateral sinus thrombosis, and otic hydrocephalus) are more likely to be associated

with AOM than COM^{4,5}. Cholesteatoma is a well-demarcated noncancerous cystic lesion derived from an abnormal growth of keratinizing squamous epithelium in the temporal bone⁶, which is commonly characterized as “skin in the wrong place”⁷. Cholesteatoma results from the enzymatic activity of the cholesteatoma matrix. This abnormal growth is locally invasive and capable of causing the destruction of structures in the middle ear cleft. Furthermore, squamous epithelium maybe Rendered destructive in an environment of chronic infection, thereby enhancing the osteolytic effects of cholesteatoma⁸. Owing to the fatal capacity of intracranial complications, cholesteatomas remain a cause of pediatric morbidity and death for those who lack access to advanced medical care^{9,10}. Cholesteatomas can be classified as one of two different types: congenital, which is specific to childhood, and acquired, which affects children as well as adults¹¹. Congenital cholesteatoma is defined as a white mass that forms prior to birth behind an intact eardrum and has no history of otitis media or previous otologic procedures. Acquired cholesteatomas most commonly begin after birth with a retraction pocket in the eardrum, usually as a result of chronic middle ear disease. Most of the mechanisms that have been proposed to explain the pathogenesis of acquired cholesteatoma can be divided into four categories: (1) invagination theory (retraction pocket theory), (2) the theory of epithelial invasion or migration (immigration theory), (3) the theory of squamous metaplasia, and (4) basal cell hyperplasia theory (papillary ingrowth theory)¹⁰. Many patients who suffer from cholesteatoma describe a frequently recurring and foul-smelling otorrhea, which is characterized as a scant but purulent discharge. Hearing loss can be progressive conductive or sensor neural. Conductive hearing loss is due to the impaired movement of ossicles, and further damage to the cochlea can cause irreparable sensor neural hearing loss, occasionally complicated by tinnitus. Destruction of the bone which over lies the semicircular Canals (particularly the horizontal canal) can trigger vertigo or balance dysfunction¹².

Conclusion

We raised the case for discussing the time of cholesteatoma surgery and its time interval with cholesteatoma complication. And with the case, we can propose that if there is a definite time interval between the two surgeries due to the better field of surgery and reduce inflammation. So Second surgery was easier and

less risky and with better results.

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Ethical Issue: It is certified that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research. Informed written consent was obtained from all participants and the Ethical Committee of Ahvaz Jundishapur University of Medical Sciences approved this study at 2015. The study protocol conforms to the ethical guidelines of the 2008 Declaration of Helsinki.

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Comparison of Shear Bond Strength of Translucent Zirconia Veneers Bond to Enamel among Different Light Intensity (An in Vitro Study)

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Abstract

Objectives: the cosmetic dentistry request to increase the duration of veneers and crowns to the tooth structure, which increase the cosmetic translucent zirconia duration. **Aims:** the research objective is to Contrast of shear bond strength of translucent zirconia veneers bond to the enamel among changed light intensity. **Method:** thirty upper-removed premolar was used. Thirty translucent zirconia discs were made according to manufacturing direction then randomly dived into two assemblies. Using bisco choice2 resin cement is light cured. The two assemblies dropped into I group and II group, Group I: low intensity light power has at 1000mW / cm² (10 Sec) used. Group II: high light intensity groups that is high intensity power at **1400 mW/cm²** (4 Sec) used. **Results:** high significant difference (<0.001) Statistically among groups II and I in means for low intensity assemblies is 10.12 Mpa however the high light intensity assemblies mean 16.97 Mpa. **Conclusions:** Giving to this study the high intensity light more efficient bond force of translucent zirconia veneer to the enamel than low intensity light.

Introduction

Translucent zirconia restoration are less translucent than glass ceramics of all ceramic, for this reason translucent zirconia recently gradually used in cosmetic restorative due to esthetics, its thickness and shade given their good properties intelligent, ^[1,2] all these properties can affect in the amount of light transmission and polymerizing efficiency of resin cement. ^[3,4]

The opacity of Zirconia have an massive influence on the transmission of curing light this is serious on the irradiance of the light is to reach optimal photopolymerization of the material. ^[5]

The dimensional stability and mechanical properties with reduced bonding to enamel affected by ineffectively polymerized resin cements for reasons of ideal cure is serious because are disposed to have altered resultant in decreased biocompatibility, micro-leakage, staining, and postoperative sensitivity. ^[6]

Limited data are available concerning the effectiveness of light intensity on the polymerization

of resin luting cements beneath translucent zirconia restorations. Therefore, the purposing of this analysis was to assess the effect of different light intensity degree on shear bond strength of the monolithic zirconia to the tooth that bonded with the light polymerization resin cement.

The null hypothesis was that the different light intensity degrees have no effect on shear bond strength, or on the different light intensity degrees have effect on shear bond strength between monolithic zirconia to the tooth.

Materials and Method

2.1. Samples preparation:

Prepare six zirconia rectangular cubic from Presintered Y-TZP (ELEMENT Z - Zircon Blanks) zirconium oxide blocks High-translucent quality is as transparent as the Lithium Disilicate. It is specially adapted to realize the anterior teeth. Realize unit crowns, inlays, veneers, onlays and maximum 3 unit bridges. Perform a rectangular cubic shape with the dimensions

of (30 mm, 10 mm and 50 mm) from the Y-TZP blank by the cutting saw, and then dividing the rectangular cubic longitudinally by cut in to three rectangular cubic bar shape with the dimensions of (10 mm, 10 mm and 50 mm) Figure (1).



Figure 1. Zirconia rectangular cubic bars

Each the zirconia rectangular cubic bar was determined the center point at the one end of it to cemented a fitting a bar oriented with long axis of the zirconia rectangular cubic bar to prepare it for the milling to alteration of the rectangular cubic bar to the cylindrical bar shape with uniform diameter (3.74 mm) these alteration done by adapted the fitting bar in to the grained machine with low speed rotation and then milled longitudinally by the large a carbide round bar with laboratory micro-motor straight hand piece in a manner allowing free movement of it along the sided blank of the zirconia parallel Figure 2 (a), to convert the rectangular cubic bar to a cylindrical bar shape with constant diameter (3.74 mm), than after complete perform the cylindrical bar shape with required measurement ensure a smoothing with sandpaper by longitudinal movement Figure 2 (b).

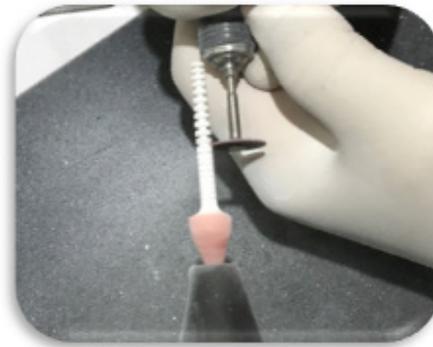
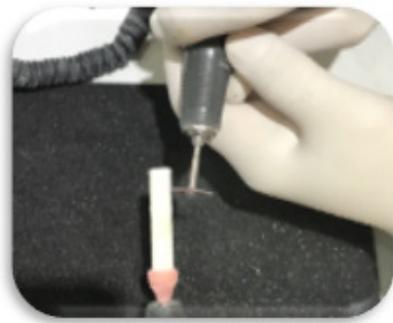


Figure (2)

(a) converts the rectangular cubic bar to a cylindrical bar shape

(b) smoothing of cylindrical bar with sandpaper by longitudinal movement

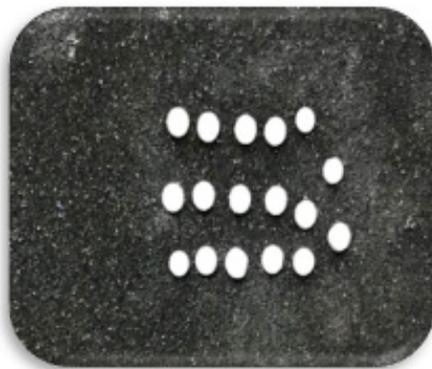


Figure (3)

(a) dividing of the zirconia cylindrical

(b) zirconia disc

The zirconia cylindrical bar divided in a cross section cutting in a way that the carbide disc directed perpendicular to the cylindrical bar in a constant measurement to perform a disc with measurement thickness (1.25 mm) Figure 3 (a).

The following step cut the zirconia cylindrical bar into discs, every disc was measured a 1.25mm, thickness with 3.74 mm diameter, this done by carbide cutting disc Figure 3 (b).

The gained discs placed in the tube furnace for sintering (HT-S MVmihmvoigt-germany 2014) for 8 hr at 1500 °C include the cooling, follow the manufacturer's guidelines. Through that process of shrinkage in a 3-dimensional volumetric of the milled discs of 25% took place for that reason the milled cylinders to 25% greater volume. After sintering all zirconia discs measured to the following dimension (3mm diameter, 1mm height).

After complete finishing and polishing of the discs and sintering according the manufacturing recommended,

2.2. Preparation of the tooth:

2.2.1. Teeth selection:

All the teeth that be used should be checked by eye magnification lens from no caries contain, or cracks, line fractures, and restoration. All the teeth (upper first human premolars) are newly extracted from the younger patients undergo orthodontic treatment.

Using pumice with a rubber cup for cleaning all the teeth from the debris than bathed by distilled water and saved at room temperature in the normal saline.

2.2.2. Acrylic blocks construction:

A pattern built rubber frame square of (1.5cm x1.5cm x 2cm) for purposing of production of acrylic blanks. The tooth root was fixed parallel to the long axes in the acrylic cold cure mixture; below the cement-enamel junction 2mm should be appearing from the root.

2.2.3. Teeth preparation

The buccal surface preparation through flattening of the cementing surface to obtain fitness of the zirconia disc to the cemented surface of buccal surface, the preparation was achieved for all the teeth by using the

straight hand piece through disc with diamond cutting side with copious water cooling in a direction so as to the disc by keeping it with long axis parallel to the tooth axis.

The samples stored in the freezer with storing media. Then the teeth samplings were spread equally into six subgroups.

2.3. Bonding the zirconia disc to enamel:

Prior to cementation a coated the zirconia disc by apply zirconia primer to the zirconia surface that bonding of each groups (I and II) of zirconia disc with a micro brush then the material left to react for 180 seconds following to manufacturer's guidelines, after that dried by distilled water.

Etch the enamel by using the unietch for 10 second and rinse and dray, than apply two coats of all bond (A) and all bond (B) to the enamel and air dry, than 10 seconds light cure for, lining the bonding surface of the zirconia disc with the shade stable of biscco choice 2 veneer cement and gently seal the disc the tooth and remove the excess cement, Resin was cured by using Valo Ortho LED curing light (Ultradent, South Jordan, UT) at the same light-tip distance (10 mm) with the following procedures:

Group I: 15 zirconia discs were cured with a standard LED curing light (1000 mW/cm²) for 10 seconds.

Group II: 15 zirconia discs were cured by a high-intensity LED curing light (1400 mW/cm²) for 8 seconds.

2.4. Shear bond strength test:

Using a testing universal machine (model 4411; Instron, Norwood, MA, USA) at crosshead velocity about (0.5 mm/min) via testing machine (figure 2).

Specimens were positioned in acrylic resin were prepared, in a way that the zirconia disc were perpendicular to the shear blade, all three groups of the study submitted to the shear bond strength test with placing the tip of active shear blade on the superior portion of the zirconia disc (figure 3), and the force was directed to the bracket-tooth interface by a blade at a cross-head velocity of 0.5 mm/minute till the zirconia disc detached.

The maximum force applied for de-bonding the zirconia disc from tooth surface was recorded in Newton (N), The readings were gained in kgf (Kilogram-force), changed into N (Newton), then the shear bond strength was determined by divided the force by zirconia disc surface area, with average surface area of the zirconia disc was (12.4 mm²), so the shear bond strength measured values in MPa.

Statistical Analyses and Results

Data analysis was carried out by SPSS version 21.0. Mean and standard deviation (Mean±SD) for each variable were calculated and using Paired sample t-test performed statistical comparison.

Table 1: The illustrative statistics of different zirconia surface shear bond strength

groups	Mean±SD	P
Low	10.12±1.900	<0.001
High	16.97±1.555	

Highly significant differences (P<0.001) were observed.

The shear bond strength values of 30 measurements of from two recorded groups for twenty measurements for each group to comparison between low light intensity (group I) and high light intensity (group II) on the shear bond strength between zirconia disc and enamel of buccal surface of the tooth, The means and standard deviations of shear bond strength values for each group are shown in Table (1), demonstrate highly significant difference between two groups, which mean that using high power light with translucent zirconia discs more effective and great shear bond strength to flat enamel tooth surface.

Discussion

The aesthetic dentistry and patient demand is to maximum bond of translucent zirconia either veneers or crowns to the tooth structure to obtain long duration of the cosmetic prostheses. So this research concerned to develop the best and easier way to improve the bond of the translucent zirconia restoration to the tooth structure with the different intensity of light cure that used with resin cement.

The optimum cement selected for CAD/CAM

restorations is the resin cement for bonding of, as the retention of the crown not depends on the frictional retention [7].

The single pastes of light cure resin cement contain a photo initiator system, which is composed of camphor Quinone as a photosensitive component and a tertiary amine. The wavelength 480 nm (the visible spectrum in the blue region) of light activates camphorquinone [8], which first released free radicals from binding of the tertiary amine and then releases two then conversion of the monomers start. The polymerization of photo-cured resin cements starting after the material exposure to light [9]

The resin cement curing dependent on exposure time of cement to the light to a certain extent after a period of time of exposure to light-curing unit the maximum polymerization could be achieved [10]

There is a new production of VALO-LED light (Ultradent Products Inc.) with three changed light intensities mode and proposing curing times for light cure (Table 2).

Table 2. VALO-LED light modes and proposing curing time

Power (Mw/cm ²)	Standard	High power	Extra power
	1000	1400	3200
Time (sec.)	1×10	2×4	2×3

The current research used monolithic zirconium oxide veneers that relatively opaque may have some advantages over metal and zirconia-ceramic restorations. The monolithic zirconium oxide more conservative for tooth reduction compared to glass-based all-ceramic crowns, yet the flexural strength and fracture toughness of the monolithic material reduces the potential for chips and fractures associated with the use of veneering porcelain [10].

The results in this research shown that the zirconia disc shear bond strength to the enamel when comparison between low light intensity (group I) and high light intensity (group II) were observed highly significant differences (P<0.001), the high light intensity increase the shear bond strength all the samples material

standardized in the translucency (made from one high translucency zirconia blank) and thickness.

One of the difficulties of zirconia restorations is the relative opaque nature of the material when compared to other ceramic materials due to the size of the crystalline particles, leading to bigger light scattering and less translucency because less light is transmitting through the material^[11].

The current research improve the disadvantage of the opacity and scattering of light of the zirconia restorations through the compensated with the increase light intensity so increasing of the light intensity will increase the light that transmitted through the zirconia restorations to the light cure resin cement and than completely curing of the resin cement and the end result increase the shear bond strength of the zirconia disc to the enamel tooth structure.

The result agree with (Passos et al) when compare between the effect of different radiant exposures (ten, twenty, and thirty J/cm²) on the DC of dual cured cements, and concluded that a radiant exposure of ten J/cm² had a significant decrease in the DC^[12].

The percentage of carbon-carbon double bonds measured by (DC) that has been transformed to single bonds to form a polymeric resin. But the greater the percentage the better the resin performance (e.g. strength, resistance to wear, micro-leakage, and resistance to water sorption)^[13].

Conclusions

Founded on the results of the research, summarized, as the shear bond strength of the zirconia disc to the enamel will increase with increase light cure intensity.

Conflict of Interest: The author has no disclosures to report.

Source of Funding: Self.

Ethical Clearance: Not required.

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Determination of Criteria for the Age Estimation (Chronological) According to Structural Changes of Teeth and Alveolar Bone Height in Images of Cone Beam Computed Tomography in Adults

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Abstract

The chronological age is a key to legal medicine research. The aim of this study was to Determination of Criteria for the Age Estimation According to Structural Changes of Teeth and Alveolar Bone Height in Images of CBCT in Adults. The present cross-sectional study was derived from Cone Beam Computed Tomography(CBCT) images of spring 2016 to March 2018 in the Radiology Department of Hamadan School of Dental Medicine. The research investigated radiographic images of 265 patients referred to the School of Dental Medicine in the age range of over 20 years of both sexes with at least two molar teeth at both sides based on Gustafson's method. The correlation between the predicted and real age in the age group of over 40 years was significant in both men and women. In the age group under 40, the male and female buccal bone height variable was the most predictor that had a significant effect in the regression model. In men, there was a significant difference between age and various erosion levels. In both groups of men and women, there was a significant difference between age and different levels of periodontal recession. There was a significant difference between age and heights of buccal bone in both men and women ($P<0.05$). Measurement of buccal bone level by the CBCT had the best and highest relationship with chronological age. The examination of buccal bone level is appropriate for the legal age estimation.

Keywords: Age Determination by Teeth, Alveolar Bone Height, Dental Attrition

Background

The age estimation by teeth is significantly important because they are resistant to physical, mechanical and chemical effects. It can be examined in people directly and without wasting time¹. The age estimation methods vary depending on whether participants are children or adults. The best results can be obtained when the participant's growth is rapid and a number of teeth are also evolving². The age estimation through skeletal

remains is one of four characteristics of biology in the identification³. Age-related changes have been reported for almost every part of the human skeleton such as cranial sutures, dental system, hands, ribs, thigh bone, and clavicle⁴. Teeth provide a history of the individual life and can be used as a valid factor in estimating the age of about 10 weeks of intrauterine life onwards. The age estimation has been successfully supported by developmental stages of teeth, and structural changes in their chemical composition⁵. Measures on dental radiographs are non-invasive methods for estimating adult age in both living people and the dead. Radiography, which is used to estimate the dental age based on the tooth creation, includes the lateral oblique radiography of jaws, intraoral and panoramic radiography^{6,7}. CBCT was introduced as an optimal imaging modality due to

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its sub millimeter resolution, high image quality, short scanning time and decreased patient radiation dose times lower than that of MSC⁸. Since the dental age estimation by the help of radiographs is less changed by the help of other indices, it is highly taken into consideration⁹. The prominent feature of this method is the high coefficient of reliability and low diversity coefficient that result in an ideal result that is close to the individual's chronological age¹⁰. On the other hand, the importance of estimating the patient's age is obvious in many therapeutic activities including the treatment design in orthodontics and pediatric dentistry^{11,12}. This is particularly important in multinational societies facing with many legal and illegal immigrations^{13,14}. Therefore, the age estimation in living samples and the need for non-invasive methods have been widely considered in studies. The children and adolescents' age can be estimated using skeletal, dental, anthropological and physiological methods¹⁵. The prominent features of this method were the high confidence coefficient and low diversity coefficient that resulted in an ideal result close to the individual's chronological age. Therefore, this important issue may be achieved through structural changes such as periodontal erosion and recession and the creation of secondary dentin as well as measurement of bone-related buccal indices such as measuring the area, thickness and height of this part of the human skeleton in the resulting images from the CBCT. The aim of this study was to Determination of Criteria for the Age Estimation(Chronological) According to Structural Changes of Teeth and Alveolar Bone Height in Images of Cone Beam Computed Tomography(CBCT) in Adults.

Materials and Method

Study design, setting and participants:

The present study was a retrospective cross-sectional study with a code of ethics, of taken CBCT images from patients who needed the CBCT during their dentistry treatment and referred to Radiology Department of School of Dental Medicine of Hamadan University of Medical Sciences from spring 2015 to March 2017. The samples were 265 according to the statistical formula. Images were selected from people over 20 years of age with at least two molar teeth on two sides referred to Hamadan School of Dentistry. Participants, who had premolar teeth with restoration, crown and decay, or para-functional habits such as

Bruxism, and CBCT images due the lesion, trauma, and systemic disease or dental anomalies, were excluded from the study. Images were taken by NewTom 3G device(Verona/Italy) with a standard protocol depending on age and field of view. The sex, age and date of scan were recorded in a demographic form. According to a pilot study by Matsikidis et al., the first premolar teeth of both sides were selected for study¹⁶. The studied variables were erosion of secondary dentin and periodontal recession based on Gustofson criteria. Gustofson indices including the attrition and creation of a secondary dentine and periodontal recession were measured by a semi-panoramic cut(8mm) of teeth images from the center of teeth in a thickness of 1 mm based on the Oldez Classification¹⁷.

Oldez Classification:

Step-0: No attrition

Step-1: Start of attrition with loss of cusps sharpness

Step-2: attrition reached the dentin

Step-3: attrition reached the dentin along with pulp opening

Secondary dentin formation:

Step-0: The pulp horns are at the top of the midpoint of crown.

Step-1: The pulp horns are at the highest midpoint of crown.

Step-2: The pulp horns reach the tooth enamel-cementum boundary and are below the midpoint of crown.

Step-3: The pulp horns reach the highest point of the tooth enamel- cementum boundary.

Periodontal recession:

Step-0: No recession

Step-1: Recession reaches the cervical one third of root

Step-2: Recession reaches the middle one third of root

Step-3: Recession reaches the apical one third of root

The bone height was measured by a 2-mm cross-section cut to avoid the artifact (partial volume averaging) of images; and measurements were based on CEJ distance up to the highest midpoint of the buccal bone. The images were separately examined by two jaw and facial radiologists under the same conditions.

Data Analyses

Statistical analysis was undertaken using IBM SPSS version 23.0. The applied statistical tests included the ANOVA, Bonferroni correction, Pearson correlation coefficient and regression. The level of statistical significance was set at $P < 0.05$.

Results

The research participants included 265 people whom 126(47.5%) were female and 139(52.5%) were male. The age group of 20-29 years had the highest percentage of participants; and the lowest percentage belonged to the age group of over 60 years (Table 1). Based on the statistical ANOVA, there were significant differences in different levels of erosion in men ($P < 0.05$). Based on results, there is a significant difference between age and heights of buccal bone level in both male and female groups ($P < 0.05$) (Table 2). The effect size was 1.82 indicating that for one unit increase in the height of the buccal bone level in this age group, the age increased by almost 2(1.82) years on average. In men older than 40 years of age, the highest predictors were the periodontal recession, the secondary dentin formation, and buccal bone height with significant effects on the regression model. The effect size of periodontal recession was 4.32 indicating that for one unit increase in periodontal recession in the age and sex group, the increased by 4 years on average ($4.32 \cong 4$). The effect size of the buccal bone level height was -2.25 indicating that for one unit increase in the buccal bone level height of the age and sex group, the age decreased by 2 years on average. Based on the fitted regression model in women in the age group of above 40 years, the highest predictor was the buccal bone level height with significant effect in the regression model. The correlation was significant between the predicted and real values of age in the age group over 40 years in both men and women indicating the effectiveness of research variables in the correct prediction of real age (Table 3). Where, Y is the estimated age; x1 refers to an erosion stage, x2 is related to the periodontal recession stage; x3 refers to the secondary

dentin formation stage, and x4 is related to the buccal bone level height. The estimated age can be obtained by inserting relevant variables into the presented criteria according to gender and age groups (Table 4).

Table 1. Age grouping of research Participants

Age grouping	No.	Percentage
20-29	157	59.2
30-39	32	12.07
40-49	55	20.75
50-59	11	4.15
≤60	10	3.77
Total	265	100

Table 2. Relationship of buccal bone level with sex

Sex	Correlation coefficient	P-value
Male	0.29	0.00*
Female	0.40	0.00*

Table 3. Correlation between the predicted value of age and real value according to gender and age group

Age (years)	Sex			
	Male		Female	
	R	P-value	R	P-value
<40	0.321 ^a	0.038 ^{b*}	0.311 ^b	0.036 ^{c*}
≤40	0.633 ^b	0.001 ^{c*}	0.892 ^c	0.000 ^{d*}

Table 4. The obtained correlation based on fitted regression model to predict the estimated age in terms of gender and age group

Age (Years)	Sex	
	Male	Female
	Obtained model	Obtained model
<40	$Y=21/23+(0/42x1)-(0/84x2)+(0/28x3)+(1/82x4)$	$Y=19/76-(0/76x1)-(1/02x2)+(0/39x3)+(1/88x4)$
≤40	$Y=35/27+(0/97x1)-(0/93x2)+(0/23x3)+(3/09x4)$	$Y=35/27+(0/97x1)-(0/93x2)+(0/23x3)+(3/09x4)$

Discussion

The present study was conducted to determine criteria for the age estimation according to structural changes in teeth and alveolus bone height in images of cone beam computed tomography (CBCT) in adults. The study of morphological parameters of teeth according to radiography stereotypes was more reliable than other methods for the age estimation¹⁸. The lack of changes in teeth during the body growth and its ease of use for the age estimation as well as benefits of radiological methods compared to other methods have led to higher attention to this issue¹⁹. Modern advances in imaging help the dentist to use the CBCT with the appropriate field of view and spatial resolution; therefore, the internal mineralized structure of the pathologic lesions can be investigated with a low radiation dose²⁰. In the present study, the correlation coefficient between predicted and real values of age according to gender indicated a statistical significant difference in the age group over 40 years in both sexes. In a similar study in Malaysia in 2017, Koh et al. found a significant relationship between the correlation coefficient and the chronological age; and it was consistent with the present study²¹. CT is the most ideal and accurate way of measuring pulp to teeth dimensions. However, the recent studies have preferred the CBCT to CT due to lower radiation dose and higher image resolution than CT in the age estimation. Each tooth can be used to estimate the age²². The present study utilized the cone beam computed tomography and it was found that CBCT images were useful to evaluate the tooth age; and the measurement of bone level was highly related to the chronological age. In a study by Brkic et al. (2006), the results indicated the predicted usefulness of this device for the age estimation²³. The results of a research by Yang et al. were consistent with

the present study, and they even reported the matched volume of CBCT image teeth to estimate the teeth age²⁴. Secondary dentin is a factor that is not influenced by environmental factors of human remains and is thus very precise. Preliminary studies found that the amount of secondary dentin was related to the chronological age and it was indirectly measured by radiography²⁵. The secondary dentin deposition is a determining factor in the age estimation. The secondary dentin deposition begins when teeth are located in the occlusion and the root is complete, and continues throughout its life. This process causes the pulp volume to decrease as age grows^{24, 26}. The accuracy is an important feature in any method for estimating age. The more the age estimation of techniques is close to the real age, the more the method is accurate²⁷. Findings of the present study indicated that measuring the buccal bone level according to the CBCT had the best and highest correlation with chronological age; and the buccal bone level measurement was also suitable for the age estimation. The correlation between predicted and real age in an age group over 40 years was significant in both men and women indicating the impact of research variables in the correct prediction of the real age.

Conclusion

According to the comparison of the present study with other studies, the dependant variables of study were affected by different factors and were highly variable. Factors such as the health, social, personal, cultural and economic factors change the dependant variables. Despite the fact that some findings of the present study were suitable for the age estimation, their mere application is not recommended. The relations and findings can be used as auxiliary methods with other

methods for the age estimation.

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Ethical Clearance: Taken from Committee of research Hamadan university of Medical sciences.

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Effectiveness of Education Program upon Patient's Practices Toward Hemophilia among more than Fourteen Years Old in Thi-Qar Heredity Center

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Abstract

The present quasi-experimental study aimed to determine the Effectiveness of Education Program upon Patient's Practices toward Hemophilia among more than Fourteen Years Old in Thi-Qar Heredity Center. The program was designed through assessment of patients needs relative to their practices toward self care management and implemented through a series of educational sessions. The study was conducted in Thi-Qar Heredity Center in Al-Nasiriyah City from the 1st of Des 2017 to 20th of Oct 2018. The sample was comprised of (50) hemophilia patients among more than fourteen years old and divided equally into study and control groups. Data was collected through the use of hemophilia patients practices tests which were developed for the purpose of the study, which consists of three parts: The first part is related to the demographic characteristics like patients' age, level of education, marital status, type of parents marriage relationship, residential area, type and severity of hemophilia; The second part consists of patients' practices items related to the patient's self care management practices (28) items related to hemophilia patient's self care management was also developed for the determination of the characteristics of the subject.

Keywords: Effectiveness, Education Program, Hemophilia

Introduction

Hemophilia type A is more common, according to 80-85% of the total population of hemophilia. All species affect males mostly, and 40-60% of the population have a severe form of illness and disorder in about one-third of newly diagnosed cases without a parents history suggesting that it arises as a new mutation¹. Repeated hemorrhages, especially in persons with severe hemophilia (factor activity less than 1% of the normal level), can lead to the development of chronic arthropathy. Overtime, this condition can cause joint pain, reduction in joint range of motion, crippling musculoskeletal deformity, and disability². Understanding the clinical features of hemophilia and the appropriateness of the clinical diagnosis. Using screening tests to identify the potential cause of bleeding, for example, platelet count, bleeding time

(BT; in select situations), or other platelet function screening tests, prothrombin time (PT), and activated partial thromboplastin time (APTT). Confirmation of diagnosis by factor assays and other appropriate specific investigations³. Platelet count, BT, PT, and APTT may be used to screen a patient suspected of having a bleeding disorder⁴. Bleeding time lacks sensitivity and specificity and is also prone to performance-related errors. Therefore other tests of platelet function such as platelet aggregometry are preferred when available^{5,6}. These screening tests may not detect abnormalities in patients with mild bleeding disorders including some defects of platelet function, FXIII deficiency, and those rare defects of fibrinolysis, which may be associated with a bleeding tendency. One-stage assays based on APTT are the most commonly used techniques. FVIII- and FIX-deficient plasma must completely lack FVIII and FIX respectively, i.e. contain < 1 IU/dl, and have normal levels of other clotting factors⁷. Treatment consists of injecting intravenously the missing clotting factor. The complexity of treatment and the psychosocial aspects of hemophilia make care in a general hematology

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department or practice less desirable⁸. Treatment of hemophilia in the world today is only available to about 20% of affected population and those treated are mostly in the developed countries. The majority of bleeding episodes in hemophilic patients occur within the joints; hemarthrosis of the knees, elbows and ankles account for almost 80% of the bleeding episodes⁹.

Results and Discussion

Table (No.1) shows that the high percentage of the study group age was between (14-28) years old which accounted (44%), (60%) of them were single. In regard to hemophilia patient's parents marriage relationship, those who were relative accounted for (68%) , in respect to the family types (56%) were extended concerning the hemophilia patient's educational level (20%) of them were able to read and write. In regard to patient's employment, those who were governmental employee constituted (44%), in respect to the residential areas where sample live high percentage represented (64%), live in urban area, (64%) of them their monthly income was not enough, (68%) had moderate disease severity and (60%) of participants were regularly visits the center. Table 2 shows that the high percentage of the study group age was between (14-28) years old which accounted (40%), (58%) of them were single. In regard to hemophilia patient's parents marriage relationship, those who were relative accounted for (64%) , in respect to the family types (64%)of sample live within extended. Concerning the hemophilia patient's educational level (24%) of them were primary school graduated. In regard to patient's employment, those who were governmental employee constituted (48%), in respect to the residential areas where sample live high percentage represented (60%), live in urban area, (68%) of them their monthly income was not enough, (68%) had moderate disease severity and (64%) were regularly visits the center. Table 3 indicated that there was no significant differences between the study and the control group's practices relative to the pre-test. Table 4 revealed that there was significant differences between the study group practices relative to the pre and post-test 1. Table 5 showed that there was no significant differences between the control group's practices relative to the pre and post-test 1. The findings of table 6 showed that there was significant differences between the study and the control groups practices relative to the pre and post-test 1. Adequate knowledge and practices has been recognized as a necessary ingredient in the

patients' ability to lead normal and productive life to their himself. The patient's practices in the self care is considered one of the essential tools in raising the standard of care giving by the himself. The hemophilia patients must have sound understanding of scientific principles underlying each step of any procedure in order to prevent possible risk factor, so they become able to apply their practices into effective self care. The results reveal that the highest percentage of the hemophilia patients are selected for the implementation of the educational program and comprehensive self care (Table 1 and Table 2) shows that (44 %) of patients are in age (14-28) years old, for the study and the control groups, more than the half of the study and control groups sample (60% and 58%) are single and this is supported by a study done by Salih and Abdulmuhsn., (2014) they mentioned that more than half of the sample are Single, around (68 % and 64%) of them have relative of parents marriage relationship both the study and control groups, while (56% and 64%) of them live with extend family of the study and control groups and this agrees with the result of (Jennifer., 2017) study in which he indicated that (53.3%) of the hemophilia patients lived with extend family, the present study found that around (20%) of them are able to read and write while just (16% and 20%) are un able to do so. Participants for both study and control groups, and (44% and 48%) of the study and control groups of them are governmental employee, and also the researcher finds that (64% and 60) of the patients live in urban of the study and control groups and this comes with the results of a study carried by (Sacks and Rona.,2009) in the Hereditary Blood Disease Center in Al-Nasiriya, which revealed that (67.5%) of the patients live in urban, while (64% and 68%) of them their monthly income is not enough the study and control groups, found (68%) of them have moderate severity of disease, and around (60% and 64%) of them regularly visits the center the study and control groups. (Table 3) it indicates that the hemophilia patients have a low level of education and their knowledge and practices regarding the management of disease, and this is clear when those patients are not formally exposed to that information as they were assessed before starting the study. These results are consistent with the findings of Hemophilia Foundation Australia (HFA),2009 which indicate that the hemophilia patients in developing countries need an educational program about hemophilia, and how to manage their himself during episodes of bleeding.

Through the application of the t-test the study findings indicated that the hemophilia patients practices didn't show any statistical differences between the groups in the pre test occasion (Table 3). This means that there are no differences in practices in the study and control groups prior to the implementation of the educational program. When t-test was applied again, statistically significant differences were identified between the practices of the study group after the implementation of the education program and post-test 1 with the relative comparison of the pre test occasion (Table4). The present study agrees with HFA.,2005 , a post test evaluation was conducted to determined the effect of education program on hemophilia patients practices toward self care management showed statistically significant impact of the program upon those patient's self care practices, particularly hemophilia patients of (14-28) years old which was approximately consistent with the finding of our present study. In a correlation study Among the 40 subjects aged from 11 to 20 years (40) hemophilia patients who were interviewed for the determination of the relationship between their practices relative to their self care management, the study finding indicated that there was correlation between self care management status and hemophilia patients practices, and these were considered as important factors for determining the hemophilia patients self care management status. The effect of the educational program implementation was documented by Warriar, (2015) and provided support the effect of our education program implementation when they found that there was positive correlation between hemophilia patient's practices relative to their self care management status due to such implementation. In another study, conducted by Evat, (2010) a post test was conducted to determine the effectiveness of educational program upon hemophilia patient's practices in which (18) classes for (28) hemophilia patients for (2) months. The results show significant improvement of such educational activity. The finding of the present study revealed that there were no significant differences between the control group's practices when they compared between the pre and the posttest occasion. This means that hemophilia patients practices didn't show any significant modification improvement or changes. Throughout the implementation of the Education Program, it had been shown that there were no significant changes experienced by the control group regardless of the time consumed between the pre and the post test 1 (Table 5). That means, no single patient

had been acquired specific education practices out of the Heredity Center. In contrast the study group had significant benefited out of the educational program when they were compared with the control group in the post test 1 occasion (Table 6). Scientifically speaking, it was determined that the present Education Program had made a significant contribution to the improvement of the hemophilia patient's practices, which was very obvious throughout the course of the present study.

Table 1. Distribution of the study group according to their demographical characteristics

Demographic characteristics	Ratings and interval	F	%
Age	14-28	11	44.0
	29-43	8	32.0
	44- And more	6	24.0
Total		25	100%
Marital status	Single	15	60.0
	Married	10	40.0
Total		25	100%
Type of parent marriage relationship	Relative	17	68.0
	Non relative	8	32.0
Total		25	100%
Family type	Nuclear	11	44.0
	Extend	14	56.0
Total		25	100%
Education level	Un read and write	4	16.0
	Able to read only	1	4.0
	Able to read and write	5	20.0
	primary school graduate	4	16.0
	Secondary school	4	16.0
	High school	4	16.0
College and above	3	12.0	
Total		25	100%

Table 2. Distribution of the control group according to their demographical characteristics

Demographic characteristics	Ratings and interval	F	%
Age	14-28	10	40.0
	29-43	9	36.0
	44- And more	6	24.0
Total		25	100%
Marital status	Single	14	58.0
	Married	11	44.0
Total		25	100%
Type of parent marriage relationship	Relative	16	64.0
	Non relative	9	36.0
Total		25	100%
Family Type	Nuclear	9	36.0
	Extend	16	64.0
Total		25	100%
Education level	Un read and write	5	20.0
	Able to read only	0	0
	Able to read and write	5	20.0
	Primary school graduate	6	24.0
	Secondary school	2	8.0
	High school	4	16.0
	College and above	3	12.0
Total		25	100%

Table 3. The comparative difference between the study group and the control groups practice’s scores of the pre-test

Variable	Study Group \bar{X}	Control Group \bar{X}	t-Observed	P≤ 0.01
Practices	39.6800	42.5600	-1.098	0.278
t critical = 2.009 df = 48				

Table 4. The comparative difference between the study group practice’s scores of the pre and post test 1.

Variable	Study Group		t-Observed	P≤ 0.01
	Pre-test \bar{X}	Post1-test \bar{X}		
Practices	39.6800	66.1600	9.038	0.000
t critical = 2.064			df = 24	

Table 5. The comparative difference between the control group practice’s scores of the pre and post test 1.

Variable	Control Group		t-Observed	P≤ 0.01
	Pre-test \bar{X}	Post1-test \bar{X}		
Practices	42.560	42.440	0.27	0.78
t critical = 2.064			df = 24	

Table 6. The comparative difference between the study group and the control groups practice’s scores of the post-test 1.

Variable	Study Group \bar{X}	Control Group \bar{X}	t-Observed	P≤ 0.01
Practices	66.1600	42.4400	10.317	0.000
t critical = 2.009 df = 48				

Conclusion

The study results had revealed that the study group participant had benefited from the implementation of the educational program. However, their practices were adequately improved and developed. The study concluded that this education program can be considered as an effective mean for practices, improvement.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols

were approved under the Institute Thi-Qar high health, Iraq and all experiments were carried out in accordance with approved guidelines.

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Risk Analysis of Occupational Safety and Health in Pharmaceutical Analysis Laboratory in Indonesia

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Abstract

Laboratory is a place to conduct educational activities, experiments, research, and product quality test. In the Pharmaceutical Analysis Laboratory, there are plenty of chemical substances that potentially contain hazards. This study is cross-sectional study conducted in the Laboratory of Pharmaceutical Analysis, Faculty of Pharmacy, Universitas Airlangga Surabaya. Risk analysis is a process to identify hazards by calculating the size of the risks and determining whether a risk is acceptable or not. This study is objectified to identify the hazards in the Laboratory of Pharmaceutical Analysis, to assess, and to determine the risk level of identified hazards, as well as to provide recommendations of control that can be done to decrease the impacts of the risks using HIRADC method. There are three risks that belong to high-risk level, eleven risks that belong to moderate-risk level, and two risks that belong to low-risk level. All three high-risk level risks include skin burns caused by the exposure of concentrated HNO₃, phenol, and concentrated H₂SO₄. The controls that can be carried out to reduce the three high-risk level risks are by performing every activity by the book and wearing Personal Protective Equipment (synthetic rubber gloves, long-sleeve laboratory coat, goggles, and chemical respirator).

Keywords: *laboratory of analysis, pharmacy, hazard identification, risk*

Introduction

Laboratory is a place to conduct experiments, development, education, and product quality test⁽¹⁾. Laboratory can often be found in research and development institutions, service companies, industries, and universities. Faculty of Pharmacy has numerous laboratories and one of those is the Laboratory of Pharmaceutical Analysis. The Laboratory of Pharmaceutical Analysis is a place to lead scientific activities, experiments, and research by using various equipment and chemical substances that can potentially be hazards to cause occupational accidents and occupational illnesses. Laboratory is a workplace with potential hazards that are likely to cause any problem of Occupational Safety and Health, such as occupational accidents and occupational illnesses.

According to OHSAS 18001, risk of Occupational Safety and Health is the combination between the likelihood of danger or exposure and the severity of the injuries or health problems caused by the danger or exposure itself⁽²⁾. Related to this issue, Education Bureau conducted a survey in 2011/2012 regarding school laboratory accidents in 401 middle schools. From the survey, it was obtained that there were 348 reported cases of laboratory accidents and 328 people were injured due to the accidents. Laboratory of Chemistry ranks the second as the laboratory with the most occupational accidents in the schools. Among them, 39.1% had grazes, 37.6% with minor burns, 8% with accidents on the eyes, and 7.2% exposed to chemical substances^(3,4).

Other than that, plenty cases of occupational accidents can also be discovered in university laboratories. One of the cases were the accident occurred in the Laboratory of Chemistry in Texas Tech University in 2010. That accident resulting to a

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student lost three fingers, face burn, and perforation of the eye. It was noticed that the accident was caused by the improper procedure when conducting an experiment that use the flammable derivative of nickel hydroxine pechlorate⁽⁵⁾. Another case of occupational accident in university laboratory was traced in Tsinghua University, China, in 2015. The accident occurred due to hydrogen tube explosion which resulted to the death of the student who conducted the experiment⁽⁶⁾.

The quality of Occupational Safety and Health is indispensable to avoid or to minimize the occurrence of occupational accidents. One endeavor to accomplish is by performing risk analysis of Occupational Safety and Health. Risk analysis is completed by doing risk identification and risk assessment before doing determinant control to minimize the risk that may result in a safe, comfortable, and efficient workplace⁽⁷⁾. Therefore, according to the existed hazards, the author attempts to perform Hazard Identification, Risk Assessment, and Determinant Control in the Laboratory of Pharmaceutical Analysis, Universitas Airlangga. In broad, this study is objectified to identify the hazards in the Laboratory of Pharmaceutical Analysis, to asses, and to determine the risk level of the identified hazards, as well as to provide several recommendations of doable control in order to reduce the risk impacts.

Therefore, based on the potential hazards that can occur in Laboratory of Pharmaceutical Analysis, the authors are interested in conducting research related to Risk Analysis of Occupational Safety and Health in Pharmaceutical Analysis Laboratory in Universitas Airlangga, Indonesia. The general objective of this study is to identify the hazards, to assess, and to determine the risk level of identified hazards, as well as to provide recommendations of control that can be done to decrease the impacts of the risks at the Laboratory of

Pharmaceutical Analysis Universitas Airlangga.

Material and Method

This study is a descriptive observational study with cross-sectional design. This study was conducted in the Laboratory of Pharmaceutical Analysis, Faculty of Pharmacy, Universitas Airlangga. The technique of data collection was done by direct visit and direct observation of the research location, interview to the laboratory workers, and secondary data analysis. The study and the data collection alone were done during December 2018. The variables of this study include hazard and risk identification, risk assessment, and control of the Laboratory of Pharmaceutical Analysis.

This study was completed by implementing HIRADC method. The first step of the method was by observing the working activities and performing hazard identification. Hazard is something that is potential to cause harm or injury⁽⁸⁾. Hazard identification was accomplished by identifying in use chemical substances. The next step was identifying the risks that were likely to occur due to the procurement of the equipment and materials. Following the step, risk level assessment by multiplying risk Likelihood and Severity was carried out after determining the risk categories of Likelihood and Severity. Likelihood can be translated into the level of possibility of risk occurrence, which can be measured or determined based on the incidence happened in the past. Meanwhile, Severity is the level of seriousness of the impact of a risk. The category level of Likelihood, Severity, and risk level applied in this study are in accordance with AS/NZS 4360 standard^(2,9). The results of the analysis can determine level of risk of potential hazards with low (L), moderate (M), high (H), or extreme (E) risk categories. After cognizing the risk level, control identification and recommendation that are believed to reduce the risk level were completed.

Table 1: Likelihood Category (Level of Possibility)

Level	Description	Explanation
1	Jarang Rare	The Likelihood of hazards is very small, almost never happens
2	Unlikely	Usually not happens, but the Likelihood is unlikely, the frequency of occurrence is annually
3	Possible	The Likelihood of hazard is small or coincidental, the frequency of occurrence is monthly
4	Likely	The Likelihood of hazard in particular circumstances, the frequency of occurrence is almost 100%
5	Almost Certain	Very likely to happen, the frequency of occurrence is certain

Source: AS/NZS 4360:2004

Table 2: Severity Category (Level of Severity)

Level	Description	Explanation
1	Insignificant	No injury
2	Minor	First Aid kit, employees continue to work
3	Moderate	Injuries that need medical treatment, employees do not go to work
4	Major	Severe injuries (limb or partial disability), loss of production capacity
5	Catastrophic	Death

Source: AS/NZS 4360:2004

Table 3: Risk Level Determination Table

Severity	5 (M)	10 (H)	15 (H)	20 (E)	25 (E)
	4 (L)	8 (M)	12 (H)	16 (H)	20 (E)
	3 (L)	6 (M)	9 (M)	12 (H)	15 (H)
	2 (L)	4 (L)	6 (M)	8 (M)	10 (H)
	1 (L)	2 (L)	3 (L)	4 (L)	5 (M)
	Likelihood				

Source: AS/NZS 4360:2004

Findings

The Laboratory of Pharmaceutical Analysis is one of the laboratories in the Faculty of Pharmacy, Universitas Airlangga. This laboratory is a facility to support pharmacy education. This laboratory contains numerous potential hazards that can be resulting to any risk of Occupational Safety and Health. Activities performed in this laboratory include formulating reagents and conducting experiments on functional group analysis. The chemical substances used in the experiments that are likely to be hazard sources are concentrated HNO_3 , phenol, and concentrated H_2SO_4 , ethanol, and ether.

According to the research results and the completed analysis, it was noticed that there were three high-risk level risks, eleven moderate-risk level risks, and three low-risk level risks. All three risks that belong to high-risk level in the Laboratory of Pharmaceutical Analysis involve skin burn due to the exposure of the used chemical substances. Each of those three risks has the

total risks of twelve. The controls that can be executed to reduce the risk level that is potentially dangerous for the Occupational Safety and Health in the Laboratory of Pharmaceutical Analysis are by conducting experiments as referred to the laboratory procedure, wearing Personal Protective Equipment, such as synthetic rubber gloves, long-sleeved laboratory coat, and chemical respirator or goggles, as well as mixing chemical substances in a fume hood.

Hazard identification in the Laboratory of Pharmaceutical Analysis

In the Laboratory of Pharmaceutical Analysis, chemical substances and equipment that can potentially cause any issue on Occupational Safety and Health are discovered. The used and potentially cause issues on Occupational Safety and Health include concentrated HNO_3 , phenol, concentrated H_2SO_4 , ethanol, and ether. Those chemical substances are then analyzed to figure out the risks that may arise from three risks that belong

to high level.

The three risks are identified as skin burns caused by the exposure of HNO_3 , skin burns caused by the exposure of phenol, and skin burns caused by the exposure of concentrated H_2SO_4 . The eleven moderate-risk level risks are Skin irritation caused by the exposure of concentrated HNO_3 , phenol and concentrated H_2SO_4 ; eyes irritation caused by chemical splash of concentrated HNO_3 , and phenol; respiratory tract irritation if breathing in concentrated HNO_3 and concentrated H_2SO_4 gasses; lungs, mucous membrane, respiratory tracts, skin, and eyes damage if continuously exposed by concentrated HNO_3 and concentrated H_2SO_4 ; and skin, digestive tract, and respiratory tract irritation because of ether substance. And two low-risk level risks are flames caused by liquids and steam of ethanol and ether.

In fact, those chemical substances are often used as one of experiment materials. Unfortunately, the students are often being reckless while conducting experiments resulting to nudge the alarming chemical substances expose it to the skin.

Risk assessment on the Laboratory of Pharmaceutical Analysis

Risk assessment on the Laboratory of Pharmaceutical Analysis is completed by determining the levels of Likelihood and Severity of each risk in accordance with AS/NZS 4360 standard^(2,9). The exposure of concentrated HNO_3 , phenol, and concentrated H_2SO_4 in the Laboratory of Pharmaceutical Analysis have the level of Likelihood of 4, which means that the possibility of hazard occurrence in a certain condition has the frequency of almost 100%. This happens because concentrated HNO_3 , phenol, and concentrated H_2SO_4 are the substances that are likely to be used in an experiment. The exposure of concentrated HNO_3 , phenol, and concentrated H_2SO_4 can result to minor burns and severe burns if exposed to the skin, making the risk has the Severity level of 3. This can be said so due to the fact that severe burns need medical treatment to prevent any infection.

In risk assessment process, it is noticed that the total risk of the exposure of concentrated HNO_3 , phenol, and concentrated H_2SO_4 resulting skin burns is 12. Based on the result of the risk assessment, the exposure of concentrated HNO_3 , phenol, and concentrated H_2SO_4

resulting skin burns are categorized as high risk. In other words, it means that the control and consideration of resources to reduce risks are in need to be immediately processed.

Determinant Control in the Laboratory of Pharmaceutical Analysis

Determinant control is performed to reduce risk level to minimize the risks that are likely to affect Occupational Safety and Health when conducting any activity in the Laboratory of Pharmaceutical Analysis. The controls applied in the Laboratory of Pharmaceutical Analysis, Universitas Airlangga, to reduce the risk level among others are: conducting experiments as procedure, wearing Personal Protective Equipment, and mixing chemical substances in a fume hood.

In further explanation, conducting experiments as procedure is aimed to reduce any action that can affect Occupational Safety and Health as well as to give manuals to perform any experiment effectively. The next control is by wearing Personal Protective Equipment, such as synthetic rubber gloves, long-sleeved laboratory coat, goggles, and chemical respirator. The wearing of these equipment is objectified to protect the body from the exposure of chemical substances, be it in form of liquid, solid, or gas, to minimize the impact of its exposure to the skin. Furthermore, determinant control is also completed by mixing chemical substances in a fume hood. This is intended to protect the body from the steam or poisonous chemical gas that are alarming for the body, especially for respiratory tract, as the result of mixing chemical substances. Therefore, the authors provide several recommendations to reduce the risk level, namely revising experiment SOP and including Occupational Safety and Health aspects in the SOP, separating chemical substances from any flammable sources by noticing the substance storage, and paying more attention to the laboratory.

Conclusion

The Laboratory of Pharmaceutical Analysis is a laboratory with several potential hazards sourcing from the exposure of chemical substances used while conducting experiments. There are three potential hazards that belong to high-risk level, for instance, the exposure of concentrated HNO_3 , phenol, and concentrated H_2SO_4 that results to skin burns. The controls that can be performed to reduce the risk level are by conducting

experiments as procedure and by wearing Personal Protective Equipment when conducting an experiment, namely synthetic rubber gloves, long-sleeved laboratory coat, goggles, and chemical respirator.

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Correlation Ear Leaf Height with Measurement of Vertical Dimension of Occlusion

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Abstract

Background: Accurate **Vertical Dimension of Occlusion (VDO)** measurements are an important step in the treatment of dentures in order to provide comfort to the wearer. VDO measurements can be done directly (face measurement, swallowing, phonetic, biting force, and tactile methods) and indirectly (cephalometric photos, digital photos, Hayakawa formulas, and pre-extraction records). Many methods of vertical dimensions measurement have been found, but until now there is no exact method. Therefore, the theory of the measurement of vertical dimensions continues to be developed compared to anthropometric measurements. The purpose of this study was to determine the relationship between the measurement of ear leaf height and the measurement of Vertical Dimension of Occlusion. **Material and Method:** The type of research used was an observational method in a cross-sectional study design. The sampling method uses purposive sampling, carried out on 72 undergraduate students of the Faculty of Dentistry of Universitas Muslim Indonesia (UMI). Vertical Dimension of Occlusion (VDO) measurements are measured directly on the subject using the inside micrometer and ear leaf height measurements using a digital vernier caliper. **Results:** The Spearman Correlation test shows that there is a long relationship between the little finger and Vertical Dimension of Occlusion (VDO) (p value 0.002) and r 0.355, which means a weak level of correlation. **Conclusion:** Anthropometric measurements of ear leaf can be used as an alternative to determine the actual vertical dimension of occlusion because based on the results of the study there is a significant correlation between the height of the ear leaf and the measurement of Vertical Dimension of Occlusion (VDO) with a weak degree of correlation.

Keywords: Vertical Dimension of Occlusion, Anthropometry, Method of Willis, Ear Leaf, Little Finger

Introduction

Vertical Dimensions (VD) is one of the important components in the treatment of dentures and height of the vertical face which can be measured based on assesment of facial height proportion. This is because the function of mastication, speech, and facial aesthetics all depend on the vertical and horizontal relations of the mandible with the maxilla. If the determination of the vertical dimension is not correct, in addition to reducing the efficiency of mastication, it can also damage the residual ridges, remaining teeth, and temporomandibular joints. In general, there are two types of vertical dimensions,

namely Vertical Dimension of Occlusion (VDO) and Vertical Dimension of Physiology (VDF).^{[1],[2],[3]}

DVO is the vertical distance of the jaw when the teeth occlude, while the VDF is the vertical distance when the opening and closing muscles of the mandible are in rest, and the teeth do not come into contact with each other. Therefore, VDF is always greater than (VDO). The difference between DVF with (VDO) is called freeway space. The average size of the freeway space that is considered normal is 2-4 mm.^[4] The dentist is responsible for determining the value of VDO correctly in performing treatment. Determination (VDO) is not something easy especially in elderly patients who have long experienced edentulous total or partial. Several factors are considered responsible for the emergence of ambiguity in VDO measurements, including:

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difficulties when making measurements on facial skin because it is difficult to determine landmark points, and there are changes in psychological and pathological conditions.. The method to be used in determining VDO must meet the criteria, including: accurate and repeatable measurements, easily adapted techniques, types and completeness of the tools needed, and shorter time needed. However, there is no opinion that states a method is more accurate than other methods. [4], [5]

There are several methods for determining VDO directly or indirectly. Direct measurement means that measurements are made directly on the patient's face or mouth. The number of facial measurement methods for measuring VD makes the choice of dentist more varied as using the Willis, McGee, Hurst and Hamm methods. The tools used are various, such as Sorensen Profile Scale, TOM Gauge, calipers and Willis Bite Gauge. One easy way to determine the vertical dimension is the Willis method, namely the distance of the subnation to gnation. [6], [7], [8], [9]

Anthropometric method is one method that can be used to determine VDO. Leonardo da Vinci and Mc Gee stated that there was a relationship between VDO and various anthropometric measurements. Face measurement is used to determine VDO, one of which is facial proportion, which is one third lower face. [5]

Leonardo divides the anterior part of the Viturvian face, namely the hairline to the eyebrows, the eyebrows to the nose base and the nose base to the bottom of the chin. The distance from the bottom of the chin to the base of the nose, the distance from the eyebrow to the base of the nose and the distance from the hairline to the eyebrows are equal to 1/3 the length of the face. In addition Leonardo da Vinci explained that the ear height is equal to the length from the nose base to the middle area between the right and left eyebrows. Ear height is also the same as the distance between the hairline to the eyebrow and the nose base to the bottom of the chin. So

that the ear length is 1/3 the vertical length of the face. [10]

Based on this background, the researchers were interested in examining the correlation of measurements of Vertical Dimension of Occlusion using the Willis method to the height of the ear leaves of UMI Dentistry Students.

Material and Method

This study was conducted on October 8st - January 9th, 2019. The type of this study was *cross-sectional* study. The sample in this study was the dental student. The research sample was 72 people consisting of 22 people in 2017, 20 people in 2016, and 30 people in the year 2015. Data analysis was performed by using Data were analyzed using the Spearman test correlation test with $\alpha = 0.05$. This research uses a purposive sampling technique.

Results

Total sample that would be analyzed in this study was 72 samples. Based on bivariate analysis in the Table 1 and 2, analysis of ear leaf height with measurement of Vertical Dimension of Occlusion (p value < 0.005).

Measurement of Vertical Dimensions of Occlusion (VDO) was carried out by using the Willis method by using a measuring instrument Inside Micrometer, by measuring the distance between points under the nose to the point below the chin (Subnation to gnation). Measurements are made 5 times to avoid measurement errors and then the measurement results are recorded. Then for the measurement of the earlobe height, the distance between the superaurale and the subaurale was measured by using a Digital Caliper tool.

All results of the measurement are then collected and recorded and carried out by collecting and analyzing the data of the research results can be seen in the following table:

Tabel 1. Distribution and Frequency of Vertical Dimensions of Occlusion

		Frequency	Percent	Mean	Std.Deviasi
VDO	Low	28	38.9	61.7467	4.20159
	Normal	42	58.3		
	High	2	2.8		
Total		72	100		

Table 1. Explains that the measurement results of the vertical dimensions of dentistry students of UMI were the most, namely the normal VDO value of 42 samples or 58.3% and the lowest results were students with a high vertical dimension of 2.8%. VDO is said to be low if the measurement results are less than 60 mm,

said to be normal if the value of the vertical dimension is 60-70 mm, and is said to be high if the value of the vertical dimension is more than 70 mm. The average VDO of Dentistry students UMI is 61.7467 mm with standard deviation (Std.Dev) which is 4.20159.

Tabel 2. Distribution and Frequency of Ear Leaf

		Frequency	Percent	Mean	Std.Deviasi
Ear Leaf	Low	3	4.2	59.5503	3.68614
	Normal	65	90.3		
	High	4	5.6		
Total		72	100		

Table 2. Explained that the highest measurement results of the earlobe of the Faculty of Dentistry students of UMI were the high normal earlobe values of as many as 90.3% and the fewest results were students with a low ear height of 4.2 %. Ear leaf height is said to be low if the measurement results are less than 55 mm, it is normal if the value of ear leaf 66-65 mm high, and is said to be high if the high value of ear leaf is more than 65 mm. The high average Ear Leaf students of the Faculty of Dentistry of UMI is 59.5503 mm with standard deviation (Std.Dev) which is 3.68614.

Table 3. Correlation Ear Leaf Height with Measurement of Vertical Dimension of Occlusion (VDO)

VDO	Ear Leaf Height								p value
	Low		Normal		High		Total		
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Low	2	2.8	26	36.1	0	0	28	38.9	0.002
Normal	1	1.4	37	51.4	4	5.6	42	58.3	
High	0	0	2	2.8	0	0	2	2.8	
Total	3	4.2	65	90.3	4	5.6	72	100	

Table 3. Explain that 2.8% of VDO and ear leaf are low, 36% of VDO is low and normal earlobe, there is no sample with low VDO and high earlobe, normal VDO and low earlobe as much as 1 sample or 1.4%, Normal VDO and normal ear leaf were 37 samples or 51.4%, normal VDO and high Ear Leaf were 5.6%, samples with high VDO and low Ear Leaf were not found, high vertical dimensions and normal ear leaf as much as 2.8% and high VDO and earlobe height also not found.

Based on the results of the Spearman correlation test analysis shows that p value 0.002, means that there is a very significant relationship between ear leaf height and measurement of Vertical Dimension of Occlusion (VDO). The correlation coefficient shows the level of correlation or the relationship between the independent variable and the dependent variable. The correlation coefficient obtained is 0.355 which indicates a low level of correlation.

Discussion

Table 1. The frequency of VDO is at most 58.3% with normal VDO and the lowest result is students with high VDO of 2.8%. The results of this study indicate that students who have normal VDO tend to be more compared to students who have high VDO. But not a few students have low VDO. Supporting factors are caused by the population that is dominated by female students who have smaller VDO values than men. VDO is the distance between two points on the maxilla and mandible that are determined when the jaw muscle is contracted and the teeth are occluded. ^[11]

Rege (2017) in India with a population of 320 people consisting of 160 women and 160 men and research conducted by Chairani (2016) in Padang, West Sumatra with a population of 112 people consisting of 56 women and 56 men. Based on the study, the average vertical dimension of female occlusion was lower than the vertical dimension of men. ^[12]

Agustinawati (2012), it was suggested that the average length and width of the curvature of male lower jaws was greater than that of women. The average length of the male and female lower jaw is 11.35 cm and 10.6 cm. Differences in the size of the mandible in men and women can be influenced by the function of the oral cavity, oral habits and muscles of the oral cavity and hormones. ^[13]

Table 2. The measurement of ear leaf height shows that the frequency of students with high normal ear leaf values is more than 90.3% and the lowest results are students with a low ear leaf height of 4.2%. These results indicate that students of the Faculty of Dentistry of UMI undergraduate programs tend to have normal ear leaf and very few have high ear leaf. Based on research conducted by Bar (2014) in Indian, it was suggested that there were no differences in the size of left and right ear growth in humans. The human ear will also continue to grow with age. ^[15]

Based on the results of VDO measurements and height of ear leaf, UMI dentistry faculty students found that those with low occlusion and ear leaf vertical dimensions were 2.8%, Vertical Dimension of Occlusion low and normal ear leaf as many as 36.1%, not found low Vertical Dimension of Occlusion and high ear leaf, Vertical Dimension of Occlusion normal and low ear leaf as many as 1.4%, vertical dimensions

of normal occlusion and normal ear leaf as many as 51.4%, normal vertical dimensions and high ear leaf as many as 5.6%, samples with high vertical dimensions of occlusion and low ear leaf were not found, high vertical dimensions and normal ear leaf were 2.8% and high vertical dimensions and high ear leaf were not found.

Table 3. The results of the spearman correlation test analysis showed that p value $0.002 < 0.01$ means that there is a very significant relationship between the height of ear leaf and the occlusion vertical dimension. This is in line with the theory of Leonardo Da Vinci (1914 that the ear height is equal to the distance between the hairline to the eyebrow and the nose base to the chin, which means that the ear height is 1/3 the vertical length of the face. ^[9]

Prajapati (2015) in India, entitled "An Anthropometric Correlation of Vertical Dimension of Occlusion and Linear Ear Length in Dentulous Subjects" in the population of KH Shah Dental College and Hospital, India. The number of research subjects was 200 people consisting of 100 women and 100 men. Pearson's Correlation Test results show a p value 0,000 for women and men with a correlation coefficient for men of 0.750 and for women of 0.570. The results of the study showed that there was a correlation between the vertical dimensions of occlusion and the height of ear leaf. ^[14]

Rege (2017) is the study of the comparison of measurements of the vertical dimensions of occlusion to several measurements of the height of ear leaf, nose and little finger as anthropometric measurements. The results of the research using the Pearson's Correlation test showed p value 0.001 for the correlation between the vertical dimensions of occlusion and the length of the little finger obtained 0.232, while the correlation between the vertical dimensions with the height of ear leaf was 0.500. In this study also stated that the measurement of the height of ear leaf measured from super aurale-sub aurale can be used in determining the vertical dimensions of occlusion in edentulous patients because it has a very significant correlation test result. Very high VDO causes cheek biting. ^{[12],[16]}

Conclusion

Measurement of ear leaf height and occlusion vertical dimension can be an alternative measurement of vertical dimensions of occlusion. The dentist is

responsible for determining the value of VDO correctly in performing treatment. In practice, the determination of VDO is not something that is easy, especially in elderly patients who have long experienced edentulous total or partial

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Ethical Considerations: Ethical clearance was obtained from Universitas Muslim Indonesia; with number” 220/A/KEPK- UMI/IX/2018. Just before the interview, written (or thumb impression) consent was obtained from each participant in Universitas Muslim Indonesia guidelines.

Conflicts of Interest: The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

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Relationship Between Knowledge and Availability of Personal Protective Equipment with the Attitudes Toward Occupational Safety and Health of the Students in Laboratory X

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Abstract

Occupational Safety and Health (here after OSH) are all efforts to protect workers / laborers in order to realize optimal work productivity which is a human right protected by Law of the Republic of Indonesia Number 1 of 1970 about Work Safety.⁽⁴⁾ Occupational Safety and Health (OSH) is a substantial component that needs to be enforced whether in industrial sectors or in educational sectors. Educational sectors require to implement OSH learning practices as what has been implemented in the Laboratory X at Faculty of X. Practically, the students occupying the laboratory must have the attitude of OSH to lessen or foreclose the risks of unwanted occupational accidents. Experiments conducted in the laboratory undoubtedly contain hazards reasoning from physical, chemical, ergonomic, and psychosocial factors. Negative impacts that can occur such as the emergence of potential hazards that can cause accidents, fires or blasting and environmental pollution. In addition, potential hazards can also threaten the safety and health of workers at risk of workplace accidents and work-related illnesses, thus impacting the company both financially and company reputation.⁽¹⁾

This research is observational descriptive research which aims at realizing the relationships between the knowledge level and the availability of Personal Protective Equipment (here after PPE) to the attitudes toward OSH in Laboratory X. The sample of this research is all population that consists of 33 student respondents in Faculty of X. The research method employed in the data collection, this research was the observational descriptive research. The instrument of this research is in the form of questionnaire concerning on the knowledge of OSH, the availability of PPE, and the attitudes toward OSH in the laboratory. The results sustain that there is no correlation between the knowledge level of OSH and the attitudes toward OSH in the laboratory. However, there is a weak relationship noticed between the availability of PPE and the attitudes toward OSH in the laboratory ($p=0.056$; $\alpha=0.05$). Thus, in the end, it can be inferred that the knowledge level of OSH does not influence the attitudes toward OSH, yet the availability of PPE does even though according to the statistic test, the relationship between the availability of PPE and the attitudes toward OSH is considered perceptible.

Keywords: Attitudes toward OSH, Availability of PPE, Knowledge.

Introduction

Based on *Regulation of the Minister of Manpower of the Republic of Indonesia Number 5 of 2018* about Occupational Safety and Health of the Work

Environment, states that occupational safety and health, here in after abbreviated as OSH, are all activities to guarantee and protect the safety and health of workers through efforts to prevent work accidents and work-related diseases.⁽²⁾

Based on *Regulation of the Minister of Manpower of the Republic of Indonesia Number 12 of 2015* Occupational Safety and Health or OSH is a series of activities in the form of reducing or eliminating the

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sources of hazard in the workplace, which objectives are ensuring and protecting the labor through the prevention from the occupational accidents and occupational illnesses caused by the workplace environment.⁽³⁾

The implementation of OHS must be in accordance with Law Number 1 of 1970 on Occupational Safety, which includes:⁽⁴⁾

Providing personal protection tools to workers.

Prevent and reduce workplace accidents.

Prevent and reduce the danger of blasting.

Give first aid to an accident.

Based on Regulation of the Minister of State for the Use of State Apparatus and Bureaucratic Reform Number 03 of 2010 on Functional Position of Educator Laboratory Staff and Credit Figures, Laboratory is a supporting unit for educational institution in the form of room, both permanent and mobile, which is managed systematically for the activities of research, education, and community service by utilizing the specific equipment and materials based on the certain scientific method.⁽⁵⁾

According to ILO on the data of Fatal Accidents and Disease 2008, the total number of fatality reached 2.34 million, including the fatal occupational accidents which made up to 321,000 or about 14%, while the fatal occupational illness was as many as 2.02 million or about 86%. ILO also predicted that there are 160 million cases of non-lethal diseases related to work occur every year.⁽⁶⁾

Based on National Social Security of 2016, the number of occupational accidents that occur in Indonesia was still relatively high until the end of 2015, and there have been 105,182 cases of occupational accidents and have increased every year by 5%.⁽⁷⁾ Generally, the occupational accidents is generated by two factors, which is human and environmental factors. The occupational accidents in the laboratory cannot be separated from the human and environmental factors. The human factors inducing the occupational accidents in the laboratory are generally the unsafe actions from humans themselves, such as violating the rules in the laboratory and not applying the OSH attitudes. Meanwhile, the environmental factor is the environmental or equipment condition in the laboratory.

Work in the laboratory like students' experiments can't be separated from the utilization of materials and equipment which require special treatment. The attitudes toward OSH are required as the initial efforts to prevent occupational accidents in the laboratory. The attitudes toward OSH are also needed to ensure the students remain safe in practicing in the laboratory. The students' attitudes toward OSH in the laboratory should be instilled and established from the beginning. Various procedures in the laboratory such as the provision and use of work equipment, the use of Personal Protective Equipment (PPE), and so on should be understood and implemented by the students.

The attitudes toward OSH need to be applied in the work and practicum implementations conducted by the students in the laboratory, one of them is at Laboratory X in Faculty of X. The students' attitudes toward OSH are implemented to anticipate and prevent the potential hazard so that there is no occupational accidents in the laboratory.

Material and Method

Based on the research method employed in the data collection, this research was the observational descriptive research. It is addressed as the descriptive research design since it describes the phenomenon under study as well as the scope of the issue under study⁽⁸⁾. Meanwhile, in terms of the research time, the approach employed in this research was cross-sectional since it is only conducted simultaneously in a certain period of time⁽⁹⁾. The population and sample of this study was all students who conducted the experiments in Laboratory X at Faculty of X with a population of 33 respondents.

Material for data source of this research was the primary data and the instrument of data collection was questionnaire. The data collection technique of this research was utilizing questionnaire. The data analysis employed in this research was bivariate analysis to discover the relationship between the independent and dependent variables. The independent variables of this research were the knowledge level of OSH and the availability of PPE, while the dependent variable of this research was the attitudes toward OSH.

Findings

This research was conducted in one of the laboratories used for student experiment in one of

the majors in Faculty of X. The experiment activities in the laboratory of Faculty of X has implemented the occupational safety and health which aimed at protecting the students from the occupational accidents in the laboratory as well as training them to acquire the attitudes toward OSH before eventually entering the working world.

Based on the research results on 33 respondents, it was discovered that the relationship between the knowledge level of OSH and the attitudes toward OSH of the students in Faculty of X is as follows:

Table 1 Relationship between the Knowledge Level of OSH and the Attitudes toward OSH of Students in Laboratory X at Faculty of X

Level of Education	Attitudes toward OSH				Total	
	Moderate		High			
	n	%	n	%	n	%
Advanced	1	3	32	97	33	100
Total	1	3	32	97	33	100

Table 1 about Relationship between the Knowledge Level of OSH and the Attitudes toward OSH of Students in Laboratory X at Faculty of X are presented the respondent distribution according to the knowledge level to the attitudes toward OSH. From the table, it can be seen that there were 32 respondents (97%) acquired the high attitudes toward OSH when they were in the laboratory. Yet, there was a student (3%) who had the

high knowledge level but acquired the moderate attitudes toward OSH. The results of statistical test indicated that there was no relationship between the knowledge level of OSH and the attitudes toward OSH.

Table 2 Relationship between the Availability of PPE and the Attitudes toward OSH of Students in Laboratory X at Faculty of X

Availability of PPE	Attitudes toward OSH				Total		p
	Moderate		High				
	n	%	n	%	n	%	
Moderate	0	0	3	9.1	3	9.1	-0.056
High	1	3	29	87.9	30	90.9	
Total	1	3	32	97	33	100	

Table 2 about Relationship between the Availability of PPE and the Attitudes toward OSH of Students in Laboratory X at Faculty of X are illustrated that the respondent distribution according to the availability of PPE to the attitudes toward OSH. From the table, it can be observed that as many as three people (9.1%)

acquired moderate response toward the availability of OSH and high attitudes toward OSH in the laboratory of Faculty of X.

Meanwhile, there were 29 students (87.9%) of Faculty of X who owned high response to the availability of PPE and high attitudes toward OSH. Then, there

was a student (3%) who acquired high response to the availability of PPE yet had the moderate attitudes toward OSH. The results of statistical test demonstrated that there was an extremely weak relationship between the availability of PPE and the attitudes toward OSH ($p = -0.056$; $\alpha = 0.05$).

A. Relationship between the Knowledge Level of OSH and the Attitudes toward OSH

The research results on 33 respondents demonstrated that the students owned the high knowledge level of OSH. According to Green's theory via Notoatmojo (2010), knowledge is one of the predisposing factors that can determine someone's attitude.⁽¹⁰⁾

This is in line with Arikunto's (2002) statement that individuals acquire the high knowledge level when they are able to answer the questions correctly, that is above 75%.⁽¹¹⁾ This research result can be said that the practicum students in Laboratory X at Faculty of X acquired the high knowledge level of OSH.

This research results indicated that there was no relationship between the knowledge level of OSH and the attitudes toward OSH. This is also in line with the research of Nestri Dito (2016) which explicated that there was no relationship between knowledge and the application of paramedical OSH in the hospital in Condong Catur of Sleman Regency, since someone's knowledge level can be affected by several factors, such as habitual, environmental, and family factors.⁽¹²⁾

B. Relationship between the Availability of PPE and the Attitudes toward OSH

The research results on 33 respondents about the availability of PPE in the laboratory showed that the students with the positive response toward the availability of PPE and high attitudes toward OSH had more number, that is as many as 87.9%. Green via Notoatmodjo (2010) argued that attitude is the predisposing factor which affects someone's behavior.⁽¹⁰⁾ Attitude is someone's tendency to respond both positively and negatively toward certain people, objects, and conditions, which means that someone's positive attitude and response could generate the person to behave as expected, while someone's negative attitude and response would drive the person to behave badly, for example is the OSH behavior.

However, as obtained in the research results, the availability of PPE did not ensure that all individual would have the attitudes toward OSH. This could be caused by various factors, such as concerning the availability of OSH and not considering the impacts that could happen to the safety of the individual in the laboratory, so that the individual did not acquire the attitudes toward OSH.

The availability of PPE became the part of infrastructure provided by Faculty of X. According to the research of Gilang, infrastructure acquired the significant impact to the students' character toward OSH which means covering the attitudes toward OSH, mainly in the laboratory.⁽¹³⁾ In accordance with the research of Gilang which was in line with the data obtained from the field, the availability of appropriate equipment and PPE would facilitate the students and generate them to have the desire in developing their characters in that they could apply the OSH behavior well.

Conclusion

Based on the results of the research above, it can be concluded that:

1. The results of statistical test indicated that there was no relation between the knowledge level of OSH and the attitudes toward OSH. The students' knowledge level in Laboratory X at Faculty of X was not in line with their attitudes toward OSH.

2. The results of statistical test demonstrated that there was an extremely weak relationship between the availability of PPE and the attitudes toward OSH. The number of students who had positive response toward the availability of PPE was as many as 87.9%. This could be rendered by various factors, such as concerning the availability of PPE.

Recomandations for the problem are increasing awareness to use PPE for student in Laboratory with socialization about the importance use of PPE in the Laboratory, requiring the use of PPE in the Laboratory when student doing practices by looking for procedures in Laboratory and complete provision of PPE in the Laboratory.

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Vitamin C Protect Against Monosodium Glutamate Mediated Oxidative Stress in the Male White Rats

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Abstract

The present study evaluated the ameliorative effect of vitamin C on alteration in thyroid hormones induced by monosodium glutamate. Total number of twenty male rats were divided into five groups each group contain four rats. Groups I administrated distal water and standard diet to keep as control group, group II and III were administered MSG in to two doses (8, 16g/kg) respectively. Finally, Group IV and V were administrated MSG (8, 16 g/kg with vitamin C) respectively for 30 days. The results show decrease in serum triiodothyronine, serum thyroxine, superoxide dismutase, catalase in addition significant increment in the thyroid stimulating hormone level and lipid peroxidation in the groups of rats treated with MSG only while all parameters back in to normal values in the groups of rats treated with MSG and vitamin C also, the histopathological changes appear degeneration and pyknotic cells in the thyroid gland. In conclusion, food additives as MSG have many side effects in the body when taken it for long period and vitamin C has vital role to protect the body from any foreign body.

Keywords: *Vitamin C, MSG, SOD, CAT, MDA, thyroid gland.*

Introduction

Monosodium glutamate is corrosive salt of glutamate. One of important amino acids in the protein structure is glutamate and found in the center of protein and peptides, monosodium glutamate is the famous sustenance added substance¹. It was utilized in various fixation as per the sort of supplements. These days, the innocuous grouping of MSG in weight control plans and its poisonous quality in human is as yet a begging to be proven wrong issue². MSG is generally utilized as a flavor enhancer in home and in addition in sustenance industry. Thusly, the vast majority of canned and junk food as seasoned chips, canned soups, arranged suppers, marinated meats, packaged soy or oriental sauces, solidifying nourishments and tried fish containing variable groupings of MSG³.

"In creatures, higher portions of MSG were affirmed to be neurotoxic as it destructs neurons in the hypothalamic cores through their adjustments in the hypothalamo-pituitary-adrenal pivot (HPA). In addition, the inordinate MSG organization may prompt harm of liver and kidney. These discoveries indicate that unbound glutamate separated from MSG may

conceivably. Follow up on specific receptors in the focal or fringe neurons, causing histopathological changes"⁴.

"Shockingly, writings exploring the impact of MSG on the morphology and capacity of thyroid organ are extremely disputable. A few creators revealed non-noteworthy changes in thyroid morphology after extensive stretch of MSG treatment in neonatal rodents⁵. On the opposite side, an image of an ordinary hypothyroidism was accounted for by different creators in mice treated with various portions of MSG for multi week and the progressions are seen simply after a time of 13 and 52 weeks of the treatment. Then again, an image of expanded thyroid action was accounted for in grown-up rodents got MSG (4 mg/g body weight) for multi week and the impact was watched multi month after the last portion"⁶.

As of late, MSG fear had expanded because of the restricting responses and hurtfulness of MSG, with few and constrained writing concerning the basic changes in thyroid organ of creatures treated with MSG⁷.

Nutrient C (vit C) is an outstanding cancer prevention agent and has been appeared to secure different tissues against the harm caused by ROS.

Moreover, numerous investigations have demonstrated that vit C might be of advantage in unending ailments, for example, cardiovascular infection, growth and waterfall, presumably through cell reinforcement component ⁸.

"This study was designed to examine the effects of different doses of monosodium glutamate on the antioxidant activity, functional and histological changes of the thyroid gland of adult rats and protective effect of vitamin C.

Materials and Method

Monosodium glutamate (MSG) commercially available pack as a white colored substance used as flavor enhancer and purchase from the local market. Vitamin C tablets (500 mg/tablet; Emzor Pharmaceutical Ltd, India) were dissolved in distilled water to 10% solution just before daily administration.

Animals

Twenty adult male albino rats (*Rattus norvegicus*) weighting 220–250 g were used in the present study. They were obtained from the animal house in the faculty of science/ kufa university. The rats were acclimated for one week in the animal house before the start of the experiment and fed on standard diet and water. After one week the rats were randomly divided into five groups each group has four rats. G (1) kept as control group and fed on standard diet and normal saline, G (2) fed on diet contain MSG at dose 8 mg/g/kg, G (3) fed diet contain MSG at dose 16 mg/g/kg, (4) fed on diet contain MSG at dose 8 mg/g/kg and vit. C at dose 5 mg/kg and G (5) fed on diet contain MSG at dose 16 mg/g/kg and vit. C at dose 500 mg/kg for 30 days.

Blood collection

"At the end of experiments. Each animal was anaesthetized by the mixture of xylazine 0.1 ml and ketamine 0.5 ml and they were scarified ⁹. The blood was put in test tube containing gel and left for 30 minutes in room temperature to get serum and put in eppendorf tubes which kept at (- 20) in a cooler for biochemical examination. The neck was opened to get the thyroid gland for the histological study ¹⁰.

Antioxidants & thyroid hormones

were determined after the rats scarified depending

on kits (Elabscience company, China).

Statistics Using computerized SPSS program.

Results

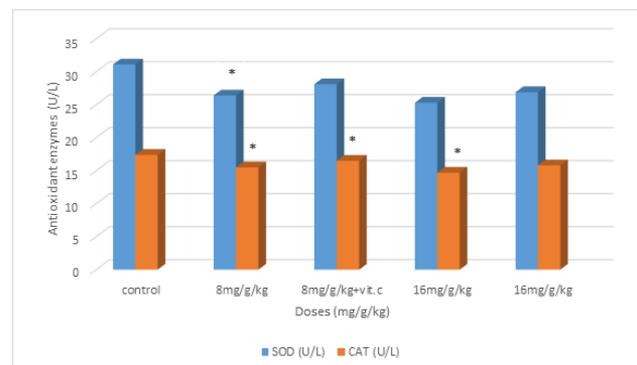


Figure (1): Effect of monosodium glutamate at doses 8 mg/g/kg and 16 mg/g/kg with vitamin C at dose 500 mg/kg in the levels of antioxidant enzymes (SOD & CAT) in the male rats for 30 days.

(*) significant difference $p < 0.05$

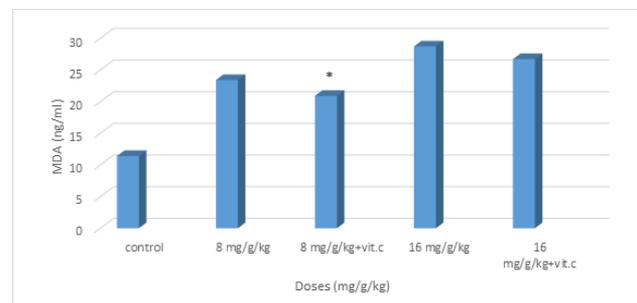


Figure (2): Effect of monosodium glutamate at doses 8 mg/g/kg and 16 mg/g/kg with vitamin C at dose 500 mg/kg in lipid peroxidation in the male rats for 30 days.

(*) significant difference $p < 0.05$

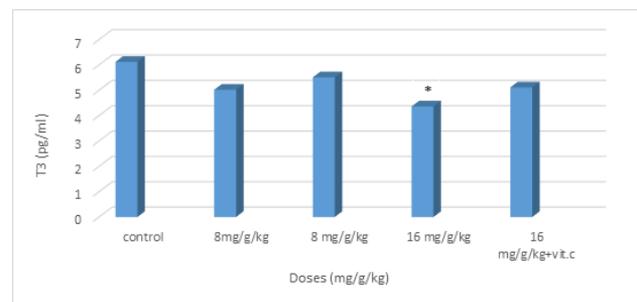


Figure (3): Effect of monosodium glutamate at doses 8 mg/g/kg and 16 mg/g/kg with vitamin C at dose 500 mg/kg in the level of thyronine hormone in the male rats for 30 days.

(*) significant difference $p < 0.05$

Discussion

The current investigation demonstrates orally administrated with monosodium glutamate displayed a profoundly noteworthy increment in MDA level. The expanded lipid peroxidation saw in this investigation might be credited to coordinate impact of expanded age of ROS came about because of MSG. Glutamate is ineffectively transported crosswise over cell films and could collect intracellularly, adjusting the redox condition of the cell ¹¹. In this changed redox express, the cell favors lipid combination and has a tendency to close down lipolysis. In liver, glutamine debasement yields glutamate which at that point experiences oxidative deamination to create ammonium particles and α -ketoglutarate. Thus, the expanded level of glutamine could likewise start lipid peroxidation by changing the redox capability of the cell ¹².

Additionally revealed that rehashed MSG portions demonstrated drawn out and deferred impacts on the mitochondrial free extreme forager framework, and the weighty layer harm as construed from adjusted levels of Mn superoxide dismutase (Mn-SOD) and catalase, the superoxide obliterate the iron sulfur focuses and, along these lines, irreversibly deactivate the iron-containing catalysts. Thus, it could be proposed that the MSG organization may give a fruitful model of oxidative pressure and, consequently, might be utilized to research the cancer prevention agent properties of a few common items. The diminishing in the catalase on organization of MSG in this investigation could be credited to their expanded union came about because of the enlistment, as cell reinforcement catalysts are actuated in light of oxidative pressure in MSG-treated mice ¹³.

Nutrient C, a water solvent cancer prevention agent is the most vital free extreme forager in extracellular liquids, catching radicals in the fluid stage and shields biomembranes from peroxidative harm ¹⁴.

It was discovered that the i.p. organization of vit. C to MSG infused mice reestablished SOD action to almost control level, while MDA level was diminished altogether after vit C organization when contrasted with control gathering. Accordingly, the present rebuilding of SOD and CAT action to almost control level, notwithstanding the abatement in MDA content in the liver and kidney tissues, could show the cancer prevention agent properties of vit C. It likewise

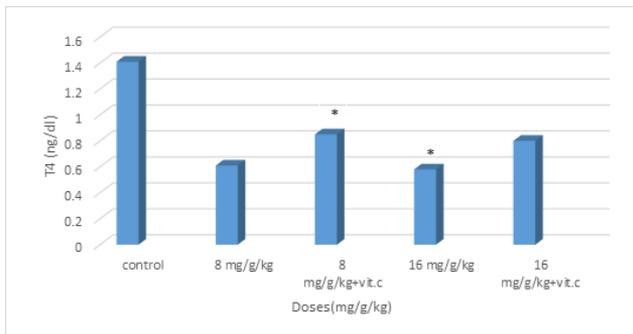


Figure (4): Effect of monosodium glutamate at doses 8 mg/g/kg and 16 mg/g/kg with vitamin C at dose 500 mg/kg in the level of thyroxine hormone in the male rats for 30 days.

(* significant difference $p < 0.05$)

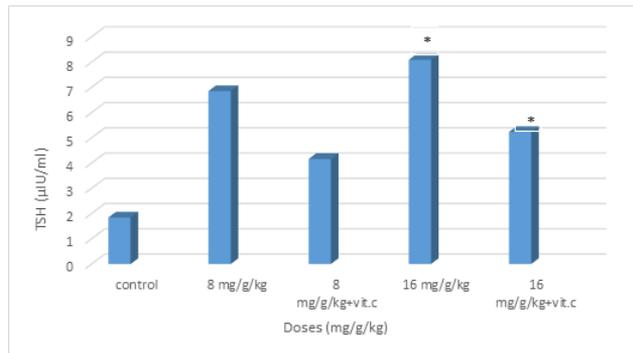


Figure (5): Effect of monosodium glutamate at doses 8 mg/g/kg and 16 mg/g/kg with vitamin C at dose 500 mg/kg in the level of thyroid stimulating hormone in the male rats for 30 days.

(* significant difference $p < 0.05$)

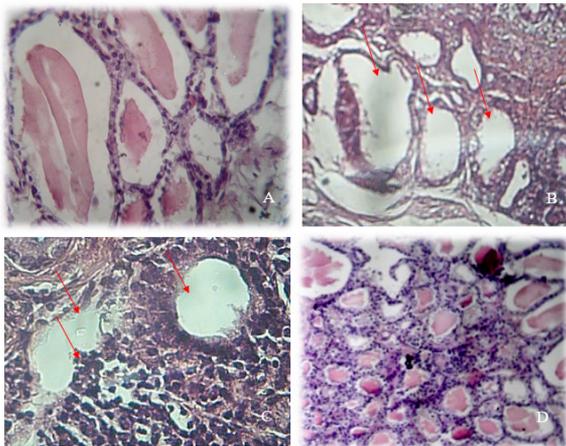


Figure (6): Cross section of thyroid gland in control group (A) show normal the thyroid follicles with large peripheral follicles (arrow) lined with cuboidal epithelial tissues, (B) cross section of thyroid gland in the group of rats treated with 16 mg/g/kg of MSG showing large of thyroid follicles with degeneration of lining epithelial tissues and pyknotic nuclei were seen (C) While the thyroid follicles become normal and decrease pyknotic nuclei in the group of rats tread with 16 mg/g/kg of MSG and vit.C for 30 days (D) (H&E 400 X).

expanded the cancer prevention agent enzymatic action¹⁵. The utilization of vit C is helpful for the cell reinforcement impact as it offers a successful and safe method for expanding body insusceptible framework against free radicals and, in the meantime, keeps the oxidative worry in a condition of parity¹⁶.

Also, in the present examination, it was discovered that the oral organization of sustenance added substance blends MSG to rodents demonstrated expanded in centralizations of thyroid digestion hormones (T3 and T4) when contrasted and control rodents. This perception could be credited to incitement of thyroid organ and adrenal organs by MSG or might be because of neurotoxic impact of MSG as it destructs neurons in the hypothalamic cores through their adjustments in the hypothalamo-pituitary-adrenal hub (HPA)¹⁷. In this manner, these adjustments in thyroid hormones may be come about because of modification in the pituitary – thyroid hub and this may assume a job in youngsters hyperactivity most likely through influencing higher focuses in the mind. It was recorded that MSG causes endocrine issue accordingly for initiated oxidative worry in exploratory creatures¹⁸.

In addition, this outcome might be expected to increase gonadotrophin-discharging hormone (GnRH) related with the sores on the arcuate core of the nerve center that happens in creatures given MSG, Such neuronal misfortunes in the nerve center can result in disturbance of the hypothalamic-pituitary system¹⁹.

“In the current work, unmistakably, Vit.C caused the most noteworthy decrement the mean estimation of FT4 and FT3 and least declines in the mean estimation of TSH pursued by Zinc then Vit.E lastly Iron supplementation. The negligible diminish in serum T3 and T4 and the huge increment in the convergences of TSH in the gathering coadministered with Chlorpyrifos and Lead were enhanced by Vit. C (100 mg/kg) mostly because of its cancer prevention agent properties²⁰.

The thyroid hormones reacted to cell reinforcements showing the centrality of cancer prevention agents for the avoidance of specific illnesses in thyroid organ by securing natural framework against conceivably destructive impacts of procedures or responses that can cause inordinate oxidations²¹.

In the current study recolored segments of the thyroid organ of gathering II uncovered no conspicuous

changes are watched with respect to follicular shape or distance across. On the opposite side, anomaly in the state of some thyroid follicles with intermittence of their storm cellular layer were distinguished in gathering III and IV. This anomaly in the state of thyroid follicles was already depicted in MSG treated rodents²².

Increment in follicular epithelial tallness and lessening in the colloid was identified in the present work in all gatherings treated with MSG; the fringe follicles were delimited by cubical epithelial cells with adjusted focal cores and the focal ones were lined by columnar epithelium. This outcome came as per different creators who detailed noteworthy increment in the normal tallness of the follicular cells, diminished measure of colloid in a few follicles together with congested stromal vein after a day by day intra-peritoneal infusion of MSG 4 mg/g body weight for seven days and the rodents analyzed following multi month from the last portion²³.

In the present study couple of pyknotic cells began to show up in gathering II which turned out to be more transcendent with the presence of shed cells in the colloid in gathering III and IV. What’s more, regions of loss of follicular example, and others with follicular obliteration were seen in gathering IV. A comparable outcome was beforehand announced in the kidney of MSG treated rodents. They alluded that to oxidative harm. They included that the age of responsive oxygen species is viewed as an essential occurrence under an assortment of stress conditions²⁴.

In conclusion, nutrient C supplementation improves the metabolic changes caused by MSG through restraint of the oxidative pressure and lessening lipid peroxidation. Albeit, in light of the aftereffects of the present investigation, nutrient C might be advantageous in limit the lethal impacts of MSG on thyroid organ capacities. These impacts are related with the ground-breaking cell reinforcement properties of nutrient C as it produces valuable impacts against metabolic disarranges.

Conflicts of Interest: The author declares that there is no conflicts of interest relevant to what is written.

Funding Source: University funding was provided for: data collection, analysis, and interpretation; trial design; patient recruitment. No public funding was received.

Ethical Clearance: The study was conducted in accordance with the ethical principles that have their origin in the

Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local Ethics Committee.

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Risk Quotient (RQ) Analysis in Workers Exposed to Respirable Dust in Ceramic Industry

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Abstract

Ceramics are produced from mashed clay, made using high temperatures with long durability so that the clay powder becomes very dry, triggering the spread of dust in the work environment. The very small dust, when inhaled, is able to enter the lungs, causing health problems to workers. To identify health problems that can occur to the workers, risk analysis is needed to determine the level of risk in the workers. This study aims to analyze the risk of workers exposed to respirated dust in ceramics industry. This study was an observational study using a cross sectional approach. The population in this study were all workers who worked in the production sector in ceramics industry comprising 30 workers. The sample in this study was the study population, consisting of 30 workers. Exposure to respirable dust on the respondents was measured using total dust sampling, indicating that 53.3% of the respondents had values exceeding the threshold <2 mg/m³ according to Minister of Manpower and Transmigration Regulation No. 13 of 2011, concerning Threshold Value of Chemical Factors in Work Environment. The analysis showed that the RQ (realtime) values ranged from 0.13-1.06 mg/m³/year. Measurement of the level of risk based on RQ value showed that 13.3% of the workers had an RQ value of >1 , which means that they had a risk of being unsafe against exposure to respirated dust, so that they were at risk of developing health problems. Actions that can be taken to minimize the adverse effects of dust in work environment are by controlling dust at the source, using Personal Protective Equipment (PPE) at work, and periodic physiological pulmonary health examination.

Keywords : *respirable dust, ceramic industry, risk characteristics, Risk Quotient (RQ)*

Introduction

Health of the workers is also a concern of public health. Air pollution is the entry of living beings, substances, energy, and/or other components into ambient air by human activities so that they exceed the prescribed air quality standards¹

There are several stages of the process that must be done to make ceramic products, ie. processing raw materials, forming, drying, combusting, and grinding. Basically, ceramics are divided into two, the traditional ceramics, which are made using natural raw materials such as ceramics for glassware and other household furniture; and fine ceramics, which are made using metal or metal oxides. For example, metal oxides (Al₂O₃, ZrO₂, ThO₂, BeO, MgO, and MgAl₂O₄), nitrides and carbides (Si₃N₄, SiC, B₄C, and TiB).

According to WHO² harmful dust is as large as 0.1 to 5 microns or 10 microns. The Ministry of Health states that the size of harmful dust ranges from 0.1 to 10 microns. Threshold value is a standard of recommended work environment factors in the workplace so that workers can still receive it without causing health problems. Minister of Manpower Regulation Number 13 of 2011 concerning Threshold Values of the physical and chemical factors in the work environment set a threshold of 2 mg/m³.

Risk Analysis is a scientific process that is used to estimate the possible negative effects of health due to exposure to harmful chemicals.³ The level of risk in workers can be determined by conducting exposure analysis in which risk agent intake that enters the body of the workers was calculated according to the workers' anthropometry and is assessed as the default.

Method

This study was an observational study with a cross-sectional approach. The population in this study was all workers in the production section, ranging from raw materials processing to packing, comprising 30 persons. The sample in this study was the study population of 30 workers. This study was conducted in the ceramic industry of PT. X in Gresik District, East Java, Indonesia. Data collection was carried out in November - December 2018.

In this study the primary data consisted of measurements of inhaled dust using a Total Dust Sample measuring instrument, and the measurement of lung function capacity using spirometry. Determination of individual characteristics and exposure factors was carried out using a questionnaire. Primary data collected in this study with using questionnaires were about self-identity, age, duration of exposure and the use of Personal Protective Equipment (PPE).

Results

Workers' age distribution

Table 2. Total dust exposure distribution to workers in the ceramics industry production section in 2018

Respondents	Dust Level (mg/m ³)	Respondents	Dust Level (mg/m ³)	Respondents	Dust Level (mg/m ³)
1	5.8	11	5.8	21	1.2
2	1.2	12	1.2	22	5.8
3	1.2	13	5.8	23	5.8
4	1.2	14	1.2	24	1.2
5	5.8	15	1.2	25	1.2
6	5.8	16	0.95	26	5.8
7	5.8	17	5.8	27	5.8
8	0.95	18	1.2	28	5.8
9	0.95	19	1.2	29	5.8
10	5.8	20	5.8	30	5.8

Dust measurement using total dust sampling that had been installed in each respondent showed dust levels of 0.95-5.8 mg/m³. Minister of Manpower and Transmigration Regulation Number 13 of 2011 concerning the Threshold Value of Chemical Factors

Table 1. Distribution of respondents based on the age of the workers in the production section of a ceramics industry in 2018

No.	Age	Total	Percentage (%)
1.	19-27	11	36.67
2.	28-36	12	40
3.	37-45	4	13.33
4.	46-54	3	10
Total		30	100

Table 1 shows that the majority of the workers are 28-36 years old (40%). They were the workers in the production section of the ceramics industry.

Level of respirated dust

Dust measurement used Total Dust Sampling that had been installed in each respondent, which aimed to determine the distribution of respiratory dust exposure to each respondent. Measurement of dust levels was carried out in the work environment of the respondents.

in Work Environment on particulate respirable dust determines the threshold of <2 mg/m³. Thus, in this study as many as 16 (53.3%) workers had Total Dust Sampling higher than the predetermined threshold value.

Exposure analysis

This study was to determine the intake value of the risk agents that entered the body of the workers in accordance with the workers' anthropometry and

the existing default values. The variables in exposure analysis in this study were concentration, inhalation rate, exposure time, exposure frequency, duration of exposure, body weight and time of average exposure. Table 3 shows the results of exposure analysis to workers in the ceramics industry:

Table 3. Distribution of exposure analysis for respondents in the ceramics industry in 2018

Respondents	C	R (inhalation rate)	T _E (h/day)	f _E (effective days/year)	D _t	W _b	T _{avg} (h/y)	I _(realtime)
1	5.8	0.589	7	250	2	53	365	0.020612
2	1.2	0.624	7	250	2	62	365	0.003859
3	1.2	0.563	7	250	2	47	365	0.004592
4	1.2	0.597	7	250	2	55	365	0.004166
5	5.8	0.576	7	250	2	50	365	0.021371
6	5.8	0.593	7	250	2	54	365	0.020372
7	5.8	0.627	7	250	2	63	365	0.018463
8	0.95	0.62	7	250	2	61	365	0.003087
9	0.95	0.677	7	250	2	79	365	0.002603
10	5.8	0.597	7	250	2	55	365	0.020138
11	5.8	0.68	7	250	2	80	365	0.015762
12	1.2	0.553	7	250	2	45	365	0.004714
13	5.8	0.617	7	250	2	60	365	0.019053
14	1.2	0.563	7	250	2	47	365	0.004592
15	1.2	0.663	7	250	2	74	365	0.003436
16	0.95	0.593	7	250	2	54	365	0.003336
17	5.8	0.617	7	250	2	60	365	0.019053
18	1.2	0.657	7	250	2	72	365	0.003499
19	1.2	0.609	7	250	2	58	365	0.004028
20	5.8	0.613	7	250	2	59	365	0.019260
21	1.2	0.613	7	250	2	59	365	0.003984
22	5.8	0.686	7	250	2	82	365	0.015501
23	5.8	0.624	7	250	2	62	365	0.018655
24	1.2	0.666	7	250	2	75	365	0.003405
25	1.2	0.648	7	250	2	69	365	0.003599
26	5.8	0.617	7	250	2	60	365	0.019053
27	5.8	0.644	7	250	2	68	365	0.017565
28	5.8	0.634	7	250	2	65	365	0.018092
29	5.8	0.624	7	250	2	62	365	0.018655
30	5.8	0.617	7	250	2	60	365	0.019053

Realtime exposure analysis was calculated based on years of work ranging from being accepted as a worker for the first time until the implementation of this study. The value of realtime intake was the intake value until this study was carried out, while the estimated intake value was the cumulative estimated intake value. The results of calculating realtime intake were used to determine the value of RQ risk level of the respondents. The intake value was also used to determine the estimated value that will be calculated within 5 years, 10 years, 15 years, 20 years, 25 years, and 30 years.

Risk characterization

Table 4. Distribution of risk level values (RQ) of realtime exposure and estimatedly 30 years later among the workers in the ceramics industry in 2018

Respondents	Risk Level Value (RQ)						
	Realtime	5 years	10 years	15 years	20 years	25 years	30 years
1	1.030605	3.60711	6.18363	8.76014	11.33666	13.9131	16.4896
2	0.19299	0.67546	1.15793	1.64041	2.122889	2.60536	3.08783
3	0.229623	0.80368	1.37773	1.95179	2.525856	3.09991	3.67397
4	0.208327	0.72914	1.24996	1.77078	2.2916	2.81241	3.33323
5	1.068587	3.74005	6.41151	9.08298	11.75445	14.4259	17.0973
6	1.018606	3.56512	6.11163	8.65815	11.20466	13.7511	16.2976
7	0.923177	3.23112	5.53906	7.84700	10.15495	12.4628	14.7708
8	0.154395	0.54038	0.92636	1.31235	1.69834	2.08432	2.47031
9	0.13019	0.45566	0.78114	1.10661	1.432092	1.75756	2.08304
10	1.006915	3.52420	6.04148	8.55877	11.07606	13.5933	16.1106
11	0.788128	2.75845	4.72877	6.69909	8.669413	10.6397	12.6100
12	0.235736	0.82507	1.41441	2.00375	2.593097	3.18243	3.77177
13	0.952691	3.33441	5.71614	8.09787	10.4796	12.8613	15.2430
14	0.229623	0.80368	1.37773	1.95179	2.525856	3.09991	3.67397
15	0.17182	0.60137	1.03092	1.46047	1.890024	2.31957	2.74912
16	0.166841	0.58394	1.00104	1.41814	1.835247	2.25234	2.66944
17	0.952691	3.33441	5.71614	8.09787	10.4796	12.8613	15.2430
18	0.174981	0.61243	1.04988	1.48734	1.924796	2.36225	2.79970
19	0.20143	0.70500	1.20857	1.71215	2.215727	2.71930	3.22287
20	0.963007	3.37052	5.77804	8.18555	10.59307	13.0005	15.4081
21	0.199243	0.69735	1.19545	1.69356	2.191671	2.68977	3.18788
22	0.77507	2.71274	4.65041	6.58809	8.525769	10.4634	12.4011
23	0.932785	3.26474	5.59670	7.92866	10.26063	12.5925	14.9245
24	0.170287	0.59600	1.02172	1.44744	1.873161	2.29888	2.72459
25	0.179977	0.62992	1.07986	1.52980	1.979748	2.42969	2.87963
26	0.952691	3.33441	5.71614	8.09787	10.4796	12.8613	15.2430
27	0.878287	3.07400	5.26972	7.46544	9.661158	11.8568	14.0525
28	0.904614	3.16614	5.42768	7.68921	9.950754	12.2122	14.4738
29	0.932785	3.26474	5.59670	7.92866	10.26063	12.5925	14.9245
30	0.952691	3.33441	5.71614	8.09787	10.4796	12.8613	15.2430
Minimum	0.13019	0.45566	0.78114	1.10661	1.432092	1.75756	2.08304
Maximum	1.068587	3.74005	6.41151	9.08298	11.75445	14.4259	17.0973
Average	0.589293	2.06252	3.53575	5.00899	6.482224	7.95545	9.42868

Risk characterization was carried out to identify the level of risk to determine the level of dust at certain concentrations which had a risk to create health effects on the workers. Risk characterization was carried out by comparing or dividing the intake with the dose or concentration of respirable dust. The value of the risk level was stated without units and was regarded as safe if the intake \leq Rfc or expressed by $RQ \leq 1$. The level of risk was regarded as unsafe when the intake $>$ Rfc or expressed by $RQ > 1$. Table 4 shows the results of calculated RQ value of workers in the ceramics industry.

Discussion

Dust is a solid chemical substance produced by natural and mechanical forces, such as processing, destruction, softening, rapid packing, blasting, etc., from organic and inorganic objects.⁴ In this study, the production process in ceramics industry was carried out in the same building with closed conditions so that the respirable dust was evenly distributed throughout the production room. Respirable dust source in the production part comes from raw materials in the form of clay and several other types of materials. Firing in the production process carried out to temperatures reaching 1200 degrees C will form another fraction of respirable dust that is more reactive and more hazardous. Measured dust levels had a uniform distribution throughout the workplace with an average level of 3.6 mg/m³.

Risk characteristics can be determined from the ratio of intake and the reference dose value (RfC), where the higher the intake, the higher the risk. In this study, the value of dust RfC (TSP) used a reference dose value from the Environmental Health Risk analysis study conducted by Rahman et al.⁵ which was equal to 0.02 mg/kg/day because the value of RfC dust (TSP) in the IRIS list was not yet available. Table 6 shows that the value of RQ in realtime exposure indicates that 13.3% of the workers have an RQ value > 1, which means that they have an unsafe risk of respirable dust exposure. In other words, 13.3% of the workers exposed to respirable dust to date have a risk of experiencing health problems.

According to Wallaert⁶ there are two main causes of obstructive pulmonary function disorder in groups of people who are always exposed to dust. The first cause is that the exposure to dust concentration lasts more than ten years. The second cause is that the level of dust exposing an individual exceed the Threshold Value.

Calculation of risk management strategies resulted in a median of safe concentrations, safe frequencies and safe times, which were, respectively, 5.62 mg/m³, 243 days/year and 6 hours/day. Safe duration could not be determined because the results of realtime calculations of dust exposure based on the working period of workers have shown a level of risk that is not safe. The safest risk management strategy that is most likely and feasible to do is to reduce the concentration of risk agents, namely the concentration of respirable dust in the work environment, to the safe limit according to the

calculation of the risk management strategy. The safe limit for respirable dust concentration was calculated from each worker, then the median value of the safe concentration was taken as 6.08 mg/m³.

After risk analysis, the next step was to run risk management if the obtained one was the unsafe level of risk, either current risks or future risks. After conducting a risk analysis, we obtained a safe limit value in accordance with anthropometric conditions and current environmental conditions, which was equal to 6.188 mg/m³. This safe concentration value was chosen because it was the most logical value and most likely to be fulfilled. To achieve this value, the company must make efforts to control the respirable dust.

Control can be done by using a hierarchy of controls, ie. technical, administrative, and the use of personal protective equipment. Technical control can be carried out, among others, by installing local vents on biscuit printing machines as well as on kilns or on machines that have the potential to remove dust to be sucked and stored in dust collector. Wet process can also be done to minimize the spread of dust in the work environment. Administrative control can be done by rotating workers in the production section whose working period is more than 20 years, especially in the processing of raw materials. Health examination in preventive efforts need to be carried out, especially special health examination for workers in production department by prioritizing routine anatomical and physiological examinations. Personal protective equipment that can be used is a mask for reducing dust, especially those measuring under 5 micrograms. Personal protective equipment is the last alternative choice if technical and administrative controls are no longer possible. Types of masks that can be used to reduce dust entering the lungs include the masks of N-95 or N-100 type.

Conclusion

Respiratory dust levels were measured using the NIOSH 7500 method. The measurement was performed using total dust samplers on the workers and it was found that 53.3% of the total respondents exceeded the Threshold Value for respirable dust (NAB=2 mg/m³) with a concentration between 0.95 - 5.8 mg/m³. The assessment of the level of risk in realtime exposure on each worker showed an unsafe level of risk (RQ> 1) due to exposure to respirable dust by 13.3% of the total

respondents. These figures indicate the need for dust control by identifying the limits of safe duration, safe concentration, safe frequency, and safe time through the assessment of risk management strategies. The assessment of risk management strategy results in safe duration, safe concentration, safe frequency and safe time. From these assessment, the most logical and most feasible alternative to reduce the level of risk to be safe is to reduce the concentration of respirable dust in work environment until $\leq 2 \text{ mg/m}^3$.

Conflict of Interest: Nil

Source of Funding : Self

Ethical Clearance: Received from the Ethics Committee of the Faculty of Public Health, Airlangga University, Indonesia.

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The Effect of 1.2mg Simvastatin Mouthwash on the Level of Interleukin-6 in Patients with Chronic Periodontitis

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Abstract

Various materials and methods are nowadays used as complementary therapies for leveling the root surface for the treatment of periodontal diseases. The present study was conducted to evaluate the efficacy of simvastatin mouthwash on the level of interleukin-6 as an inflammatory cytokine that is supposed to be effective in the development of chronic periodontitis. The present randomized, double-blind clinical trial was conducted on 40 patients with moderate to severe chronic periodontitis. Initially, scaling and leveling the root surfaces were conducted for all patients and necessary training was presented; subjects in the intervention group, in addition to scaling, received 1.2simvastatin mouthwash. The level of interleukin-6 was measured before and one month after intervention, and data was analyzed by SPSS using paired t-test and covariance analysis. After treatment, there turned out to be a significant decrease in the level of interleukin-6 in the intervention group compared to the control group ($P < 0.05$). The findings of the present study showed an increase in the clinical efficacy of treatment of chronic periodontitis with oral administration of 1.2 mg simvastatin as complementary therapy with scaling and leveling of the root surface.

Keywords: *Simvastatin, Mouthwash, Chronic Periodontitis, Interleukin-6.*

Introduction

Periodontitis is a chronic infectious tooth disease in which the protecting tissue is damaged due to bacterial infection, inflamed periodontal tissue, and ultimately degeneration. If the disease remains untreated, the protective structure around the tooth, including periodontal ligaments and bone, disappears, resulting in the loss of the teeth^{1,2}. Chronic periodontitis is the most common form of periodontal disease and progression of the disease is due to the high level of pre-inflammatory cytokines³. Cytokines play an important role in the pathogenesis of periodontal disease and are useful for the diagnosis of periodontal disease and the effect of periodontal treatment⁴. Interleukin 6 is a cytokine most

commonly associated with periodontal inflammation; it, also, is associated with the termination of B-lymphocytes differentiation and complement-activation and is an important cytokine associated with bone degeneration in advanced periodontitis⁵. Non-surgical treatment in form of scaling and leveling of the root surface is the first phase in the treatment of periodontal diseases,⁶ but some patients may not respond appropriately to the non-surgical treatment, mainly due to the colonization of remaining microorganisms in the soft and hard tissues of the host. Other factors of failure of treatment include hard access to periodontal deep pockets, forearm pockets and root extensions^{7,8}. Because of the limited access to deep pockets, additional treatments are needed to prevent re-microbial colonization after professional-looking pocket removal⁹. In such clinical settings, new therapies are used as complementary treatments, along with scaling and leveling the root surface¹⁰, such as mouthwashes. Chlorhexidine is the most effective ingredient in plaque control, which reduces plaque and

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inflammation of the gum¹¹. Use of chlorhexidine cause various side effects, such as browning of teeth and tongue, and restorations of silicates and resins, transient taste disorder and deafness if it finds its way into the ear canal¹². According to the results of formerly conducted studies, statins have considerable pleotropic effects, such as anti-inflammatory and triggering ossification¹³. Also, the pleomorphic anti-inflammatory effects of statins are likely to result from inhibiting the change of isoprene in inflammatory signal generators¹⁴. Simvastatin is a specific competitive inhibitor of 3-hydroxy-2-methylglutaryl coenzyme A reductase¹⁵. Grover et al study in 2015 stated that simvastatin gel has an inhibitory effect on interleukin-6 pre-inflammatory cytokine in gingival fluid in patients with chronic periodontitis¹⁶. In fact, simvastatin is an artificial statin that is useful for periodontal treatment on bone metabolism functioning through disabling osteoclasts and having an effect on the production of isoprenoids¹⁷. It also increases bone formation in invitro and animal studies¹⁸; administering simvastatin gel, according to the results of studied conducted on human subjects, such as Vemanaradhya et al study in 2015, caused significant decrease in the majority of associated parameters in patients with chronic periodontitis¹⁹. According to the results of limited studies which have, so far, been conducted on simvastatin, 1.2mg simvastatin gel has been mostly analyzed. Since using the gel form is complicated and it should be used in the presence of a clinician and it is more suitable for cases where the patient enters the surgical phase, the present study was conducted to evaluate the effect of 1.2 Simvastatin mouthwash on the level of the Interleukin 6 in patients with chronic periodontitis.

Materials and Method

The present double-blind, randomized, clinical-trial was ethically approved by the Ethics Committee of Ilam University of Medical Sciences with the IR. MEDILAM.REC.1397.105 code. Based on mean and standard deviation of previous studies in intervention and control groups, and also with respect to $\beta = 0.2$ and $\alpha = 0.05$, the number of subjects needed in each group was determined to be 20 subjects based on the formula for calculating the sample size for independent averages, forming the final sample of subjects for the study. 20 women and 20 men with chronic periodontitis admitting to periodontal department of Ilam Dentistry School were evaluated and assessed in the present study.

Having moderate to severe chronic periodontitis, no smoking, and no gum surgery were the main inclusion criteria; additionally, patients taking lipid lowering drugs, patients who received antibiotics during the last 12 months, pregnant and breastfeeding women, and also Individuals with systemic diseases affecting the periodontal condition were excluded from the study. Prior to collecting the saliva sample, the objectives were explained for the subjects and their written consent form was collected. The subjects were asked to avoid eating and drinking at least 2 hours before collecting saliva. Prior to collecting the saliva sample, the subjects washed their mouth with water for one minute; then, the oral cavity was evaluated to ensure the absence of debris. After 15 minutes, they were asked to swallow saliva in their mouths. Then, they were asked to spit out saliva into a sterile container for a minute. Saliva was collected at 3 ml per person. This method is called non-inhaled saliva collection, which is a reliable method for testing the saliva content. The patients were randomly divided into two equal groups. Before each intervention, sampling was performed and interleukin-6 levels were determined in these patients; professional health education was performed for both groups. The study groups included the control group (n = 20), which contained patients treated with placebo mouthwash and the intervention group (n = 20), including subjects treated with 1.2mg Simvastatin mouthwash. The sequences of treatments were determined with a randomized code and the medications were given blindly to the patients 3 times (every 8 hours) for 2 weeks. It should be noted that, no antibiotic and anti-inflammatory drugs were prescribed after treatment. After scaling and leveling the root surface and prescribing the mouthwash, samples were-recollected from all five groups one month later. Biochemical analysis of salivary specimens was performed to evaluate the level of interleukin 6 using an ELISA kit and antibody pairs. In the oral preparation of simvastatin, 1.2 mg of simvastatin powder was dissolved in 100 ml bottles of distilled water, along with a 6.6% alcohol solution and additives. The same placebo mouthwash, containing 9.6% base alcohol, was stained with activated non-active amine as diffiam. Patients also used mouthwash every 8 hours for 2 minutes. The results were compared between the two groups before and one month after analysis by ANOVA and paired t-test.

Results

In order to investigate the effect of 1.2 mg

Simvastatin mouthwash on the level of interleukin-6 in patients with moderate to severe chronic periodontitis, salivary levels of this biomarker in 40 patients with periodontitis, which included 20 women and 20 men with a mean age of 46 years, were examined and compared before and after treatment; none of the samples dropped at the course of the intervention.

The mean level of interleukin-6 was decreased in both groups after intervention, but this decrease was higher in the intervention group (Table 1). The difference in interleukin level in the intervention group who used the 1.2 mg simvastatin mouthwash after scaling and leveling of the root surface was significantly higher than the control group who used placebo mouthwash (Fig. 1).

Table 1. Interleukin-6 levels at the concentration of mouthwash before and after intervention

Mouthwash Type	Sex	Number	Before intervention		After intervention	
			± SD	Mean	± SD	Mean
Simvastatin 1.2 mg	Men	10	12.73	69.76	9.11	23.12
	Female	10	15.62	72.12	11.22	23.72
	Total	20	13.49	70.94	9.64	23.42
Placebo	Men	10	13.73	55.52	7.06	31.72
	Female	10	18.96	60.44	14.94	35.40
	Total	20	15.82	57.98	10.92	33.56

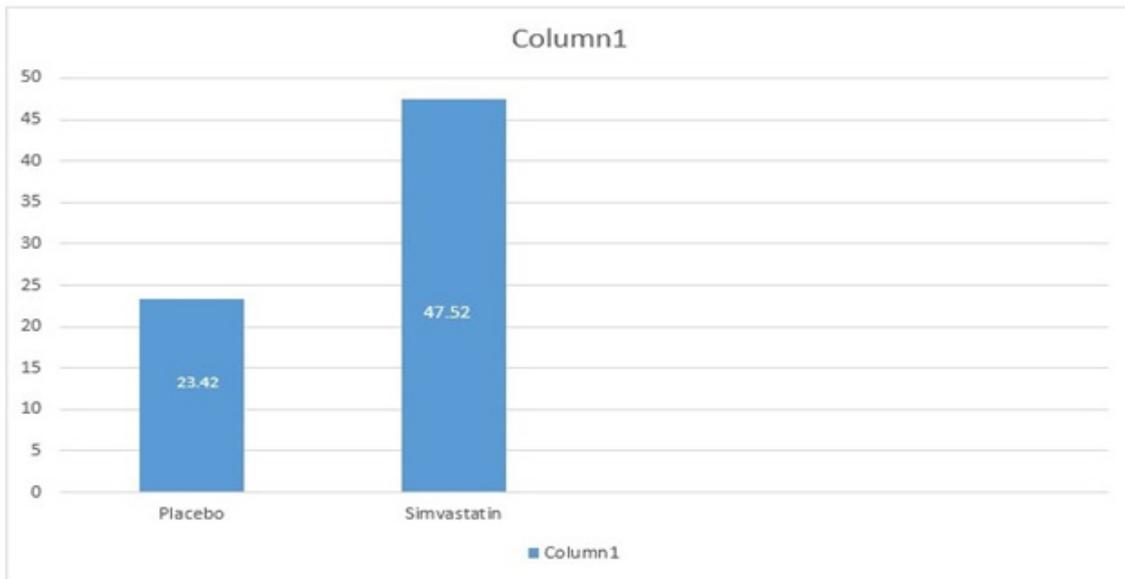


Figure 1. The difference in mean of interleukin level decrease in the control and intervention groups

Discussion

Various environmental, genetic and safety factors are involved in the development of periodontitis, among which the role and effect of cytokines have largely been confirmed. Currently, huge bulk of research and studies focus on treatments of periodontitis using cytokines that affect the development of this disease. Interleukin-6

concentrations in patients with periodontitis are higher than healthy subjects, suggesting that interleukin-6 plays an important role in inflammatory processes involved in periodontitis. Interleukin-6 may be one of the cytokines responsible for initiating and progressing the periodontal destruction process; it, also, can play an important role in inflammation of the gum and periodontitis, and it has been shown that the level of this cytokine in the saliva

of patients with gingivitis and chronic periodontitis increases, indicating the association between the severity of inflammatory disease and the level of interleukin 6. Antibacterial agents that are used topically for the prevention and treatment of periodontal diseases are the most commonly used antiseptic agents, among which chlorhexidine is more common due to the broad spectrum of antimicrobial activity. However, its side effects, such as leaving color stains on the teeth and excessive gum mass, browning of teeth, restoring silicates and resins, transient dysfunction in the sense of taste and deafness in case of penetration into the ear canal, and short life span have stimulated the researchers to seek for possible substitutes. Since simvastatin gel has been effective in the treatment of chronic periodontitis, it was attempted to investigate the effect of the application of simvastatin mouthwash on the level of interleukin-6 in saliva of 40 patients with chronic periodontitis, with the main hypotheses related to the effect of simvastatin on the interleukin-6 in patients with chronic periodontitis and its immunological effect in the treatment of periodontitis patients. Few studies have been conducted to investigate the effect of 1.2 mg simvastatin in the treatment of chronic periodontitis. The results of Grover et al study in 2015 indicated that simvastatin gel has an inhibitory effect on interleukin-6 pre-inflammatory cytokines in the gingival fluid of patients with chronic periodontitis¹⁶, which was quite consistent the results of the present study. Additionally, the results of Vemanaradhya et al study in 2017 showed that using 1.2 mg simvastatin gel caused considerable and significant decrease in all clinical parameters in patients with chronic periodontitis²⁰. Rao et al 2013 study indicated further reduction in the gingival hemorrhage index, probe depth, further CAL regeneration, and further improvement of intra-abdominal lesions at SRP treated sites and 1.2 mg intravenous injection of simvastatin gel in smokers with chronic periodontitis¹⁵. The results of Ranjan et al study (2017) showed significant decrease in gingival indices and probe depth and increased regenerative CAL in the group treated with 1.2 mg simvastatin compared to the control group; radiographic evaluations confirmed that the rate of bone loss in the group receiving intervention was considerably higher than the control group²¹. As the results of formerly conducted and the present study indicate, 1.2 mg simvastatin mouthwash has a positive role in the treatment of chronic periodontitis. Changing the form of simvastatin from gel to mouthwash, which is more commonly used, easier to use and more accepted

by patients, is one of the main advantages of the present study which distinguishes it from other research in this domain; this is in itself an innovation.

Conclusion

The application of 1.2 mg simvastatin mouthwash as a complementary therapeutic and root leveling treatment has a significant effect on the level of interleukin-6, an inflammatory cytokine that is effective in the development of chronic periodontal inflammation; decrease in the level of this cytokine reduces periodontal inflammation and accelerates the recovery process in patients with chronic periodontitis.

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Knowledge, Attitude and Performance of General Dentists in Relation to Children with Hemophilia and Related Therapies in Ahwaz

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Abstract

Introduction: The greatest concern for children with hemophilia is the risk of bleeding during and after treatment. A significant number of dentists refuse to treat these patients; thus, they refuse to visit dentists until there is a comprehensive and extensive need for dental treatment. This study tended to assess knowledge, attitude and performance of general dentists in relation to children with hemophilia and their related therapies in Ahwaz.

Materials and Method: this cross-sectional descriptive study was carried out by a researcher-made questionnaire consisting of 4 parts: personal information (5 questions), knowledge (9 questions), attitude (9 questions) and performance (9 questions) in 2018. The questionnaires were submitted to 100 dentists working at clinics of Ahwaz. The collected data was analyzed by SPSS22 software.

Results: In this study, 43 men and 57 women participated. Mean scores of knowledge were 4.36 ± 1.18 female dentists and 4.00 ± 1.04 for male dentists. The mean scores of attitude were 18.31 ± 3.99 in women and 15.93 ± 2.97 in men. Mean scores of performance were 10.3 ± 0.99 for male dentists and 3.16 ± 0.95 for female dentists, which were not statistically significant.

Conclusion: This study showed that knowledge and attitude and performance of dentists is not optimal in relation to children with hemophilia. Therefore, it is necessary to provide educational programs and give the necessary knowledge to the dentists.

Keywords: *knowledge, attitude, performance, hemophilia, dental procedures.*

Introduction

Hemorrhagic disorders include hereditary defects in coagulation factors, platelet deficiency, vascular disorders and fibrinolytic defects. Hemophilia is the most common hereditary coagulation disorder and is associated with deficiency in coagulation and hemostatic factors.¹ Hemophilia A or Classic is the most common type of hemophilia caused by factor VIII deficiency called the anti-hemophilia factor. Hemophilia B or Christmas disease is due to factor IX deficiency or plasma thromboplastin component. Other types of factor deficiency have been observed with very little prevalence.²

Both types of hemophilia have an X-linked recessive pattern and have common clinical features; however, they can be distinguished only through hemostatic assessment *in vitro*.³

These disorders are divided into subgroups based on level of pre-coagulation factor in the blood: severe deficiency (<1%), moderate deficiency (1 to 5%) and mild deficiency (5% to <50%).⁴ In mild hemophilia, bleeding occurs only after surgery, tooth extraction or trauma; in moderate type, there is spontaneous hemorrhage in small amount as well as hemorrhage after minor trauma. In severe hemophilia, there is spontaneous hemorrhage in muscles and weight bearing joints.⁵

Tears in mouth are one of the common causes of bleeding in children with hemophilia with varying degrees; the most common intraoral hemorrhagic sites are maxillary frenum and tongue.⁶ The main approach in treating these patients is to replace coagulation factors. Anti-fibrinolytic medications are used alongside the condensed factor and to prevent clot lysis in the oral cavity.⁷

Dentists should be aware of type of hemorrhagic disorder, severity, frequency, and treatment of hemorrhagic episodes. The greatest concern for these patients is the risk of bleeding during and after treatment; therefore, a precise medical evaluation of these patients, particularly children, is necessary before dental treatment.^{8,9}

A significant number of dentists refuse to treat these patients; thus, they refuse to visit dentists until there is a comprehensive and extensive need for dental treatment.¹⁰

Since there is concern about knowledge of general dentists about these patients and management of their treatment,⁹ this study tends to assess knowledge, attitude and performance of general dentists in relation to children with hemophilia and related treatments in Ahwaz.

This study tended to assess knowledge, attitude and performance of general dentists in relation to children with hemophilia and their related therapies in Ahwaz.

Materials and Method

To do this descriptive cross-sectional study and assess the knowledge, attitude and performance of dentists, a questionnaire was developed by the researchers. The developed questionnaire consisted of 4 parts: personal information (5 questions), knowledge (9 questions), attitude (9 questions) and performance (9 questions). The questionnaire was developed based on similar questionnaires in this field.^{11,12} Formal validity and content validity were evaluated by a paediatric dentist. Reliability of the final questionnaire was verified by performing a pilot study on 10 general dentists based on the Cronbach coefficient of 0.85.

The questionnaires were submitted to 100 dentists working at clinics of Ahwaz. The questionnaire was completed in person and by visiting the clinics.

After completing the questionnaire, the correct responses to the knowledge section were presented to the dentists for proper education. The collected data was analyzed using SPSS22 software.

For this purpose, some of the variables were classified as follows:

The variable age was divided into 4 age ranges: 25-30, 30-35, 35-40, and >40 years. The duration of employment as a general dentist was divided into 4 groups: <5 years, 5-10 years, 10-15 years and >15 years. The average number of children treated by the dentist during a month was divided into 4 groups: <10 people, 10-20 people, >20 people, and no treatment for children.

The responses to the questionnaire were based on the McDonald's Dentistry for the Child and Adolescent (2016).

A positive score was considered for each correct response in the field of knowledge and performance and a zero score was considered for each wrong response (false or unmarked). Finally, total score was set at 9 for knowledge and 9 for performance. Thus, knowledge and performance levels were classified into three groups: poor (0-3), moderate (4-6), and good (7-9).¹³

To assess the attitude of dentists by type of question, each option was scored from 1 to 5 and their sum was considered. A higher score indicated a more positive attitude of the dentist. Data was analyzed by t-test, Pearson correlation coefficient and one-way ANOVA.

Results

In this study, 43 dentists were men and 57 dentists were women. The mean score of knowledge, attitude and performance of female dentists was slightly better than male dentists, but there was no statistically significant difference between the two groups. Mean scores of knowledge were 4.36 ± 1.18 for female dentists and 4.00 ± 1.04 for male dentists. The mean scores of attitude were 18.31 ± 3.99 for women and 15.93 ± 2.97 for men. The mean scores of performance were 10.3 ± 0.99 for male dentists and 3.16 ± 0.95 for female dentists, which was not statistically significant (Table 1).

Table 1: Mean scores of knowledge, attitude and performance by gender

	Gender	N	Mean ± SD
Knowledge	Male	43	4.00±1.04
	Female	57	4.36±1.18
Performance	Male	43	3.10±0.99
	Female	57	3.16±0.95
Attitude	Male	43	15.93±2.97
	Female	57	18.31±3.99

Considering the classification of knowledge of dentists in terms of the scores of responses to the questionnaire, 40% (40) of dentists had poor level of knowledge, 56% (56) had a moderate level of knowledge and 4% (4) had a good level of knowledge.

There was a significant relationship between age of the dentists and the number of treated children per month ($p=0.009$). There was also a significant relationship between experience of the dentists and the treated children per month ($p=0.001$).

There was a reverse relationship between age and knowledge, attitude and performance; however, only the relationship between age and knowledge was significant ($p=0.021$).

There was a significant relationship between knowledge and attitude, in the sense that the more positive the attitude was, the higher the knowledge was ($p=0.001$).

There was a direct and significant relationship between knowledge and performance. The higher the knowledge, the better the performance ($p=0.003$).

There was a direct relationship between attitude and performance; however, it was not significant ($p=0.055$) (Table 2).

Table 2: Comparison of p-values in levels of knowledge, attitude and performance

Attitude	Performance	Knowledge	
0.001	0.003	-	Knowledge
0.055	-	0.003	Performance

Discussion

Assessing the level of knowledge, attitude and performance of health care providers is part of the process of educational needs assessment, which can be the basis for retraining programs for different groups of health care providers.

Dentists are an important part of healthcare providers. Dentists should be aware of the effects of hemorrhagic disorders such as hemophilia on how to deal with their patients, particularly children, and should ensure hemostasis before taking risky bleeding procedures.¹¹ Some dental procedures can cause bleeding, particularly in patients whose bleeding control has undergone changes due to systemic diseases such as haemophilia. In most cases, as soon as patients with bleeding disorders are identified, certain actions are taken to reduce bleeding during dental procedures.¹³

A significant number of dentists refuse to treat these patients; thus, they refuse to visit dentists until there is a comprehensive and extensive need for dental treatment.¹⁰

In this study, knowledge, attitude and performance of general dentists in Ahwaz in relation to children with hemophilia and their treatments were evaluated. Knowledge of 40% was poor, 60% had moderate and only 4% had good knowledge. Most dentists have poor knowledge and performance in relation to anti-fibrinolytic drugs, receiving factor and topical hemostatic drugs for various dental treatments such as pulp treatment and tooth extraction.

This is consistent with Kumar¹⁴ (14%), in which 78.3% of dentists had poor knowledge about patients taking antiplatelet drugs, while Haghi in Kermanshah found that knowledge of dentists about hemorrhagic disorders was acceptable and about 60% received total score of knowledge.¹¹ Basir Shabestari et al. reported

that the level of knowledge was moderate.¹³ In the present study, the most correct responses of dentists were related to minimum level of factor for homeostasis, but there was poor knowledge about the need for factor replacement for various treatments and symptoms in children with hemophilia.

Based on the results of this study, the mean scores of knowledge and attitude of female dentists was slightly better than male dentists, but there was no statistically significant difference between the two groups. In this regard, Robati and Farokhi¹⁵ and Basir Shabestari et al.¹³ reported no significant difference in knowledge between male and female dentists, while Moshaverinia et al.¹⁶ in Shiraz reported that female dentists had higher knowledge about haemorrhagic disorders.

In this study, there was a significant difference between age of the dentists and level of knowledge as the level of knowledge decreased with age. Similar results were found in Kia and Ghodsian¹⁷, Haghi et al.¹¹, and Moshaverinia et al.¹⁶, which confirmed the decrease in knowledge of participants by increasing the age and time of graduation. The higher level of knowledge of younger dentists can be attributed to more recent knowledge and newer reference books.

In the present study, 54% of dentists had poor performance in relation to patients with hemophilia, 43% had a moderate performance and only 3% had good performance. Considering the importance of dental procedures in children with hemophilia, it seems necessary to promote knowledge of dentists in this regard.^{18,19} In this case, the results of this study were consistent with the results of Salehi in Isfahan, because he also noted the low level of knowledge of dentists in Isfahan regarding haemorrhagic disorders.¹² In the present study, most dentists believed that children with hemophilia are referred to pediatric dentists for dental treatment. In a study by George et al.²⁰, 54.3% believed that they could treat the patients in the clinic and 45.7% preferred to treat the patient in the hospital.

In order to achieve topical anesthesia in hemophilic patients, coagulation factors for homeostasis need to be 40%; 60% of dentists responded correctly. The dentist knowledge about the level of factor was higher than knowledge of dentists reported by Salehi in Isfahan and Basir Shabestari in Qazvin.^{12,13}

For children with hemophilia, some topical anesthetic injections (intra-ligation injections) are allowed and there is no need to correct the coagulation factor; 40% of dentists responded correctly to this question. Regarding the knowledge of dentists about topical anesthesia in these patients, this study was consistent with Salehi and Basir Shabestari.¹³

Conclusion

This study showed that the level of knowledge and attitude and performance of dentists was not optimal in relation to children with hemophilia. Therefore, it is necessary to provide educational programs and give the necessary knowledge to the dentists.

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Co-Molecular Roles of Human Cytomegalovirus and p73 gene in late events of Nasopharyngeal and Sinonasal carcinogenesis

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Abstract

Sinonasal and Nasopharyngeal carcinomas are related to many environmental and genetic predisposing factors. HCMV plays an “oncomodulatory” role in the neoplastic process and can induce cellular responses that would provide a growth advantage for neoplastic cells. p73 was implicated in carcinogenesis of nasopharyngeal and sinonasal carcinomas. The research aimed to evaluate the cellular protein expressions of P73-tumor suppressor gene in relation to HCMV infection in tissues from nasopharyngeal, sinonasal benign and malignant tumors. This study included 183 formalin fixed, paraffin embedded tissue blocks from 35 inflammatory nasal polyps (INP), 35 sinonasal papilloma (SNP), 65 nasopharyngeal carcinomas (NPC), 18 sinonasal carcinomas (SNC) as well as 30 nasal healthy tissues as control for this study. In nasopharyngeal and sinonasal cancer tissues HCMV-DNA were detected in (78.5% and 66.7%, respectively) while, in sinonasal papilloma and nasal polyps, they were detected in (62.9% and 74.3%), respectively where the results have revealed highly significant differences ($P < 0.01$). Overexpression of p73 in nasopharyngeal, sinonasal benign and malignant tumor tissues in comparison with healthy control has been noticed. The significant detection of HCMV along with P73 genes expression in nasopharyngeal and sinonasal cancer patients could point for an sharing etiologic role for both of them in carcinogenesis.

Key words: NPC, SNC, pp65-HCMV, P73, CISH, IHC.

Introduction

Nasopharyngeal cancer is commonly seen in the posterior-lateral nasopharynx or pharyngeal recess¹. Human Cytomegalovirus (HCMV) is a beta-herpesvirus that causes lifelong infection in human². Infection with HCMV is typically harmless for pediatric and adults while serious consequences has been reported in immunocompromised persons and developing fetuses³. The tegument protein pp65 is involved in phosphorylation of the tegument protein pp28 and the immediate early protein IE72, which was proposed to prevent recognition of IE72 by CD8+ T lymphocytes. Pp65 appears to affect the activity of a specific subset

of cytotoxic T –Lymphocytes (CTLs) by modulating the processing of IE1-72⁴. Human cytomegalovirus has an implications in the etiology of several human cancers; including cervical carcinoma, prostatic adenocarcinomas and colonic and brain cancers⁵. HCMV infection might have role in building up the tumor cells through protection of certain tumor cells from apoptosis and modulating angiogenesis. However, there is scarcity of literatures evaluating the relationship between HCMV and NPC⁶. The deletion or silencing of p73 gene in pancreatic cancers, neuroblastoma, breast and hepatocellular carcinomas suggesting its potential role as tumor suppressor gene⁷. The present study could represent the first one in Iraq that dealing with analyzing the concomitant translational expression of p73 gene HCMV-DNA in nasopharyngeal and sinonasal tumors.

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Materials and Method

This study enrolled a total number of one hundred eighty three (183), selected formalin-fixed,

paraffin-embedded blocks from nasopharyngeal and sinonasal tissues. They were collected from archives of histopathological laboratories of several hospitals in Baghdad (Ghazi Al-Hariri Teaching Hospital, Al-kindy Teaching Hospital, Al-Yarmok Teaching Hospital). Some of these tissues block were related to the past 6 years (2013, 2014, 2015, 2016, 2017 and 2018) and are including 18 sinonasal carcinoma, 65 nasopharyngeal carcinomas, 35 sinonasal inverted papillomas, 35 nasal inflammatory polyps and 30 healthy sinonasal tissue blocks obtained from patients subjected to nasal bridge reconstruction operation as a control group. The diagnoses were based on their accompanied pathological reports of the corresponding patients. The age of these individuals (patients and controls) were ranged between (17-83) years (120 male, 63 female). Histopathological sections were made for biopsies and stained by hematoxylin and eosin for final definitive diagnosis. The detection of HCMV by Chromogenic in situ hybridization (CISH) reactions kit (purchased from ZytoVision GmbH, Fischkai, Bremerhaven, Germany) was performed on 4µm paraffin embedded tissue sections by using digoxigenin-labeled oligonucleotides probe which targets HCMV-pp65 DNA (Cat. Number: T-1113-400). The detailed methods for performing CISH reactions were conducted according to the instructions of the above manufacturing company, and done in the Molecular Virology Laboratory of the Clinical Communicable Diseases Research Unit, at College of Medicine, University of Baghdad. Immunohistochemical (IHC) assays were used to evaluate p73 expression in sinonasal and nasopharyngeal tissues by using Monoclonal Rabbit Anti-P73 antibodies (Cat. Number: ab40658) and rabbit specific HRP/DAB detection IHC Kit, Abcam /England) that targeted nuclear specific proteins. The quantification of CISH and IHC signals were assessed under light microscopy at (100X). Scoring and intensity of signals were done according to ⁸.

Statistical Analysis

In this study, SPSS program (version-21) was used for statistical analysis where Chi-Square test (χ^2), Odd ratio and Spearman's rho were used to assess the significances between variables.

Results and Discussion

The results of HCMV pp65 DNA-CISH among study groups:

Table (1) shows the positive results of HCMVpp65-DNA-CISH signal detection of tissues obtained from patients with NPC and SNC cancers as well as benign sinonasal tumors; the signals of HCMV/ CISH reactions were detected as blue discoloration that was detected by their specific probes and counter stained with nuclear red, positive CISH reactions where they constituted 78.5% of the total NPC tissues, 66.7% of total SNC tissues while in benign sinonasal papilloma and nasal polyps tumors (62.9% and 74.3%, respectively) compared to control group which presented with (6.7%) positive signals. The results revealed that SNC and NPC have odds ratio value of 51(5000) and 28(2700) while, SNP and INP have odds ratio 23.692 (2269.2) and 40.444 (3944.4), respectively. Statistically, there are highly-significant differences among the studied groups ($P < 0.01$). Of the positive tissues of NPC the highest percentage (29.2%) was in score 2, while the sinonasal carcinoma tissues have the same percentage (22.2%) in scores 1,2,3. On other hand, in benign sinonasal papilloma and nasal polyps, highest percentages (25.7% and 34.3%) were in score 1, respectively. Statically highly significant differences were recorded between studied groups at ($P < 0.01$) as detailed in (Table 1). The signal intensities of HCMV-CISH signal detection were illustrated, in NPC tissues group the strong signal intensity was noticed in (53.8%) whereas (18.5%) and (7.7%) have moderate and weak intensity, respectively. In sinonasal carcinoma, (38.9%) have strong intensities; while (16.7%) and (11.1%) have moderate and weak intensities.

The results of P73-IHC among studied tissues groups:

The signals of p73 -IHC were detected as brown discoloration at the specific antigenic sites of these reactions. (Table 2) illustrates the positive results of P73-IHC detection, where 72.3% of NPC, 94.4% of SNC, 60% of SNP and 71.4% of INP tissues were with total positive signals in comparison to control healthy group in which only (3.3%) noticed as positive signal. Statistically, highly significant differences recorded between studied groups ($P < 0.01$). The highest positivity percentage (35.4%) of NPC tissues had score 3, on the other hand highest percentage of sinonasal carcinoma of examined tissues (55.6%) were with score 3. In benign sinonasal papilloma and nasal polyps, the highest percentage (31.4% and 45.7%, respectively) have score 3. The signal intensities of p73-IHC signal

detection were noticed as follow, in NPC tissues group (46.2%) has strong signal intensities; while (15.4%) and (10.8%) have moderate and weak intensities, respectively. In sinonasal carcinoma, (66.7%) has strong intensities; while (22.2%) and (5.6%) have moderate and weak intensities, respectively. Table (3) shows the positive-HCMV results in relation to the examined histopathological grading of NPC and SNC. Regarding HCMV in SNC (66.7%) reveals poorly and undifferentiated grade. While in NPC (82.3%) was of poorly and undifferentiated grade. On the other hand, p73 in SNC (82.4%) were mainly noticed to have moderate and poorly differentiation grades whereas in NPC (74.5%) have undifferentiated grade.

Correlation of HCMV pp65-DNA-CISH with p73 in patients with Sinonasal and Nasopharyngeal Lesions: There are weak positive relationships between HCMV and p73 scores in nasopharyngeal carcinoma while this relationship was weak negative non-significant in sinonasal carcinomas. In nasal polyps, there were also weak negative relationships which did not reach significant level, whereas the correlation between HCMV and p73scoring was weak positive in sinonasal papilloma (Table 4)

Human cytomegalovirus blocks host DNA synthesis and deregulates cell cycle progression (9). A possible correlation between HCMV infection with SNC and NPC has been suggested by ^{6,10} but their results were lower than the present results. However, many other studies failed to establish a link between HCMV and sinonasal-nasopharyngeal malignancies ⁶¹. The previous studies have found that the expression of HCMV-DNA among NPC patients has ranged from 2% to 15% (12,13). Regarding benign nasal tumors, many studies have indicated a possible correlation between INP and HCMV infection ^{14,15}. The present study corresponds with the aforementioned studies that also used molecular techniques for HCMV detection in the studied tissues from inflammatory nasal polyps (INP). Regarding sinonasal papilloma, scarcity of studies to indicate the prevalence or correlation of such infection with SNP are faced. Regarding interplay between HCMV and grading in SNC these finding showed that HCMV have role in late events of multistep of SNC carcinogenesis process however by analogy, Ali *et al.*, found that CMV play

a late role in cervical adenocarcinoma and this may be due to small number size of samples that preclude clear or conclusion regarding the exact role of HCMV in SNC carcinogenesis. Effect of HCMV along with p73 was mainly at an early event and continued (although to a lesser effect) as an late event in SNC carcinogenesis in collaboration with many other factors in this process. On the other hand, in NPC, the co-existence of HCMV and p73 molecular markers play a possible role in the NPC carcinogenesis at late events. These findings supported by finding of other researcher ⁵. According to the odds ratio value of SNP and INP the present study suggest strong association between HCMV with both (SNP and INP) progression. As well as, this could indicates an important role of CMV infection in tumorigenesis and progression of sinonasal and nasopharyngeal carcinoma. Thus variability in HCMV detection rates between different studies might be explained by the variability in the study groups not only to the detection method but to their different prevalence according to the geographic origins. Several researcher have reported an oncogenic transforming potential of HCMV *in vitro* and several studies have been linked HCMV infections with malignant phenotype such as breast cancer. These findings could supported by results of current study in NPC. The viral infection may be an altered expression of IE protein which act as accessory production of viruses and immune evasion. The Pp65 is a major tegument protein responsible for modulating/evading the host cell immune response during HCMV infections. Human cytomegalovirus have many mechanisms to evasion from immune system as follow, inhibition of the antigen presentation, down-regulation of surface MHC expression, elaboration of transforming growth factor-beta (TGF- β) from infected cells and secretion of viral IL-10 homologue (CMV IL-10). These have assisted tumor cells to evade the immune-surveillance, ultimately survive, and progress. Human cytomegalovirus increase several cell cycle-regulatory proteins such as p53 that is a structural and functional homolog of p73, phosphorylated retinoblastoma RB and induced cyclin E expression resulting cell cycle progression into G1 and S phases. In addition, HCMV blocked induction of apoptosis that mediated by IE genes.

Table (1): Distribution of signal scores of HCMV pp65-DNA-CISH reactions.

HCMV scores A.H. Control		Studied groups					Pearson Chi-Square (P-value)
		Inflammatory nasal polyp (INP)	Sinonasal papilloma (SNP)	Sinonasal carcinoma (SNC)	Nasopharyngeal carcinoma (NPC)		
Negative	N	28	9	13	6	14	P=0.00 Highly Sign. (P<0.01)
	%	93.3%	25.7%	37.1%	33.3%	21.5%	
Positive	N	2	26	22	12	51	
	%	6.7%	74.3%	62.9%	66.7%	78.5%	
+	N	1	12	9	4	15	
	%	3.3%	34.3%	25.7%	22.2%	23.1%	
++	N	1	7	6	4	19	
	%	3.3%	20%	17.1%	22.2%	29.2%	
+++	N	0	7	7	4	17	
	%	0%	20%	20%	22.2%	26.2%	
Total	N	30	35	35	18	65	
	%	100%	100%	100%	100%	100%	
Odds ratio			40.444	23.692	28	51	

Table (2): Results of IHC-P73 expression among the studied tissues.

P73-IHC signal scores A.H. Control		Studied groups					Pearson Chi-Square (P-value)
		Inflammatory nasal polyp (INP)	Sinonasal papilloma (SNP)	Sinonasal carcinoma (SNC)	Nasopharyngeal carcinoma (NPC)		
Negative %	N	29	10	14	1	18	P=0.00 Highly Sign. (P<0.01)
	%	96.7%	28.6%	40%	5.6%	27.7%	
Positive %	N	1	25	21	17	47	
	%	3.3%	71.4%	60%	94.4%	72.3%	
+ %	N	0	2	1	0	14	
	%	0%	5.7%	2.9%	0%	21.5%	
++ %	N	1	7	9	7	10	
	%	3.3%	20%	25.7%	38.9%	15.4%	
+++ %	N	0	16	11	10	23	
	%	0%	45.7%	31.4%	55.6%	35.4%	
Total %	N	30	35	35	18	65	
	%	100%	100%	100%	100%	100%	

Table (3): Co-presence of HCMV and p73 with grading in sinonasal and nasopharyngeal carcinomas.

Studied groups	Diagnosis Positive		HCMV		P73		
			Negative	Positive	Negative		
Sinonasal carcinoma (SNC)	Moderately differentiated	N	4	4	8	0	
		%	33.3%	66.7%	47.1%	0%	
	Poorly differentiated	N	6	1	6	1	
		%	50%	16.7%	35.3%	100%	
	Undifferentiated	N	2	1	3	0	
		%	16.7%	16.7%	17.6%	0%	
	Total	N	12	6	17	1	
		%	100%	100%	100%	100%	
	Pearson Chi-Square (P-value)			P=0.343 Non Sign.(P>0.05)		P=0.435 Non Sign.(P>0.05)	
	Nasopharyngeal carcinoma(NPC)	Well differentiated	N	8	2	8	2
%			15.7%	14.3%	17%	11.1%	
Moderately differentiated		N	1	1	0	2	
		%	2%	7.1%	0%	11.1%	
Poorly differentiated		N	4	0	4	0	
		%	7.8%	0%	8.5%	0%	
Undifferentiated		N	38	11	35	14	
		%	74.5%	78.6%	74.5%	77.8%	
Total		N	51	14	47	18	
		%	100%	100%	100%	100%	
Pearson Chi-Square (P-value)			P=0.553 Non Sign.(P>0.05)		P=0.071 Non Sign.(P>0.05)		

Table (4): Spearman’s rho statistical testing to evaluate studied molecular marker scoring in relation to HCMV infections in sinonasal and nasopharyngeal lesions.

Spearman’s rho (Scoring) Nasopharyngeal carcinoma		HCMV			
		Sinonasal carcinoma	Sino-nasal papilloma	Nasal polyp	
P73	r.	0.068	-0.339	0.129	-0.120
	P-value	0.593	0.168	0.459	0.494

Conclusion

The highly significant translational expression of P73 gene as well as high rate of occurrence of HCMV in nasopharyngeal and sinonasal carcinoma, could indicate an important role of these molecular in the nasopharyngeal and sinonasal carcinogenesis.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Nurses' Knowledge Concerning Standard of Clinical Care for Thalassemia Patients in Thi-Qar Province

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Abstract

Objective of the study: Asses nurses' knowledge about child with thalassemia, Find out the association between nurses' knowledge and their age, course of training, years of experience, and socio economic status, Investigate the differences in nurses' knowledge between the gender groups and level of education groups. A non-experimental design held through using nurses' knowledge toward children with thalassemia. It has been carried out in order to achieve the early stated objectives with the application of knowledge assessment to one group of nurses through the period of 1st of November 2017 to the 1st of December 2018. Most of the results were based on demographic information between the ages of 30-39, where the majority of women were graduates of the Diploma in Nursing When tested, the results were weak and related to the knowledge of nurses about thalassemia according result overall knowledge .

Keywords: Nurses, Knowledge, Thalassemia

Introduction

Thalassemia considered as recessively autosomal inherited (genetic) condition demonstrating either reduction or absence of synthesis in one of two polypeptide, chains fractions (α or β), that form the a normal adult human (Hb%) hemoglobin molecule. The signs and symptom severity varies to from Thalassemia major, intermedia and another type, it is minor thalassemia , with the characterization of the various forms based on the gravity of the condition rather than the underlying genetic defect or abnormality¹, Thalassemia is one of genetic blood disorders effecting the abnormal formation of hemoglobin chain which considered as a growing problem in the world² Specifically among those of Mediterranean descent, such as Greeks,. and Italians, and amongst those from Africa,. Southeast Asia, Iran, and Arabian Peninsula³.

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Results and Discusion

In this table, more than 60% of the sample is between 20-29 years old and the same percentage are women who have graduated from medical institutes with 5 years of experience but about 70% live in urban areas and more than 60% do not have enough monthly income. The current study's results reveal the nurses are selected for the Standard of Clinical Care for Thalassemia patients , Table (1) shows that (62.1%) of nurses were in age (20 -29) years old, more than the half of the study sample (62.1%) are females and male that (37.9%) , this is supported by a study done by [4] on pediatric nurses and his study he mentioned that more than half of the sample are females, about marital status can show(37.9%) married and (62.1%) it is nursing single. about percentage of number of female , from the investigator point of view, this result comes because the preparation of plan for the colleges nursing in Iraq that focused on females than males (80% females, 20% males) because of the decrease in female nursing staff in the Iraq, around level of education (51.7%) of them are graduated from nursing institute., and while just (17.2%)

are bachelor graduated from nursing school, this result high percentage of nurses working in the Center for Hematology and those with a higher diploma is due to the small number of nursing colleges in governorate and this result give level of education in nursing that should be elevated level of knowledge, this study focusing with , To improve the patient outcomes and meet the challenges of the U.S. health care system, the Institute of Medicine recommends higher educational attainment for the nursing workforce. Characteristics of registered nurses (RNs) who pursue additional level of education are poorly understood,. and this information is critical to planning long-term strategies for U.S. nursing education., show (62.1%) of them have more than (2) years of experience of job as nurses, ,and while (58.6%) of them have (2) years of experience in the field center of hereditary blood diseases ., This result give period of service for nurses in the center was few, because of the frequent transfer of health personnel from the Center of blood diseases to other health centers in the province, that affects the type of service provided to patients hence the newly employed do not have skills and knowledge in center,. this study agrees with the result of⁶ study in which the American Nursing Association , and the American College of Nursing Education has recommended integration of genetics knowledge and skills into routine health care to provide effective interventions for individuals and families that important to elevated skills . the result of a study carried by (Najeeb and Al- Daragy,2004). Concerning to the resident result, it was found that the majority of the nurses sample (72.4%) are from urban an residence. From the researcher focusing point of view, this result that may be due to the rural residential area nurses are more likely to continue in their education ,and that refer to educational and economic statue of their family and life style ,this result support by⁷ which report that rural participants were less likely than were urban participants to believe that female nurses are ready to accept large numbers of men into the profession. Concerning table (2) nursing knowledge that response overall we can see high significant in identify the disease , We notice that the results were moderate and low, which give us a perception that the information was brief on the knowledge of the disease from the aspects of the phenomenon only and there is no depth in the details of the disease, which includes the types and classification and diagnosis, and matters related to blood transfusion and personal care, which include the maintenance of

complications and nutritional aspects, Treatment and special bone marrow transplantation. This is due to the researcher’s tendency to frequent mobility of nurses working in the center. This result supported with table shows (58.6%) of nurses have a fair level of knowledge. And we show result that is poor of knowledge,. Results shown that these nurses cared for people with a range of cancers, While they reported an above-moderate level of competency, they also rated their level of competency higher in physical than in psychosocial care. Among them self-perceived educational needs were more knowledge, and skills in psychosocial care, communication, dealing with side-effects of treatment and pain management [8]

Table (1). Distribution of the demographic Information

Items		F.	%
Age	20-29	18	62.1
	30-39	11	37.9
Gender	Male	11	37.9
	Female	18	62.1
Marital status	Single	18	62.1
	Married	11	37.9
Level of education	Preparatory	9	31.0
	Institute	15	51.7
	Bachelor	5	17.2
years of service	less than 5 years	11	37.9
	More than 5 years	18	62.1
years of service in field	less than 2 years	12	41.4
	More than 2 years	17	58.6
Resident	Rural	8	27.6
	Urban	21	72.4
Economic status	Not enough	23	79.3
	Somewhat enough	6	20.7

Conclusion

According to the results and analysis of the data according to the objectives, the following conclusions are presented, the conclusions are: Most of the results were based on demographic information between the ages of 30-39, where the majority of women were graduates of the Diploma in Nursing., When tested, the results were weak and related to the knowledge of nurses

about thalassemia, There are significant differences related to knowledge, after exposure to the test and after reviewing the educational for children Thalassemia

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Thi-qar, Faculty of nursing, Department of pediatric nursing – Thi-Qar – IRAQ and all experiments were carried out in accordance with approved guidelines.

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Nurses' Practices Concerning Standard of Clinical Care for Thalassemia patients in Thi-Qar Province

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Abstract

Objective of the study: Asses nurses' practices about child with thalassemia, Find out the association between nurses' practices with demographic data. A non-experimental design was used at the level of nurses' practices in the treatment of Thalassemia patients. The goal was to apply the highest level of skill to the female nurses at the Thalassemia Center during a specific period of 1st of November 2017 to the 1st of December 2018. According to the results, the majority of workers in the average age of the dream were diploma holders, most of them females, and residents of the center, and according to the results there was a weakness in the level of practices related to topics such as giving blood early detection of the disease, treatment of complications that result from the disease.

Keywords: Nurses, Practices, Thalassemia, clinical care

Introduction

The newly born child is a carrier of the inherited traits of anemia. Thalassemia is normal at birth. Changes in signs and symptoms occur on the child, such as hepatitis and severe anemia, 6 months after birth, There are signs and symptoms seen by physical examination such as changes that can be observed on facial bones, teething, weakness due to decrease RBC, slow growth, dyspnea, and skin change yellow (increase levels of the bile pigment bilirubin) and acute anemia related to disease can cause sudden death (within twenty-thirty years) and the main factor is heart failure¹. Moreover, ² stated that growth failure, bone structure (bone tissue loss), and an enlarged size of liver are common. As long as a patients with thalassemia disease have symptoms not demonstrate under the six months old most children with beta thalassemia and some types of thalassemia alpha, which are associated

with a different type of hemoglobin (hemoglobin), called embryonic hemoglobin, after 6 months of normal "hemoglobin", which begins to replace the fetus type, may begin The mark and the symptoms. Staff working at the Hematology Center are always in urgent need of health care programs to help them care for patients to reduce the risk of complications so they can live near their families. ³ World Health organization (WHO) (2010) reports confirm that if the patient and the patient are diagnosed with the severe type of disease, focus on giving the person and family important information about the disease, specifically the nursing staff in charge of awareness to reduce the complications of the disease. The nurse played an important role in the health team of health care professionals who took care of people with hemoglobinemia, contain hemoglobin (Hb%) such as the Mediterranean clitoris and sickle cell disease, which were extremely difficult and fatal if left untreated and treated. Exchange knowledge and focus on prevention, treatment and care, and these procedures can be more effective on the patient ⁴.

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Rresults and Discusion

The majority of the sample was from the average age group, female and unmarried, with 5 years of experience

in the health sector. According to the results related to the economic aspect, most nurses were dissatisfied with the economic situation. Table (2) shows that the response of the nursing staff to the practice component of children with thalassemia was very low and according to the questionnaire they showed that (14) of the questions were at a low level of evaluation. Out of 24 of the entire questionnaire, the results of the above table indicate a weak level of nurses' practices towards childcare look as if mean of score as in lower limit. Satisfied level of knowledge and practices has been acknowledged as a compulsory element in the nurses' aptitude to lead normal and productive life to their patients⁵. The Nurse's knowledge and practice were painstaking as one of the crucial tools in raising the standard of patient care giving by the nurses. They must have sound understanding of scientific principles underlying each step of any procedure in order to prevent possible risk factor, so they will be able to apply their knowledge into effective care⁶. Targeted training to address the knowledge deficit is required, with the wider components of advance care planning promoted. There is a need for greater role clarification to ensure nurses in long-term care settings identify with the process in the future⁵. According to results in the demographic information table, the majority of nurses were 30 years old and the majority were unmarried who had a diploma and had less than 2 years of experience at the Hematology Center, this is supported by a study done by⁷ on pediatric nurses. The study was conducted in the province of Dohuk – Iraq, the study was focused on the nurses knowledge level about management and nursing care toward child special need, sample included 129 nurses, most of sample was under 30 years old, and majority working that female, whose mentioned that more than half of the sample were females, though, marital status can show (37.9%) married and (62.1%) of them are single. From the investigator point of view, this result relation to plan for the nursing colleges in Iraq that focused on females more than males (80% females, 20% males) for the reason that of the decrease in female nursing staff in the Iraq. Around level of education (51.7%) of them are graduated from nursing institute, while just (17.2%) are bachelor level of nurses working in the Center for Hematology in addition to those with small number of higher diploma level of nurses, this study sustained by⁸. The study was conducted in America. The focus of the study was on the development in the educational aspect of nurses and the extent of satisfaction. It focused on the development of medicine compared to the level of scientific and educational nurses towards nursing care

for diseases. The sample included children and people with chronic diseases that need constant attention. The program focused on improving the level of knowledge. A group of 8 volunteer nurses took the test. The results showed a marked improvement in the level of knowledge and increased self-confidence, the table shows (62.1%) of population have more than (2) years of experience of job as nurses, and while (58.6%) of them have (2) years of experience in the field of hereditary blood diseases. This result give period of service for nurses in the center was few, because of the numerous alternation of health personnel from the Center of blood diseases to other health centers in the province, that distresses the level of service provided to patients, hence the newly employed do not have skills and knowledge in center, this agrees with the result of⁹ which the American Nursing Association, and the American College of Nursing Education has recommended integration of genetics knowledge and skills into routine health care to provide effective interventions for individuals and families that important to elevated skills. In concerning the resident result, it was found that more than half of the nurses (72.4%) are from urban, from the researcher focusing point of view, this result that may be due to the rural residential area, nurses are more likely to continue in their education, and that interrelated to educational and economic statue of their families and life style, this result support by¹⁰ which report that rural participants were less likely than urban participants in nursing profession. Concerning nurses practices who's working in thalassemia center pretest table, there are many items of practices were not good, and include both psychological and social that related to patients, and counseling, especially pregnant women and teenager age, there is weakness in matters related to increase in level of body iron, Was very weak particularly the nutritional status with relationship to tea by reducing the proportion of iron, and about encouragement to meet the psychological needs of the patient through periodic meetings of families, this result could be seen in table which shows the nurses response to thalassemia overall practice items, it publicized (100 %) of the nurses included in the study have a poor level of practices. A study conducted in Syria by¹¹, aimed to assess the effects of Patients' and Care-givers' Knowledge, Attitude, & Practice, with Quality of Life among Thalassemia Major Patients' in Syria, was total of 238 thalassemia patients participated in the study, resulted in lack in patients' knowledge and skills regarding the disease which influenced by poor level of nurses to improve their knowledge regarding their inheritant disorder.

Table (1) Distribution of studied population according to their sociodemographic characteristics

Items		F.	%
Age	20-29	18	62.1
	30-39	11	37.9
	Total	29	100.0
Gender	Male	11	37.9
	Female	18	62.1
	Total	29	100.0
Marital status	Single	18	62.1
	Married	11	37.9
	Total	29	100.0
Level of education	Preparatory	9	31.0
	Institute	15	51.7
	Bachelor	5	17.2
	Total	29	100.0
years of service	less than 5 years	11	37.9
	More than 5 years	18	62.1
	Total	29	100.0
years of service in field	less than 2 years	12	41.4
	More than 2 years	17	58.6
	Total	29	100.0
Resident	Rural	8	27.6
	Urban	21	72.4
	Total	29	100.0
Economic status	Not enough	23	79.3
	Somewhat enough	6	20.7

Conclusion

According to the results analyzed, most of the sample of the nurses who work in the center less than two years and the age of 30 years without marriage and most of the sample in the center of the city live, according to the results on the economic side there was no satisfaction with the standard of living, there is a marked weakness of practices related to blood transfusion and care During the treatment

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, Faculty of nursing, Department of pediatric nursing - Babylon – IRAQ and all experiments were carried out in accordance with approved guidelines.

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The Electrocardiographic Abnormalities in Patients with End-Stage Chronic Kidney Disease in Kirkuk General Hospital

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Abstract

Background: Chronic kidney disease (CKD) has an increased risk of not only end-stage renal disease (ESRD), but majority of moderate CKD patients do die from cardiovascular disease (CVD) before reaching ESRD. The occurrence of electrocardiographic (ECG) changes in uremic patients has been recognized for decades.

The Aim of Study: To study ECG abnormalities in patients with end-stage chronic kidney disease.

Patients and Methods: This is a cross-sectional study carried out at Kirkuk General Hospital. Patients were recruited from the dialysis unit and all who met diagnostic criteria for stages 5 CKD were included. There were 100 cases on regular hemodialysis, (60) were males and (40) were females. All had their standard 12-lead electrocardiogram (ECG) recorded and various findings. All patients were examined and the blood was drawn from each patient and sent for renal function tests and serum electrolytes level.

Results: The most common causes of CKD were hypertension (HT) (78%) and diabetes mellitus (DM) (55%). The most common electrolyte disturbances were hypocalcaemia (35%) and hyperkalaemia (29%). The ECG abnormalities among the patients of CKD were: LVH(30%), LAE(11%), mixed LVH and LAE(16%), sinus tachycardia(25%), sinus bradycardia(24%), ventricular ectopic beat(20%), arterial ectopic beat(6%), ischemic changes(10%), tented T-wave(43%), prolonged QT interval(43%), Arterial fibrillation (2%) and normal ECG (4%). All these findings are related to the causes of CKD especially HT and DM and other causes.

Conclusion: HT and DM are most common causes of CKD, and ECG abnormalities and electrolytes disturbance were prevalent in patients with CKD.

Keywords: *Electrocardiographic ECG, Chronic kidney disease CKD, Cardiovascular disease (CVD).*

Introduction

There are many equations in the human body act all together to keep the body in equilibrium, and disturbance in single equation may lead to disturbance of that equilibrium. Renal function is an example. It is recognized now that even mild abnormalities in measures of kidney structure and function are associated

with increased risk for developing complications in other organ systems as well as mortality^[1,2].

Chronic kidney disease (CKD) is a general term for heterogeneous disorders affecting kidney structure and function. The 2002 guidelines for definition and classification of this disease represented an important shift towards its recognition as a worldwide public health problem that should be managed in its early stages by general internists. Disease and management are classified according to stages of disease severity, which are assessed from glomerular filtration rate (GFR) and albuminuria, and clinical diagnosis (cause and pathology)^[1]. Chronic kidney disease can be detected

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with routine laboratory tests, and some treatments can prevent development and slow disease progression, reduce complications of decreased GFR and risk of cardiovascular disease, and improve survival and quality of life^[3]. Cardiovascular disease (CVD) disorder is the commonest causes of morbidity and mortality in end-stage renal disease (ESRD) patients with or without dialysis therapy. Patients with ESRD have an exceeding high risk for CVD and majority of deaths in chronic kidney disease (CKD) patients are due to cardiovascular events^[4,5,6]. Patients with CKD often develop electrolyte abnormalities and metabolic acidosis. Fluid retention is common in advanced CKD and disproportionate fluid retention may occur in milder disease, sometimes

leading to episodic pulmonary oedema^[7,8]. The occurrence of electrocardiographic (ECG) changes in uremic patients has been recognized for decades^[9]. Patients with chronic kidney disease (CKD) undergoing hemodialysis experience a high annual mortality rate (7% per year) with 25% of all deaths due to sudden cardiac death^[10]. ECG changes may include reflection of structural changes such as left ventricular or atrial hypertrophy, ischemic changes or electrolyte disturbances that affect PR, QRS, and QT intervals or may cause arrhythmias^[11].

The aim of study: to study ECG abnormalities in patients with end-stage chronic kidney disease in relation to electrolytes disturbances and causes of CKD.

Patients and methods

Patients:

A cross sectional study has been conducted at Kirkuk General Hospital throughout the duration from December 2014 to August 2015.

The studied population included (100) cases, (60) cases were males and (40) case were females all are admitted to the Dialysis unit and referred consecutively to electrocardiography in same unit of hospital. And (5cc) of blood from all the patients to laboratory unit for measurement of renal function tests and electrolytes level.

Inclusion Criteria

Patients with CKD on regular hemodialysis and most of them at stage 5 as classified by eGFR.

Exclusion Criteria

- 1-Patients with Acute kidney injury(AKI).
- 2-Patients with Hepatitis.
- 3-Children patients under age of 10 years old.
- 4-Agitated patients.

Data Collection

The data collected by data collection sheet that is design for each patient which include the demographic characteristic of patients. All patients were examined and investigated for renal functions tests and serum electrolytes, also ask about clinical features and cause of CKD. All patients were instructed about the study and their agreement was taken.

Laboratory Methods:

Five ml of venous blood was drawn without using tourniquet from each patient and sent to the laboratory for measurement of renal function tests and electrolytes. Normal value of blood urea (2.5-6.6)mmol/L^[12]. Normal value serum creatinine (60-120)Mmol/L^[13]. Normal value serum potassium (3.6-5.1)mmol/L. Normal value of serum calcium (2.1- 2.6 mmol/l) (8.5- 10.5 mg/dl)^[14].

ECG changes: Include changes in rate ,rhythm, PR interval, Pwave, QRSwave ,QT interval, ST segment, T wave and other change.

Statistical Analysis and Data Management :

The Statistical Package for Social Sciences (SPSS, version 18) was used for data entry and analysis. Chi (χ^2) square test of association was used to compare proportions of different factors among different groups of study sample. P value of ≤ 0.05 was regarded as statistically significant. Data presented by tables.

Results

Out of 100 patients of the dialysis unit; (60) were male, and (40) were female, the mean age was (53.49±15.4) years and the mean BMI was (26.2±6.7).

Only (4) of the patients had normal ECG findings as compared with (96) of the patients with abnormal changes. ECG changes consistent with hypocalcaemia was found among (44), followed by hyperkalemia (43), followed by left ventricular hypertrophy (LVH) (30) of the patients, and Sinus bradycardia among (24), as shown in table -1-

Table-1- ECG abnormalities in patients with CKD

ECG conclusion	Frequency	Percent
left ventricular hypertrophy (LVH)	30	30.0
left atrial hypertrophy (LAH)	11	11.0
Mixed(LVH+LAE).	16	16.0
Sinus tachycardia.	15	15.0
Sinus bradycardia.	24	24.0
Ventricular ectopic beat.	20	20.0
Atrial ectopic beat	6	6.0
Ischemic changes.	10	10.0
Hyperkalemia.	43	43.0
Hypocalcaemia	44	44.0
Atrial fibrillation.	2	2.0
Normal	4	4.0
Total	100	100.0

About 24(45.5%) of Diabetic patients had hypocalcaemia, followed by Hyperkalemia.19 (35%), followed by 15(27%) for LVH, and SB.

Most common ECG abnormalities among glomerular disease were hyperkalemia 7 (70%), followed by hypocalcaemia 3(40%).

Among those who had congenital abnormalities the most common ECG findings were hyperkalemia 8 (67%), followed by hypocalcaemia 7(58%) and LVH 4(33%).

Among those who had interstitial diseases it was LVH and hyperkalemia 1(100%).Among those had Obstructive lesions the common findings were Hyperkalemia.8 (40%), LVH 7(35%), and hypocalcaemia 7(35%). Among HT patients the most common ECG findings were hypocalcaemia 37(47%), Hyperkalemia.31 (40%), followed by LVH 24(31%), as shown in table-2-.

Table-2-the relation between ECG abnormalities and causes of CKD

ECG abnormalities	DM		Glomerular disease:		Congenital		Interstitial		HT		Obstructive		Others	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
LAH	6	11	1	10	2	17	0	0	8	10	0	0	1	14
LVH.	15	27	3	30	4	33	1	100	24	31	7	35	2	29
Mixed(LAH&LVH)	4*	7	2	20	1	8	0	0	13	17	1	5	3*	43

Cont... Table-2-the relation between ECG abnormalities and causes of CKD

Sinus tachycardia.	12*	22	0	0	3	25	0	0	11	14	2	10	2	29
Sinus bradycardia	15	27	2	20	2	17	0	0	21	27	2	10	0	0
Ventricular ectopic beat	11	20	0	0	1	8	0	0	12*	15	5	25	2	29
Atrial ectopic beat	5	9	0	0	0	0	0	0	5	6	1	5	1	14
Ischemic changes	9*	16	2	20	0	0	0	0	8	10	1	5	0	0
Hyperkalemia.	19*	35	7	70	8	67	1	100	31	40	8	40	4	57
hypocalcaemia.	24	45.5	3	40	7	58	0	0	37	47	7	35	4	57
Atrial fibrillation	2	4	0	0	0	0	0	0	0*	0	2	10	0	0
Normal	2	4	1	10	0	0	0*	0	3	4	3*	15	0	0
Total	55	100	10	100	12	100	1	100	78	100	20	100	7	100

*significant P value< 0.05

About 1(2.3%) of those with Tented T wave had potassium level < 3.6mmol/L, 19(44.2%) of them had level of 3.6-5.5 mmol/l and 22(51.2%) of them had level of 5.5-6.5mmol/l, and 1(2.3%) of them had a level of > 6.5, this relation was statistically not significant, as shown in table -3-.

Table-3- ECG changes consistent with hyperkalemia in relation to potassium level by lab measurement

S.potassium mmol/l	Yes		No		Total
	T wave		T wave		
	tented	Normal	tented	Normal	
<3.6	1	0	0	6	6
	2.30%	0	0.00%	10.70%	10.50%
3.6-5.5	19	0	1	44	45
	44.20%	0	100.00%	78.60%	78.90%
5.6-6.5	22	0	0	6	6
	51.20%	0	0.00%	10.70%	10.50%
> 6.5	1	0	0	0	0
	2.30%	0	0	0	0
Total	43	0	1	56	57
	100.00%	0	100.00%	100.00%	100.00%
X2, P value	Not applicable		0.27,>0.05		

About 22(50%) of those with Prolonged QT wave had calcium level <2.1 mmol/l, 22(50%) of them had a level of 2.1-2.6 mmol/l, and non of them had a level of > 2.6, mmol/l as shown in table -4-.

Table-4- ECG changes consistent with hypocalcaemia in relation to calcium level by lab measurement.

s. calcium	Hypocalcaemia					Total
	Yes		Total	No		
	QT interval			QT interval		
	Prolonged	Normal	Prolonged	Normal		
<2.1	22	0	22	0	13	13
	50.00%	0	50.00%	0	23.60%	23.60%
2.1-2.6	22	0	22	0	39	39
	50.00%	0	50.00%	0	70.90%	70.90%
>2.6	0	0	0	0	3	3
	0	0	0	0	5.50%	5.50%
Total	44	0	44	0	55	55
	100.00%	0	100.00%	0	100.00%	100.00%
X2, P value	Not applicable			Not applicable		

Discussion

The mean age of study patients was 53.49±15.4 years. This is in agreement with findings of earlier studies which showed highest incidence between third and fifth decade of life [15,16,17]. In contrast with reports from industrialized countries in which more than 50% of CKD patients are above 65 years [18,19,20].

The most common ECG abnormalities among CKD patients are, LVH, sinus bradycardia, ventricular ectopic beat, sinus tachycardia, mixed LVH and LAE, LAE, ischemic changes, arterial ectopic beat and atrial fibrillation respectively. Overall, the LVH and other ECG abnormalities in this study is in agreement with that observed in CKD patients by Oyediran AB and Akinkugbe OO, and Akinsola W et al [15,16]. But contrasts with 83% reported by Blayer AJ et al and Cohen MV et al [18,19]. Although there is general agreement that LVH is highly prevalent in dialysis patients, it does vary depending on composition of study population, age, gender, blood pressure, heart rate, and ethnicity.

In the present study, the most common causes of the CKD were ; HT, DM, obstructive nephropathy, congenital diseases, glomerular diseases and rarely interstitial disease and other causes. This is in agreement with previous studies [15,16,17]. In contrast with reports from industrialized countries that DM is more common than HT. Also the glomerular diseases more common than congenital and interstitial diseases [18,19,20]. This happened as a result of differences between races and ethnicity. Diagnostic facilities and medical devices may also lead to this difference.

In the present study 35% of patients had hypocalcemia while 23% of them had hyperkalemia. This is in agreement with previous studies [21,22], and contrast with other studies [23,24]. This is because of the difference in accuracy and good performance of the machine and workers between developed and developing countries.

More than half of patients with tented T-wave in the present study had hyperkalemia by lab measurement, while (44.2%) of them had normal potassium level and (2.3%) of them had hypokalemia, and half of those with

prolonged QT interval had hypocalcemia and the other half had normal calcium level by lab measurement. This is in agreement with previous studies [21, 22], and in disagreement with other studies [23, 24]. This is due to the difference in accuracy and good performance of the machine and workers between developed and developing countries, also it pointed that the electrolytes disturbance that are found in ECG changes (Prolong QT interval and tented T wave) are not always in concordance with laboratory test among the patients. Findings on ECG are neither sensitive nor specific for hyperkalemia. Therefore, although

ECG changes should trigger urgent treatment, treatment decisions should not be based solely on the presence or absence of ECG changes [25, 26, 27].

Conclusions

Concerning the findings of the present study the followings may be concluded:

1-The most common causes of CKD are Hypertension, DM, Obstructive lesion, Congenital diseases, Glomerular diseases, other causes and Interstitial diseases respectively.

2-The ECG abnormalities in end-stage CKD are tented T-wave, prolonged QT interval, LVH, sinus bradycardia, ventricular ectopic beat, sinus tachycardia, mixed LVH and LAE, LAE, ischemic changes, atrial ectopic beat and atrial fibrillation respectively.

3-The electrolytes disturbance that are found in ECG changes (Prolong QT interval and Tented T wave) are not always in concordance with laboratory test among the patients.

Conflict of Interest: (Nil – There are “No Conflict of Interest”).

Source of Funding: By both researchers (Self).

Ethical Clearance: Committee members are approved to perform a study about:

“The electrocardiographic abnormalities in patients with end-stage chronic kidney disease in Kirkuk General Hospital”

After discussion of study plan with researchers.

Researchers

Professor assistant. Zaidan Jayed Zaidan / Department of internal medicine, College of Medicine, Tikrit University, tikrit – Iraq.

Imad Tahseen Abdulhafedh / Diploma of Medicine- Al-Ramadi Teaching Hospital.

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