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Socio-demographic Profile of Pattern of Solvent Abuse among Street Children in Bengaluru

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ABSTRACT

Background: Solvent use among children and adolescents is a major concern across the world. Solvents are easily available, convenient to use, relatively inexpensive, and legal for certain uses; and all these factors promote their use and also abuse at later stages in youngsters.

Objectives:

- a) To study the socio-demographic pattern of solvent abuse.
- b) To describe the patterns and consequences of solvent abuse.
- c) To design a better preventive and rehabilitative approach to help these children.

Methodology: The present observational study was conducted in the Department of Forensic Medicine & Toxicology, Bangalore Medical College & Research Institute, Bengaluru during the study period of 2 years from 1st Aug 2010 till 31st Aug 2012. The study was done on the street children, who stay in the areas of Railway Station, Kalasipalya and Shivajinagar of Bangalore City; who were interviewed based on a predesigned proforma relating to solvent abuse and the data were analyzed. Totally 200 street children with history of solvent abuse were enrolled into the study.

Results: In the present study, Solvent abuse was common among male children in the age group of 13-15yrs. Majority of the children were coolie by occupation, started working by the age of 10 years & most of them took shelter on foot path. Tobacco was the most common other substance of abuse followed by Gutka, Alcohol & Ganja.

Conclusion: This study has identified key issues requiring urgent public health action. The widespread use of solvents is particularly concerning due to easy, cheap availability and unrestricted sales to minors, as well as detrimental health effects of the same should be a major concern for law and policy makers. It is likely that the use of solvents could impact upon the ability of street children to be integrated into society and resume a normal social life.

Keywords: Solvent; Abuse; Streetchildren; Bengaluru

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INTRODUCTION

Streets throughout the world are home to millions of children who endure hardships and injustices while struggling to survive¹. The United Nations Children's Emergency Fund (UNICEF) defines children living and working on the street in three categories: 'children

of the street’, ‘children on the street’ and ‘children from street families’². Children on the street spend a proportion of their time on the street, working to provide an economic contribution to their family, but often return home at night, maintaining familial ties. Children of the street both work and sleep on the streets and have an absence of regular contact with family members. Children from street families live with their families in the street².

Although street-involved children and youth (SICY) are a world-wide phenomenon, the dynamics that drive children to the streets are quite diverse and vary between high-income and low to middle-income countries³. While youth in developed countries usually become street-involved due to familial conflict and child abuse⁴, children in resource-constrained settings (RCS) succumb to street life due to abject poverty, child abuse, neglect and familial dysfunction, death of one or both parents, war and socio-cultural and religious beliefs⁵⁻⁹. Additionally, the solvent use habits adopted by SICY in RCS are often divergent from those of their counterparts in high income countries¹⁰. Youth in street circumstances in high-income settings engage in using injection drugs and other substances that are not used commonly among children and youth on the streets in RCS¹⁰⁻¹².

There are an estimated 100 million street children worldwide of which 30 million are in Asia and 10 million in Africa. India alone has an estimated number of 414,700 street children in its major cities. It is found that about 80,000 street children live in and around Bengaluru. Roughly about 60 new children land up on bus stands and railway stations every day in Bengaluru¹³.

METHODOOLOGY

The present observational study was conducted in the Department of Forensic Medicine & Toxicology, Bangalore Medical College & Research Institute, Bengaluru during the study period of 2 years from 1st Aug 2010 till 31st Aug 2012. The study was done on the street children who stay in the areas of Railway Station, Kalasipalya and Shivajinagar of Bangalore City, who were interviewed based on a predesigned proforma relating to solvent abuse and the data were analyzed. Totally 200 street children with history of solvent abuse were enrolled into the study.

RESULTS & OBSERVATION

In the present study, 93.5% were male and 6.5% were female. Among the different age groups (Table 1), it was observed that the highest numbers of children were aged 14 years (31.5%) and the lowest were aged 11 years (1.5%). It was observed that, most of the street children lived (Table 2) in the premises of Gandhinagar (34%); followed by Shivaji nagar(16%), K R Market (14%) & Magadi (6.5%). It is noted that majority of the children were coolie (39%) by occupation (Table 3) followed by begging (28.5%), rag picking (24%), hotel cleaner (6%) and parking toll collector (2.5%). Majority of the street children were from Karnataka (91%), followed by Tamil Nadu (6.5%) and Andhra Pradesh (2.5%). In 64.5% of children, the parents were uneducated (illiterates).

Table 1: Age wise distribution of cases

Sl no.	Age	Number of cases	Percentage
1.	11	3	1.5%
2.	12	24	12%
3.	13	35	17.5%
4.	14	63	31.5%
5.	15	32	16%
6.	16	20	10%
7.	17	13	6.5%
8.	18	10	5%

Table 2: Place of Living/ Native Place

Sl no.	Place	Total number of cases	percentage
1	Gandhi nagar	68	34%
2	Shivaji nagar	32	16%
3	K.R. Market	28	14%
4	Nelmangala	9	4.5%
5	Anekal	8	4%
6	Srirampura	5	2.5%
7	Hosur	13	6.5%
8	Ananthpur	5	2.5%
9	Sunkada katte	3	1.5%
10	Kamakshipalya	3	1.5%
11	Magadi	13	6.5%
12	K.G. Halli	3	1.5%
13	Whitefield	1	0.5%
14	Banashankari	1	0.5%
15	Wilson garden	1	0.5%
16	Bannerghatta	1	0.5%
17	Other places	6	3%

Table 3: Type of Work/ Occupation among Children:

Sl no.	Work	Number of cases	Percentage
1.	Coolie	78	39%
2.	Parking Toll Collector	5	2.5%
3.	Hotel Cleaner	12	6%
4.	Rag Picker	48	24%
5.	Begging	57	28.5%

In this study, we found out that majority of the children took shelter (Table 4) on foot path (45%), followed by shelter home (27%), railway station (14%), market (7%) and home (7%). It was interesting to note that, in 41% of cases, children started to work from an early age of 10years. Tobacco (59.5%) was the most common other substance of abuse (Table 5), followed by Gutka (19%), Alcohol (19%), Ganja (2.5%) and the other major part did not abuse any other substance (32.5%). Influence of friends (70.5%) was the most common reason for solvent abuse (Table 6) reported by most of the children followed by curiosity (15%), for kick (12%) and for sleeping (2%).

Table 4: Shelter Place

Sl No	Shelter Place	Number	Percentage
1	Foot Path	90	45%
2	Shelter Home	54	27%
3	Railway Station	28	14%
4	Home	14	7%
5	Market	14	7%

Table 5: Other Substances of Abuse Reported:

Sl No	Other Substances of Abuse Reported:	Number	Percentage
1.	Tobacco	119	59.5%
2.	Gutka	38	19%
3.	Alcohol	38	19%
4.	Ganja	5	2.5%
5.	Fevi Bond	6	3%
6.	None	65	32.5%

Table 6: Reason for Using Solvent:

Sl No.	Reason For Using Solvent	Number	Percentage
1.	Friends / peer pressure	141	70.5%
2.	Curiosity	31	15.5%
3.	For Kick	24	12%
4.	To Sleep	4	2%

DISCUSSION

Benegalet al¹³ in a similar study in Bangalore found that 69% of these children preferred to be on the streets and 24% hailed from economically poor families. 81.9% of these children were male and earned up to 150 rupees a day. Majority of them took to solvent abuse to feel happy, and felt it as form of relief from various problems. They started with tobacco, solvents and proceeded to use of cannabis and alcohol. Pagore et al¹⁴ in a study of 115 children in Delhi found that 68.7% of the children faced some form of abuse at home and 57.4% took to substance abuse on the streets. Earliest age to begin substance abuse was 5.5 years compared to 11 years as in our study. Poonam et al¹⁵ in a study in Mumbai of 217 children found that 44.23% of them on the streets reported substance abuse. 11.3 years was the mean age to start use of these solvents. Males (63.54%) had higher rate of solvent abuse compared to females, which is similar to our study. According to them 39.34% used cannabis, 37.7% used alcohol and 32.8% took to solvent abuse. 70.5% of the children said they started use of drugs out of inquisitiveness.

Sharma et al¹⁶ in a study of 487 children in Delhi showed that 25.7% of them addicted to tobacco. 17% used alcohol, 15.8% used solvents and 26.3% were involved in poly substance abuse. Peer pressure was considered primarily responsible for driving these children to drug abuse. Immaculate Mary et al¹⁷ suggests that 32.1% of children below 18 years of age take to solvent abuse on the street. They usually start with tobacco and proceed to solvents. Cannabis is usually started by bigger children above 13 years of age. Though lots of laws are existent to prevent use of dangerous solvents by children these are not effective enough in controlling the problem. Khan et al¹⁸ in a study of street children in Pakistan claimed that 90% of the children have taken to glue sniffing as it is cheap and easily available without any strict regulations. 40%

of these children suffer from some form of ill health due to this habit. Similar conditions have been reported in various cities of Nepal, East Timor, Vietnam, Hongkong etc. that 65.9% of these children live on the street with their families and 66.8% have some form of physical abuse¹⁹.

These children face a variety of personal problems at their homes and work place. They are exposed to a variety of risk factors normally considered for substance abuse. Peer pressure, work stress, easy availability of drugs, rebelliousness and development of anti social behavior on the streets push these children into solvent and other substance abuse.

CONCLUSION

This study has identified key issues requiring urgent public health action. The widespread use of solvents is particularly concerning due to easy, cheap availability and unrestricted sales to minors, as well as detrimental health effects of the same should be a major concern for law and policymakers. It is likely that the use of solvents could impact upon the ability of street children to be integrated into society and resume a normal social life. Additional effort and collaboration between policy makers, communities and researchers is essential to understand and implement mechanisms to reduce the harms associated with using inhalants, while also preventing and stopping solvent use among this vulnerable population.

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A Retrospective Analysis of Mandibular Fractures: An Autopsy Study - 2012-2016

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ABSTRACT

Background and objectives: Mandibular fracture, also known as fracture of the jaw, is one of the most commonly fractured facial bones and the most commonly fractured sites are the body of the mandible. The cause of the injury may be road traffic accidents, assault, falls, industrial injuries or sports injuries but the relative number of each varies considerably between countries and areas. This study intends to evaluate the age, gender distribution, the cause and anatomical distribution of mandibular fractures among autopsied cases.

Method: A retrospective study was conducted at Sri Devaraj Urs Medical College, Kolar from 2012 to 2016 and a total of 72 cases were studied.

Results: Out of 72 (100%) cases, the males 54 (75%) outnumbered females with 18 (25%) cases. 45.1% of fractured cases were seen in the age group of 21 – 30 years. Road Traffic Accidents 40 (55.6%) was the cause of mandibular fractures in majority of the subjects. The most common site of mandibular fracture was body of mandible with 28 (38.8%) cases.

Conclusion and interpretation: The results could be useful in interpreting the pattern of mandibular fractures among autopsied cases. Since the high frequency of mandibular fractures are due to RTA, the various preventive measures can be employed to minimize the sequelae of mandibular fractures like creating awareness among public about safety measures.

Keywords: Mandibular fractures, Road Traffic Accidents, Autopsy, Body of mandible.

INTRODUCTION

Mandibular fracture, also known as fracture of the jaw, is a break through the mandibular bone.

It was first described by Egyptian Papyrus in 1650 BC.¹ Given its prominent anatomic location; the mandible is one of the most commonly fractured facial bones. Before the invention of the automobile, mandibular fractures were most often caused by assault or other blunt trauma like falls, industrial injuries or sports injuries to the jaw. However, Road Traffic

Accidents (RTA) are now responsible for an equal share of the incidence of such injuries.² In terms of violence, young males are most at risk with alcohol an aggravating factor. Women and children are much less at risk but can be from domestic violence.³ The relative number of each varies considerably between countries and areas and they can be usually attributed to cultural, social, environmental and economic factors.⁴

The most commonly fractured sites are the body of the mandible, condyle, angle, symphysis, ramus and the coronoid process. Trauma to one side often produces an ipsilateral body fracture and a contralateral subcondylar fracture. A heavy blow to the symphysis produces a symphyseal fracture and bilateral subcondylar fractures.³

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The fracture site depends upon the mechanism of injury, magnitude and direction of impact force, prominence of the mandible and anatomy of site.⁴ The aim of the present study was to assess age and gender distribution, etiology and anatomic distribution of mandibular fractures among autopsied cases.

MATERIALS AND METHOD

This retrospective study was carried out at Sri Devaraj Urs Medical College, Kolar from 1st January 2012 to 31st December 2016 comprising all cases which were autopsied in the Department of Forensic Medicine.

In this study, the demographic variables such as age and gender, etiology and the site of mandibular fractures were noted. The medico-legal records were also referred for additional information.

The data obtained was recorded in the pre-designed and pre-tested proforma, which comprised relevant data and analyzed.

RESULTS

A total of 72 cases presenting with mandibular fractures of 1423 number of autopsied cases during 2012 to 2016 in the Department of Forensic Medicine were studied.

Table 1. Distribution of Mandibular fracture cases according to age and sex

Age (in years)	Male	Female	Number of Cases
≤ 10	01	01	02 (2.8%)
11-20	03	01	04 (5.6%)
21-30	32	07	39 (54.1%)
31-40	13	06	19 (26.3%)
>40	05	03	08 (11.2%)
Total	54 (75%)	18 (25%)	72 (100%)

Out of 72 (100%) cases, 54 (75%) were males and 18 (25%) were females. The maximum numbers of fractured cases 39 (45.1%) were seen in the age group of 21 – 30 years. More than 2/3rd of the cases were between 21 – 40 years.

Table 2. Distribution of Mandibular fracture cases according to Etiology

Etiology	Male	Female	Number of Cases
RTA	32	08	40 (55.6%)
Fall	18	05	23 (31.9%)
Assault	01	04	05 (6.9%)
Sports	02	00	02 (2.8%)
Other causes	01	01	02 (2.8%)
Total	54 (75%)	18 (25%)	72 (100%)

Road Traffic Accidents 40 (55.6%) was the cause of mandibular fractures in majority of the subjects, followed by Fall with 23 (31.9%) cases.

Table 3. Distribution of Mandibular fracture cases according to Anatomical site

Anatomical Site	Number of Cases
Para symphysis	12 (16.7%)
Symphysis	02 (2.8%)
Body of Mandible	28 (38.8%)
Angle	08 (11.2%)
Ramus	01(1.4%)
Condyle	07 (9.7%)
Coronoid	01(1.4%)
More than one site	13 (18.1%)
Total	72 (100%)

The most common site of mandibular fracture was body of mandible with 28 (38.8%) cases, followed by fracture of mandible with more than one sites with 13 (18.1%) cases. The fracture of ramus and coronoid were the least common sites with 01 (1.4%) cases each.

DISCUSSION

The mandible is the only mobile bone of the facial skeleton, and there has been significant increase in the number of cases in the recent years. It is a membranous bone and is more commonly fractured than the other

bones of the face. Mandibular fractures occur twice as often as midline fractures. The energy required to fracture it being the order of 44.6 – 74.4 kg/m, which is about the same as the zygoma and about half that for the frontal bone. It is four times as much force is required to fracture maxilla.⁵

In this study, the males 54 case (75%) outnumbered the females with 18 cases (25%) and the male to female ratio being 3:1. Our results are consistent with the study conducted by Kamlai U et al,⁶ Ansari et al,⁷ Kanasakar et al,⁴ adi et al, Shapiro et al.⁸

The male dominance may be due to the paternalistic nature of our society where males keep themselves most of the time outdoors and lead a more active life.

It was also observed that 54.1% of the mandibular fractures occurred in the age group of 21-30 years. More than 2/3rd of the cases were between 21 – 40 years. The least number of cases were seen in the age group less than 20 years and more than 40 years with 06 cases (8.4%) and 08 cases (11.2%) respectively.

Similar findings were noted in the studies conducted by Abbas et al⁹ and Kansakar et al,⁴ but the study conducted by Shapiro et al⁸ reported 34.1 years as mean age. This can be explained by the fact that at young age, people are more mobile, socially active, in business, sports and high speed transportation, inter personal violence, alcohol abuse and so forth.

The lower frequency of mandible fracture is seen at very young age which can be due to high elasticity of bone, poor pneumatization, thick surrounding adipose tissue and internal stabilization by unerupted teeth within maxilla and mandible. In old age, due to lower physical activities mandibular fractures are least common.

Out of 72 cases (100%), RTA (55.6%) is still mainstay as the most common cause of mandibular fracture in our population, which is in accordance with Shah et al,¹⁰ Al Ahmed et al,¹¹ Natu SS et al,⁵ Vyas A et al¹². In this study, the etiology next to RTA was followed by Fall with 23 (31.9%) cases.

Some of the authors, Jung HW et al,¹³ Mittal et al¹⁴ in their studies opined fall as the commonest cause of mandibular fractures and others Ellis E et al,¹⁵ Rashid A,¹⁶ Kirk L,¹⁷ Dongas P¹⁸ stated intentional injury or violence as the commonest cause.

The difference in the main cause of injury is largely dependent on the cities where studied were conducted, as well as, the population. High incidence of RTA in our study may be attributed to reckless driving, insufficient helmet and seatbelt usage and the availability of motorcycle for the young generation and consumption of alcohol while driving/riding.

With respect to the anatomical site, the commonest fracture region was the body of mandible with 28 cases (39.8%), followed by more than one sites 13 cases (18.1%), parasymphysis with 12 cases (16.7%). Similar results were reported by Brook IM et al¹⁹ and Olson RA et al²⁰.

The anatomic distribution and incidence of mandibular fracture are widely variable. The frequently fractured site varied from author to author. Chuong R et al²¹ opined symphysis as most frequent, Dongas P et al¹⁸ and Ogundare BO et al²² opined angle as commonest, Kansarkar et al,⁴ Vyas A et al,¹² Natu SS⁵ reported parasymphysis the commonly fractured site.

CONCLUSION

This study helps to interpret the pattern of mandibular fractures among autopsied cases. The mandibular fractures were more common in males (75%) than females (25%), with highest number of cases (45.1%) were seen in the age group of 21 – 30 years. More than 2/3rd of the cases were between 21 – 40 years. RTA was the commonest cause for mandibular fractures with (55.6%) followed by fall (31.9%). The body of the mandible was the commonest fractured site (38.8%), followed by more than one site (18.1%), parasymphysis (16.7%).

Since the high frequency of mandibular fractures are due to RTA, the various preventive measures can be employed to minimize the sequelae of mandibular fractures like creating awareness among public about safety measures.

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Infection Control in Orthodontics: A Review

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ABSTRACT

Dental care professionals are at an increased risk of cross infection while treating patients. This occupational potential for disease transmission become evident initially when one realises that most human microbial pathogens have been isolated from oral secretions. Because of repeated exposure to micro-organisms in blood and saliva, incidence of certain infectious diseases has been significantly higher among dental professionals than observed for general population.

Keywords: Infection control, Sterilization, Disinfection, Orthodontic office, Waste management

INFECTION CONTROL IN ORTHODONTICS

Dental care professionals are at an increased risk of cross infection while treating patients. Incidence of infectious diseases has been significantly higher among dental professionals than observed for general population. Orthodontists are exposed to a wide variety of microorganisms in orthodontic office by contaminated instruments, inhalation of aerosols or via percutaneous injuries with archwires, ligature wires, band material and other sharp cutting instruments.¹ A study found that orthodontists have the second highest incidence of hepatitis B among dental professionals.² New materials “as received” from the manufacturers are not free from bacterial contamination before use in patients. Further studies would be required to determine the level of risk that this poses.³

Means of transmission

1. **Patient to Dental Team:** It can be by three

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means

- 1) Direct contact : With patient’s saliva or blood
- 2) Droplet infection: They occur as a result of sprays, spatter or aerosols from patients mouth.
- 3) Indirect contact: involves transfer of microorganisms from the source (e.g., the patient’s mouth) to an item.

2. **Dental Team to Patient:** If the hands of dental team member contain lesions or other nonintact skin. If a member of the dental team bleeds on instruments or other items that are then used in the patient’s mouth, cross infection may result.

3. **Dental Office to Community:** Microorganisms from the patient contaminate items that are sent out or are transported away from the office. Dental laboratory technicians have been occupationally infected with hepatitis B virus (HBV). Also, regulated waste that contains infectious agents and is transported from the office may contaminate waste handlers if it is not done in proper containers.

Goals of infection control⁴

ADA council on dental therapeutics has recommended the following

1. Decrease the number of pathogenic microbes to the level where normal body resistance mechanisms can prevent infection .

2. Break the cycle of infection from dentist, assistant & patient & eliminate cross infection.

3. Treat all the patient & instrument as though they could transmit an infectious disease

4. Protect patient & personnel from infection & protect all dental personnel from threat of malpractice.

Infection control strategy

Each clinical practice must have a written infection control policy which must be upgraded with the latest recommendations. Infection control strategy involves various steps

1. Patient screening: A patient with subclinical infection is a potential source of cross-contamination. Therefore, all the patients must be screened by obtaining the relevant medical and dental history from them and a physician must be consulted if doubt arises

2. Instrument processing:

a. Containment: During and after each procedure, every effort should be made to confine all instruments and devices that have come in contact with the patient to a well-defined and limited area. Rationale: when contaminated instruments are confined to a limited area, microorganisms are not spread unnecessarily. Utility gloves, protective eyewear and clinic garment should be worn

b. Holding (presoaking): All contaminated instruments should be stored in a presoak solution immediately after the procedure. Rationale: It is seldom possible to clean the instruments used on each patient immediately after the procedure. The debris on such instruments may dry, making them more difficult to clean. Recommendations: Use presoak solutions which consists of detergents or detergents containing disinfectants like phenolic compounds. The pre-soaking solution should be discarded at the end of the day.

c. Pre-cleaning/pre-sterilization: All contaminated instruments should be properly cleaned before the process of sterilization. Rationale: Blood, Saliva and material on instruments can insulate microorganisms from sterilizing agents, and interfere with effective

sterilization. Hence cleaning reduces this bio burden to facilitate sterilization.

-Manual cleaning or hand scrubbing: Time consuming and increases the chances of accidental puncture or cuts through direct handling of sharp and pointed instruments. Complete personal protective equipment should be worn. Instruments should be immersed in a detergent and cleaned under running water using a soft brush with a long handle.

- Ultrasonic cleaning: It is effective, time saving and much more safe than hand scrubbing. A cleaning solution that is specifically recommended by the manufacturer for use in ultrasonic cleaner should be used.⁵

Presoaked instruments contained in the basket should be immersed in the cleaning solution of ultrasonic cleaner. The cleaner should be covered and operated for atleast 6-10 mins. After cleaning, instruments should be thoroughly rinsed. ⁶

d. Corrosion control, drying and lubrication: Before subjecting the instruments for sterilization, the instruments must first be cleaned thoroughly with no debris and dried to reduce chances of corrosion and a rust inhibitor (dip or spray) should be applied. Lubrication of instruments with movable parts like hinges of orthodontic pliers should be done prior to steam sterilization with a water based lubricant. A sodium nitrite rust inhibitor can also be used. Corrosion resistance is directly proportional to its chromium content and inversely proportional to its carbon content. Disinfectants, or detergents with pH greater than 8.5 can disrupt the chromium oxide layer. Blood saliva and debris if not rinsed and directly autoclaved can cause pitting corrosion. Chrome plated instruments should be processed separately from stainless steel ones, because of electrolytic action which can carry carbon particles from exposed metal of a chrome plated instrument and deposit them on stainless steel. Chrome plated pliers are more resistant to corrosion than stainless steel pliers.

e. Packaging: Packaging involves organizing the Instruments in functional sets and wrapping them or placing them in sterilization pouches, bags, trays, or cassettes. Rationale: Packaging Instruments before processing through the sterilizer prevents them from environmental contamination after sterilization, and maintains sterility during storage or when being

distributed to chairside. Recommendations: Only a wrapping material that is designed as a sterilization wrap for a particular type of sterilizer should be used. Trays and cassettes are very good options for packaging orthodontic instruments and bands, because they retain instruments during pre-soaking, ultrasonic cleaning, sterilization and storage, and finally for use at chairside. They eliminate the potential risks like puncturing or cuts while handling sharp contaminated instruments

Autoclave sterilization must allow steam to penetrate inside it and reach every instrument contained in it and all its surfaces. Requirements of packaging materials: Dry heat sterilization must not insulate items from heat, must not get destroyed by temperature used. Unsaturated chemical vapor sterilization must allow vapour to precipitate on contents and not react with the vapour.

3. Sterilization

1) Heat sterilization

a. Dry heat sterilization: This method uses hot air to kill microorganisms and has the advantage of not causing corrosion. It dehydrates the bacterial protein and decreases its resistance to denaturation

At a given temperature, dry heat is less efficient than moist heat, because dry heat is not as efficient a heat conductor as moist heat.

Rapid heat transfer Sterilizer: Also called as forced air convection units. The mechanism of bacterial killing is similar to conventional dry heat unit. They use higher temperature than other dry heat units and there is a controlled internal air flow within the chamber. As a result, they have a substantially shorter sterilization intervals.

b. Steam pressure sterilization: Steam sterilization is the oldest and most commonly used of acceptable methods for instrument sterilization in dentistry since many years. Sterilization is accomplished by making use of steam under pressure which causes denaturation and coagulation of microbial proteins. Mechanism: When water heated under pressure, its boiling point is raised together with the temperature of the generated steam.

c. Gas or ethylene oxide sterilization

Ethylene oxide: The use of ETO is recognized by

the American Dental association (ADA) and Centers for Disease control and prevention (CDC) as an acceptable method of sterilization for the following items that can be damaged by heat and/ or moisture, and those that can be cleaned and dried thoroughly.

MECHANISM: A gas with very high penetrating ability. It acts by alkylating the amino, carboxyl, sulphhydryl groups in protein molecules thus reacts with RNA and DNA.

Recommendation for materials in orthodontics

a. Impression trays:

Aluminium or chrome plated: heat or gas sterilization can be used. Custom acrylic trays: disinfect by NaOCl or iodophor or to discard. Plastic trays: ethylene oxide sterilization or disinfection by NaOCl or iodophor. Alginates are relatively less stable, hence ADA recommends disinfection of alginates by immersion in diluted sodium hypochlorite or iodophors with minimal disinfection time. After disinfection the impressions should be rinsed to remove residual disinfectant.

b. Disinfection of removable appliances: Immerse completely into a disinfectant for the time recommended for tuberculocidal disinfection. ADA recommends immersion in iodophors or sodium hypochlorite for 10 mins. Disinfection of baseplates of removable orthodontic appliances by using 0.12% chlorhexidine spray once or twice a week reduced the contamination by Mutans Streptococci on the acrylic surface.⁷

c. Disinfection of wax bites: ADA recommends disinfection of wax bites by a spray-wipe-spray technique. Should remain wet after the second spray for atleast 10 mins. Rinsed again to remove residual disinfectant.

d. Stone cast disinfection: ADA recommends disinfection of wax bites by a spray-wipe-spray technique should remain wet after the second spray for atleast 10 mins.

e. Orthodontic pliers: High quality stainless steel can be treated with dry heat, autoclave, chemical vapour, ethylene oxide. Plier with plastic parts can be treated with ethylene oxide, chemical disinfection or sterilization.⁸

f. Orthodontic bands: Thread the bands to be sterilized on the auxiliary wire, and suspend the wire across the rack to dry heat or autoclave sterilization

g. Orthodontic wires: TMA wires treated with ethylene oxide, autoclaving. NiTi wires treated with ethylene oxide. Stainless steel wires treated with autoclave, dry heat and ethylene oxide.⁹

h. Orthodontic marking pencils: Conventional orthodontic pencils can not be autoclaved. Gas sterilization can be done.¹⁰

i. Elastomeric Chains and Ligatures: Chemicals are not suitable for disinfection of elastomeric ligatures and E-chains because they alter the physical properties of the elastics. For E-chains it is best to cut-off some more above that is required and discard the rest.

Sterilization monitoring: The goal of sterilization is to eliminate all forms of microorganisms on the items being processed. Reports describing spore testing of sterilizers used in dental office have indicated sterilization failure frequencies from 15.1% – 51%. ADA recommend weekly spore testing of dental office sterilizer. Types of monitoring

a. Biological monitoring: Biological indicators contain highly resistant bacterial spores that are more difficult to kill than any other microbes. Types of biological indicators :

-*Bacillus stearothermophilus* - steam or chemical vapor sterilization

-*Bacillus subtilis* - dry heat or ethylene oxide gas sterilization.

b. Chemical monitoring

It involves use of color-changing chemical indicators on the outside and inside of packs, bags, cassettes or trays.

-Rapid-change indicators: Tapes, labels and bag markings are referred to as external chemical indicators. Change in color after brief exposure to high temperature, which indicates that the items have been processed through a sterilizer.

-Slow-change or integrated indicator: Indicators designed to use inside of packs, bags or trays, called internal indicators are more accurate than external

indicators. At least one item per load should contain an internal indicator.

c. Physical Monitoring: Physical monitoring of the sterilization process involves observing the gauges and displays on the sterilizer and recording the sterilizing temperature, pressure and exposure time. Thus, physical monitoring may not detect problems resulting from overloading, improper packaging material or use of closed containers.

Handling processed instruments

a. Drying and Cooling : Packs, pouches or cassettes processed through steam sterilizer may be wet and must be allowed to dry before handling

b. Storage : Handling of sterile packages should be kept to a minimum. The oldest sterile should be used first as long as the packaging material is intact. This is referred to as the “first in-first out” system of stock rotation.¹¹

c. Distribution : Instruments from sterile packs or pouches can be placed on sterile, disposable trays. Sterilized instrument cassettes are distributed to and opened at chairside

3. Personal protective and barrier technique:

a. Gloves: The operator should thoroughly rinse his hands with cold water and dry the hands before gloving.

b. Masks: Masks selected for use should have at least a 95% bacterial filtering efficiency for small particle aerosols (3-5 µm). A new mask called fluid shield has an inner protective filter and resists penetration of contaminated fluids which collect on the outer mask layer.

c. Eyewear: Eyewear should be disinfected between patients by spray wipe spray method.

d. Pre procedure antiseptic mouthwash: during invasive procedure as mini implant placement. A long lasting antimicrobial rinse such as 0.12% chlorhexidine gluconate can suppresses oral microorganisms for upto 5hrs.

4. Dental office design

a. Office flow : The layout of the entire office

should incorporate a smooth efficient operational flow. Instrument recirculation center (IRC) should not be attached to treatment and nontreatment areas or placed in a walkway

b. **Cabinetry** :The number of drawers and their contents should be minimized to simplify cleanup procedures. Treatment room cabinetry should be positioned on both sides of the patient’s chair. This will allow both the doctor and assistant access to essential side support areas and provide flexibility to both right and left-handed clinicians working in the same space.

c. **Laminates and wall and floor coverings** :It should be easy to clean and disinfect all the surfaces. Avoid wood surfaces textured wall coverings and decoration. Laminates in long run hold their clean appearance.

d. **Ventilation** :Work areas must have positive ventilation to control noxious vapours form various chemicals used in laboratory and sterilization areas.

5. **Water system**: The dental unit water supply systems (DUWS) are contaminated with micro organisms in the form of a biofilm.new heat sterilizable independent water delivery system (AquaSept) has been introduced in the market which eliminates the possibility of DUWS contamination. Heat sterilization of all system components between patients prevents biofilm build-up and kills passively retracted pathogens. The CDC recommends Independent water reservoir, Line filters, Handpiece for 20- 30 sec, Antiretraction valve, Periodic chemical treatment.

5. Waste management

Management of Regulated Medical Waste in Dental HealthCare Facilities is done by use of color-coded or labeled container that prevents leakage (e.g., biohazard bag) to contain nonsharpregulated medical waste. Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of biomedical waste management in any establishment. The commonly used items in an orthodontic office and their disposal protocol are shown in (Table 1)

Table 1: Orthodontic waste disposal protocol

Impression material(Discarded/Used)	Immerse 1% Sodium hypochlorite solution bucket for 24 hours and then Dispose in Black container
Dental Casts (Discarded/Used)	Immerse 1% Sodium hypochlorite solution bucket for 24 hours and then Dispose in Black container
Removable Appliances with wire component (Used/Broken not to be worn by patient anymore)	Sharps Container containing 1% Sodium hypochlorite
Wires, steel ligatures, orthodontic miniimplants, Needles after being burnt, Sharps	Container containing 1% Sodium hypochlorite
Wax bite registrations	Red container
Debonded brackets, buttons and other attachments	Red container
E-chain, elastic ligatures, elastics	Red container
Mouthmask, Gloves	Red container
Headcap, Shoe covers	Black container
Infected cotton	Yellow container
Syringe (after breaking at Hub in Needle destroyer)	Red container

CONCLUSION

Infection control is half the treatment of any practice. It should be remembered that, we are health care professionals who are supposed to treat and not infect. We are dealing with very fragile and viable tissues

that are susceptible to hazardous microorganisms and infections. Patients seek treatment with lot of “HOPE” on us and the initial step in uplifting their hopes is by “Proper Sterilization & Infection Control”

Conflict of Interest: Nil

Source of Funding: Self

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A Study on Demographical and Clinical Profile and the Outcome of Snake Bite Victims in a Rural Tertiary Care Hospital

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ABSTRACT

Background: Snake bite is an important occupational and rural hazard because India has always been a land of Exotic snakes. Snake bite is a major public health problem throughout the world, more so in tropical and subtropical countries. In a predominantly agricultural country like India with its rich flora-fauna, the encounter between man and snake is frequent occurrence. With rapid urbanization and deforestation, the incidence of snake bite is high and forms a significant group of hospital admissions. **Objective :** To know demographical and clinical profile of snake bite patients presenting to a Rural tertiary care centre in mandya. **Materials and method:** A cross sectional study was conducted in Adichunchanagiri Institute of Medical Sciences from March 2015 to March 2016. All the cases with presented with history of snake bite and or clinical features and admitted to hospital were included in the study. A total of 46 Cases of Snake bite were admitted during the study period. **Results:** In this study majority of victims were in the age group of 25-50 years. The male to female ratio was almost more than 2:1. The mean age of the patient was 36.58 years. 60.85% cases of cases presented to emergency room with pain and tenderness in the bite site alone and rest of the cases with other signs of local envenomation. **Conclusion:** Awareness should be created among the population regarding the implications of snake bite on the loss of life. Basic First aid, use of boots and importance of the early hospitalization for the early recovery has to be advised and educate to the population at risk.

Keywords: Snake bite, Venom, Rural, Occupation,

INTRODUCTION

Snakebite is a common medical emergency and an occupational hazard in most parts of India.

Early in 2009, snake-bite was finally included in the WHO's list of neglected tropical diseases confirming the experience in many parts of this region that snake- bite is a common occupational hazard of farmers, plantation workers and others, resulting in tens of thousands of deaths each year and many cases of chronic physical handicap.¹

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Various studies have shown that nearly 15,000 to 25,000 people die annually in India due to snake envenomation, whereas the world mortality is estimated to be 30,000 to 40,000 per annum. ². In India death due to snake bite accounts to total of 2.8 to 5.3%, which is much higher when compare to USA(20 death per year) and Europe(1 death in 3-5year). ²

The factors like favorable climate, rural predominance of the population and farming practiced in India are the major contributing factor for the snake bite. Hence India is also know as land of Exotic Snakebites

Most parts of Karnataka also acts as a natural habitué for majority of snakes like cobra, viper, rat snakes

Many species are mainly nocturnal (night hunters) e.g. kraits, but other species are mainly diurnal (day-time hunters). People must be specially vigilant about snake-bites after rains, during flooding, at harvest time and at night and to be taken necessary precaution.

Snake-bite is an environmental, occupational and climatic hazard in rural area and attention to the following recommendations for community education might reduce the risk of bites. Snakes have adapted to a wide range of habitats and prey.

Most often snake bites are reported due to human interaction with the habitat of the snakes.

In India there are about 216 species of snakes of which about 52 are venomous and of these only 5 varieties of snakes are commonly encountered as the cause of snakebite poisoning². They are,

1. Russell's viper - Doboiaruselli
2. Cobras - (Common cobra) - NajaNaja
3. Krait – BungarusCaeruleus
4. Saw scaled viper - EchisCurinatus and Pit viper.³

Hence This Study Is Undertaken To Asses The Demographical And Clinical Profile And The Outcome Of Snake Bites In The Rural Area Of Mandya District, Karnataka.

OBJECTIVE

To know demographical and clinical profile of snake bite patients presenting to a rural tertiary care centre in Mandya district Karnataka.

MATERIALS AND METHOD

A cross sectional study was conducted in Adichunchanagiri Institute of Medical Sciences from March 2015 to March 2016. All the cases with presented with history of snake bite and or clinical features and admitted to hospital were included in the study. A total of 46 Cases of Snake bite were admitted during the study period .The admitted patients were admitted in the emergency ward and history of the snake bite , time site, identification marks of snake ,any significant features of snake , clinical features and symptoms were evaluated on admission. Immediately after the admission and first aid of the cases the patients' blood was sent for routine

examination and complete blood picture.The number of the doses of Anti Snake venom used was also noted.

RESULTS

A total number of 46 patients were admitted in the Adichunchanagiri Institute of Medical Sciences during the study period. In this study majority of victims were in the age group of 25-50 years. The male to female ratio was almost more than 2:1. The mean age of the patient was 36.58 years.

Table 1 : Socio Demographical Profile of the cases

AGE	FREQUENCY	PERCENTAGE
<20	4	8.6
20-29	12	26.08
30-39	14	30.43
40-49	9	19.56
50-59	5	10.86
60-69	2	4.34

SEX	FREQUENCY	PERCENTAGE
MALE	27	58.69
FEMALE	19	41.31

OCCUPATION	FREQUENCY	PERCENTAGE
Farmer	26	56.5
Labour	12	26
Housewife	6	13
Others	2	4.5

EDUCATION STATUS	FREQUENCY	PERCENTAGE
Illiterate /till 4 th	32	69.5
5-10 th	8	17.39
More than 10 th	6	13.11

Agriculturists were the most Commonest victims of snake bite who accounted for(56.5%) of admissions in our study. The most of patients were illiteratesor not completed primary school education

Table 2: Time and Site of Snake Bites

		Frequency	Percentage
Types of snake	Unidentified	28	60.8
	Vipers	8	17.4
	Cobras	2	4.3
	Krait	8	17.4
Site of bite	Head and neck	0	0
	Upper limbs	11	23.9
	Lower limbs	35	76.1
	Multiple bites	0	0
Time of bite	4AM-10 AM	7	15.2
	10AM-4PM	6	13
	4PM-10PM	31	67.4
	10PM-4AM	2	4.4

Out of 46 snake bites victims 60.8% type of snake were not identified. Hematotoxic viper bites were next most common snake bites. About 70% victims were of hematotoxic snake bite victims among the unidentified cases. Rest consisted both neuro and hematotoxic snake bites.

Out of 46 cases 76.1% of bites were mostly on the lower limbs involving ankle and foot including webspaces .

Significantly the bites were more frequent around dusk and early night .Once the dim light sets in movement of mankind also reduces and the snakes and other creatures move out of their habitat in search of prey. So this is the time when patients account for maximum no. of snake bites.

Table 3: Clinical Profile of Snake Bite

		Frequency	Percentage
Local Practices followed	Nil	11	23.9
	Tourniquet	27	58.7
	Incision	5	10.8
	Herbal medicine	3	6.6
Local Manifestation	No local manifestation	10	21.75
	Pain & tenderness	28	60.85
	Swelling	4	8.7
	Multiple Manifestations	4	8.7
Haematotoxic Manifestation	Nil	30	65.2
	Bleeding from site	16	34.8
Neuroparalytic Manifestation	Nil	38	82.6
	Ptosis	3	6.5
	Loss of conscious	5	10.9

More than 58.7% of the cases presented to emergency with tourniquet proximal to the bite followed with incision in 10.8% of snake bite victims.

60.85% cases of cases presented to emergency room with pain and tenderness in the bite site alone and rest of the cases with other signs of local envenomation. Bleeding from the site of bite was most common hematotoxic manifestation seen in our study and was

mostly seen in the viper snake bites.Ptosis& respiratory paralysis was seen in as the neurotoxic Manifestation and was mostly seen in krait and cobra bites.

Around 70% patients had no significant complications following hospitalization in our study.

Around 20% had hematotoxic like ARF, DIC & local gangrene. These were mostly due to viper bites. One case also presented with intra-cerebral bleed and unilateral weakness secondary to viper bite.

Average number of vials of ASV used in treatment of poisonous snake bites in this study was 7.8 vials. Out of 46 cases of snake bite 6 cases died during the course of the treatment.

DISCUSSION

Majority of the snake bites were seen in the age group which is active and economically productive group working in the field in our study, similar findings were also seen in the majority of the studies.

The incidence of the snake bite was more among the male population (59%) because they are more involved in outdoor and field activities than females. In the study done by Bhat RN⁴ and Ahuja and Singh⁵ also reported similar findings of our study.

56.5% of the people were farmers and 26% labour were the major victims of snake bite as they are exposed in field and not using any kind of protective shoes or any equipments, the findings of which can be correlated to the findings of Bhalla D⁶ and Sarangi et al⁷.

In the study done by Virmani et al⁸ and Saini et al⁹ the monsoon season was most common season for snake bite which was similar to the findings of our study. The breeding habits of frogs, mice and rats and other small animals during monsoon trigger the snakes to have a close proximity with the humans and causing more human and snake contact.

The site of bite was more common in the lower limbs (76.1%) followed by upper limbs (23.9%) in our study. These findings in our study were similar to the findings of the study done by Bhat RN⁴, Bhalla D⁶ and Reid¹⁰.

The time of the snake bite was most common in the evening and night between 4-10 PM, with diminution of sunlight and darkness making the snake and human contact more common. These findings show similarity to the findings of Bhalla D⁶, Virmani and Dutt¹¹.

Majority (58.7%) of the cases had applied tourniquets at the site of bite as a measure of first aid which is similar to the findings of Rajesh K.¹²

Pain and tenderness was the major local manifestation in our study. Similar complaints were also seen in the study done by Rajesh R¹² and Sarangi¹³.

CONCLUSION AND RECOMMENDATIONS:

Snake bites are common in the evening and rainy season among the rural population mainly in the agriculture workers. Most of the snake bites were unprovoked and the type of snake couldn't be identified and very haemotoxic.

Awareness should be created among the population regarding the implications of snake bite on the loss of life. Basic First aid, use of boots and importance of the early hospitalization for the early recovery has to be advised and educate to the population at risk.

Ethical Clearance: Taken from ethical committee

Source of Funding: Self

Conflict of Interest: Nil

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A Chemical Safety Intervention Program Designed to Reduce Occupational Exposure among Vector Control Operators in Bangkok, Thailand

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ABSTRACT

Background: Vector control operators (VCOs) face occupational risks due to pesticide and chemical exposure. The purpose of this study was to determine the effectiveness of a chemical safety intervention program designed to reduce occupational exposure among VCOs in Bangkok, Thailand.

Method: A quasi-experimental study was conducted in six Bangkok areas among 96 male operators. The operators were divided into two groups: the intervention group received intervention, and the control did not. General participant information, including personal behavior and environmental working conditions, were collected via standardized questionnaires. Urine samples were collected to evaluate biological exposure. A linear mixed model and repeated measure ANOVA were used to compare the differences in outcome measures between the two groups at a baseline and two follow-ups (follow-up 1 and follow-up 2).

Results: At the baseline measure, both groups had similar sociodemographic characteristics, personal habits, and environmental working conditions. After the intervention program, the intervention group had effectively reduced difference means for 3-phenoxybenzoic acid (3-PBA), trans, trans-muconic acid (tt-MA) and o-cresol. There were also statistically significant differences between the groups at follow-ups 1 and 2.

Conclusion: The findings suggest that the introduction and implementation of chemical safety programs could reduce biological exposure and prevent health symptoms due to chemical exposure among VCOs.

Keywords: *Vector control operators, occupational exposure, 3-PBA, tt-MA, o-cresol*

INTRODUCTION

Vector-borne diseases are a significant health concern among human populations worldwide, accounting for an estimated 17% of the global burden of infectious disease according to the World Health Organization.¹ Vector control operators (VCOs) play an important role in vector-borne disease control programs. However, they face occupational risks and health hazard due to pesticide use and chemical exposure.

Cypermethrin is a synthetic pyrethroid insecticide first synthesized in 1974 and widely used in agriculture, the textile industry, and the public health sector.² Within the public health sector, cypermethrin has been widely used to control mosquito populations in residential environments. The United States Environmental

Protection Agency (EPA) has classified cypermethrin as a possible human carcinogen (group C) because there is limited evidence that it can cause cancer in animals.^{3,4} The EPA re-evaluated the substance in 2004, finding “suggestive evidence of carcinogenicity but not sufficient to assess human carcinogenic potential.”⁵

Cypermethrin enters the body mainly by inhalation and ingestion of particulate matter and spray mist and can occasionally be absorbed through the skin. As humans excrete cypermethrin rapidly^{2,6}. Previous studies based on occupational research have shown that acute exposure may result in dizziness, nausea, anorexia, fatigue^{7,8} and increase sperm DNA damage.⁹ High doses after direct exposure can cause symptoms including the following: paraesthesia of the eyes, face, and breast;

asthmatic breathing; palpitations; headaches; anxiety; hyperactivity; tremors; involuntary movement; chronic seizures; confusion; irritation; and itching sensations.^{10,11}

The most common method of adult mosquito control is chemical spraying with thermal fog machines. This process consists of mixing a very small amount of pesticide with diesel fuel to in a combustion chamber. Diesel fuel has been used as a carrier for thermal fogging agents, but it creates thick smoke and has a strong smell, leading some communities to oppose its use.¹² Moreover, diesel fuel is a complex of hydrocarbon and contains polyaromatic hydrocarbons such as benzene, which the International Agency for Research on Cancer has classified as carcinogenic to humans (Group 1).¹³ Petroleum distillates such a diesel may “produce eye, skin, and respiratory irritation and symptoms of CNS depression, such as headache, dizziness, nausea, and vomiting.”¹⁴

Previous studies found that personal protective equipment (PPE) was effective in reducing pesticide exposure among workers.¹⁵ Van et al. conducted a study of the effectiveness of PPE that examined the relevance of dermal and inhalation exposure to chlorpyrifos among pest control operators. It showed that intervention in the form of a PPE program significantly reduced metabolites in urine before the onset of spraying activities.¹⁶

Although cypermethrin, benzene, and toluene exposure via inhalation or skin contact can contribute to health symptoms. However, limited information is available on the effectiveness of intervention including PPE program to reduce biological exposure among VCOs. This study aims to determine the effectiveness of a chemical safety program to reduce occupational exposure among VCOs in Bangkok, Thailand.

MATERIALS AND METHOD

Study population

This quasi-experimental study was conducted in six administrative areas in Bangkok—Central Bangkok, South Bangkok, North Bangkok, East Bangkok, North Khungthon, and South Khungthon. Ninety-six male (18–60 years) public health VCOs were recruited and met the inclusion criteria. There were 48 operators in the intervention group from North Bangkok, South Bangkok, and East Bangkok and 48 operators in control group from North Khongthon, South Klonthon, and

Central Bangkok.

The sample size calculation is based on Wang et al.¹⁷ The sample size was calculated by using a sample size for a comparative study of two population means: continuous outcomes with 80% power, beta 0.35, and 95% confidence level.¹⁸ Thus, this study required a sample size of at least 30 participants in each group plus an additional 10% of the total participants to account for sample withdrawal. Inclusion criteria to recruit participants were as follows: 1) has worked as a VCOs for over six months; 2) sprays chemicals for over two hours per day with a similar formula pesticide; and 3) is a healthy male between the ages of 18 and 60. Permission to conduct this study on human subjects was approved by the Ethical Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University (COA No.172/2558).

DATA COLLECTION

Demographic characteristics

Operators were interview face to face by using questionnaires with to identify general characteristics of the participants, which consists of sociodemographic characteristics, personal factors, working conditions, and environmental factors at a baseline (October –November, 2015) as shown in Table 1

Biological monitoring

Outcomes was evaluated biological exposure by collecting urine samples in the intervention and control groups at baseline, first follow-up session (March 2, 2016–May 3, 2016) and second follow-up session (July 2–October 3, 2016). Urine samples were collected in 50 ml polystyrene tubes from the first void of the morning, transferred to a 10 ml polystyrene tube, and kept at -20°C until the time of analysis. For 3-PBA as cypermethrin metabolism, analysis methods were modified from Thiphom and Prapamontol’s method of using high-performance liquid chromatography (HPLC) by used acid hydrolysis method¹⁹ For trans, trans-muconic acid (tt-MA) and o-cresol, the Scherer and NIOSH 8301 methods were used to determine the level of tt-MA and o-cresol by using high-performance liquid chromatography.^{22,23}

Chemical safety program (intervention)

The intervention program consisted of a chemical

safety training program that included the following: 1) two days of training about basic chemical safety including chemical toxicity, health hazards, chemical safety handling, mixing and spraying 2) conducting medical examinations, providing information about occupational health and symptoms and diseases prevention 3) two days of training about proper PPE use including a fit test program and 4) providing a chemical safety booklet.

Statistical Analysis

This study used SPSS v. 16 for data analysis. Descriptive statistics of mean and standard deviation were used to analyze participants' demographics. For measuring and comparing significant differences between the intervention and control groups, an independent t-test for sociodemographic characteristics (age and years of work experience). A chi-square was used to test for accident injury history, systematic illness, and work/

task characteristics. To evaluate the effectiveness of the intervention program by comparing differences in the mean outcomes of the intervention and control groups at the baseline, follow-up 1, and follow-up 2, a linear mixed model and repeated measure ANOVA were used. The statistical significance was designated as $p \leq 0.05$.

RESULTS

General characteristics

Table 1 shown the groups had similar sociodemographic characteristics; all participants were male and close in age ($p = 0.74$). The average work experience of the VCOs in the intervention group and control group were 8.8 and 7.9 years, respectively ($p = 0.92$). There were no significant differences between the groups.

Table 1. Sociodemographic characteristics of the intervention and control groups at the baseline

Sociodemographic characteristics	Total (n = 96)		Intervention group (n = 48)		Control group (n = 48)		P-value*
	Mean	SD	Mean	SD	Mean	SD	
Age (years)	41.70	10.20	42.10	10.95	41.42	9.51	0.74
Work experience (years)	11.31	8.35	11.21	8.83	11.40	7.90	0.92

* independent t-test at $P\text{-value} \leq 0.05$

Table 2 shows results of the homogeneity of age group, education level, personal factors, environmental factors, working conditions, and PPE use. The characteristics were similar between the intervention and control groups; most participants fell in the 31 to 40 year age group and most had graduated from secondary school ($p = 0.05$). There were not significant differences in the personal factors; similar numbers of participants reported smoking ($p = 0.089$), drinking ($p = 0.77$), and consuming preserved food ($p = 0.112$). Working conditions in terms of the activities of spraying insecticide, mixing insecticide, and spraying time

were similar in both groups ($p = 0.452$). The duration of spraying insecticides did not differ between the intervention and control groups ($p = 0.112$); each usually sprayed more than three hours per day. The percentage of operators spraying indoor areas was similar in both groups: 58.3% in the intervention group and 60.4% in the control group ($p = 0.835$). Almost all of the participants reported not using PPE while working (spraying and mixing): 81.2% in the intervention group and 66.7% in the control group. There was no significant difference between the groups ($p = 0.162$).

Table 2 Sociodemographic characteristics of the intervention and control groups at the baseline

Sociodemographic characteristics	Intervention group (n = 48) n(%)	Control group (n = 48) n(%)	X ² (df)	P-value*
Age group				
<30	9(18.7)	8(16.6)	1.85(3)	0.603
>31-40	8(16.6)	12(25.0)		
>41-50	14(29.1)	16(33.3)		
51>60	17(35.4)	12(25.0)		
Education level				
Primary school	9(18.7)	15(31.2)	7.63(2)	0.050
Secondary school	31(64.5)	18(37.5)		
Diploma	8 (16.6)	15(31.2)		
Smoking				
Do not smoke	10(20.8)	18(37.5)	4.83(1)	0.089
Smoke	36(75.0)	30(62.5)		
Drinking				
Do not drink	7(14.6)	8(16.7)	0.079(1)	0.779
Drink	41(85.4)	40(83.3)		
Consume preserved food				
No	31(64.6)	38(79.2)	2.52(1)	0.112
Yes	17(35.4)	10(20.8)		
Indoor spraying				
No	20(41.7)	19(39.6)	0.043(1)	0.835
Yes	28(58.3)	29(60.4)		
Working condition				
Spraying insecticide	40(83.3)	36(75.0)	1.01(1)	0.452
Mixing/loading pesticide	8(16.4)	12(25.0)		
Duration spraying				
<3 h/day	19(39.6)	20(41.7)	0.043(1)	0.835
>3 h/day	29(60.4)	28(58.3)		
PPE use				
Do not use	39(81.2)	32(66.7)	2.66(1)	0.162
Use	9(9.4)	16(33.3)		

*Chi-square test at $P\text{-value} \leq 0.05$

Effectiveness of the safety chemical program

Table 3 and Figures 1, 2, and 3 present means and intervention effects metabolite measurements. After intervention, means of 3-PBA in the intervention group had decreased by both Follow-up1 and Follow-up2, but the control group’s measurements had increased at Follow-Up 1 and had decreased at Follow-Up 2. For means of tt-MA and o-cresol had similar trends, in the intervention group’s metabolite measurements were decreased than the control group in both follow-

ups. In contrast, the control group’s measurements had increased at both Follow-ups. For intervention effects, all metabolite in the control group were decreased significantly than control group by both Follow-up1 and Follow-up2 with $p < 0.001$. Moreover, the difference means for 3-PBA, tt-MA, and o-cresol were significantly reduced in the intervention group compared to the control group at follow-ups 1 and 2, clearly indicating that intervention program were successful.

Table 3: Intervention effects of the chemical safety program on reducing chemical metabolites adjusted for time and time group interaction (continuous)

Biological exposure	Group	Time			Intervention effects			
		Baseline	Follow-up 1	Follow-up 2	Follow-up 1		Follow-up 2	
		Mean	Mean	Mean	Magnitude 95%CI	P-value	Magnitude 95%CI	P-value
3 PBA (ug/g creatinine)	Control	5.26	6.60	5.56	-4.76 (-5.64, -3.89)	< 0.001	-3.97 (-5.08, -2.87)	< 0.001
	Intervention	4.76	1.33	1.08				
tt-MA (ug/g creatinine)	Control	16.76	14.47	27.31	-5.59 (-8.57, -2.61)	< 0.001	-16.08 (-21.19, -10.97)	< 0.001
	Intervention	14.74	6.85	9.21				
O-cresol (mg/g creatinine)	Control	163.75	172.67	200.48	-127.66 (-164.66, -90.66)	< 0.001	-122.72 (-159.21, -86.23)	< 0.001
	Intervention	156.17	37.42	70.18				

For unadjusted used generalized estimating equations(GEE) with times and time interaction,

Distribution=Poisson, Link = Identity

DISCUSSION

After intervention and two follow-ups, the metabolites in the intervention group were effectively reduced compared with control group at the follow-up 1 and 2 measurements. These similar findings Keifer, who found that PPE was effective in reducing pesticide exposure among workers.¹⁵ These findings are also consistent with a study conducted by Van et al. showed that a PPE intervention program significantly reduced metabolite levels in urine.¹⁶ However, the levels of tt-MA and o-cresol in both the intervention and control groups increased slightly in the follow-up 2 measurement. It is possible that the chemical cartridge was less able to absorb volatile organic compounds(VOCs) due to humidity, which can cause the activated carbon to absorb water vapor.²² Another possible issue was that most operators in the intervention group were unaccustomed to using chemical masks and wearing the chemical mask or respirator might have been uncomfortable.

Time spent spraying indoors versus outdoors was not included in this study; operators were only asked about overall time spraying, which may be a confounding factor.

CONCLUSION

This study's findings suggest that the introduction and implementation of chemical safety programs is vital for reducing chemical exposure among VCOs. Owners should also provide proper PPE with special medical examinations by occupational health officers

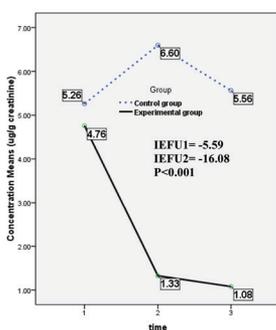


Figure 1 Means of 3-PBA(ug/g creatinine) in intervention group and control group at Baseline, Follow-up 1, and Follow-up 2

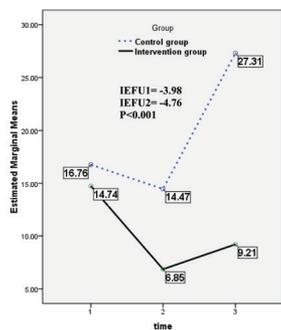


Figure 2 Means of tt-MA (ug/g creatinine) in intervention group and control group at Baseline, Follow-up 1, and Follow-up 2

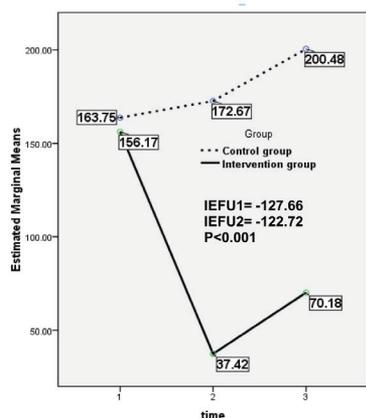


Figure 2 Means of o-cresol (mg/g creatinine) in intervention group and control group at Baseline, Follow-up 1, and Follow-up 2

and biological monitoring for occupational health surveillance that complies with the Occupational Safety, Health and Environmental Act, 2554.²³

Future studies should be conducted using a randomized, controlled trial with long-term follow-ups to assess the effectiveness of a multi-integrated OSH intervention program to reduce biological exposure indices (BEI) and health symptoms among public health VCOs.

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Conflict of Interest: No conflict of interest.

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The Effectiveness of the Schema Therapy with the Group Method on the Women with Social Anxiety

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ABSTRACT

Generalized anxiety disorder is a common psychiatric disorder. The cognitive models of social anxiety emphasize on the important role of dysfunctional cognitions in the formation and maintenance of social anxiety; one of the new cognitive approaches in the treatment is the schema therapy. This study is conducted with the aim of the effectiveness of schema therapy with the group method on the women with social anxiety. This study design form is quasi-experimental with the control group. In order to implement the study by the covariance method, 30 women were selected with a diagnosis of social anxiety by the professionals in Tehran city with the purposive sampling method in 2016; and after the implementation of the pre-test and after reviewing the homogeneity of the mean scores of each scale, they were included in two control and study groups that each one had 15 participants. The study group has received the schema treatment trainings over a period of 60 days in 10 90-minute sessions by two of the senior experts of Family Counseling and Clinical Psychology. But the control group did not receive any training. The Social Phobia Inventory of Connor and et al (2000) has been used for the evaluation. The covariance analysis results showed that there is a significant difference between the study and control groups in the scale of social anxiety. In other words, it can be said that the made changes are the result of the medical interventions and the effect of the independent variable. Also, the Eta square shows the coefficient of the schema-based therapeutic effect on the improvement of the symptoms of social anxiety of the study group.

Keywords: *schema therapy, social anxiety, women*

INTRODUCTION

Social anxiety disorder or social phobia is a type of anxiety that is known with fear and extreme anxiety in the social situations and at least it disrupts a part of the daily activities of the person¹. Social anxiety disorder is an extremely debilitating disorder that can disturb many aspects of the individual's life. In severe cases, social anxiety can dramatically reduce the individual's quality of life. Some of the patients may not leave the house for weeks or they may forget about many social situations such as jobs and educational situations. Social anxiety can be specific (when only some specific social situations cause anxiety; like speaking in public), or generalized. Generalized social anxiety generally involves a type of serious, chronic and persistent concern that the person has from the judgment of others on his/her appearance or behavior or being ashamed and humiliated in front of others. Although the suffering person notices the irrationality or indulgence in this sense of fear and

concern, it is very difficult for him/her to overcome this fear². The cognitive models of social anxiety emphasize on the important role of dysfunctional cognitions in the formation and maintenance of social anxiety³. And they consider the fear of negative evaluation and even positive evaluation as one of the most dysfunctional cognitions in this psychological problem. Several studies have shown that negative evaluation is high in the people with social anxiety⁴.

Schema therapy approach emphasizes on the early maladaptive⁵. Which includes the fixed beliefs and patterns that are emerged from childhood and adolescence and maintained in the adulthood. These beliefs show a strong resistance against change and the individual looks at the around world through these beliefs. Young believes that the early maladaptive schemas are the oldest cognitive components and unconditional beliefs and feelings about us, and they are created by the indigenous interaction mood of the child

with his/her inefficient experiences with the parents, sisters, brothers and peers during the early years of life; and these unconditional schemas increase the vulnerability and the neurotic forms of disorders and psychological problems⁶.

They are self-maintaining patterns from the memories, emotions, cognitions, senses and human perception of the environment. They do their job out of habit and easily; when a person is faced with a challenge, he/she distorts the data instead of changing the schema⁵. The researches have shown that the early maladaptive schemas are associated with various symptoms. For example, the perfectionism schema is associated with the symptoms of anxiety⁷, and psychological maladjustment⁵, eating disorders, psychosomatic symptoms, anxiety and job depression⁸.

The theorists of schema therapy criticize the cognitive techniques, cognitive-behavioral and other techniques, and they believe that they have designed a perfect solution to reduce the symptoms of anxiety and depression. In this approach, schema Therapy is the same deep and pervasive patterns or themes that are formed from the memories, emotions and cognitions and physical sensations which are formed in the childhood and adolescence and are perpetuated on the path of life⁵. Schema therapy is a new integrated and systematic treatment that provides a program to evaluate and modify the early maladaptive schemas. On the basis of the built classic cognitive-behavioral therapy, it combines the cognitive-behavioral, interpersonal, attachment and practical techniques to measure and adjust the early maladaptive schemas. Schema Therapy emphasizes on the evolutionary roots of psychological problems in childhood and adolescence and the use of motivating techniques and the concept of incompatible coping styles⁹. From the perspective of Young, due to the fact that schema therapy emphasizes on the deepest level of cognition; therefore, it seeks to amend the central core of this problem, and this operation has a high success rate in reducing the symptoms such as anxiety and depression and also in preventing its return¹⁰. The research results indicate the effectiveness of the schema therapy on the improvement of the symptoms of anxiety¹¹, and depression¹². Given the importance of the role of schemes in mental illnesses and the importance of this disease among people, this study is conducted with the aim of studying the effectiveness of schema therapy with the group method on decreasing the social

anxiety symptoms in a sample of women.

METHODOLOGY

This study design form is quasi-experimental with the control group. In order to implement the study by the covariance method, 30 women were selected with a diagnosis of social anxiety by the professionals in Tehran city with the purposive sampling method in 2016; and after the implementation of the pre-test and after reviewing the homogeneity of the mean scores of each scale, they were included in two control and study groups that each one had 15 participants. The study group has received the schema treatment trainings over a period of 60 days in 10 90-minute sessions by two of the senior experts of Family Counseling and Clinical Psychology. But the control group did not receive any training.

The content of the training sessions is as follows:
The session one: the explanation of the schema model with a simple and clear language, the manner of the formation of early maladaptive schemas, the features of the early maladaptive schemas, the transitional roots and its scopes, the functions of the schema, the styles and the maladaptive coping responses.

The session two: training the patients about the schemes, the conceptualization of the patient problem based on the schema-oriented approach and collecting all of the obtained information during the measurement, identifying the disturbed areas of schema related to the patients, studying the objectives that are confirming or rejecting the evidences of schemas based on the past life and current life evidences of the patient.

The session three: Learning the two cognitive techniques of schema therapy, including schema reliability test and a new definition of the confirming evidences of the Schema.

The session four: learning and practicing two other cognitive techniques, the evaluation of the advantages and disadvantages of the coping styles of the patient and establishing a dialogue between the aspects of the schema and the healthy aspects and learning the healthy aspects' answers by the patient.

The session Five: Training the techniques of preparing the schema Training Cards, writing the schema registration form in daily life.

The session six: providing the logic of using the experimental technique, mental imagination, the conceptualization of the mental image in the form of schema and running an imaginary dialogue, strengthening the concept of healthy adult in the patient’s mind, identifying the unsatisfied emotional needs and fighting against the schemas on emotional level.

The session seven: creating opportunities for the patient to have identification toward parents and his/her unmet needs by them, helping the patient to vent the blocked emotions of the traumatic event and providing the context of supporting the patient.

The session eight: Finding new ways to establish connection and giving up the excessive avoidance and compensation coping styles, preparing a comprehensive list of the problematic behaviors and determining the change priorities and determining the therapeutic targets.

The session nine: the mental imagination of the problematic situations and dealing with most problematic behaviors, practicing the healthy behaviors through mental imagination and playing the role and performing the tasks related to the new behavioral pattern, reviewing the advantages and disadvantages of

the healthy and unhealthy behaviors.

The Session ten: overcoming the barriers of behavioral change, summarization and conclusion¹³.

RESEARCH TOOLS

The Social Phobia Inventory of Connor et al. (2000): this questionnaire has 17 items, which measure the signs of fear, avoidance and the physiological discomfort in the social phobia. These 17 items are scored from 0 to 4, and the scores of each item will be summed with range of 0 to 68 to achieve a total score. The higher score of the person indicates the severity of the disorder in the individual.

RESULTS

The age range of the study group was 38.12 ± 3.21 and the age range of the control group was 42.76 ± 8.16 . The maximum age of the participants was 49 and the minimum age was 25. The one-sample Kolmogorov - Smirnov test was used in order to evaluate the data normality; the results showed that the variables were not significant at the significance level of $P \leq 0.05$. Therefore, the distribution of the study variables is normal and the parametric tests can be implemented. The Levine test results in table 1 also show that the research groups have the ability to be compared with each other.

Table 1: The results of Levin test to evaluate the equality of the variances of the two groups

Variables	F	df1	df2	Sig.
Depression	2.925	1	28	.098

Table 2: Descriptive Statistics

Groups		N	Min	Max	Mean	Std. De
Test	Pre-test	15	33.00	47.00	41.6000	4.93964
	Post-test	15	30.00	43.00	36.4000	4.23927
Control	Pre-test	15	34.50	46.50	41.7000	4.00357
	Post-test	15	58.50	70.50	65.7000	4.00357

The covariance analysis was used to evaluate the effectiveness of the schema-oriented group therapy.

Table 3: Statistical Properties for Variables in the Pretest, Posttest on the Studied Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	363.842	1	363.842	87.588	.000	.764
group	6402.637	1	6402.637	1541.315	.000	.983

The covariance analysis results showed that there is a significant difference between the study and control groups in the scale of social anxiety. Accordingly, due to significant difference of the mean of the research variables between the study group of the social anxiety variable and the control group in Table 2, and the existence of a significant difference that is resulted from the covariance analysis in Table 3, it can be concluded that the created changes are the result of the medical interventions and the effect of the independent variable. Also, the Eta square shows the coefficient of the schema-based therapeutic effect on the improvement of the symptoms of social anxiety of the study group.

DISCUSSION AND CONCLUSION

This research is conducted with the aim of studying the effectiveness of schema therapy with the group method on decreasing the social anxiety symptoms in a sample of women. The covariance analysis results showed that there is a significant difference between the study and control groups in the scale of social anxiety. In other words, it can be concluded that these kind of created changes are the result of the medical interventions and the effect of the independent variable. Also, the Eta square shows the coefficient of the schema-based therapeutic effect on the improvement of the symptoms of social anxiety of the study group. These results are consistent with the study results of Baljé et al (2016)¹⁴; Calvete et al (2015)¹⁵; Calvete (2014)¹⁶; Saffarinia et al (2014)¹³; Calvete et al (2013)¹⁷.

In the treatment process, the schema therapy helps the patient to create a healthy sound in his/her mind and empower his/her healthy mentality by questioning the schemas. This therapeutic approach helps the patients to properly assess the schemes, styles and their coping strategies. According to the effect of this approach, the patients see the schemas and coping strategies as an external reality that they can fight against them based on the objective and empirical evidences. In fact, one of the reasons of the success of the schema therapy is targeting these underlying structures by using the cognitive techniques.

Various evidences have shown that, although schema therapy is originally set individually, the existence of the group factors has facilitated the activation of the schema therapy techniques and has major remedial effects on the central schemas such as

rejection and giving up, social exclusion, mistrust and emotional deprivation¹⁸. In fact, due to the creation of the links and interaction between the members of the group, the possibility of the actual encounter and linking the early experiences with the schematic processes are increased here and now in a supportive environment; and on the other hand, by increasing the learning of the substitution opportunities, the sense of self-efficacy and risk taking of the members will be strengthened to conduct the new behaviors. Also, the group members learn to express empathy and meet their emotional needs in the group instead of withdrawing from their emotions.

Ethical approval: Related departments should be assured about the confidentiality of the results of questionnaires.

Conflict of Interest: The authors report no conflict of interest.

Source of Funding: Self

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A Prospective Study of Pattern of Skull Fractures and Intra-cranial Hemorrhages in Relation with Fatal Head Injury Cases Brought for Autopsy of SSG Hospital, Vadodara

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ABSTRACT

Introduction: 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.

Material & Method: The present study was conducted in Department of Forensic Medicine, Govt. Medical College, Vadodara during 2015- 2016. Total 320 cases of autopsy were studied irrespective to the age; gender, religion, cast etc., who have died 'due to head injuries by any means. All the data related to time, manner and manifestation of head injury were recorded with detailed autopsy examination and subsequently analyzed statistically.

Result: Of the total 320 cases, 236 cases (64.1 %) were due to RTA. In this study, lacerations were the most common scalp injuries. In our study, among 320 cases of head injuries, cranial vault and base of skull bones were fractured in 249 cases (77.81 %) and in the remaining 71 cases (22.19 %) there was no fracture. In our study, among 320 cases of head injuries, intracranial haemorrhage was present in 302 cases (94.38%)

Keywords: - Scalp, Fracture, Intra-cranial Haemorrhage.

INTRODUCTION

Head and neck are most common of all the regional injuries in forensic practice. Head injury is a major cause of morbidity and mortality in all age groups, ranging from the infant who is a victim of abusive head injury to the elderly person who is injured in a fall. 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.

Injury to brain without fracture of skull is not uncommon, though fracture of skull is usually

accompanied by some degree of injury to the brain. ¹ The study of pattern of skull fractures in these cases is important as head being the most exposed and prominent part of body; it becomes most susceptible to injuries, as a result of criminal violence or accident.

The skull fractures, especially by blunt force offer varying diagnostic and medico- legal problems to the medical jurists as well as to the clinicians. The two most common types of significant head injury in adults encountered by the forensic pathologist are blunt force head injury and gunshot wounds of the head. The aim of present study is to find out the reasons behind fatal head injury, pattern of different haemorrhages and fractures observed during autopsy.

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AIMS AND OBJECTIVES

- To correlate pattern of scalp and facial injuries in relation with injury to skull and brain.

- To Study the circumstances of causation of trauma.

MATERIAL AND METHOD

The present prospective study was conducted in Department of Forensic Medicine, Govt. Medical College, Vadodara during 2015- 2016. Total 320 cases should be considered who have died due to fatal head injuries irrespective to the age; gender, religion, cast etc. All the data related to time, manner and manifestation of head injury were recorded with detailed autopsy examination and subsequently analyzed statistically. Cases where bodies were in advanced state of decomposition were excluded.

RESULTS

Table No. 1- The different trauma mechanisms related to the cases

MECHANISM OF TRAUMA	NUMBER OF CASES	PERCENTAGE
RTA	236	73.75%
Fall	39	12.19%
Railways	24	7.5 %
Assault	7	2.19 %
Others	14	4.37 %
Total	320	100 %

Of the total 320 cases, 236 cases (73.75 %) were due to RTA and 39 cases (12.19 %) were due to fall, 24 cases (7.5 %) and 7 cases (2.19 %) were due to railway injury and assault respectively. 14 cases (4.37 %) were due to other causes like industrial accidents, gunshot injuries, electrocution and burns.

Similar observation was made by G Gururaj, Sastry Kolluri, where RTA constituted 62 %, fall constituted 22 % and assault constituted 10%.^{1,2}

Table No. 2- Pattern of Scalp injuries in various causes of injury

SCALP INJURY	CAUSE					TOTAL
	RTA	RAILWAYS	ASSAULT	FALL	OTHERS	
Abrasion	9 (64.29%)	1 (7.14%)	0	3 (21.43%)	1 (7.14%)	14
Contusion	18 (81.82%)	0	0	4 (18.12%)	0	22
Laceration	62 (65.26%)	16 (16.84%)	4 (4.21%)	7 (7.37%)	4 (4.21%)	95
No Injury	110 (80.29%)	3 (2.32%)	1 (0.73%)	17 (12.41%)	6 (4.38%)	137
Total	236 (73.75%)	24 (7.5%)	7 (2.2%)	39 (12.19%)	14 (4.36%)	320 (100%)

In this study, lacerations were the most common scalp injuries in all mechanisms of injury including RTA, railways, fall etc. An incised wound (1 case) was exclusively seen in assault and chop wounds (2 cases) were exclusively seen in assaults and fall. Punctured wound (1 case) was observed in RTA cases. A combination of abrasion and contusion were observed in RTA (3 cases), combination of abrasion and laceration were observed in RTA (1 case), whereas combination of contusion and laceration were observed in RTA (6 case) and in fall (1 case).

In a study conducted by Bamjee Y, Lowmie J F, Cleaton-Jones P E, Lownie M A, violence was the most common cause of injury on head, as in the USA and Zimbabwe, but unlike the rest of the world in which it is motor vehicle accidents.³

Table No. 3- Pattern of facial injuries in various causes of injury

FACIAL INJURY	CAUSE					TOTAL
	RTA	RAILWAYS	ASSAULT	FALL	OTHERS	
Abrasion	49 (76.6%)	3 (4.7%)	1 (1.6%)	8 (12.5%)	3 (4.7%)	64
Contusion	08 (72.7%)	0	0	1 (9.1%)	2 (18.2%)	11
Laceration	115 (76.7%)	3 (2%)	0	3 (2%)	2 (1.33%)	150
No Injury	26 (34.2%)	13 (17.1%)	5 (6.6%)	26 (34.21%)	06(7.9%)	76
Total	236 (73.75%)	24 (7.5%)	7 (2.2%)	39 (12.19%)	14 (4.36%)	320 (100%)

In this study, abrasions and lacerations were the commonest of facial injuries in RTA, whereas abrasions over face were common in railways.⁴

The combination injuries including combination of abrasion and contusion (4 cases), combination of abrasion and laceration (19 cases) and combination of contusion and laceration (4 cases) were more seen in RTA.

Roccia F, Bianchi FA, Zavattero E, Baietto F, Boffano P studied that motor vehicle accidents and falls were responsible for most injuries to patients with facial lacerations.¹⁰

Table No. 4- Pattern of Fractures of Calvaria

TYPE OF FRACTURE	NUMBER OF CASES	PERCENTAGE
Fissured/Linear	124	38.75%
Sutural	8	2.5%
Comminuted	20	6.25%
Depressed	9	2.81%
Crushed	10	3.13%
Craniotomy	35	10.94%
Fissured + Comminuted	2	0.63%
Fissured + Depressed	1	0.31%
Sutural + Comminuted	1	0.31%
Comminuted + Depressed	31	9.68%
Fissure+ Sutural	4	1.25%
Fissure+ Sutural + Depressed	1	0.31%
Fissured + Depressed + Comminuted	3	0.94%
No Fracture	71	22.19%
Total	320	100%

In our study, among 320 cases of head injuries, cranial vault and base of skull bones were fractured in 249 cases (77.81 %) and in the remaining 71 cases (22.19 %) there was no fracture. Among fractures of the Calvaria, fissured/

linear fracture was the commonest accounting for 124 cases (38.75 %) followed by comminuted and depressed fracture together which was present in 31 cases (9.68 %) followed by comminuted fracture alone was present in 20 cases (6.25%) . Craniotomy present in 35 cases (10.94%).

In contrast study by Shivendra Jha et al, where the incidence of fractures of vault of skull were frequent (93.9 %), amongst which about half (45.2 %) of the fractures were comminuted fractures, followed by depressed and linear fractures.⁵

This is in similar with a study done by Mohammad Zafar Equabal, Shameem Jahan Rizvi, where they concluded linear fracture in 34 cases (43.04 %) was common followed by basilar fracture 14 cases (17.73%) and then comminuted fracture 06 cases (07.61 %).⁶

Table No. 5- Pattern of Intracranial haemorrhage

TYPE OF INTRACRANIAL HAEMORRHAGE	NUMBER OF CASES	PERCENTAGE
EDH	2	0.63%
SDH	27	8.44%
SAH	58	18.13%
Crushed	5	1.56%
Expelled Out	13	4.05%
EDH + SDH	6	1.87%
EDH + SAH	4	1.25%
SDH + SAH	166	51.87%

Cont.. Table No. 5- Pattern of Intracranial haemorrhage

SDH + IVH	2	0.63%
SAH + IVH	2	0.63%
EDH + SDH + SAH	21	6.56%
SDH + SAH + IVH	9	2.81%
EDH + SDH + SAH + IVH	2	0.63%
EDH + SDH + SAH + ICH	3	0.94%
Total	320	100%

In our study, among 320 cases of head injuries, intracranial haemorrhage was present in 302 cases (94.38%) and in the remaining 18 cases (5.62%) there was crushing of brain or brain expelled out. The common intracranial haemorrhage in the current study was combination of subdural and subarachnoid haemorrhage in 166 cases (51.87 %), followed by subarachnoid haemorrhage alone in 58 cases (18.13%) and subdural.

In a retrospective study by Goel Saurabh, Singh Virendra B, Agarwal Namita, Niranjana Ashutosh, subdural haemorrhage (45%) was observed most commonly, followed by subarachnoid haemorrhage (31%), whereas extradural and intracerebral haemorrhages were found in comparatively less number of cases viz, 14 % and 8 % respectively. Combination of all haemorrhages was seen only in 2 % of cases.⁷

In a study by Gupta S, Roychowdhury U B, Deb P K, Moitra R, Chhetri D, the commonest type of intracranial haemorrhage found was subdural haemorrhage (68%) followed by extradural haemorrhage (28%) and intracerebral haemorrhage (8%) was the least common.⁸

Table No. 6- Correlation of fracture site with various mechanisms of injury

FRACTURE	CAUSE				TOTAL	
	RTA	RAILWAYS	FALL	ASSAULT		
Frontal	2	0	4	1	7	12.91%
Temporal	15	0	1	0	16	29.6%
Parietal	3	1	0	0	4	7.4%
Occipital	8	1	0	1	10	18.5%
ACF	7	0	0	0	7	12.9%
MCF	7	0	2	0	9	16.7%
PCF	1	0	0	0	1	1.9%
Total	43	2	7	2	54	100%

Of the 54 cases with fractures, on considering site of skull vault fracture, temporal bone was involved in 16 cases (29.6 %) as it is the thinnest bone and more prone to fractures, followed by occipital and Middle cranial fossa bones in 10 cases (18.5%) and 9 cases (16.7 %) respectively. On considering site of skull base fracture, majority of cases involved middle cranial fossa in 9 cases (16.7 %) due to larger area of side impact and thinness of this part of base of skull, as compared to anterior cranial fossae accounting for 7 cases (12.9 %). Least involved area in fracture was posterior cranial fossae in 1 cases (1.9%).

In a study by Anand Menon, Nagesh K R, parietal bones were involved in 22 % of cases, followed by temporal, frontal and occipital bones in 20 %, 17 % and 12 % respectively. Also, middle cranial fossa, posterior cranial fossa and anterior cranial fossa were involved in 26 %, 17 % and 15 % respectively. Least involved area in fracture was the occipital bone (12%).⁹

CONCLUSION

Common causes of intracranial lesions due to blunt force are vehicular accidents, assault by blunt weapons, and fall from height etc. Maximum numbers of cases are due to vehicular accidents. Linear/Fissured fracture of the calvaria was the commonest accounting for 124 cases (38.75%) with temporal bone being commonly involved .

A combination of subdural and subarachnoid haemorrhage in 166 cases (51.87%) was the commonest type of intracranial haemorrhage seen, with cerebral edema being commonly present in 103 cases (32.18%) and contusion in 26 cases (8.13%).

Thus this study emphasizes that autopsy is the gold standard in observing the various lesions amongst fatal cases and form a very vital cog in medico legal cases for the administration of justice.

Conflict of Interest: Nil

Ethical Clearance - Taken

Source of Funding: Self

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Study of Knot and Profile of Ligature Materials used in Asphyxial Deaths caused by Hanging in Kanpur; a Metropolitan City of India

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ABSTRACT

Background: Hanging is caused by suspension of the body by a ligature encircling the neck. The person may use any article readily available for this purpose, like a rope, saree, belt, bed sheet etc. Most times, Ligature mark and material may be the only evidence available in deaths due to either hanging or strangulation. Their thorough examination and analysis is extremely helpful in differentiation and provide vital medicolegal information.

Method: Present one year study was done at the mortuary of GSVM Medical College Kanpur. It includes retrospective evaluation of 441 deaths occurred due to hanging during the period of 1 year from January 2013 to December 2013.

Results and Conclusion: out of 441 cases (12.02% of total autopsies) of violent asphyxia deaths, 78.91% cases were due to Hanging wherein most common manner of death is suicidal 342 (98.27%). Maximum cases 134 (38.50%) were seen in the age group 21 to 30 years with a male predominance (62.93%). Soft ligature material was mostly used (n=217; 62.35%). The mark was obliquely placed in all cases and it was above the thyroid cartilage in 92.24% cases.

Conclusion: This study will educate and provide vital information for the Doctors, Police and concerned authorities in investigating cases of Hanging.

Keywords: Hanging, Autopsy, Ligature Material

INTRODUCTION

The term Compression of neck is broadly used for non specific causes of neck pressure which may be sudden. Ligature mark is a characteristic feature found

in two types of neck compression- (I) Hanging (II) Ligature strangulation. Hanging is a form of Asphyxial death due to constriction of the air passage at the neck, as a result of suspension of the body by a ligature in the form of a noose, applied in such a manner, when weight of the body or some other body part (e.g. head) acts as a constricting force. ¹

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Hanging is called complete when body is fully suspended and no part of the body touched the ground and constricting force is weight of whole body. On the other hand in incomplete or partial hanging, the body is partially suspended, the toes or feet touching the ground

or are in a sitting, kneeling, lying down, prone or any other posture with only head and chest off the ground. As hanging is invariably presumed to be suicidal, the suicide usually hangs on the spur of moment with little premeditation, using any type of ligature available at hand. Articles used as a ligature may be a rope or Dhoti, Saree, Turban, Bed-sheet, Handkerchief, Belts, Braces, Scarves, Towels, Gamcha, Metallic chains, Wires, Leather strap etc. Dhoti, Saree, Curtain etc. may be torn into strips & used as ligature. In short, the material can be anything handy and available near place of occurrence as the suicide is an impulse mediated act. All cases of hanging are considered to be suicidal until the contrary is proved.²

Knot is frequently in the form of a single knot to produce a running noose or fixed by a granny or reef knot, occasionally a simple loop is used.² There may be more than one turn around the neck and / or more than one knot imparting corresponding complexity to the mark. Ligature mark depends on the nature and position of the ligature used, and the direction of suspension of body after death. If the ligature is soft, and removed immediately after death, there may be no mark. Again, the intervention of a thick and long beard or clothes on the neck leads to the formation of a slight mark. Sometimes, the pattern of the ligature material is impressed on the skin and a characteristic diagonal mark of the strands found when the rope is used.

Against this background, the present study tried to focus on the characteristic features of ligature mark and material

METHOD AND MATERIALS

Present study was done in the Department of Forensic Medicine & Toxicology, GSVM Medical College Kanpur from January 2013 to December 2013, for a period of one year, considering the inclusion and exclusion criteria.

Inclusion criteria:

1. All age groups.
2. All cases of hanging reported to the mortuary of GSVM Medical College Kanpur during the study period.
3. Either of the genders.

Exclusion criteria:

1. Decomposed cases.
2. Alleged history of strangulation.

A detailed history from the police & the relatives along with the pretested questionnaire with variables regarding the type of Ligature Material, point of suspension, type of hanging, type & position of knot etc. were collected. The data obtained was analyzed using latest software.

OBSERVATION AND RESULTS

During study period, a total of 3667 Autopsies were conducted in the mortuary of GSVM Medical College Kanpur. out of them 441 (12.02%) cases of violent asphyxia deaths WERE REPORTED Among them most cases (n=342; 78.91%) were due to Hanging wherein most common manner of death was suicidal 342 (98.27%).

Males 219 (62.93%) clearly outnumbered the female 129 (37.06%). Highest incidence of Hanging was noticed in the age group of 21-30 years (35.37 %) followed by 11-20 years age group (23.58 %). Regarding the place victims (95.11%) preferred closed places like living room over the open spaces (4.88%); as place of hanging.

Soft material (62.35%) was the most commonly used ligature material (Table -1) than the hard one.

Table -1. QUALITY OF LIAGATURE MATERIAL

Material	No	%
Soft	217	62.35
Hard	131	37.64
Total	348	100

Amongst the soft materials, 'Dupatta' was the most commonly used material in majority of the cases (27.29%).

Table-2. TYPE OF LIAGATURE MATERIAL

Material	No	%
Soft		
Duppta	95	27.29
Saree	59	16.96
Bed sheet	13	3.73
Lunghi	37	10.63
Other	13	3.73
Hard		
Electrical wire	48	13.79
rope	83	23.85
Total	348	100

The present study also revealed that the type of knot (Table -3) in most cases (54.31%) was fixed & in 45.68% it was found to be 'running' type.

Table -3. TYPE OF KNOT IN HANGING

Type of knot	No	%
Slip Knot	159	45.68
Fixed knot	189	54.31
Total	348	100

In more than half of the cases (85%) the point of suspension was found to be the ceiling fan. The most common type (Table 6) of hanging in this study was observed to be 'Atypical' type (95.11%).

DISCUSSION

The hanging / liagature mark is the most relevant feature of hanging and its characteristics are well known in the literature. It is an important tool in differentiation of hanging from strangulation. But most of the time, the ligature material is not available during autopsy examination in hanging. Hence, the features of ligature material are not submitted to systematic analysis.

However, the type and position of knot play an important role in the mechanism of death and autopsy findings in hanging.

Autopsy surgeon should note whether the mark on the neck corresponds with the material alleged to have been used in hanging, and if it is strong enough to bear the weight and the jerk of the body.

Out of total 3667 postmortem examination from Jan 2013 to Dec 2013; 441 (12.02 %) died due to violent asphyxia death. This Study is in accordance with Love R B et al³ (10.70 %)B3, Azmac D B4 (15.7%), Srinivasa Reddy P et al B5 (19.14%), and Amandeep et al⁶ 2003 (5.26 %), Patel A P et al⁷ 2013(5.36).

Out of these 441 cases of asphyxia death, 350 were suicidal in nature and among these 342 were due to hanging.

Study shows that Hanging is the most frequently used method for asphyxial death (n=342; 78.91%), These results are fairly similar to Love RB et al³ (75.0%) and Patel A P et al⁷ (82.48%).

We found that males (62.93%) were affected more than females (37.06%) similar to Chaurasiya N et al⁸ who reported 53.71% males in comparison to 46.29% females.

It was noted that majority people committed suicide by hanging within the closed secure places 331(95.11%) i.e. at their home rather than at open place 17 (4.88) like fields, forest and gardens. This is also supported by Rawat et al⁹ who reported hanging in closed and open places 71.29% and 28.71% respectively; and Patel A P et al⁷ who too, reported the same [closed place (96.25%) and open place (3.75%)]

Most victims 217(n=217; 62.35%) used soft ligature material in quality followed by hard 131(37.64%) material for hanging. Our results are strongly supported by various other studies as in (Table -4)

(Table -4) LIGATURE MATERIAL USED IN HANGING CASES IN DIFFERENT STUDIES

S. No.	STUDIES	LIGATURE MATERIAL (in hanging cases)		
		Soft	Hard	Total
	Present study	217 (62.35%)	131 (37.64%)	348 (100%)
	Ankur P <i>et al</i> ⁷	256 (80%)	64 (20%)	320 (100%)
	Sharma B R <i>et al</i> ¹⁰	31 (56.36%)	24 (43.64%)	55 (100%)
	Naik S K <i>et al</i> ¹¹	129 (53.97%)	110 (46.03%)	239 (100%)
	Vijaynath V <i>et al</i> ¹²	70 (70%)	30 (30%)	100 (100%)

For the purpose of present study the ligature material is divided into two broad groups. 1. Hard –e.g., electric wire, rope, nylon wire etc. 2. Soft – e.g., dupatta, bed-sheet, saree etc. The use of ligature material in studies of different cases of hanging by different authors is summarized in table 7. The difference in the studies could be because of fact that suicide is because of an impulse and for that the victim uses whatever material is available early on that particular period of time. To conclude it can be said that for a person to end his/her life by hanging, he/she may use any material available in the vicinity^{10, 11, 12}

(Table -5) LIGATURE MATERIAL USED

Material	No	%
Soft		
Duppta	95	27.29
Saree	59	16.96
Bed sheet	13	3.73
Lunghi	37	10.63
Other	13	3.73
Hard		
Electrical wire	48	13.79
rope	83	23.85
Total	348	100

Material used in hanging soft 62.35% and hard 37.64%.

Type of material used in hanging showed that, in maximum incidences; dupatta 95 (27.29%) was used followed by rope 83 (23.85%), sari 59 (16.96%), electric wire 48 (13.79%) etc. In Goa; Rawat *et al*⁹ found that rope (plastic/fibre) was used in maximum 44 (43.56%) cases, followed by dupatta in 23 (22.77%) and bed sheet in 12 cases (11.88%). In a study by SH Bhosle *et al*¹³ it was nylon rope (53.01%) followed by long handkerchief (06.03%) and Chunni (06.03%). Jute rope, cotton rope and sari were used as ligature material in 03.61% cases each while the ligature material could not be ascertained in 16 (19.28%) cases. In Patel A P *et al*⁷ study most commonly reported soft material was loke, dupatta (67.5%) followed by bed sheet (10%) and among hard material; rope (18.75%) was preferred over the electric wire (1.25%). P.B Vaghmare *et al*¹⁴ also noticed that soft Ligature material was preferred like dupatta 38.33%, rope 35% and sari 13.33%.

According to the position of knot, our study shows, maximum hanging cases present with atypical 331(95.11), followed by typical 17 (4.88) position of knot. This is quite similar to that of Patel A P *et al*⁷ who also observed atypical knot in most (97.5%) cases.

On the basis of degree of suspension; Type of Hanging was found to be complete in most cases (336; 96.55 %) this is very close to Patel A P *et al*⁷. who found complete suspension in 98.75% cases. Rawat *et al*⁹ *et al* also reported complete hanging in 86 (85.14%) cases as far as direction of ligature mark is concerned; all 100% cases present with oblique ligature mark. Which is extremely close to the study of SH Bhosle *et al*¹³ who observed the same findings in 98.81% cases.

In maximum incidence 189 (54.31%), the type of knot was fixed rather than slip knot 159 (45.68%). Rawat et al⁹ cases of hanging, 85 (84.15%) victims have used slip knot and 16 (15.84%) victims used fixed knot.

In most cases 202 (58.04 %), the knot was seen in right side of the neck followed by left side 128 (36.78 %) back 17 (4.88 %) and in front of neck 1 (0.28 %). This is fairly similar to Rawat et al⁹ study where the knot was seen on right side of neck in 61 (60.39%) cases, on left side of neck in 33 (32.67%) cases, on front of neck in 1 (0.9%) case and on back of neck in 6 (5.94%) cases. The number of ligature marks was ONE in almost all cases 342 (98.27%) while multiple ligature mark were seen in 6 (1.72%) cases only. Rawat et al⁹ too found single ligature mark in 96 (95.04%) cases of hanging and multiple in 5 (4.95%) cases.

Observation is incomplete when obliquity along the course of the ligature mark is not noted in cases of hanging and strangulation. Authors have reported that hanging mark is situated obliquely across the circumference of neck.^{1,2,15}

Hanging is a commonly preferred mode of suicide as it is a simple and non-expensive method where death is almost certain. Meticulous examination of the ligature mark and material can help to arrive at confirm opinion as to the cause of death. Chemical analysis samples also play vital role, however more detailed study is required with crime scene visits.

In the present study, 'Dupatta' was the most common ligature material used. Running type of knot was the most commonly used with ceiling fan being the most common point of suspension. These findings are similar to studies conducted by Patel AP et al⁷, Bhoosle SH et al¹³, Sharma BR et al¹⁰. The probable reason for 'Dupatta' being the most common ligature material is because of the easy availability in every home in our country and that it can sustain one's weight. Ceiling fan is chosen in majority because it can withstand the weight of the person and available in almost every living room in the house.

CONCLUSION

Hanging being viewed as giving quick painless death and with easily available ligature material & ligature points in secluded place without arousing much suspicion, this mode is increasingly accepted

for self suspension. Hanging is always considered suicidal in nature until contrary is proved. This study will educate and provide valuable information for the medical professionals, Investigating Officers and other concerned authorities in investigating cases of Hanging.

Conflict of Interest: None

Ethical Clearance: Taken from the Ethical Committee from the Institute

Source of Support: Nil

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Electrocution Deaths – A 6 Year Retrospective Study

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ABSTRACT

Background: Owing to extensive use of electricity in home and industries, electrocution injuries are one of the common causes of morbidity and mortality in India. Deaths due to fatal electric injuries are quite common in and around Ballari, and hence a retrospective study was conducted on the cases of death due to electrocution.

Objectives: This study was carried out with the aim to find out the profile of electrocution deaths in fatal electrocution. **Materials and Method:** This retrospective study was conducted at V.I.M.S, Ballari, Karnataka, India. Total 5590 autopsies were conducted in the Department of Forensic Medicine and Toxicology during 1st January 2010 to 1st January 2016; of them, 64 cases of death due to electrocution were analyzed. **Results:**

In this study, majority of the victims were men (90.62%) aged between 11 and 40 years (87.5%). In 46.87% cases, victims were electrocuted at electric pole contact and all cases (100%) were accidental in nature. In most of the victims, limbs (75.00%) were involved due to a contact with electric source followed by the cases. In this study, we observed that the incidences were typically higher in late monsoon season (59.37%) as compared to other seasons, which shows that there is a characteristic seasonal variation in cases of electrocution. **Conclusion:** Electric injury varies from nil to severe destruction of tissues, so in all cases of death due to electrocution meticulous autopsy should be performed to help the investigations for the purpose of compensation and to plan future safety measures. Pattern of fatal electrocution injuries in this study is more or less similar to that observed in most of the other studies conducted by various authors and the incidences are typically higher in the rainy season.

Keywords: *Electrocution, burns, accidental death, injury*

INTRODUCTION OR BACK GROUND

Electricity is an integral part of modern society. Electrical burns are responsible for considerable morbidity and mortality and are usually preventable with simple safety measures.^{1,2} Almost all fatalities by electrocution are accidental, while homicides and suicides from electricity are rare or uncommon.² Many workers are exposed to electrical energy daily during the performance of their tasks. Electricity is a ubiquitous energy agent to which many workers in different occupations and industries are exposed daily in the

performance of their duties. In addition, many people in different daily activities deal with it. Many people know that the principal danger from electricity is that of electrocution, but few really understand how minute a quantity of electrical energy is required for electrocution. In reality, the current drawn by a tiny 7.5 W, 120-volt lamp, passed from hand to hand or hand to foot across the chest is sufficient to cause electrocution.³ The number of people who believe that normal household current is not lethal or that power lines are insulated and do not pose a hazard is alarming. Electrocutions may result from contact with an object as seemingly innocuous as a broken light bulb or as lethal as an overhead power line and might have affected workers, since the first electrical fatality was recorded in France in 1879 when a stage carpenter was killed by an alternating current (AC) of 250 volts.⁴ Death due to electrocution involves both low- and high-voltage currents, however, most deaths

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are due to low-voltage currents used in houses and minor industrial settings. The type of power system employed in India is an AC 220–240 V, 50 A. The epidemiology of electrical fatalities in and around Ballari, India is described between 2008 and 2012. This study: highlights the magnitude of the problem of occupational and home accidental electrocutions in and around Ballari, identifies potential risk factors for fatal injury, and provides recommendations for developing effective safety programs to reduce the risk of electrocution. It is hoped that this study will serve as a valuable resource for safety and public health professionals, safety and health trainers, researchers, and others who can affect the prevention of accidental electrocutions.

MATERIAL AND METHOD

This retrospective study was conducted in the Department of Forensic Medicine and Toxicology of V.I.M.S, Ballari, Karnataka, India. Total 5590 autopsies were conducted from 1st Jan 2010 to 1st Jan 2016, and of them, 64 cases (1.14%) in which death were alleged due to fatal electrocution were selected for this study. All these cases were studied irrespective of their age and gender, and we also tried to find out the seasonal and diurnal variations, if any, in cases of electrocution. Detailed and complete autopsy examination was conducted with the aim to find the area of body parts affected and types of electric injury, whether it is a contact injury or flash burns due to a spark. Information regarding the incidence of electrocution was collected from the police papers, and autopsy reports were taken into consideration to conclude the manner of death, whether it was suicidal, accidental, or homicidal in nature. Finally, the data were collected and analyzed after comparing with those of Indian and foreign authors.

FINDINGS: RESULTS

We analyzed 64 cases of fatal electric injury, which were brought to us for the autopsy examination from 1st January 2010 to 1st January 2016. Majority of the victims were men (90.62%) as compared to women, with a male/female ratio of 9.6:1.

Table No.01. Profile of sex

Male	Female
58	6

Most of the victims (39.00%) were in the third decade of their life, 23 cases were found in second decade (35.93%), 8 cases belonged to age group 31-40 years (12.5%), 3 cases in age group of 41-50 years (4.68%), 2 cases belonged to age group 71-80 years (3.12%). One each case was found in age groups 1-10 years, 51-60 years and 61-70 years (1.56%). Around three-fourths belonged to younger and adult age groups (e.g., from 11 to 30 years).

Table No. 02. Profile of age

1-10 yrs	01
11-20 yrs	23
21- 30 yrs	25
31-40 yrs	08
41-50 yrs	03
51-60 yrs	1
61-70yrs	1
71-80yrs	2

We tried to find out the seasonal and diurnal variations in cases of death due to electrocution, and we observed a characteristic seasonal variation. In this study, incidences of death due electric injury were typically higher (38 cases, 59.37%) in the season of late monsoon and post monsoon, which was in the months of September to December in Ballari, from 2010 to 2016. 15 cases (23.43%) in early monsoon and 11 cases (17.18%) in winter.

Table No. 03. Profile of Month wise distribution

January-April	May-august	September-December
11	15	38

Majority of the incidences (41 cases: 64.06%) happened during the daytime between 7 AM and 7 PM as compared to night (23 cases: 35.93%). In most of the incidences, victims were injured by electrocution when they were at home (64.06%) and working with some electric source.

Table No.04. Profile of Diurnal variation.

Day time	Night time
41	23

Upper limbs were the most common body part affected by electrocution in more than three fourth (48 cases:75.00%) of the cases and contact wound of electrocution was also noticed.

Table No. 05. Profile of Site of body involved in electrical injuries

Limbs	Trunk	Head
48	13	03

In our study, all cases of fatal electric injuries were accidental in nature (64 cases: 100.00%), and we did not find any case of suicidal or homicidal electrocution.

Table No. 06. Profile of Manner

Accidental	Suicidal	Homicidal
64	00	00

In our study, 30 cases (46.87%) were due to contact with electric pole, followed by 20 cases (31.25%) were due to contact with live wire, followed by 9 cases (14.06%) due to domestic appliances and lastly 5 cases (7.81%) due to unknown sources.

Table No. 07. Profile of Source of electric current

Electric pole	Domestic appliance	Live wire	Unknown source
30	09	20	05

DISCUSSION

In India, majority of the cases of electrocution are caused by the low-voltage domestic supply, but those due to high tension supply are also common nowadays. In this study, we analyzed the cases of fatal electrocution in contrast to age, gender, place of incidence with seasonal variations, and type and manner of electrical injury, and the findings were compared with the observations made by other authors. The incidences of death due to fatal electric injuries in our study were .14%, which is almost similar with the incidences observed by Gupta et al.⁵ (2.02%) and Rautji et al.⁶ (1.98%) in their studies. Incidences of death due to fatal electrocution were quite lower in the studies conducted by the foreign authors^{7,8} than those reported by us. In this study, majority of the victims were men (90.62%) of adult age group [e.g., from 11 to 30 years

(87.5%)], which is consistent with the findings of most of the other authors.⁵⁻⁹ We made an effort to analyze the cases according to seasonal and diurnal variations and observed a characteristic higher incidence of fatal electrocution in the season of late monsoon, which is in the months of September to December in this area. These results were slightly consistent with the observations made by Gupta et al. [4] and Kumar et al.¹⁰, whereas Shaha and Joe¹¹ and Sheikazadi et al.¹² found higher incidences of fatal electrocution in summer seasons. The wetness of the environment in rainy season is responsible for the increased incidences. In our study, majority of the incidences (64.06%) happened during the daytime between 7 AM and 7 PM as compared to night. Most of the victims were electrocuted at electric poles (%) while they were working with some electric source, which slightly deviated from observations by the other authors in their studies.^{5,11} However, Kumar et al. [9] and Sheikazadi et al.¹² observed higher incidences of fatal electrocution at working places. Our study shows that in majority of the cases limbs were the most common body part affected followed trunk, which is similar to the observations of almost all other Indian authors.^{5, 6, 9, 10, 12}

Manner of death in this study was concluded with the help of alleged history regarding the incidence, information from police papers, and findings of autopsy report, and we found that all deaths in our study were accidental in manner and there was no case of death due to suicidal or homicidal electrocution. Almost similar types of findings were observed by other authors in their studies.^{5, 6, 12} Gupta et al.⁵ found only one case of suicide whereas Sheikazadi et al.¹² reported 3.4% cases of suicide. Strength of our study is that we have laid stress on the parameters such as seasonal and diurnal variations in cases of death due to electrocution. Also, no such study has been conducted so far in and around Ballari on this particular subject. In this study, we had a good sample size in 6 years, which is not there in the studies of most of the other authors and might be due to low incidences of the cases of death due to electrocution in their area.

Limitations: There are some limitations also of our study. First, we have studied the cases retrospectively so have to rely on the observations seen by the others, which may vary from person to person. Second, if this study were done prospectively then we could have discovered and analyzed some more issues related with

this topic.

CONCLUSION

The passage of electric current through human body can produce multiple effects, varying from a localized muscle spasm to sudden death of the person. All cases of death due to electrocution should be investigated properly for the purpose of compensation and future safety measures. Autopsy in cases of death due to electrocution is not an easy task for the autopsy surgeon because injuries over the body vary from nil to gross destruction of tissues. Majority of the fatal injuries are due to inadvertent contact with a low-voltage domestic supply but these may also occur due to working with a faulty line or in industries or rarely when the people come into the area of magnetic field of a high-tension cable. The mortality rate in cases of fatal electrocution can be decreased by the immediate and adequate resuscitation because often the victim may be in a state of suspended animation. In all these cases, history regarding the incidence with detailed examination of scene of crime and autopsy report may help us to conclude the cause of death and its manner so the data can be used further to plan and implement the preventive policies to reduce such incidences.

Pattern of fatal electrocution injuries in this study is more or less similar to that observed in most of the other studies conducted by various authors. Our study revealed that the most of the victims were men aged between 11 and 30 years who died at work place due to accidental contact electrical injury over limbs. This study also shows a typical seasonal and diurnal variation, according to which the incidences of electrocution were typically higher in the season of monsoon as compared to other seasons.

Conflict of Interest – None

Source of Funding- none

Ethical Clearance– Ethical approval was declared from the University ethics committee

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Estimation of Stature from Head Length of Adults Belonging to Soligas- A Genetically Isolated Tribe from Southern India

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ABSTRACT

Stature is an important primary character that defines an individual's identity and has paramount importance when only a part of body or a grossly mutilated body is available to the expert for forensic work up. Presently there exist no studies on populations which are ancient, unique, which are geographically, genetically and culturally isolated; Soliga tribal population of BR Hills represents one such population. Stature and head length were measured among 98 soliga volunteers above 25 years of age. Average stature observed was 164.39 cm in males and 152.67 cm in females. Average Head length was 17.88 cm in males and 16.80 cm in females. Positive correlation exists between stature and head length amongst the soliga population. A set of simple regression equations (combined and separate for males and females) of forensic significance were established. To assess the accuracy, the means of the minimum, maximum and average head length were applied to the respective equations and when the means of the estimated values and original values were compared, statistically insignificant differences ($p > 0.05$) were yielded implying that the equations can be applied to the Soliga tribal population within acceptable margins of error.

Keywords:- Stature, Head length, Forensic anthropology, Human remains identification, Soligas.

INTRODUCTION

Identification of an individual, living or dead is of paramount importance in forensic practice, especially when dismembered body parts or skeletal remains are received for examination. Eventually one has to define identification features like race, sex, age and stature. Two major methods exist for estimation of stature: the anatomical method, which requires the presence of a complete skeleton and is more useful in examination and interpretation of archeological remains and has limited or no forensic applicability when the bodies are dismembered or mutilated. Under such scenario the mathematical method, which requires a complete or a partial long bone or a body part and employs regression formulae or multiplication factors to estimate the stature based on the correlation of individual measurements

to living statures fulfills the forensic need^{1, 2}. Various dimensions/measurements of the various body parts exhibit biological relationships of different degrees with the stature of an individual. Populations exhibit variations with regards to body proportions because of the various factors like ethnicity, geographical location, nutrition status, physical activity and environment^{3, 4}

Careful literature review reveals that presently there exist no studies on populations which are ancient, unique, which are geographically, genetically and culturally isolated; these populations are the best candidates for any anthropometric and anthropological study. Soliga tribal population of BR Hills represents one such population⁵. There currently are no population-specific standards reported for the Soliga tribal population despite, abundance of research, all over India and elsewhere especially concerning the relationship between Head length (HL) and stature. This paper represents a specific part of a wide study - "*Anthropometric profile of Soliga tribal population*". The present paper focuses mainly on relationship between head length and stature in

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the Soliga tribal population, wherein an attempt has been made to develop regression formulae to estimate stature from this measurement. These findings would be a valuable tool for the anthropologists in general and forensic experts in specific for estimation of stature. In addition, this paper will provide valuable data for further comparison with other genetically pure populations worldwide.

MATERIALS AND METHOD

A total of 98 normal, healthy Soliga tribal volunteers, comprising 46 males and 52 females above the age of 25 completed years were enrolled in this study, (since the epiphyseal fusion of the bones is not complete until 25 years)⁶. The data collection was performed during a 2-week period between 8:00 am and 10:00 am to avoid the influence of diurnal variation⁷. Subjects with a history of chronic illness, dwarfism, gigantism, steroidal therapy, trauma, physical deformity, or any surgical procedure that might affect stature or head, were excluded from the study. The study was performed in adherence to the principles established with the declaration of Helsinki and within the legal boundaries of the land. Written informed consent was obtained for every subject and all female subjects were examined in the presence of another female. Standard anthropometric instruments were used in the present study. Head length (HL) of each subject was measured in centimeters to the nearest millimeter and the stature of each subject was measured in centimeters. All of the measurements were obtained in a well illuminated room. All the measurements were performed by the same observer to exclude inter-observer errors. These measurements include the parameters elaborated in the fore coming sections.

(1) **Stature:** The stature was measured using a Harpenden portable stadiometer (Holtain Ltd, UK) in centimeters (cm). Subjects were asked to stand barefooted on the stadiometer platform with their feet in close contact, the trunk braced along the vertical board, and the eyes gazing straight ahead. Each subject's face was placed in the Frankfurt plane, and the measurement was taken by bringing the projecting horizontal sliding bar to the vertex⁸.

(2). **Head length (HL):** The head length was measured using a small spreading caliper with round edges (GPM ltd, Switzerland) in centimeter (cm) to

the closest millimeter. Subject being in an comfortable position and gazing front in an frankfurt plane, the distance between the glabella(the prominent area on the forehead just above the nose and between the eyebrows,) and the external occipital protuberance represented the head length⁹.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 14 (SPSS, Inc., USA). The intra-observer measurement error and reliability were estimated to be within acceptable standards for all measurements ($R > 0.9$; $rTEM < 5\%$)¹⁰. The absolute technical error of measurement (TEM) was estimated using the following equation:

$$TEM = \sqrt{ED^2 / \sqrt{2N}}$$

Where D is the difference between each two successive measurements, and N implies the number of individuals tested¹⁰⁻¹². The relative technical error of measurement (rTEM) was estimated from each two successive sets of measurements by dividing the TEM for a given variable by the grand mean of that variable and multiplying the result by 100^{10, 11}. Along with these measurements the coefficient of reliability (R) was also calculated¹³. The means, standard deviations, ranges (minimum and maximum) and differences were estimated. An independent t-test was used to test for differences between mean measurements. Strength of correlation between stature and the HL was calculated using Pearson correlation coefficient. Sex-specific and combined simple regression equations for stature estimation were developed using the HL. The simple linear regression equations for estimation of stature were derived in the form of, Y (stature) = a (constant) + b (regression coefficient of the independent variable) X (individual variable) +/- SEE (standard error of the estimate). A low SEE indicates a higher accuracy. A p value of less than 0.05 was considered statistically significant in our study. The developed equations were then tested by substituting the minimum, the maximum and the means of the HL in respective regression equations to estimate the stature^{12, 14}. A paired-samples t-test was employed to compare the differences between the actual and estimated means using derived equations.

RESULTS

Descriptive statistics for the stature and HL for combined and both sexes are as represented in Table 1 and 2 respectively. When the means of measurements

for males and females were compared using a paired t test, all of the measurements were significantly larger for males than for females ($p < 0.001$).

Table 1. Combined distribution of stature and head length.

	Mean	Maximum	Minimum	SD
Age(in years)	37.74	61.00	25.00	11.59
Height (in cm)	158.17	175.00	143.00	8.00
HL(in cm)	17.31	20.00	15.00	0.955

SD: Standard Deviation

Table 2. Sex wise distribution of stature and head length.

Parameter	Males				Females				Independent t test		
	Mean	Max	Min	SD	Mean	Max	Min	SD	T	Df	P (two tailed)
Height (in cm)	164.39	175	150	5.33	152.67	165	143	5.57	9.92	45	0.000***
HL (in cm)	17.88	20	17	0.765	16.80	19	15	0.806	-6.881	45	0.000***

SD: Standard Deviation

***the test was significant at 0.001 level (2 tailed)

Sex-specific and combined correlation coefficients were calculated and regression analyses conducted using HL as an independent parameter/variable and stature being the dependent one. The correlation coefficient between stature and HL (Sex wise and combined) are as represented in table 3. Combined estimates gave better correlation and of both the sexes females presented with lowest correlation coefficient.

Table 3. Simple linear regression equations

	Regression equation	+/- SEE	R	r ²	p-value
Males	127.261+2.068 x HL	+/-5.219	0.299	0.089	0.049
Females	138.118+0.867 x HL	+/-5.576	0.126	0.016	0.375
Combined	86.016+ 4.169 x HL	+/-6.976	0.498	0.240	0.000

S=stature, HL=Head length, r=correlation coefficient (pearsons)

The simple linear regression equations and the corresponding standard errors of estimates(SEE), were derived for the stature estimation in males, females and combined (both sexes) for HL as shown in table 3. The actual stature and the estimated stature from the minimum, maximum and means of the upper limb measurements were compared utilizing various regression equations (Table 4). The greatest variations were observed in the minimum and maximum values. In both sexes, the mean value estimates were close to the actual stature, and there was no statistically significant ($p > 0.05$) difference between them.

Table 4. Comparison of actual stature and estimated stature (in cm) from the HL and paired t-test of mean difference

Stature (Combined)				
Minimum	Maximum	Mean	t	p-value
Actual – 143	Actual -175.00	Actual- 158.17	0.002	0.999
Estimated-148.551	Estimated-169.396	Estimated-158.1813		
Stature (Males)				
Minimum	Maximum	Mean	t	p-value
Actual -150	Actual -175.00	Actual -164.39	-0.313	0.784
Estimated-162.417	Estimated-168.621	Estimated-164.23684		
Stature (Females)				
Minimum	Maximum	Mean	t	p-value
Actual -143	Actual- 165.00	Actual- 152.67	0.142	0.900
Estimated-151.123	Estimated-154.591	Estimated- 152.6836		

DISCUSSION

The Soligas are an ancient aboriginal forest tribe of veddid type (Dravidian speaking, forest dwelling tribes), dwelling in the states of Karnataka and Tamil Nadu, India. In Karnataka they are mainly distributed in the forests of the Biligirirangan (BR) hills and other hilly parts of Mysore and Chamrajanagar districts. The Soligas represent a genetic isolate in the BR Hills since they do not interbreed with neighboring populations and have maintained a distinct gene pool. The Soligas possess the lowest number of alleles and heterozygosity when compared with all the worldwide populations⁵. We have estimated stature amongst this unique Soliga tribal population of BR hills. Average stature seen in our study is 164.39 cm in males and 152.67 cm in females. However, these findings are less compared with that of observations made by other studies^{9, 15-18}; this could be due to poor dietary factors of Soligas in comparison to other populations, since primitive nutritional practices are still followed by the Soligas. Partly this can also be attributed to the environmental factors. Average HL observed in our study is 17.88 cm in males and 16.80 cm in females and average for the combined sample is 17.31 cm. In similar studies conducted by Kamal P¹⁹, mean of the head length of males was 18.43 cm and females was

17.63 cm and by Singh R²⁰, mean of the head length of males was 17 cm and females was 16 cm. Also in study by Akhter Z on Bangladeshi Garo adult females, mean of the head length was observed to be 17.49 cm, which is higher when compared to present study (female) stature, this in accordance to the hypothesis that, there exist various inter and intra population differences all secondary to the variations in genetic, environmental and dietary habits²¹.

The difference of means of the heights and the HL as measured by paired t tests between males and females is significant ($P < 0.05$), the values in males being higher. This observation is in accordance to observations made by Agnihotri AK et al⁹ in their study on Indo-Marituan population. This observation is attributable to direct relationship of body dimensions with sex of an individual, since the difference in the hormonal status results in early hormonal maturity in females in comparison to males, consequently reducing the time involved in growth. In the present study, regression analysis revealed positive correlation between height and the only for males and when both sexes were combined ($p < 0.05$), however the correlation was insignificant in case of females. This is similar to the observations made by Agnihotri AK et al⁹ on Indo-Marituan (The correlation coefficients (r) of all

cephalo-facial dimensions was less than 0.5 in both the sexes). This observation is also in accordance to another study by Pelin C²² on Turkish population where in it was observed that, correlation coefficients between head length and stature was low, changing only between 0.012 and 0.229. Contrastingly other studies done on North Indian population it was found that all the cephalo-facial measurements were significantly correlated with stature ($P < 0.001$, $P < 0.01$)^{23, 24}. These observations validate the hypothesis that there exist various inter and intra population differences all secondary to the variations in genetic, environmental and dietary habits.

A total of 3 simple regression equations were derived. However, the regression coefficient and the SEE with respect to HL is lower compared to many other body dimensions used in routine forensic practice, like percutaneous upper and lower limb measurements by regression analysis⁶⁻²⁴ implying relative inferiority of HL as a parameter to estimate stature in comparison to these dimensions. However, HL is more useful for assessment of stature when only the severed head is available for examination. To assess the accuracy, the means of the minimum, maximum and average HL were applied to the respective equations and when the means of the estimated values and original values were compared, statistically insignificant differences ($P < 0.05$) were yielded implying that the equations can be applied to the Soliga tribal population within acceptable margins of error for routine forensic practice.

CONCLUSION

In the present study, regression analysis revealed positive correlation between the stature and the HL. The correlation was stronger in males than in females and when combined together a higher correlation was reached. HL is useful for assessment of stature when only the severed head is available for examination.

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Source of Funding: None

Ethical Clearance: None

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Study of Deaths due to Firearm Injuries in Tribal Region of Bastar

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ABSTRACT

Background: Man has been fascinated with the idea of launching a projectile at animals, developed more efficient ways of doing so. The intervention of gunpowder led to development of firearms^{1,2}. From the ancient time up to this age of globalization use of Firearm has been increasing day by day, so increase of crime rate due to easy availability of the weapons. The present study provides information regarding the deaths due to firearm injuries in tribal region of Bastar. **Method:** This study was conducted in the department of Forensic Medicine, Late Baliram Kashyap Memorial Government Medical College, Jagdalpur. The autopsy reports over the period of six years, i.e. January 2010 to December 2015 were studied. **Results:** 150 cases of firearm deaths were studied during the period, amongst which 90.6% were homicidal victims. 3.3% suicidal, 2.6% accidental and in 3.3 % death motive could not be determined. Male:Female ratio of victims is 5:1, most affected age group was 21 to 30 years. Smooth bored weapon was use more frequently than rifled firearm. Thorax was the most common site of injury, followed by Head & Neck, Abdomen and Extremities. Amongst the Homicidal cases Property dispute was the most common motive, followed by Group fight, Enemity and Dacoity.

Keywords: Firearm , homicide, death.

INTRODUCTION

Over the years firearm and explosive weapons have posed serious threat to the human resource and thus grabbed attention of the research workers. In order to combat the rising toll of deaths due injuries by firearm and explosive, it is a must to analyze presented cases in terms of pattern and number of injuries, fatalities due to involvement of vitals, population and age group affected along with a thorough insight into the predisposing risk factors.

Due to invention of more and more sophisticated firearm weapons and availability globally, death rate due to firearm injuries have increased tremendously. In the USA the most frequent method of killing in cases of homicide and suicide is by means of firearms³. More than 25,000 people die every year in the USA by injuries caused by firearms⁴.

Our work emphasizes on such a retrospective study that spans over a period of 6 years in a tertiary care centre.

MATERIAL AND METHOD

This retrospective study was conducted in the department of Forensic Medicine, Late Baliram Kashyap Memorial Government Medical College, Jagdalpur. The autopsy reports over the period of six years, i.e. January 2010 to December 2015 were studied. All the cases of deaths due to firearm injuries were included. The

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manner of death was recorded from requisition. Other parameters were tabulated from autopsy reports. Total 150 cases were included in the study which presented to mortuary of the institute. The all survivals were excluded.

RESULTS

In this six year study, total 150 cases of death due to firearm were recorded.

Table 1. Manner of Death

Total no. of cases	150	100%
Homicidal	136	90.66
Suicidal	5	3.34
Accidental	4	2.66
Undetermined	5	3.34

Out of which 136 cases were Homicidal, 5 were Suicidal, 4 Accidental and 5 of non determined nature(Table 1).

Table 2. Age group and Sex

Age in Years	Male	Female	Total	%
0-10	00	00	00	00%
11- 20	02	00	02	01.3%
21-30	45	13	58	38.7%
31-40	40	11	51	34%
41-50	24	01	25	16.6%
51- 60	09	00	09	06%
61 & above	05	00	05	03.4%
Total	125	25	150	100%

Most common age group is 21-30 years followed by 31-40. Male Female ratio is 5:1(Table 2).

Table 3. Type of Firearm weapon

Type	No. of cases	%
Smooth bored firearm	80	53.3%
Rifled firearm	45	30%
Unknown firearm	25	16.7%
Total	150	100%

In more than half cases(53.3%) Smooth bore firearm is used, while 30% cases of rifled firearm was recorded, which suggest frequent use use of homemade or factory made firearm(Table 3).

Table 4 Range of firearm

Range	Cases (149)	%
Contact	85	56.7
Close	06	04
Distant	32	21.3
Unknown	27	18
Total	150	100

In 56.7% cases contact shots were fired(Table 4).

Table 5. Time of survival

Survival in hours	No. of cases	%
< 6 hours	51	34%
6- 12 hours	48	32%
12- 24 hours	36	24%
>24 hours	15	10%

If we talk about survival, not more than 10% victims survive for more than 24 hours. (Table 5)

Table 6. Site of Injury

Site	No. of cases	%
Head & Neck	41	27.2
Thorax	48	32
Abdomen	35	23.3
Upper extremities	13	8.6
Lower extremities	11	7.2
Other	02	1.3

Most common injury site is Thorax (32%) followed by Head & Neck(27.2%), Abdomen(23.3%) followed by extremities. (Table 6)

Table 7. Motive

Manner	Motive	No of Cases	%
Homicide	Family/Other Enemity	26	17.3
	Theft/ Dacoit	25	16.7
	Property	50	33.3
	Riots/Group fight	35	23.3
Suicide	Failure in love	1	0.66
	Money/Debt	2	1.33
	Tired of Disease	2	1.33

About Motive, Amongst the Homicidal cases Property dispute(33.3%) was the most common motive, followed by Group fight(23.3%), Enemity(17.3)% and Dacoity(16.7%). In suicidal cases , Money problem and Disease followed by love were the reasons.

DISCUSSION

In the United States, firearms are used in more than half of all homicides and almost half of all suicides ⁵.

Here we did a retrospective study of 150 cases of firearm deaths.

In present study the most affected age group is 21-30 years while in the study by **zahid hussain et al** ⁶ most affected age group is 16-30 years, The male to female ratio was 5.75:1 and in present study the M:F ratio is 5:1 which is almost similar.

Our study shows out of 150 cases, 90.6% cases were Homicidal, 3.3% were Suicidal, 2.6% Accidental and 3.3% of non determined nature. Almost similar results were found in Study performed by Sachan R et al⁷, which shows 92% homicidal cases, suicidal 2%, Accidental 2% , and Undetermined 4%.

In more than half of cases (53%) smooth bored firearm was used , which suggest easy availability and use of homemade or factory made firearms.

More than half firearms were shot from contact range which is 56.7%, followed by distance range 21.3% and close range 4%. Similar results were found in study of Sachan R⁷, where 60.6% shot were contact shots, 16.7% were distance shot and 3% were close shots.

As most of the firearm injuries are fatal , chances of survival are very less if treatment is not given in time.

In present study, 34% victims died before 6 hours, 32% within 6 to 12 hours, 12.1% between 12 to 24 hours, and only 10% survive for more than a day. While in study of Sachan R ⁷ 31.8% victims survive for less than 1 hour, 33.3% for less than 12 hours, 12.1% died between 12 to 24 hours, while only 9% survived for more than a day , which shows almost similar results. In another study of Recep F et al⁸, death occurred in hospital and during the transfer to the hospital in 14.5% and 7.4% of the cases .

Thorax was the most common site of injury in present study which comprises 32% cases, followed by head & Neck (27.2%), Abdomen (23.3%) and extremities(15.8%). On the contrary study of Sachan R shows most common site is Abdomen which comprises 48.4% of cases, followed by Head & Neck (27.2%) , Extremities (24.2%) and Thorax(18%). While study of Recep F et al⁸ shows most common site of injury is Head which comprises 39.2% of all cases.

There can be a lot of different motives for homicide and suicide, but in present study most common motive of homicidal firearm death was property dispute (33.3%) followed by group fight or riots(23.3%), family or other enemity(17.3%) and theft or dacoity (16.7%). Similarly study of Sachan R et al⁷ shows the most common motive of homicidal firearm death is property dispute(29.5%) followed by group quarrels(22.95%), dacoity (21.31%), and enemity (13.1%).

Conflict of Interest: None

Ethical Clearance : Taken from ethical committee of college

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Naphthalene Poisoning – A Case Report

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ABSTRACT

Naphthalene, also known as naphthalin or tar camphor, is the prime ingredient of moth balls which has been used widely as an industrial and household chemical. However, poisoning with the same, intentional or accidental, is rare. We report a case of a 41 year old patient who was admitted to our hospital with dark cola colored urine and constipation as a result of ingestion of 5 moth balls as a suicidal attempt. The treatment of this kind of poisoning is methylene blue, vitamin c and exchange transfusion. The use of methylene blue and vitamin c both can be extremely dangerous if patient is G6pd deficient. The merit of this case lies in the management of this difficult and rare poisoning in the background of G6pd deficiency.

Keywords: Naphthalene, moth balls, G6PD, methylene blue.

INTRODUCTION

Naphthalene is a freely available substance used in households among clothes, toiletries etc. as they give out fragrance and as they are available in small circular forms known as mothballs. Mothballs containing naphthalene have been banned in Europe since 2008 and have been deemed carcinogenic in the USA. Usually this kind of naphthalene balls cause toxicity in children due to accidental ingestion as they appear like sugar balls and have a pleasant odour as well. Intentional suicidal exposure with this chemical is rare and there are few case reports in literature.

CASE REPORT

A 41 year male patient presented to our hospital with tachycardia, tachypnea, severe pallor, icterus, peripheral cyanosis, hepatomegaly and very dark colored urine. He was initially admitted in a private nursing home where a differential diagnosis of pulmonary embolism and hemolytic anemia was made. He was shifted to our hospital and was admitted in the intensive care unit (ICU) for tertiary care management. On Abdominal x-ray imaging, three suspicious shadows were seen. A repeat history was taken in which the patient finally revealed that he had consumed 5 naphthalene balls of standard size and starting experiencing constipation since the day of consumption of the same.

On examination he was found to have a pulse rate of 130/min, respiratory rate of 24 – 28/min, saturation was 85% on oxygen at 4 litres/min, however, blood pressure was 110/70 mm Hg at the time of admission. He also appeared drowsy and disoriented. His abdomen was non-tender and his cardiovascular examination was unremarkable.

Blood investigations revealed hemoglobin – 3.00 gm/dl, Platelet count – 291, RBC morphology – Normocytic, normochromic, Schistocytes present, Reticulocyte count – 10.20, Haptoglobin – 22.60 (low) (RR- 300 – 200 mg/dl) Total bilirubin– 7.96, Indirect Bilirubin – 6.23, ALT – 51.13, AST – 144.53, Direct Coombs test – negative, Heinz body – Present. ABG – Respiratory Alkalosis with metabolic acidosis. LDH – 1930.00, Creatinine – 0.37, G6PD – 6.66(Normal Range). Urine when examined was found to be positive for blood and not having any red blood cells or casts which thus was suggestive of hemoglobinuria. The blood methemoglobin level was found to be 26%.

In view of the above features patient was started on high flow oxygen through a non-rebreathing mask, however the SpO₂ moved from 85 % to 88% only.

Patient was started on IV fluids and a sodium bicarbonate infusion was started to achieve alkalinisation of the urine (to maintain urine pH>7)in-order to reduce hemoglobin deposition and tubular damage. Drug

of choice was methylene blue but due to his G6PD deficiency we could not use it so instead we transfused the patient with multiple packed cells which acted as scavengers till the hemolysis recovered.^[1]

Patient was started on oral lactulose following which patient passed stools after two days of admission after which his laboratory parameters started settling down. He was shifted to the wards 8 days after admission to the ICU after his hemoglobin had stabilized to >10 gm/dl and his active hemolysis had stopped. He made a full recovery and was discharged from the wards.

It was concluded that patient had developed hemolysis due to the absorption of naphthalene via the gastro-intestinal tract (GIT), which was due to the sublimation of the naphthalene balls in the GIT as the transit time of the GIT had decreased as the patient was constipated.

DISCUSSION

Naphthalene, also known as naphthalene, is a crystalline, aromatic, white, solid hydrocarbon (PAH: Polycyclic Aromatic Hydrocarbon) with formula C₁₀H₈ and the structure of two fused benzene rings. Traditionally it is found as the primary ingredient of moth balls. Naphthalene is volatile in nature and forms an inflammable vapor. It has a tendency to sublime at room temperature and it has a peculiar odour. Its solubility differs with the type of solvent, e.g. it is soluble in ether and chloroform etc. and is insoluble in water.

Naphthalene absorption in the GIT depends on its affinity or lipophilicity. It enters the blood unchanged and hence differs from other PAH which are metabolized in the GIT mucosa. Clinical features may vary from mild symptoms like – abdominal pain, nausea, vomiting and loose motions. Patient may also resent with Diaphoresis, tachypnea, tachycardia and may progress to severe symptoms like confusion, convulsions; cardiac arrhythmia's which may prove to be fatal. The toxic dose of naphthalene is unknown but as less as 1 moth ball in children have shown toxicity features.^[2]

Naphthalene toxicity may also be through – dermal, inhalational and trans-placental routes. Quite often the naphthalene balls are excreted through the gastrointestinal tract as it takes a long time for the naphthalene ball to dissolve. However local absorption may take place if the ball remains in the gastrointestinal

tract for a long time (by sublimation of the naphthalene ball).

Patients may present with hemolysis due to the formation of an epoxide metabolite after naphthalene absorption occurs. When subjected to this oxygen free radicals there is a breakdown of the erythrocyte membrane causing hemolysis, this is also known to deplete the glutathione, a very important reducing agent responsible for protecting the erythrocytes from damage.^[3] Thus the signs of hemolytic may be seen in naphthalene toxicity like – severe anemia, fragmentation of red cells, Heinz bodies, meth-hemoglobinemia and hemoglobinuria.^[4] Jaundice and acute kidney injury (renal failure) may also manifest with toxic level exposure of naphthalene.

Treatment is immediate gastric lavage with activated charcoal via nasogastric tube. However gastric lavage may be useless if patient presents after two hours of ingestion. Naphthalene balls sublime i.e. change from solid to gaseous form at room temperature

The reducing agent properties of methylene blue when given in pharmacologic doses (1 to 1.5mg/kg of a 10% solution) are exploited in cases of methemoglobinemia. Methylene blue is known to reduce heme from meth-hemoglobin to form hemoglobin. In presence of G6PD deficiency methylene blue is known to cause hemolysis. The cyanosis that develops as a result of methemoglobinemia is known to disappear within 1 hour of administering methylene blue. Very rarely a second dose may be administered in the ensuing 1 hour if the cyanosis has not abated.

There have been many case reports utilizing the antioxidant effects of N Acetyl Cysteine via its positive effects on glutathione^[5] and thus helping in reducing the intravascular hemolysis. The dose utilized in various studies for this indication varies from 1200 mg to 2400 mg/day.

Vitamin C has been used in many instances as a free radical scavenger. However in our case in view of G6PD deficiency, we were not able to administer high dose of Vitamin C in fear of inducing hemolysis and hence we did administer low Vitamin C with close watch on LDH and hemoglobin.

Folic acid is indicated in cases of active hemolysis as the hemolysis may consume folic acid and thus lead to

megaloblastosis and hence folic acid was supplemented.

[6]

In cases where there is contraindication to methylene blue and Vitamin C, the treatment involves exchange transfusion. In our case due to the severe anemia we did not contemplate exchange transfusion. However we did conduct a large volume blood transfusion which effectively reduced the percentage of meth hemoglobin thus contributing to the improvement in saturations and regression of the cyanosis.

CONCLUSION

Naphthalene consumption should be taken into consideration as a differential diagnosis in cases of intravascular hemolysis as the history of the same is difficult to obtain. Also G6PD levels should be obtained to take a decision on using methylene blue as a modality of treatment. Moth balls are banned/restricted in many parts in the world. However its use in India is very rampant as it is freely available. The restriction of sale of this product will go a long way to reduce the accidental and suicidal ingestion of this chemical. It will be wise to have a rider on the packets that educates people of the harmful effects and also instructs to take immediate medical help on ingestion.

Ethical Clearance: Not applicable.

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Factors Influencing Increasing Case Backlogs in Indian Judiciary: An Analysis

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ABSTARCT

On the planet everywhere on each individual has the privilege to a fair trial. The Judiciary in any nation is the body ordered to decipher the law and guarantee each due advantage from the procedure. The organ judiciary is required to grant justice to all independent of status without making any delay, but today case accumulation is one of the best difficulties confronting legal world everywhere. In Indian Judiciary, case overabundance and delays in delivery of justice has been one of the principle prosecutions against the judicial administration system on the grounds that cases keep on heaping up between the institution and disposal of cases. The objective of the research was to examine the components impacting administration of backlogs or case accumulation in India. The purpose of the study were to analyse how accessibility of Judicial staff impact administration of backlog in India, how accessibility of physical infrastructures impacts administration of backlogs in Judiciary, how organisation of judicial structure impacts administration of case excess in Indian Judiciary and how court standards and systems impacts administration of case backlogs in India. The study is based on doctrinal approaches. The ideas of equity, right, encroachment, lawfulness, application, affect, causal associations and adequacy and so on will be managed through doctrinal approach. The information is gathered from the distributed research works and distributed information from various sources.

Keywords: *speedy justice, backlogs of cases, Indian judiciary, fundamental right*

INTRODUCTION

The right to speedy justice is one of the significant aspects of the justice delivery system. Today backlog is one of the best difficulties confronting the Judiciary world everywhere. The Indian judiciary is additionally made independent to the optimum by various arrangements of the constitution so as to maintain the majority rules system; as this judiciary is a framework outlined by mere human beings, so it has numerous disadvantages and escape clauses which lead towards to the backlog of cases. An excess or pendency of cases alludes to a position in which a court's caseload is so trouble it is hard to hear or attempt cases in a very much coordinated way in light of the fact that the quantity of institution of cases surpasses than that of disposal of cases in the court. The backlog information put together by experts are more than 30 million cases pending in different high courts and lower courts crosswise over India.

Speedy Justice:

The root of right to speedy justice lies in Hussainara Khatoon case¹, where Justice P.N Bhagwati quoted, if there is not a single procedure which does not guarantees a speedy justice and seen as reasonable, fair or just, it would violate article 21 of the Indian Constitution. However, it means undoubtedly it is a speedy trial and also includes reasonably speedy trial, which is a basic part of the Article 21 of the Indian Constitution. It is irresistible, when a person is responsible for an offence and is denied speedy trial and is tried to be denied of his liberty by imprisonment as a result of a long period of time and indicting him after such trial would constitute infringement of his fundamental right under Article 21 of the Constitution of India.

Review of Literature:

Former Chief Justice of India, Justice A.S Anand

in his article entitled *Indian Judiciary & Challenges of 21st century* observed that “The consumers of justice want unpolluted, expeditious and inexpensive justice. In its absence, instead of taking recourse to law, he may be tempted to take law in his own hands. This is what the judicial system must guard against so that people do not take recourse to extra judicial methods to settle their own scores and seek redress of their grievances.”

The 14th Law Commission of India Report observed “even though the significance of speedy disposal of cases was known as premature as in the year 1958 by the in India, neither the Constitution of India nor any prevailing laws or statutes expressly bestow the right to speedy trial on the culprit.”

In *Ansuyaben Kantilal Bhatt v. Rashiklal Manilal Shah*², the Supreme Court observed how delay is defeating the basis of justice. “In this case, the landlord, aged about 54 years, required to evict his tenant on the ground of his personal need to carry on his own business. When the matter as a final point placed before the Supreme Court after 33 years, in view of the prolonged litigation bonafide requirement may not subsist at that time. The landlord, at the age of about 87 years, was not made-up to start a new business. This is the reason of the ubiquity of the remark that Justice delayed is justice denied.”

According to former Chief Justice of India, Justice B. P. Singh, “The situation today is so grim that if a poor is able to reach up to the stage of a High Court, it should be considered as an achievement.”

In the National Seminar “Enhancing judicial capability” being organized by Odisha Judicial Academy in February 2015 Justice Amitav Roy, Supreme Court of India said “At present, our judicial system is dependent on combination of manual processes and ageing computers. The need is better, quicker and cheaper ways of creating and filling of documents to ensure speedy justice.” Justice Dipak Misra of Supreme Court of India, who was present in the seminar and said “if cases are decided using proper tools, techniques and attitude then they will help in ensuring quick justice to people. The verdicts of some trial courts are written in so confusing manner that we fail to make out what they intend to convey. If the orders are written properly, then we would take less time in understanding and disposing them.”

M Veerappa Moily, the former Law Minister of India said, “the government intends to ensure that receiving justice is the right of each and every individual, irrespective of his or her caste, colour, creed, social and financial status. While the Constitution does have certain provisions regarding need for speedy justice, there is no specific provision confirming justice as either a fundamental right or constitutional right.”

The 127th Law Commission India report³ also pointed out that the expression “access to justice had different connotations. The road blocks in the access to justice could be high cost, geographical distance, and adverse cost benefit ratio and the inordinate delay in search of illusory justice. The State was responsible for removing all road blocks in the access to justice. Accordingly, the State should ensure that the system is equally accessible to all and should lead to the results that were individually and socially just”.

A Speech delivered at China by the authorities of the Indian Judiciary that “Delay in the context of justice denotes the time consumed in the disposal of case, in excess of the time within which a case can be reasonably expected to be decided by the Court. In an adjudicatory system, whether inquisitorial or adversarial, an expected life span of a case is an inherent part of the system. No one expects a case to be decided overnight. However, difficulty arises when the actual time taken for disposal of the case far exceeds its expected life span and that is when we say there is delay in dispensation of justice. A scanning of the figures would show that despite efforts being made at various levels and substantial increase in the output being given by the system, the gap between the expected and actual life span of the cases is only widening.”⁴

Chief Justice Burger⁵ (1970) in his article also pointed out that “A sense of confidence in the courts is essential to maintain the fabric of ordered liberty for a free people and three things could destroy that confidence and do incalculable damage to society: that people come to believe that inefficiency and delay will drain even a just judgment of its value; that people who have long been exploited in the smaller transactions of daily life come to believe that courts cannot vindicate their legal rights from fraud and over-reaching; that people come to believe the law - in the larger sense cannot fulfil its primary function to protect them and their families in their homes, at their work, and on the public streets.”

The Constitutional Mandate for Timely Justice

The mandate of the constitution of India for the timely dispensation of justice is irrefutable. Justice, including the timely dispensation of justice, is an established and basic fundamental right of the subjects of India, that is intended to be ensured by the government under Articles 14, 19, 21, 32, 226, and the Preamble of the Indian Constitution. Dispensation of justice in time is likewise a sacred commitment of the Indian State in light of the Directive Principles of State Policy verbalized in Articles 38(1), 39 and 39A of the Indian Constitution and by virtue of India's worldwide lawful commitments to ensure convenient justice conveyance. The Preamble of the Indian Constitution also enables the state to secure social, financial and political justice to every one of its subjects.

Statement of the problem:

In Indian Judiciary backlog of cases and delays in justice delivery has been one of the primary prosecution against the judiciary. The institution of cases is expanding step by step as an after effect of which the rate off disposal diminishes. The gap between institution and disposal of cases is too long and as a result of which billions of cases are pending in the courts. This study will look to find out why the Judiciary can't battle this substantial backlog of cases. Specifically the delay in disposal of cases has brought about an immense case excess in this way affirming the renowned maxim "justice delayed is justice denied." There are aggregate of 24191217 numbers of cases out of which 7774424 numbers of civil cases and 16416793 numbers of criminal cases are pending across all the high courts in India (as on April 2017)⁶. In the Supreme Court of India there are total 61344 numbers of cases both civil and criminal cases are pending (as on March 2017)⁷. Among them Uttar Pradesh High Court having the most elevated number of excess of cases. Subsequently this issue all things considered overabundance in India are not diminishing but rather expanding from day by day. From the above discourse, it is affirmed that there is an issue on the management of backlog of cases that is pending in the Judiciary subsequently the need of this study emerges.

More filling of cases than Disposal:

Institution of cases has increased and disposal of cases has decreased. In different courts the filling of

cases are increasing due to more numbers of litigants which resulted in more backlogs of cases and makes justice less accessible.

Vacancies in the Courts:

The approved number of Judiciary is inadequate to deal with the heavy backlog of cases all over India. Adding to this there are vacancies even in that number of judges in all the courts. There are total 31 numbers of approved strength out of which 28 numbers of judicial members are working and 03 no of vacancies in Supreme Court of India and in all High Courts total number of vacancies is 447.⁸

Role of Judiciary:

Former Chief Justice of India Hon'ble A.S Anand said, "Lack of punctuality, laxity and lack of control over case-files and court-proceedings, attending social and other functions during working hours contribute in no small measure in causing delays in the disposal of cases. Some judges are very liberal in granting adjournments. Some judges come to courts without reading case-files, therefore, the lawyers have to spend a lot of time just to explain the facts of the case and legal point (s) involved therein."⁹

Observations of Committees over the Years

Different advisory groups have been set up and an assortment of endeavours has been made in such manner. Be that as it may, no outcome has come in diminishing the backlog and significantly accelerating the Judicial Procedure. The primary panel to look at the issues of delay was set up in the year 1924 under chairmanship of Justice Rankin. After then, various committees have put forward suggestions yet slight development has been made on the execution front. These comprise of the 'Justice S.R. Das High Court Arrears Committee in the year 1949', the 'Trevor Harris Committee in West Bengal in the year 1949', the 'Wanchoo Committee in Uttar Pradesh in the year 1950', the 'Justice J.C. Shah Committee in the year 1972', the 'Satish Chandra Committee in the year 1986' and the first 'Mallimath Committee in the year 1990'. Besides, the Law Commission of India has brought up this question in a few reports since 1955: in the 14th, 79th, 80th, 120th, 121st and 124th reports. Alternate reports on this issue, for example, 221st, 222nd and specifically the 229th managed issues of delay, pendency and arrears.

Strict and Prolonged Procedural Formalities:

Courts in India have faced a great deal of implication on the submission of defined procedures which is strict and prolonged. The procedures prescribed by law are habitually awkward and not conducive. The formal procedure in civil and criminal cases consumes a lot of time. Delay could take place because an exact stage of procedure itself takes too much time. To get justice from the courts one has to go through the expensive and complex procedures involved in litigation.

Problem of Delays and Arrears: Analysis of Various Reports:

A research work on any subject requires exhaustive study of the existing literature on the subject. The problem of delay in judicial proceeding is receiving attention of various High power committees for last more than 70 years. The reports submitted by the various committees deal with vast areas and also gives valuable suggestions, some of which have been already implemented while amending the laws subsequently.

CONCLUSION

Justice can be rendered by speedy disposal of cases which is a milestone to achieve. The main tool for speedy justice and speedy trial is embodied under article 21 of the Indian constitution. Although steps have been taken to combat with the huge pendency of cases, however it is not adequate. A drastic transformation is required in the various processes of justice delivery mechanism to deal with the backlog of cases and its speedy disposal. Aside from making the working of the legal reinforce, there is dire need to give the current framework of courts by methods for Alternative Dispute Resolution forms and other redressal instruments. This attempt has been made everywhere throughout the world to make a move against backlog of cases and have demonstrated achievement in accomplishing it.

Ethical Clearance: Not required, as the research article is based on social aspects and data extracted from the Government of India Website and doctrinally undertaken.

Source of Funding : Self

Conflict of Interest : Nil

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Diagnosis of Early Myocardial Infarction by Histochemical Staining of Heart on Autopsy

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ABSTRACT

Sudden cardiac death is one the leading causes of death all over the world. The establishment of the cause of death at autopsy is often complicated due to the absence of gross changes in the heart until 24-48 hours after the infarction. Hence, this study was conducted by collecting 54 heart specimens from autopsy of cases of sudden cardiac death over a period of 24 months and analyzing it grossly and also by staining with Triphenyl tetrazolium chloride to uncover the early changes of infarction, followed by histopathological examination and to establish the cause of death as myocardial infarction. This test revealed an overall accuracy of 88%, and hence is a very effective and cost efficient means of diagnosing early changes.

Keywords: Sudden cardiac deaths; Autopsy findings, Early diagnosis, TTC staining, Sensitivity.

INTRODUCTION

The incidence of sudden death has been increasing the world over. Cardiovascular causes contributing to the maximum for it. By the year 2020, it is estimated that IHD would be the most common cause of death throughout the world¹. It has been seen that around 80% of sudden death occurs due to coronary arterial disease². In nearly 25% of cases, death ensues within the first hour of clinical presentation. Being faced with myocardial infarction, it poses a big psychological and legal implication for the individual and to the society. The term myocardial infarction reflects death of cardiac myocytes caused by ischemia, which is the result of a perfusion imbalance between supply and demand³. Establishment of the clinical diagnosis of myocardial infarction is often difficult as the patient proceeds to death abruptly. So, the onus of determination of cause of death rests on Post Mortem Examination.

Medicolegal autopsies aim at identifying the cause of death primarily. In most cases, the identification of

the early changes of myocardial infarction is difficult as the gross changes take about 24-48 hrs to develop. "Identification of the earliest change of myocardial ischemia remains a pressing challenge". Histochemical staining for the cardiac tissues using azo dyes like TTC or NBT, aid in distinguishing the infarcted myocardium from the normal⁴. It is based on the principle that enzyme depleted myocardium remains unstained. Ischemic myocardial cells lose their membrane integrity, thereby releasing their enzymes into the blood stream and remain unstained, thus being differentiated from the normal. In the absence of gross change in the myocardial specimen, TTC staining helps the pathologist to a greater extent. Advantages of TTC include the low cost, ie. Rs 200 per gram, compared to NBT which costs Rs 5000 per gram and TTC penetrates cell membrane whereas NBT will not penetrate cell membrane⁵.

It was the aim of this study to diagnose the early changes of myocardial infarction by performing Histochemical staining of the myocardium using Triphenyl Tetrazolium Chloride (TTC) while performing the autopsy, in the absence of appreciable macroscopic ischemic changes and to further confirm the early infarction changes by Histopathological examination of the unstained areas. By this, aiming to assess the diagnostic accuracy of Histochemical staining (TTC) of

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the heart in diagnosis of early MI.

MATERIAL AND METHOD

The study was conducted over a period of 24 months at the Institute of Forensic Medicine, in collaboration with the Institutes of Pathology and Electron Microscopy, Dept of Chemistry and College of Pharmacy, Madras Medical College, Chennai-3. The study sample included 54 hearts retrieved by the autopsy of cases of sudden death, with either a history forthcoming or the morphological appearance of the heart suggestive of the cause of death to be of cardiac origin. Appropriate ethical clearance was obtained prior to the start of the study from the ethical committee headed by the chairman.

During the autopsy, the heart was isolated, washed thoroughly under running water and its weight estimated. The normal weight of heart in males is 325 ± 75 grams, mean weight 300gms (0.45% of body weight), in females it is 275 ± 75 gms, mean weight is 250 gms (0.40% of body weight)⁶.

Gross examination of the heart was done to assess the presence of any scar due to an old infarct, or any areas of softening surrounded by hyperemia or other morbid conditions. Healed infarction is manifested as a scar tissue without cellular infiltration⁷. Serial sections of the coronary arteries were made at distance of 3 mm after appreciating its consistency to look for the presence of a plaque, thickening, calcification or thrombus causing an occlusion. Serial transverse full thickness sections of the heart were made at a distance of 1cm each from the apex to the AV groove. The cut specimens were studied for the presence of old fibrotic scars or softened areas. The heart was then dissected in the line of flow of blood, to see for raised atheromatous plaques on the root of aorta, narrowing of the coronary ostia or the coronary arteries by plaques or thrombus. Two slices were chosen at random between the mid-ventricle to apex and subjected to Histochemical staining.

Preparation of TTC Solution:

12 grams of Sodium dihydrogen phosphate (NaH_2PO_4 - a low pH phosphate buffer with Mol. Wt-120g) is dissolved in one litre of distilled water to make 0.1 M solution. 14.2 grams of Disodium hydrogen phosphate (Na_2HPO_4 -a high pH phosphate buffer. Mol. Wt.-142 grams) is dissolved in one litre of distilled water

to make 0.1 M solution⁸. pH of the solution was adjusted by mixing 0.1 M Disodium hydrogen phosphate solution and 0.1M Sodium dihydrogen phosphate in different proportions

896 ml of 0.1 M Sodium dihydrogen phosphate solution and 104 ml of 0.1 M Disodium hydrogen phosphate solution were mixed to attain pH of 7.8. pH of the buffer was confirmed using pH meter. Ten grams of Triphenyl Tetrazolium Chloride was then dissolved in one litre of above phosphate buffer solution of pH 7.8 to make 1% TTC solution⁵ and stored in an Amber colored bottle, as TTC is photosensitive, and gets inactivated on exposure to light.

STAINING METHOD

The sliced specimens of the heart were washed under running water and wiped using tissue paper and were placed in one plastic container each, bigger than the specimens. TTC solution was then poured into it such that the level of it is about 2cm over the specimen to prevent atmospheric oxygen penetration. The incubation is done at room temperature for about 20 min after placing it in cardboard boxes to prevent light exposure. To prevent artefactual non-staining, the sample is turned upside down after a period of ten minutes. After incubation, the specimens were removed and studied for unstained areas of myocardium, wherein the stained areas appeared brick red and unstained pale or devoid of stain. It was considered positive for infarct changes in the absence of stain. The samples were then subjected to paraffin embedded Histopathological examination after selecting sections taken from unstained areas in TTC positive ones and two random samples from stained areas. Histopathological diagnosis of acute myocardial infarcts was made based on the following findings: wavy myofibers, coagulative necrosis, ischemic contraction band necrosis, myonecrosis, and polymorphic infiltrations of the interstitium⁵. The results of TTC staining were correlated with the Histopathological examination findings.

ANALYSIS AND RESULTS

Males occupy predominant number of cases, accounting for about 94.4% of sample, whereas female constitute only 5.61% of the sample (Table 1). It signifies the incidence of myocardial infarction / sudden cardiac deaths are greater among males.

Table: 1 Age group wise distributions of the study sample:

Age distribution	No. of Cases	Percentage
20 to 40 yrs	6	11.1%
40 to 60 yrs	27	50%
60 to 80 yrs	21	38.9%

TABLE: 2 TTC STAINING FOR EARLY MYOCARDIAL INFARCTION:

S.No	OBSERVATION	No. OF CASES	INFERENCE
1	Unstained Area of the myocardial tissue	18	TTC Positive for early MI
2	Areas of unstaining of the myocardium and areas of unstaining due to old infarct	18	TTC Positive for early MI and old MI
3	No unstaining of the myocardium except for unstaining due to old fibrotic infarct	6	TTC Negative for early MI and positive for old MI
4	All area of the myocardium stained and no unstained area.	12	TTC Negative for both MI

Table: 3 COMBINED RESULTS OF TTC STAINING METHOD AND HPE

POSITIVE/ NEGATIVE	HPE Positive for Early MI	HPE Positive for Early MI and Old MI	HPE Negative for Early MI and Positive for Old MI	HPE Negative for both MI
TTC Positive for Early MI	15 True positive TTC	0	0	3 False positive TTC
TTC Positive for Early MI and Old MI	0	18 True positive TTC	0	0
TTC Negative for Early MI and Positive for Old MI	0	0	6 True negative TTC	0
TTC Negative MI	3 False negative TTC	0	0	9 True negative TTC

On Histopathological examination, only changes like myonecrosis, waviness of fibers, nucleomegaly, Pyknotic nuclei and polymorphic infiltrations were noted, which was taken to be positive for early infarct changes. Old infarct area revealed dense fibrous tissue

replacing normal myocardial tissue.

Of the 54 hearts studied using 1% TTC staining method, 18 samples showed areas of non-staining in the absence of gross ischemic morphological changes

and were considered TTC positive for early infarct stage (Table 2). Of these 18 samples, 15 showed infarct changes on HPE (early infarct) and 3 showed normal myocardium, which was considered to be a false TTC positive (Table 3). On gross examination 15 hearts showed areas of old infarct and 3 showed an area of softening with hyperemia. These 18 samples showed areas of unstaining with TTC due to old and new infarct and were considered to be TTC positive for both early infarct and old infarct, which correlated with their HPE findings exactly (Table 3). 6 hearts were observed to have an old infarct scar on gross examination, and old infarct area showed unstaining with TTC and these 6 samples revealed features of old infarct on HPE and the stained areas showed normal histology (Table 3). 12 cases showed no gross morphological change and showed complete staining, which was taken as TTC negative for new or old infarct. HPE showed normal histology in 9 of those hearts whereas 3 revealed early infarct changes, considered to be a false negative TTC (Table 3).

Table 4 Sensitivity & Predictive value of the test

Sensitivity of the test	91.66%
Specificity of the test	83.33%
Positive predictive value of the test	91.66%
Negative predictive value of the test	83.33%
Overall Diagnostic accuracy of the test	88.64%
Likelihood ratio for positive test	8.36
Likelihood ratio for negative result	10

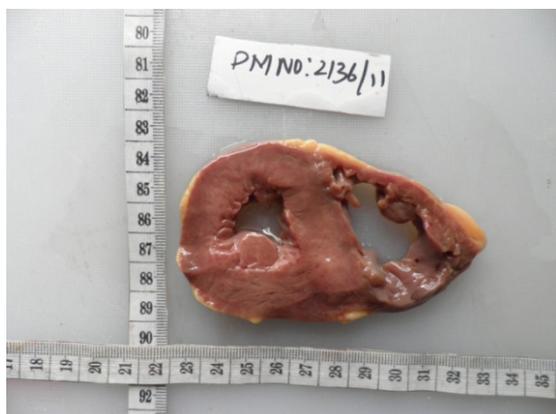


Fig.1 Heart slice before staining.

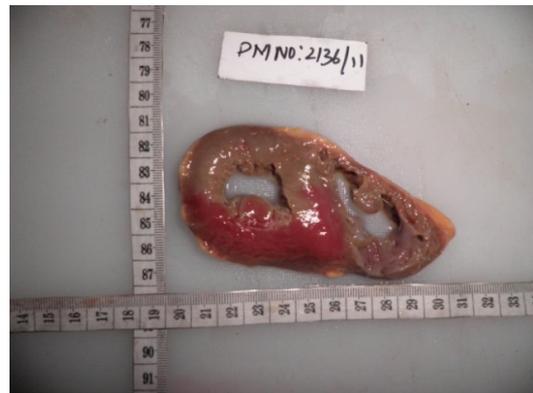


Fig.2 Heart slice after staining, shows unstaining of anterolateral wall and adjoining IV septum



Fig. 3 Heart slice before TTC staining shows old infarct fibrous scar in the posterior wall of left ventricle



Fig.4 Heart slice after TTC staining shows unstaining of posterior wall and sub endocardial region of the lateral wall of the left ventricle.

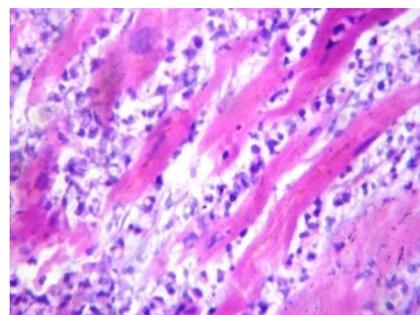


Fig.5 Micro Photo 40X shows Neutrophils infiltration, Karyorrhexis, karyomegaly, Pyknotic nuclei and Myonecrosis.

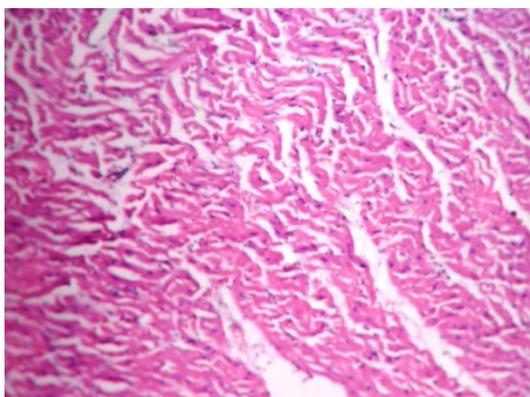


Fig.6 Micro Photo 10X shows Waviness of Myocardial fibers.

DISCUSSION

According to WHO estimates, IHD would rank No. 1 among the global disease burden by 2020. Sudden death due to cardiac causes, especially acute MI is common among both men and women. In most of the cases encountered, death due to MI occurs rapidly and abruptly hampering the clinical diagnosis as well as establishment of the cause of death due to the lack of means of diagnosis of early changes of infarction on autopsy. Acute ischemia of myocardium will stop the contractile function of fibers in 60 sec⁸. Gross examination of the heart fails to reveal any changes apparently before 24-48 hrs of infarction and the HPE examination performed on randomly sectioned samples including uninfarcted areas causes an ineffective diagnosis of MI, postmortem. To overcome this shortcoming and to provide a substantial cause of death, by scientific, easy and faster means, Forensic pathologists have devised ways of staining during autopsy which includes TTC staining of the heart. The studies conducted on TTC staining of heart samples in animal studies may not be very relevant to humans due to the variance in the species.

The use of TTC staining has been evaluated earlier and showed varied results, which highlights the importance of various factors influencing the outcome of the experiment. In a study conducted by M Shankar Bakkannavar et al⁵ in 2011, Histochemical staining using TTC for detection of acute myocardial infarction was done on 40 hearts removed from cases of sudden death. The study showed that sensitivity and specificity of the TTC staining method was 100%, however they used hydrochloric acid for adjustment of pH of the solution instead of phosphate buffer. In another study by Adegboyega et al⁹ in 1997, Histochemical staining using TTC for gross detection of early infarction showed

diagnostic sensitivity of 77.4% and specificity of 92.6%. The positive predictive value of the test was 80.5% and negative predictive value was 91.2%. (Table-4). The overall efficiency of the test was 88%

The factors which influence the outcome include:

The postmortem interval: Most important factor confounding, as the data for exact time of death is not available in most settings and is only a rough estimate obtained from the investigating police officer. The time since death determines the various enzyme activities and their levels in the body, especially dehydrogenases. The enzyme content decreases rapidly in the first 6 hrs of postmortem interval when the body is stored at 37° C. In heart stored at 4°c, the enzyme activity is not altered significantly even the body is stored as long as 6 days.¹⁰

Photosensitivity of the TTC dye: Prolonged exposure to light causes the inactivation of the dye and thereby producing false positive or negative outcomes. To prevent this, the solution should be stored at ambient atmospheres, covered with black paper to prevent exposure.

Storage: Prolonged storage of the dye decreases its efficacy. TTC solution should be used within 3 months of reconstitution⁵.

pH of the solution: It works well in the range of pH between 7.5 and 9.0, but best results are obtained at pH=7.8⁵.

The difficulty in establishing a diagnosis of acute MI in cases of sudden cardiac death is also due to the superimposition of cardiac arrhythmias contributing to death following an infarction¹¹.

Though TTC staining is an efficient way of diagnosing early MI, it involves a few limitations to its use such as:

Not being able to use the stain for decomposed specimens, as autolysis of the myocardial tissue produces false positive results.

In the event of arrhythmias occurring following myocardial ischemia but prior to infarction, the myocardial cells retain their cellular integrity causing no effect on staining, which is based on that principle of enzyme depletion.

In cases with previous old infarcts, ventricular

re-entry tachy arrhythmias are a common occurrence, which involves the scarred area, thereby not effectively observed on staining ¹¹.

CONCLUSION

This study aimed at assessing the diagnostic validity of TTC staining during the postmortem examination of sudden death cases for the diagnosis of early myocardial infarct changes revealed an accuracy of 88.64%. It has also shown a cost effective, easy and reliable way of performing the test using TTC by preparing the solution with the buffer, effectively even in the absence of complex equipments. It helps both the Forensic pathologists as well as the General pathologists in establishing the diagnosis of acute and early MI as well as taking appropriate sections from affected areas respectively. However, in case of limitations presenting such as arrhythmias occurring prior to death, the cause of death can be established using the information obtained from history and the ultra structural examination of myocardial tissue and conducting fibers. The occurrence of false positive and false negative results in Histochemical staining using TTC for early myocardial infarction, a combination of both Histochemical technique and Histopathological examination help in diagnosing early myocardial infarction in a large number of cases.

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Conflict of Interest: Nil

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A Study on Prevalence of Pulmonary Thrombo Embolism in Bedridden Hospitalized Deaths- Autopsy based Study

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ABSTRACT

Pulmonary embolism is a common, potential lethal condition and is the second commonest cause of sudden deaths in respiratory system after the sudden cardiac deaths. The most severe complication of venous thrombosis and is the most undiagnosed cause of death where no autopsy is performed. Thrombosis is the process of formation of solid mass in the blood circulation from the constituents of flowing blood and mass itself is called a thrombus. At times, the thrombus or its part may get dislodged and be carried along in the blood stream as an embolus to lodge in a distant vessel. The effect of pulmonary embolism depends, mainly, on the size of the occluded vessel, the number of emboli and the cardiovascular status of the victim. Occasionally a large embolus may get impacted at the bifurcation of the main pulmonary artery (Saddle Embolus) or may be found in the right ventricle or its outflow tract. Immobility of body parts due to various causes leads to reduced venous return and stasis because of decreased muscular massage of the leg veins resulting in thrombus formation in the deep veins of the legs. Even Prolonged sitting can lead to deep vein thrombosis. ⁽⁹⁾ Non lethal injury may end in death because of venous thrombosis and pulmonary embolism. The victims of many forms of trauma are at risk from pulmonary thrombo embolism. Small emboli may break off and impact in more peripheral branches of the pulmonary arteries, sometimes causing pulmonary infarcts that may be precursors of a massive embolus that impacts in the major lung vessels and causes rapid death. At Autopsy such large emboli are readily visible and can usually be easily distinguished from a post mortem clot. The Study is prospective and seventy five hospitalized, bed ridden, medico legal cases (Road traffic Accidents and Burns cases) who have died suddenly during the course of the treatment in the hospital are taken for the study and Autopsy conducted to know the exact cause of death. The study showed significant findings of pulmonary thrombo embolism in the pulmonary vessels which caused sudden death.

Keywords: - Pulmonary thromboembolism, Venous thrombosis, Pulmonary embolism.

INTRODUCTION

Pulmonary thrombo embolism, is the severe end stage of many different diseases producing prolonged patient immobilization or a hypercoagulative state. The

three main predisposing factors to the development of vascular thrombi are hypercoagulability, venous stasis and vascular injury (Virchow's triad) ⁽⁵⁾. The trauma patient is particularly prone to the development of deep venous thrombosis, especially with lower extremity fractures. Although there are many avenues of prophylaxis, including anticoagulation, vena cava filter and sequential compression devices/stockings or other squeezing or compressional treatments of the legs, these are not always applicable to a particular patient. Deep venous thrombosis may develop covertly and quickly break away, travel to the lungs and cause

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catastrophic pulmonary emboli with resultant sudden and unexpected death. The major cause of sudden death within the respiratory organs is vascular origin. Pulmonary embolism is very common and in fact is the most clinically un diagnosed cause of death. In almost every case the source of the emboli is the leg veins. Most thromboses remain salient and cause no problems, but a proportion embolize and block pulmonary arteries of varying size. Pulmonary embolism is a frequent cause of death, particularly in persons over 70 years of age. The diagnosis of massive, lobar, segmental, minor, or recurrent pulmonary embolism constitutes a major problem, particularly in elderly patients. Massive pulmonary embolism is life -threatening and must be treated as an emergency, requiring urgent hospital admission.

About 80%of clinically severe embolism is caused by the detaching of a thrombus from a large, deep vein of the lower extremity and much less from the pelvic veins or the right heart. Tissue trauma increases the coagulability of the blood for several weeks, the peak being between one and two weeks. The injury may confine the Victim to bed, either because of general shock and debility or because the trauma itself necessitates recumbency, as in head injuries, severe generalized trauma. In either case, recumbency leads to pressure on the calves and immobility causes reduced venous return and stasis because of lessened muscular massage of the leg veins. The common result is thrombosis of the deep veins of the legs, which can extend proximally into the popliteal and femoral vessels, forming a dangerous source of venous thrombi emboli. Small emboli may break off and impact in more peripheral branches of the pulmonary arteries, sometimes causing pulmonary infarcts that may be precursors of a massive embolus that impacts in the major lung vessels and causes rapid death.

MATERIAL & METHOD

To study the prevalence of thromboembolism in

Table: 2- Distribution for Reason of Admission:

S.No :	Reason of Admission	Total (N = 75)	Percentage %	Gender Type	Number	Percentage %
1.	Burns	N= 63	84%	Female Male	46 17	61.3% 22.6%
2.	Road Traffic accident	N= 12	16%	Female Male	2 10	2.6% 13.3%

Autopsy cases, seventy five hospitalized bed ridden, died medico legal cases are taken for the study over a period of one year, at Govt Medical College, Anantapuramu and through Autopsy was conducted to know the cause of death. Out of seventy five cases, seven cases have died due to pulmonary thromboembolism. The hearts are dissected along the course of the blood flow. Significant thrombus is occluded in the pulmonary arteries as a emboli and to confirm the cause of death, dissection of legs are done to find out the location of deep venous thrombosis. Incisions are made in the medial aspects of the lower legs from the ankle through the popliteal fossa .Skin and subcutaneous tissue are reflected, the Achilles tendon is cut and muscles of the lower legs are pulled upwards along their fascial plane . Horizontal incisions are made in the reflected muscle and in the deep veins coursing along the tibia and fibula. Then transverse cuts are made across the calf muscles containing the veins and then examined. The thrombus containing veins is identified and then sent to the histological examination. The grossing and automatic processing, block making and reporting was done in the Dept of Pathology, Govt Medical College, Anantapuramu, Andhra Pradesh.

FINDINGS

Seventy five fresh bodies, those which came for post mortem examination after prolonged hospitalization for the period of one year are taken for the study. The study is prospective through autopsy was conducted to know the cause of death. The results are statistically analyzed.

The results are shown in various tables and discussed.

Table: 1- Distribution of Gender:

S.No :	Gender Type	Total (N = 75)	Percentage %
1.	Female	N= 48	64%
2.	Male	N= 27	36%

Table: 3-Distribution for Reason of Post mortem findings.

S.No :	Cause of Death	Total (N = 75)	Percentage %	Gender Type	Number	Percentage %
1.	Multiple Injuries	N= 10	13.3%	Female Male	2 8	2.6% 10.6 %
2.	Burns	N= 65	86.6%	Female Male	42 23	56% 30.6%

Table :4- Distribution of Cause of Death :

S.No :	Cause of Death	Total (N = 75)	Percentage %	Gender Type	Number	Percentage %
1.	Pulmonary Thrombo Embolism (PTE)	N= 7	9.3%	Female Male	2 5	2.6% 6.6 %
2.	Septicemia	N= 56	74.6%	Female Male	39 17	52 % 22.6%
3.	Shock	N= 12	16%	Female Male	7 5	9.3% 6.6%

**Fig 1: Serpentine type of pulmonary thrombus.****Fig 2: Thrombus of Pulmonary Trunk and Left side Heart (PropogativeType)**

DISCUSSION

The effects of trauma by mechanical force present two major categories of phenomena. Other one side are those that are inherent in the anatomical and functional disruption of the bodily structure or structures that are directly broad range of disorders that may occur in conjunction with trauma in general, without direct relation to the location of the injury. Post traumatic embolism belongs to the latter category. The foreign circulating i.e globules of the fat or air, tissue cells, formation of thrombi are different particles are not the normal inhabitants of the blood and detached from the intima of an artery. Immobility of body parts due to various causes leads to reduced venous return and stasis because of decreased muscular massage of the leg veins, resulting thrombus formation in the deep veins of the legs. It is also logical that the reduced velocity of venous return prolongs the contact time of activated platelets and clotting factors with the vein wall, thereby encouraging thrombus formation. The components are erythrocytes, platelets, leukocytes and fibrin, vary in proportion with different stimuli to thrombus formation and in different vessel types. Thrombosis usually result from the interplay of several influences results from three main factors 1. Damage to the vessel wall 2. Impaired blood flow 3. Abnormalities in the composition of the blood.

For the study of Prevalence of Pulmonary thromboembolism seventy five dead bodies are examined, who are hospitalized and bedridden with a History of Injuries, history of varying degree Burns. Out of seventy five cases Gender distribution is male, 27 and female 48 of percentage of Female 64% and male 36%. Out of seventy five cases 84% are the cases of burns with female and male ratio of 61.3%: 22.6% and Road traffic accident cases are 16% and female and male ratio are 2.6%; 13.3%.

Among the seventy five cases, seven cases are reported with evidence of Pulmonary thromboembolism with 9.3% with female and male ratio of 2.6%:6.6%. Out of the seventy five cases, 56 cases are reported with a history of Burns and 74.6% of the people died due to the septicemia with female and male ratio of 52%:22.6% and 16% of the people died due to shock in cases of Burns with female and male ratio of 9.3%: 6.6%. All the values are reported in various tables.

The similar study venous thrombosis and pulmonary embolism -A clinico -Pathological Study in injured and burned patients conducted by Simon Sevitt during the year 1952 and 1959. The present study correlates with that study as well as with other similar studies. ⁽¹¹⁾



Fig3: Thrombus in the Pulmonary veins with bifid extension. (Propagative Type)

CONCLUSION

In the present study Sex has got difference ,males are more affected than the females and. the age groups between 25 years to up to 70 years are equally affected. All the positive cases, the deaths are occurred during the 3 rd week of hospitalisation and among 7 cases, one case reported as propagative type of Thromboembolism with a history of Burns, which is of the rarest incidence

and thrombosis is seen on the left side of the heart and pulmonary veins. The minute thrombus got accumulated in the left ventricle and left Atrium and extended in to the pulmonary veins with Retrograde flow (Propagative type), which is a rare finding when compared with other common sites. (Fig 2 & 3). The Thrombus had bifid extension in to the pulmonary veins. All the reports are statistically analyzed and reported in the tables. Though the sample size is minimum but significant findings are reported. Before the conclusion there is still a need for autopsy studies in the Investigation of risk factors and to know the role of pulmonary Thrombo embolism in rustling the sudden deaths.

RECOMMENDATIONS

Elastic compression stockings are advised those who are bedridden .Regular mobilization of the patient is necessary, Avoid prolonged sitting. A hyper coagulation work-up should be performed if no obvious cause for embolic disease is apparent ,including screening for Antithrombin III deficiency, Protein C or Protein S deficiency Lupus anticoagulant, Homocystinuria. Management is done by Pharmacological prophylaxis (hypercoagulability), medications like Anticoagulation and thrombosis. Immediate full anticoagulation is mandatory for all patients suspected of having DVT or Pulmonary embolism. Anticoagulation includes unfractionated heparin, Low molecular weight heparin, Factor Xa inhibitors, Fondaparinux, warfarin, Dabigatran and surgical procedures are Catheter embolectomy, placement of Vena cava filters. The role of clinical pharmacist is to reduce medication errors, polypharmacy. It is important for medical professionals to work aggressively to prevent this problem before it occurs. In addition to counseling patients about the risk factors and symptoms of PTE and to recommend appropriate prophylaxis regimens. Early diagnosis, medication adherence and life style modifications are the best precautions to stop the progression of disease and reduce the occurrence rate.

Conflict of Interest: - Nil

Source of Funding: - Self funding with Govt Assistance

Ethical Committee Clearance: - Taken from Govt Medical College, Ethical Committee, Ananthapuramu, Andhra Pradesh.

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Demographic Profile of Unknown Dead Bodies in South Bangalore

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ABSTRACT

Bangalore City, the Silicon Valley of India has seen tremendous growth in the past few years. Every year thousands of people migrate to the city in search of livelihood. Most of these migrants are homeless and hence the greatest problem faced during their death is the absence of identifying documents. This poses a difficult task to the police in identification of the dead. Most are labeled as unknown dead bodies and subjected for medico legal autopsy. The increasing quantum of unknown dead bodies in our morgue became the prime basis to undertake this research. We undertook a 3-year (2014-2016) retrospective study of unknown dead bodies brought for medico legal autopsy at our centre. A total of 1911 cases were subjected for medico legal autopsy of which unknown cases accounted for 125 cases (6.5%). There was a clear predominance of males 104 cases (83.2%) over females 21 cases (16.8%), with the age group above 60 years accounting to 54 cases (43.2%). followed by 41-50 years 25 cases (20%). There was an increase in the number of deaths during months of extreme temperature - in December 22 cases (17.6%) followed by January 15 cases (12%). The average time interval between the recovery of a body by the police to conduct of post-mortem examination was about 10-13 days (33.6%). The most common cause of death in majority of cases was a natural cause.

Keywords-Unknown dead bodies, medico legal autopsy, demographic profile, cause of death.

INTRODUCTION

Unidentified deaths are described as those deaths where bodies have not been identified except for the gender and appropriate age. Unclaimed deaths are described as the deaths where bodies have been identified only by name, but the next of kin or any family members are untraceable to claim the deadbody for burial or disposition.

Identification of unknown dead bodies always poses a challenge to the police and to the forensic experts. It has important implications not only from the prospect of forensic investigation, but also for ethical and legal issues. The starting point during the process of investigation especially in criminal cases is the identification of the person. This helps the investigating

officer to apprehend the assailants and stop any attempt of elimination of victim identity. In many cases, such assailant's attempts result in the bodies being recovered in putrefactive or mutilated or skeletonised state. This may be intentionally done by the assailants in an effort to destroy all traces of identity of the dead bodies so as to get away from the clutches of law. Identification of dead bodies is also important in civil cases for settlement of insurance claims, inheritance of property, performing the final rituals etc.

Identification of dead bodies becomes a herculean task during mass disaster events. Lack of evidence, absence of personal identification, deteriorated and mutilated remains beyond recognition pose huge problems for identification and legal implications on the government. In such cases, the expertise of forensic experts is extremely vital in identifying the dead.

The increasing quantum of the unknown dead bodies in our morgue became the prime basis to undertake this research. This study explores the demographic profile

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of dead bodies, the efforts taken by the investigating agency in identifying the dead and the legal issues relating to medico legal autopsy.

MATERIAL AND METHOD

This study is a retrospective three-year analysis of unknown dead bodies brought for medico legal autopsy to the department of forensic medicine, Kempegowda Institute of medical sciences from January 2014 to December 2016. Through a purposive sampling method, a pre-tested structured proforma, fulfilling the inclusion and exclusion criteria was employed to collect study data. All cases were studied with reference to Information furnished by the police, Postmortem Reports, Laboratory investigations which includes Histopathology and Chemical analysis reports.

RESULTS

A total of 1911 autopsies were conducted during the study period. Among them, 6.5% were unknown dead bodies. Male cases (83.2%) outnumbered the female (16.8%) cases. The ratio of male cases to female cases was 5 to 1. Maximum number of deaths were observed in the age group of more than 60 years (43.2%) followed by age group 41-50 years (20%) and 31-40 years (17.6%). Least deaths were observed in the age group of 21-30 years (4.8%). There were no cases below 20 years of age. **Fig 1 and 2** depicts these statistics.

Maximum number of cases were recorded in the month of December (17.6%), followed by January (12%), May (9.6%) and November (9.6%). Least deaths were accounted in the October (5.6%) and August (5.6%). **Fig 3** depicts these statistics.

With regards to treatment received it was observed that 67.8% were found dead and 32.8% were hospitalized. Among the dead who received treatment, it was noticed that 29.2% died within 4-7 days of treatment followed by 26.8% cases dying within 15-30 days of receiving treatment. 12.1% of the cases died after a month of treatment. 7.3% cases died after a year of hospitalization and 2.4% cases after for 6 months. **Fig 4** depicts these statistics.

When time interval between preserving the body in cold storage of the mortuary to conduct of autopsy was considered it was noticed that the maximum number of

cases (33.6%) were stored for 10-13 days. 20% of cases were stored for 4-6 days, 14.4% of cases for 7-9 days and 11.2% of cases for 14-16 days. 10.4% of cases were stored either for more than 17 days or less than 3 days. **Fig 5** depicts these statistics.

With regards to cause of death 46.4% of cases died due to respiratory diseases followed by 20% of cases due to cardio respiratory diseases. 14.4% of cases died due to cardiac diseases, 4% of cases due to head injury and 2.4% of cases died due to poisoning, drowning and hanging. 0.8% of cases died due to multi organ failure. **Fig 6** depicts these statistics. About 7.2 % of cases were found in decomposed state and cause of death was undetermined.

DISCUSSION

Unknown dead bodies contribute to a small but vital percentage of the total number of medico legal autopsy during the study period. Our study showed that males outnumbered the females. This is similar to results in few other studies¹⁻⁶. This could be attributed to the fact that males are considered to be breadwinners of the family, while the female tend to stay back to look after home affairs. Males leave home and venture to far off places mostly cities for better opportunities of earning livelihood. Most of the cases in this study were street dwellers, isolated from the society and were below poverty line.

Most number of death occurred in the age group of above 60 years. This could be due to the fact that debilitated elderly were abandoned, were deprived of daily basic needs like food and shelter and were prone to infection and diseases causing death. Taking the decadal distribution into consideration it was found that deaths decreased from above 60 years and the least was in the age group of 21-30 years which clearly portrays that increasing age was a added factor in causing death. Though findings were similar in one study⁶, few other studies showed differing reports¹⁻⁴. Our study showed that deaths were more during extremes of weather. Intense weather and lack of basic facilities could have contributed to the ill health of the destitutes.

Our study showed that 33% of the cases were hospitalized but died in spite of the treatment. This could be attributed to the fact that they were identified in advanced stages of illnesses and were provided treatment. In 3% of cases, it was observed that in spite

of receiving treatment for a year, death could not be prevented. Though natural illness prevailed in the deceased, a requisition for medico legal autopsy was given since the police personnel admitted the destitutes to the hospital and after death were handed over to them for further action.

It was observed that in most number of cases the Investigating officer took 10-13 days to give the requisition for conduct of autopsy. This long delay could be due to the fact that the investigating officer makes a futile attempt to search the identity of the deceased by utilizing all the available data at the death scene. These methods are time consuming and requisition to conduct autopsy is given only when all efforts to identify the dead goes in vain, This could be the reason for the delay in conducting medico legal autopsy.

The study showed that maximum number of death was due to natural causes and among them fatalities were due to respiratory diseases. This might be due to unhygienic, bad living conditions, illnesses in winters and lack of proper health care facilities. This result is akin to findings in few other studies¹⁻⁶. However, few studies have differing results⁷⁻⁹.

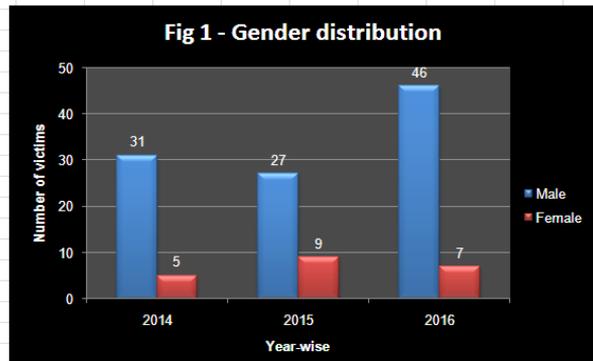


Fig 1 – Gender distribution

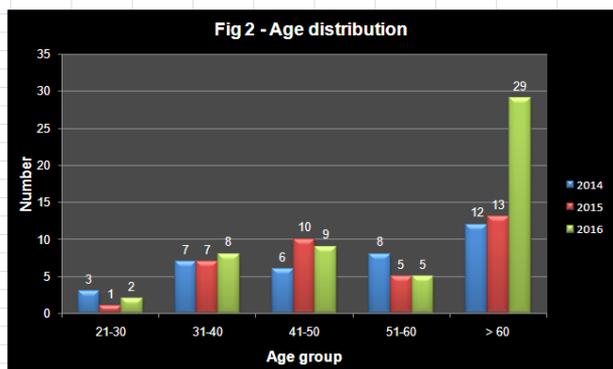


Fig 2 – Age distribution

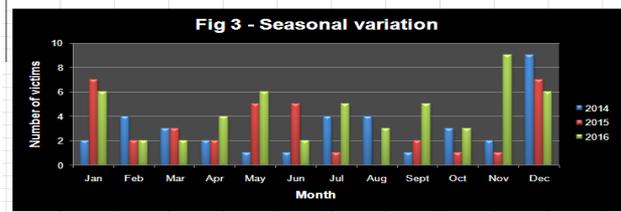


Fig 3 – Seasonal distribution

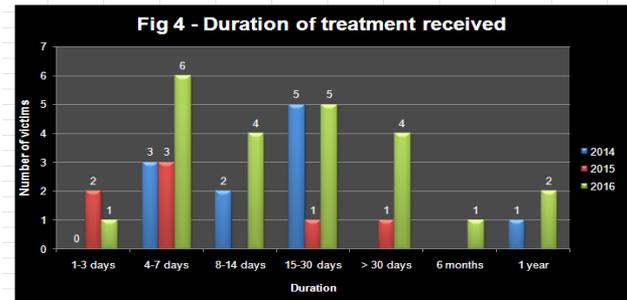


Fig 4 – Duration of treatment received

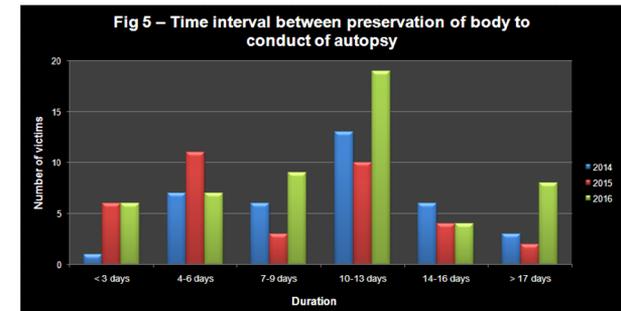


Fig 5 – Time interval between preservation of body to conduct of autopsy

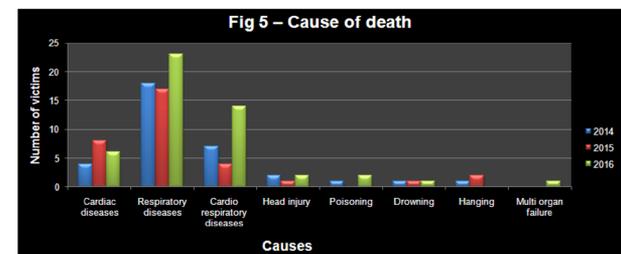


Fig 6 – Cause of death

CONCLUSION

From the above study, it is noticed that incidence of death in unknown bodies is increasing. The efforts for identification are to be improvised by the police personnel. Autopsy should be conducted without delay so that ambiguity in coming to the conclusion regarding cause of death could be condensed. Proper health planning needs to be executed by the health authorities to prevent further mortality. When there is no ambiguity regarding the manner and cause of death, the dead body

can be donated for medical education and research.

Now the country has come up with a massive project called Aadhar card. This is a unique identification project where the person details are recorded along with individual fingerprints and retinal scan. Accordingly, each individual is provided with a unique Aadhar number. This could be used as a tool in identification of a person¹². This would hugely benefit forensic experts in the coming future.

Conflict of Interest: Nil

Source of Funding: Self Funding.

Ethical Clearance: Ethical clearance from the Institutional Ethical Committee obtained for the study.

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Teratological Study of Lamivudine in Swiss Albino Mice

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ABSTRACT

Aims and Objectives: Lamivudine is a nucleoside analogue reverse transcriptase inhibitor used for treatment of hepatitis B and HIV virus infection in pregnant females and to prevent maternal to child transmission. The present study is aimed to investigate the teratogenicity of Lamivudine in growing embryo in *swiss* albino mice.

Material and Method: Lamivudine was given to pregnant *Swiss* Albino mice by oral gavage in doses of 18mg/kg body weight and 30mg/kg body weight from 6-15th day of gestation. The control mice were fed distilled water by the same route on the same gestational days. The pregnant mice were sacrificed on 18th day of gestation by cervical dislocation. The foetuses and placentae were observed for any gross malformation.

Result: On the gross examination it was observed that there was a significant reduction in the weight of foetuses and growth retardation. Also haemorrhagic patches were observed on the body. Reduction in weight and diameter of placenta size was not significant.

Conclusion: Lamivudine causes teratological changes in mice foetus and should be used judiciously in pregnant females.

Keywords: *Teratogenicity, hemorrhagic patches, growth retardation, reverse transcriptase.*

INTRODUCTION

Lamivudine is one of the frequently used antiretroviral agents used alone or in combination. It is used in both HIV and Hepatitis B virus infection. The increasing prevalence of pregnant HIV- infected women receiving ART worldwide raised the issue over the possible side effects linked to exposure in early pregnancy, mainly in the first trimester. The period of greatest susceptibility to teratogenesis when germ-layer formation and organogenesis takes place. ⁽¹⁻²⁾

Lamivudine (2', 3'- dideoxy-3'-thiacytidine, commonly called 3TC) is a potent nucleoside analog reverse transcriptase inhibitor (nRTI). Lamivudine must be metabolized to its triphosphorylated form, 3TC-triphosphate, to be an active compound. Lamivudine

crosses the human placenta and studies suggest similar plasma levels of Lamivudine found in the maternal blood, the umbilical cord and the fetal blood. 3TC clearance is prolonged in neonates compared to that in infants and older children. ⁽³⁾

In 2005, Pontes R.D.V. *et al.*, studied the effect of lamivudine on rat pregnancy outcome. They did not find any signs of resorption. In addition, even with the use of doses 9-fold higher than used in human therapy, they were not able to detect intrauterine deaths or any alterations of the number or the weight of fetuses and placentae ⁽⁴⁾. These findings suggested that Lamivudine is not associated with prematurity or low weight at birth in rats, and is parallel with the results of a meta-analysis study about the risk of an adverse outcome with antiretroviral therapy during pregnancy ⁽⁵⁾.

Animal studies of Minkoff and Augenbraun, '97, have failed to demonstrate teratological effects of prenatal lamivudine exposure in rats and rabbits at doses 130 and 160-fold higher than the human dose respectively. Guan-Guan Su *et al.*, 2004 studied the

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efficacy and safety of lamivudine treatment for chronic hepatitis B in pregnancy. They did not recommend the use of this drug during pregnancy, especially during first trimester, based on teratogenic effects observed in studies in animals. ⁽⁶⁾

Deverbhavi H et al., in 2008 have reported that lamivudine (nRTIs) binds to mitochondrial DNA polymerase gamma and result in myopathy, lactic acidosis and fatty liver and their prolonged therapy in pregnancy could result in toxic effects. ⁽⁷⁾ Looking at very few and inconclusive reports about the teratogenicity of Lamivudine, the present study has been undertaken. In the present study, Lamivudine has been experimented upon *swiss* albino mice to elucidate effects upon the offspring.

MATERIALS AND METHOD

The present study was conducted in the Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University Varanasi. 30 adult female *swiss* albino mice weighing 25 to 30 grams and average age of 80 to 100 days were used after approval from institutional ethical committee.

Procurement and acclimatization of animals:

The *swiss* albino mice (males and females) were procured from the Animal House of the Department of Anatomy, IMS, B.H.U, Varanasi. They were reared in polypropylene cages (25×25×15cm) with rice husk bedding in the Animal House of the Department of Anatomy under standard laboratory conditions with an ambient temperature of 25±5°C, 50-60% relative humidity and 12:12 hour light dark cycle. The rice husk bedding in each cage was changed in every 3 - 4 days to maintain proper sanitation. They were fed on pelleted diet obtained from local Pashu Aahar Kendra and tap water ad libitum.

Maintenance of mice colony:

To maintain the inbred mice colony the female adult mice in their pre-oestrous phase were transferred in the evening to the cages containing adult mice in the ratio of 2:1. The presence of vaginal plug on the following morning indicated mating has occurred and was designated as day zero (GD0) of gestation. In case of doubt the plug was examined microscopically for the presence of sperms. Each pregnant mouse was

separated out and housed individually in different cages and subjected to different experiments.

Experimental design:

The pregnant mice were divided into following groups:

Group 1: Control (given equivalent amount of distilled water on 6 to 15 days of gestation).

Group 2: Treated with Lamivudine during 6 to 15 days of gestation with a dose of 18 mg/kg body weight.

Group 3: Treated with Lamivudine during 6 to 15 days of gestation with a dose of 30 mg/kg body weight (ten times the normal human dose).

Lamivudine was obtained from GlaxoSmithCline Company by the name Epivir. Each tablet contained 100 mg of the drug. Before treatment one tablet was dissolved in distilled water. The drug was administered by oral gavage. Control group was similarly treated with distilled water on the same days of gestation i.e. GD6 – GD15. Water was given ad libitum.

Collection of Fetuses and their External Examination:

On the 18th day of gestation immediately after cervical dislocation uterotomy was performed. In this procedure, abdomen was opened by a midline incision and the uterine horns were exteriorized. The sacs were inspected for the sites of resorption and viable fetuses were collected. The collected fetuses were blotted dry and weighed. Same procedure was followed for placenta also. The crown rump lengths of the fetuses were recorded with the help of a graph paper. Gross external examination of the fetuses was done to observe:

General stunting in size.

Dysplasticity in the body.

Ulceration on the body wall.

Hematoma and Haemorrhages.

Size of oral aperture and development of jaw.

Defects of skull and brain.

Defects of spine.

Deformities of palate.

Malformation of limbs.

All collected fetuses were photographed for their general appearance and gross malformations wherever present. Placenta of the different groups were examined and photographed from both maternal and foetal side. The gross examination of each placenta was done to observe:

Shape of the placenta.

Haemorrhages on its surfaces.

Size of the placentae.

Site of umbilical attachment.

Length of umbilical cord.

Visualization of the umbilical artery and vein.

Weight of the placenta after mopping them dry on blotting paper.

Observations and Results

The pregnant mice were regularly observed during treatment with lamivudine from day 1 to 18. On gross examination of fetal mice and placenta following observations were made:

The reduction in weight of the fetuses in group 2 and group 3 was found to be significant in comparison to group 1. The reduction in weight in group 2 was found to be highly significant in comparison to the weight of fetuses in group1. The reduction in weight of fetuses of group3 was highly significant in comparison to group1 and was non-significant in comparison to group 2 (Table1).

Fetuses of group 2 showed significant growth retardation when compared to fetuses of group 1 (control). The fetuses of group 3 also followed similar trend and showed highly significant growth retardation when compared to fetuses of group1 but the difference was non-significant in comparison to group 2 (Table 2).

The weight of the placenta of group2 and group3 showed no significant reduction in comparison to group1 (Table 3).

There is reduction in placental diameter in the treated mice in a dose dependent manner. However, the placental diameter was significantly reduced in group3

only as compared to the control (Table 4, Fig.3).

Resorptions of pregnancy were seen in few cases (Table 5, Fig.1) and there were sporadic incidences of haemorrhagic patches on fetal mice (Fig. 2).

Table 1: Weight of foetus

Groups	Mean ± SD	p – value
Group 1	1.36 ± 0.087	< 0.001
Group 2	1.12 ± 0.16	
Group 3	1.16 ± 0.19	

Group Comparison

Group 1 vs. Group 2, p value < 0.001

Group 1 vs. Group 3, p value < 0.001

Group 2 vs. Group 3, p value > 0.05 *

Table 2: Crown rump length of foetus

Groups	Mean ± SD	p – value
Group 1	25.65 ± 1.57	< 0.001
Group 2	22.56 ± 2.22	
Group 3	23.41 ± 2.04	

Group Comparison

Group 1 vs. Group 2, p value < 0.001

Group 1 vs. Group 3, p value < 0.001

Group 2 vs. Group 3, p value < 0.05*

Table 3: Weight of placenta

Groups	Mean ± SD	p – value
Group 1	0.11 ± 0.010	> 0.39
Group 2	0.12 ± 0.04	
Group 3	0.11 ± 0.050	

Group Comparison

Group 1 vs. Group 2, p value > 0.05

Group 1 vs. Group 3, p value > 0.05

Group 2 vs. Group 3, p value > 0.05 *

Table 4: Diameter of placenta

Groups	Mean \pm SD	p – value
Group 1	8.53 \pm 0.58	> 0.001
Group 2	8.38 \pm 1.32	
Group 3	7.87 \pm 1.031	

Group Comparison

Group 1 vs. Group 2, p value > 0.05

Group 1 vs. Group 3, p value < 0.05

Group 2 vs. Group 3, p value < 0.05 *

(*) All data are expressed in mean \pm S.D. statistical analysis was done by one way ANOVA followed by post-hoc tukey test.

Groups of pregnant mice (n=10); each group was treated once a day by oral gavage with distilled water (Group 1 = Control) or lamivudine (Group 2 = 18mg/kg b.w. and Group 3 = 30mg/kg b.w.) From 6th to 15th day of gestation.

Table 5: Percentage of resorption of foetus

Groups	Total no. of live born foetus	Total no. of resorption	Percentage
Group 1	68	1	1.4
Group 2	54	9	16.6
Group 3	65	9	14.6

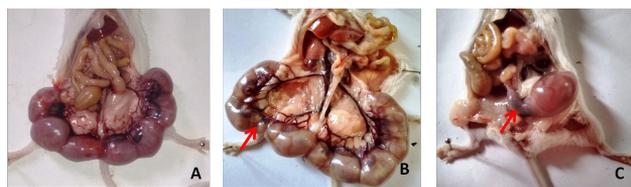


Fig. 1: showing desorption in lamivudine treated groups (low dose) B, (high dose) C, control group showing normal features A.



Fig.2: showing fetus of the treated group showing haemorrhagic patches (red arrow)



Fig. 3 : Placenta of the treated groups showing reduction in size (group II, III) as compared to control (group I).

DISCUSSION

Development of mice embryo can be divided into:

Pre-organogenesis period: From gestational day 1 to 5 and characterized by rapid proliferation of cells which do not show any differentiation.

Organogenesis period or the embryonic period: From gestational day 6 to 15; the cells show a particular morphological lineage and the differences are perceptible even at the molecular and the biochemical level.

Fetal period: This lasts from gestational day 16 to 19. This phase is characterized by rapid tissue differentiation and growth resulting in the development of full formed embryo.

The organogenesis period is the one more susceptible to teratological insult as differentiation occurs principally in this phase.

Lamivudine is a reverse transcriptase inhibitor resulting in irreversible DNA chain termination and thus altering the DNA synthesis.

Lamivudine when given prenatally in doses 18 mg/kg body weight and 30 mg/kg body weight causes significant reduction in fetal weight and crown rump length as compared to the control. This effect may be seen due to cytotoxic effect seen in first trimester which may lead to decreased embryonal cells resulting in growth retardation and low birth weight.

The incidences of embryo-lethality manifested as resorption of fetuses were enhanced in the lamivudine treated group. This phenomenon might be attributed again to embryonic effects of lamivudine due to cell destruction caused by DNA chain termination (Joseph J Eron, 2nd edition).

It is proposed that the subcutaneous haemorrhage

is a result of direct and indirect effect of the drug on the foetus, microvascular necrosis and disruption of the existing and developing vessels, particularly the limbs and the back. Adding to the above, since the drug has caused microscopic alteration in placenta, subsequent to which a hypoxic response may have been created at the placental foetal unit leading to hypoxia of the developing structures which may have been led to necrosis and haemorrhage.

The number of resorption in the lamivudine-treated groups was 9 each whereas in control it was just 1. Although the differences are not significant statistically, lamivudine treatment caused more resorption. This may be an indication of embryotoxicity.

There is no significant difference in number of resorption with increase in dose of lamivudine. This indicates fetal resorption as dependent on critical dose is equal to or less than the lower dose used in the study. As such alteration in organogenesis should be a quantal (all or none) response.

Thus we can say that lamivudine is toxic in fetal mice when given prenatally specially in large doses and when given during first trimester. Thus it should be used cautiously and judiciously in pregnant mothers, especially during first trimester.

CONCLUSION

Lamivudine causes teratological changes in mice fetus and should be used judiciously in pregnant females

Source of Funding - Self

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Accidental Fatality due to Explosion of Air Conditioner: A Rare Case Presentation

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ABSTRACT

Explosion of Air conditioners were rare entity in the past but recently the increase in use of second hand air-conditioners by some middle class sections of society. In this Study we report a fatal case due to explosion of air conditioner while he was repairing the compressor of a window it at his shop. Injuries due to an explosion are primary blast injury, secondary blast injuries, tertiary blast injuries and thermal and/or chemical injuries. The autopsy findings, the circumstances which might lead to the explosion of the compressor, are discussed in this study.

Keywords: Air Conditioner, Compressor, Explosion, Shock.

INTRODUCTION

Advancement in the science and technology in many areas has made the lives of people more advance than the ancient time. Advancement in the science and technology is directly and positively affecting the people's way of living on one hand however it is also affecting indirectly and negatively on the people's health on the other hand. Some of these instruments use superheated steam or gas under high pressure such as boilers and gas cylinders. Such instruments might me refrigerators, autoclave, coffee machines. Such instruments have been responsible for explosions in the past. One such example is Air conditioner which has made our life far more comfortable than the past. Willis Haviland Carrier invented Air Conditioner way back in 1902 and might never had thought that what he considered to be a boon to certain sections of society would be responsible for accidental deaths of individuals. In this study, we have reported a case in which AC mechanic was killed due to accidental explosion in the compressor, while repairing the unit. Such cases were rare entity in the past but recently the increase in use of second hand air-conditioners by some middle class sections of society who want to have a better life has caused rise in such deaths which can be noticed in recent newspapers and other Medias.⁽¹⁻²⁾

Injuries due to an explosion are primary blast injury (this is the result of sudden change in the environmental pressure changes resulting from blast waves), secondary blast injuries (fragments and other missiles cause these injuries), tertiary blast injuries (include acceleration and deceleration injuries caused by the victim's body impacting against stationary objects or injuries caused by collapse of structures and buildings) and thermal and/or chemical injuries³.

CASE HISTORY

On 22nd June 2016 a dead body was brought to the Mortuary of Sawai Man Singh Medical College and Hospital Jaipur, Rajasthan with alleged history of death of a male victim aged 31 years while he was repairing the compressor of a window air conditioner at his shop. The victim died on the spot.

The subject was averagely built with rigor mortis confined only to the upper parts of the body. The facial and other body hairs were singed and skin was blackened at places. There was a lacerated wound involving face, bilateral clavicles, bilateral chest. The wounds were of varying depth from muscle till cavity deep. The most affected region was thoracic cavity. There were multiple ribs fractures on bilateral sides. Laceration over the chest was surrounded by charring of tissue and singeing of hairs. (Photograph 1) Internal examination revealed

the laryngeal apparatus was completely disrupted. The lungs and heart were disrupted completely and were reduced to black mass and anatomy could not be identified. Foreign metallic body of size about 18 * 10 cm was recovered from the thoracic cavity with a weight of about 400 gms. (Photograph 2) Also there was a laceration present over right side upper arm with surrounding charring and abrasions and bruise with fracture of humerus bone. The abdominal cavity had about 1000 ml blood and blood clots. The cause of death was Hemorrhagic Shock.

DISCUSSION

Certain instruments which use gases under high pressure have caused explosions in the past similar to our case. An air conditioner is a system or a machine that treats air in a defined, usually enclosed area via a refrigeration cycle in which warm air is removed and replaced with cooler and more humid air.⁴ The part which by far causes explosion is Air condenser or compressor the leading cause of air compressor tank of air conditioner's explosion is corrosion of the tank from water condensate as it is a natural byproduct of compressed air and is always formed inside the tank. It mainly consists of an evaporator, which receives the liquid refrigerant, a condenser, which facilitates heat transfer, an expansion valve, which regulates the refrigerant flow into the evaporator, a pump that pressurizes refrigerant, and a compressor.⁵ Most of the modern, sophisticated compressors are equipped with safety valves, which alleviate excess internal pressure. If the valve becomes dysfunctional owing to some clogged pipe or if the compressor is not equipped with safety valves at all, then the excess pressure can cause explosion⁶.

In this case, the injuries were a combination of Abrasions, laceration and bruises (Marshall Triad)⁷ and associated fractures and burn injuries. These injuries are characteristic of primary explosion injuries. The injuries lead to death of individual because they were in very close proximity of the exploding material and also due to foreign bodies (Missile impact) mainly primary blast injury and also due to the foreign body embedded in the thoracic cavity (secondary blast injuries). The injury pattern was similar to cases reported by Behera C et al⁸ at Department of Forensic Medicine, All India Institute of Medical Sciences, New Delhi during year 2017. Gupta M et al.⁹ reported two cases of accidental

coffee machine explosion. In one of the case, a circular penetrating wound was present over the head with a metallic projectile which was similar to our case.

With the betterment of living standards and rapid urbanization the need of leading a comfortable life has taken a new course all together which has led to the indiscriminate use of such luxury appliances. Often to use such appliances and to achieve them at cheap rates the safety standards are overlooked. Therefore proper guidelines should be formulated for the judicious use of such appliances. There should be a set time period of use of air conditioners and the use of the AC's after that time period should be barred. The new AC's service and follow up should regular by the manufacturing company for a set time period. If the proper guidelines formulated by the government are not followed then the responsible person should face the legal consequences.



PHOTOGRAPH 1



PHOTOGRAPH 2

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To Determine the Elemental Distribution Pattern of Gunshot Residue from AK-47 & Self Loading Rifle

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ABSTRACT

Gunshot residue related studies have become imperative for Forensic Ballistic experts nowadays. It is often a challenge for these experts to determine the distance between a firearm and the target. This determination requires test firing from the firearm at various distances to compare the GSR patterns formed during the test with those observed on the victim or target. The study emphasizes on the distribution of GSR particles deposited on the trajectory at different distances (0 to 8.5 m). AK-47 and SLR weapons were used for the purpose and the results showed that there is a significant difference in the distribution of elements such as sulfur, barium and lead of GSR when analyzed using EDXRF. The study helped us to co-relate the shooting distances with the distribution of GSR.

Keywords: Forensic Science, Gunshot Residue, EDXRF, AK-47, Self Loading Rifle, Ammunition.

INTRODUCTION

Ammunition is an integral part of a firearm consisting of four essential parts, a primer, propellant, projectile and cartridge case. When ammunition is fired from the firearm, it deposits gunshot residue (GSR) at particular distances until it hits the target. GSR is a combination of semi-burnt and un-burnt particulate matter. It consists of organic compounds such as nitrocellulose and nitroglycerine; inorganic elements such as sulfur, barium, lead¹. It also contains residues of bullet jacketing material and the elemental residue from the barrel. These elements get deposited at variable distances in between the muzzle end and target, when fired from a particular AK-47 and SLR.²

Many studies have been performed concerning the analysis of GSR, leading to several advances in the field. In 1977, a comprehensive report on particle analysis of GSR was released¹. Later, more profound and refined studies have been performed in GSR analysis. Some studies related to GSR particle analysis by Schwoeble and Exline (2001) have led to the modern-day analysis of GSR¹². Energy dispersive X-ray fluorescence (EDXRF) has become the preferred technique over other prevailing techniques for the analysis of GSR.

It provides qualitative and quantitative analysis of GSR samples without any alteration. The reports and research by gunshot residue analysts have inspired many other researchers, thereby providing a better understanding and an increased reliability in GSR and its interpretations. Senior research scientists have always reported that the analysis of GSR cannot indicate the shooter; however, members of the media usually seem surprised to learn that.^{3,4} GSR-related investigations are always fetched for because the composites of GSR are not commonly found in general population and if found, leads to a better understanding of the case.

In this study, an effort has been made to relate GSR with the shooting distance. For the research work, 7.62 × 39 mm and 7.62 × 51 mm ammunition was used due to its availability. While conducting the study, the aforementioned ammunition was fired, and GSR was collected on a thin blank white paper at particularly marked distances after. All safety protocols were followed. The usual or contemporary technique to analyze GSR includes spot test to mark the presence of various elements.⁵ For this study, EDXRF was used for the analysis of the obtained GSR sample to quantify the sample by obtaining the elemental values. The distance of firing and GSR deposition could be related.

MATERIALS AND METHOD

The purpose of this study was to determine if significant differences existed in residue deposition in relation with shooting range. A null hypothesis was: There are no significant differences between GSR depositions on the path with distance determination.

2.1 Data Collection

In this study, two different brands of firearm viz. AK-47 and Self-loading Rifle (SLR) were selected based on the popularity and availability. Standard AK-47 and SLR 1A1 were available at the Ballistic Range Centre of Gujarat Forensic Sciences University, India. Both the firearms were in proper working conditions. The calibers 7.62×39 mm mild steel-core copper-jacketed and 7.62×51 mm copper-jacketed ammunitions were used for AK-47 and SLR, respectively. The ammunition was manufactured at Ordnance Factory Veraval (INDIA). The muzzle velocity for AK-47 was recorded to be 715 m/s and that for SLR was recorded around 838 m/s for all the twelve rounds of fired one after the other, the sample was collected.

The firearms were assembled in the universal receiver of Ballistic Data Acquisition System. The target was set at a distance of 10 m from the muzzle end of the firearm. For the residue collection, A4-sized blank paper sheets of dimension 20×297 mm were arranged on the trajectory at frequent intervals of 0.5 m starting from the muzzle end up till 8.5 m (i.e., 0 m, 0.5 m, 1 m, 1.5 m to 8.5 m).⁶

After the instrumental and experimental setup was supervised, 12 rounds were fired from AK-47 and SLR each. The residues which were deposited on the paper sheets on the path, was collected and further analyzed for its specificity. This experiment was repeated two more times with same number of rounds of fire. The testing was supervised by a forensic examiner familiar with gunshot residue testing procedures to ensure weapons were held level and properly measured.

2.2 Instrumentation

A handheld digital microscope (Dino-lite Premier digital microscope AM41137T{D4}) was employed for determining the size of particles from the collected Gunshot residue samples of AK-47 and SLR. Secondly, EDXRF (Energy Dispersive X Ray Fluorescence, EDX-7000, Shimadzu) was used to determine the presence

of inorganic substances from the residues and their concentrations.^{7,8} The residue samples were introduced into the sampling cups equipped with transparent Mylar film base. The X-ray beam was focused from the collimator of size 3 mm in diameter, and the residue samples were scanned in air mode instrumental arrangement.

RESULTS AND DISCUSSION

3.1 Microscopic examination

Visual examination under digital microscope of the residues collected from two different calibers showed affirmative differences for the residue collected from 7.62×39 mm ammunition and 7.62×51 mm ammunition.⁹ As the shown in the figures below; the observations indicates that the maximum deposition of particles from 7.62×51 mm ammunition is in the range of 3 m to 4.5 m with particle size 0.160-1.164 mm whereas for 7.62×39 mm the maximum deposition of the residues was in the range of 3.5 m to 5.5 m with particle size 0.155-1.160 mm.



Fig.1 (This figure illustrates the GSR particle taken from the handheld microscope with magnification of 50x. The picture displays the burnt and semi-burnt particle residue of 7.62x39mm calibre ammunition collected from a distance of 4 m from the muzzle end.)



Fig.2 (This figure illustrates the GSR particle taken from the handheld microscope with magnification of 50x. The picture displays the burnt and semi-burnt particle residue of 7.62x39mm caliber ammunition collected from a distance of 7 m from the muzzle end.)

In the given table P = Present (particular element was found at that particular distance)

Table.2 Relationship between the inorganic components of GSR at various distances in meters fired from Self Loading Rifle using 7.62x51mm Ammunition.

	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	5.5	7	7.5	8	8.5
Sulfur	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P			
Copper	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calcium	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Barium	P	P	P	P	P	P	P	P	P	P								
Silicon	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Lead	P	P	P	P	P	P	P	P	P	P	P	P	P					

In the given table P = Present (particular element was found at that particular distance)

DISCUSSION

These results partially supported our first hypothesis that, residue distribution over the path is significantly related to distance of fire from the muzzle end. The results also supported the fact; there was a difference between the patterns of distribution of two different types of ammunition because propellant charge contained concentrated residues of fire.

One possible limitation with the results could have been that the distances were in closer proximity with each other. The shooting distances were evenly spaced at intervals, but instead could have been measured at frequent intervals. This would have helped to describe the drastic change between 0 m and 8.5 m for both the ammunition and would indicate if the change was gradual or rapid. Another limiting factor was internal comparative results for same and varied types of ammunition. Future studies should include internal gradations. Since an accumulation of residues from 12 shots were taken for analysis for both the ammunition and the distances were also consistent with each other, suggesting the results are still reliable.

CONCLUSION

It was the purpose of this study to expand and give further details about a significant relation of gunshot residue patterns spread over the path it follows and determination of distances. In this study, two different calibers were used during the testing process to determine if the use of the two different caliber of

ammunition would reveal significant differences in deposition of gunshot residue patterns. Prior to the testing procedures there was a prediction that there would be a finding of no statistical relation between the gunshot residue dispersal patterns and determination of distances. Based on the findings derived from the analysis of inorganic components of the residue deposits at specified distances, the null hypothesis was rejected that there is no significant relation between the gunshot residue pattern and distance on the trajectory. The deposition of the GSR on the given trajectory was found to be different from both the ammunition used hence it doesn't follow a specific deposition pattern. Although the components found at a particular distance was specific to the particular ammunition hence the GSR distribution pattern can be co-related to the type of ammunition used. The results of this study can potentially provide new and innovative ways to determine shooting distances and GSR patterns at relative distances. At the conclusion of this study the results gives rise to the implication that forensic determinations related to firearm cases could still be carried out in instances where the firearm used in the commission of the criminal activity cannot be located or used for testing procedures, at least for AK-47 and SLR. We recommend further research in the methods leading to investigate distances and weapon types to compare it with GSR pattern distribution, to see if it has any practical value.

Ethical Clearance- Taken from institutional of ethical committee for testing at ballistic range

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Socio-Demographic Profile of Fatal Cases of Fall from Height - SMS Hospital, Jaipur During the Year 2015-16

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ABSTRACT

Steadily increasing urbanization and construction of multi-storeyed buildings has led to increase in incidences of fatalities due to fall from height. Fall from height is considered as polytrauma which causes severe and subsequent fatal injuries that may not be apparent during the initial assessment of the patient leading to missed injuries. A delay in diagnosis leads to increased, yet preventable morbidity and mortality.

The study was conducted at Department of Forensic Medicine & Toxicology, SMS Medical College, Jaipur. It was a Hospital based Descriptive type of Observational study including 100 cases during the period of April, 2015 to August, 2016.

Majority of victims were between 31-50 years of age (36%) with males preponderance(83%). Labourers were the most common victims of fall from height which was very significant. Majority of the falls in the present study occurred from terraces of houses and buildings (50%) .

Lack of safety measures and unsafe practices at work seem to be one of the important parameters for such incidences resulting in fatality. Most of such episodes are potentially preventable by simple legislative measures and public awareness.

Keywords: Fall , Polytrauma ,Cranio-cerebral damage ,Hemorrhagic shock.

INTRODUCTION

Steadily increasing urbanization and construction of multi-storeyed buildings has led to increase in incidences of fatalities due to fall from height. Among different types of injuries, the interpretation of falling trauma is becoming particularly important since falls are, according to the World Health Organization, the second leading cause of accidental or unintentional injury deaths in the world¹. Many workers in maintenance, construction and many other people in a variety of jobs are at risk of falling from height; examples include painters, decorators, window cleaners especially those who undertake jobs without proper training, planning or equipment. Falls frequently occur

because no precautions are taken, or any equipment that is used is defective, not appropriate, or used incorrectly. Increased tension and grievances in society and personal lives has led to increment in suicidal tendencies and jumping from height is a common means of suicide. Not only a means of causing self-harm or accident; fall from height is also a suitable means to execute an episode of assault which can be mimicked as an accident. Severe and subsequently fatal injuries may not be apparent during the initial assessment of the patient leading to missed injuries. A delay in diagnosis leads to increased, yet preventable morbidity and mortality, an unfortunate phenomenon that also characterizes other types of deceleration injuries. The specificity of falling trauma by which the same position and/or injury pattern can result from a variety of different initial conditions and falling mechanisms, makes its interpretation and differential diagnosis even more difficult.² Hence understanding the severity of the trauma mechanism involved in falls from height is extremely important in their management. Although fall from height is a common mode of

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trauma in our country, yet there is insufficient data in the literature in our country establishing the range of injuries due to falls from height .However, the number and patterns of falls need to be studied first to ascertain the specific corrective action that is needed.

MATERIALS AND METHOD

The study was a Hospital based Descriptive type of Observational study conducted at Department of Forensic Medicine & Toxicology, SMS Medical College, Jaipur during the period of April, 2015 to August, 2016 . During this period, a total of 6,112 medico-legal autopsies were conducted among which there were 127 cases of fatalities related to falls from height (2.07%).Out of these, 100 cases were included in this study on first come first basis after starting study. Rest 27 cases were excluded on basis of the inclusion and exclusion criteria. All body parts were examined for injuries.

OBSERVATIONS

In the present study Males out-numbered the females in cases of deaths due fall from height (83%). Majority of the cases were in 31-50 years of life (36%), followed by the 7th, 3rd decades of life. Least number of cases was reported in the geriatric age group i.e. more than seventy years of age. Males outnumbered the females in all age

groups. However, the maximum number of females fatalities of fall from height were reported > 70 &< 10 years of age. The major population of the study region comprises of followers of Hinduism, which was also the majority of the study population. Majority of both male and female victims were married(76.00%).

Table 1: Distribution of fatal cases of fall from height according to Literacy status n=100

Literacy status	No. of cases	Percentage
Literate	50	50.00%
Illiterate	43	43.00%
Not applicable	07	07.00%
Total	100	100%

Majority of victims (50%) were literate. Literacy status was not applicable in 07 victims who were less than 5 years of age. Rest 43% victims of fatal falls from height were illiterate. (Table 1)

Half of the events resulting in fatality due to falls from a height occurred in winters in the present study followed by those occurring in summer season (28%). Maximum number of cases suffering fatal episode had fallen on Tuesdays (20%), followed by Monday (19%) and took place in morning hours (36%).

Table 2: Distribution of fatal cases of fall from height according to the Occupational status of victims n=100

Occupation	Female		Male		Total	
Labourer	02	11.76%	38	45.78%	40	40.00%
Not applicable	03	17.65%	04	04.82%	07	07.00%
House wife	10	58.83%	00	00.00%	10	10.00%
Farmer	00	0.00%	16	19.28%	16	16.00%
Self-employed	00	0.00%	15	18.08%	15	15.00%
Retired	00	0.00%	01	01.20%	01	01.00%
Driver	00	0.00%	01	01.20%	01	01.00%
Service	00	0.00%	01	01.20%	01	01.00%
Student	02	11.76%	07	08.44%	09	09.00%
Total	17	17%	83	83%	100	100%

Majority of victims were labourers (40%) followed by agricultural workers (16%). 58.83% females who succumbed to the episode of fall from height were housewives.(Table 2)

Table 3: Distribution of fatal cases of fall from height according to the Place of fall

Place of fall	No. of Cases	Percentage
Terrace	50	50.00%
Stairs	13	13.00%
Tree	12	12.00%
Balcony	04	04.00%
Ladder	04	04.00%
Bridge	01	01.00%
Animal	01	01.00%
Bed	01	01.00%
Wall	01	01.00%
Others	12	12.00%
Water tank	01	01.00%
Total	100	100%

Maximum number of falls in this study had occurred from terraces i.e. roofs of buildings and houses (50%). (Table 3). The episode of fall from height was associated with consumption of alcohol in 10% cases and was exclusively males. Majority of fatal falls were accidental (96%) with only 3% and 1% suicidal and homicidal cases.

Table 4: Distribution of fatal cases according to Height of fall and the Site of impact

Height of fall (feet)	Site of impact				Total
	Head	Sides	Feet	Unknown	
4 to 5	06	02	00	00	08
5 to 10	36	08	02	01	47
10 to 15	27	07	02	00	36
15 to 20	06	00	00	01	07
20 to 30	02	00	00	00	02
Total	77	17	04	02	100

Majority of the victims who had fallen from a height of 5 to 15 feet had impacted their head as site on the ground (83.00%).(Table 4)

91% victims of falls from height had fallen on hard surface and rest of 9% victims had fallen on soft surface like mud, sand etc. Majority of the fatalities occurred due to head injury (60%); followed by spinal injury (20%); thoraco-abdominal injury (19%).

Table 5: Distribution of fatal cases of fall from height according to the Cause of death n=100

Cause of death	No. of cases	Percentage
Cranio-cerebral damage	60	60.00%
Spinal cord damage	20	20.00%
Hemorrhagic shock	20	20.00%
Total	100	100%

60% deaths occurred due to head injury followed by 20% deaths each due to spinal injury and hypovolemic shock. (Table 5).

**Table 6: Distribution of fatal cases of fall from height according to the Cause of death and the Site of impact
n=100**

Cause of Death	Site of impact				Total
	Head	Sides	Feet	Unknown	
Cranio-cerebral damage	59	00	01	00	60
Spinal cord damage	18	00	02	00	20
Hemorrhagic shock	00	17	01	02	20
Total	77	17	04	02	100

Almost all cases of death due to cranio-cerebral damage had impact at head region barring one case with feet impact leading to ring fracture of skull. Similarly majority of cases of hemorrhagic shock had fallen with side impact. In one case with feet impact, death occurred due to hypovolemic shock consequent to pelvic injury. (TABLE 6)

DISCUSSION

The victims of fatal falls from height in the present study ranged from 2 to 95 years of age. Age range was almost similar to that in the study of Venkatesh VT et al.³ Murthy CRV et al, Gulati D et al.⁵ with slight variations. This was quite variable from that reported by Prathapan V and Umadethan B.⁶ The mean age in the present study was 41.37 years. It was lesser in the study of Gulati D et al.⁵ Majority of victims were 31-50 years of age (36%) which were equally distributed between the two decades. This is quite obvious as this being the active population of the society is more involved in risky works owing to both profession and adventure. These are the active participants in societal and occupational chores and thus, more exposed to risks of falling etc. Surprisingly the next common age group reported in the present study was 61-70 years comprising of 14% of the study population. Next age group to follow in distribution was 21-30 years with 12% cases followed by 51-60 years and 11-20 years (11% cases in each). The results of the present study were quite different from other authors who reported highest incidences in Venkatesh VT et al.³, Murthy CRV et al.⁴, Gulati D et al.⁵, Kumar JVK and Srivastava AK.⁷

Males are more engaged in active work especially for the purpose of bread winning and are thus, more at risk to such episodes. Male population predominated in every age group except more than 70 years age, due to sedentary life of most in that age range. The results of the present study with male: female ratio of 4.88:1 is

quite similar to those of Venkatesh VT et al.³ and Kumar JVK and Srivastava AK.⁷ However, our results are high in comparison to those of Gulati D et al.⁵, Murthy CRV et al.⁴ and Prathapan V & Umadethan B.⁶ This variation can be attributed to regional and cultural variation in study population with differences in activity of female population in comparison to the male population of a specific region. Although, the present study was conducted at a tertiary care center located in the capital city of the state, yet rural population was predominant. This is so because this center caters to a large referral population from adjoining rural regions of the state. Also, being the highest referral center, it also caters to a lot many referral cases from other parts of the state and also from border areas of the adjoining states. Thus, the rural preponderance in victims of fatal cases of falls from height is well explained. The literacy status of the study population was quite balance with 50% literates. Literacy does affect the awareness as regards to safety precautions that must be followed while working at a height which may also be one of the reasons slightly contributing to the rural preponderance of the study population.

Majority of the victims succumbing to fatal falls from height were labourers (40%). Most of these labourers were construction workers and painters who have to work at a height at certain times and slight lack of care and disorganized conditions at the place of work may result in an untoward event of fall from height which may turn out to be fatal depending on the factors associated with the fall like the height, ground surface, site of impact etc.

Majority of the events of falls from height during the study period occurred in winters (53%) followed by summers (28%). Our results are contradictory to those of Gulati D et al.⁵ who reported 90% cases in summer and rainy season. Winters are times when people may like working at a height especially in daytime to be at ease

in cold weather with the heating effect of sun. Summers have a still higher number of cases than expected because the study period was of one and a half year which included two summer seasons with other seasons covered once.

Majority of the falls in the present study occurred from terraces of houses and buildings (50%). Our results are quite similar to those of Gulati D et al⁵ and Kumar JVK and Srivastava AK.⁷ Our results were not in accordance to those of Prathapan V and Umadethan B⁶ who reported that majority of falls in their study occurred from trees followed by buildings. Thus, majority of the falls occurred from 5-10 feet height (47%) followed by 10-15 feet height (36%). Similar results were reported by Gulati D et al⁵, Kumar JVK and Srivastava AK⁷ and those of Venkatesh VT et al.³ where majority falls occurred from 5-10 feet height followed by 10-15 feet height.

Head was the site of impact in most cases (77%). Head acts as a pivot at the top of the vertebral column and is thus a susceptible site of impact in cases of falls from height. Our results are similar to those of Kohli A and Banerjee KK⁸ quite variable to those of Kumar JVK and Srivastava AK⁷ where head impact was seen in 46.6% and by side of body in 36.6% cases. Head impact was quite high in the present study as compared to other authors Prathapan V and Umadethan B⁶. Head and spinal injuries resulted in deaths in all cases of head impact. All cases of side impact succumbed to death due to thoraco-abdominal injuries either in isolation or conjunction with each other. Head and spinal injuries remained fatal in 75% cases of feet impact and in rest one case pelvic injury resulted in mortality. The episode of fall from height was associated with consumption of alcohol in 10% cases which were all accidental in nature.

Cranio-cerebral damage resulted in mortality in majority of cases (60%) followed by spinal cord damage and haemorrhagic shock in 20% cases each. Our results are similar to those of Kohli A and Banerjee KK⁸, Venkatesh VT et al.³, Gulati D et al.⁵ Kumar JVK and Srivastava AK⁷. Height of fall did not correlate to the cause of death but hemorrhagic shock was more common in falls from less than 15 feet height resulting from thoraco-abdominal injuries whereas head and spinal injuries resulted in falls from height varying from

4 to 20 feet height without much correlation. This was contradictory to other studies as most authors report that the cause of death correlates to the height of fall and age. In all cases of head impact death resulted due to cranio-cerebral or spinal cord damage. Our results were similar to other studies Kohli A and Banerjee KK⁸, Venkatesh VT et al³, Gulati D et al⁵, Murthy CRV et al⁴, Kumar JVK and Srivastava AK⁷, Prathapan V and Umadethan B⁶. In suicidal deaths there was equal preponderance of deaths due to cranio-cerebral damage, spinal cord damage and haemorrhagic shock. Death resulted due to cranio-cerebral damage in the only case of homicidal fall from height.

CONCLUSION

Lack of safety measures and unsafe practices at work seem to be one of the important parameters for such incidences resulting in fatality. Most cases of falls from height were found at places of work in labourers and agricultural workers possibly owing to casual working environment. Most of such episodes are potentially preventable by simple legislative measures and public awareness. Also, rescue management must be kept at hand at all sites of such risks at work as immediate mortality is quite common due to cranio-cerebral damage. Safety measures at places of height like terraces and balconies of residences and other buildings should be ensured. Play of children at places at a height should be done under adult supervision. Sensitization of architects should be done for safer design of stairs, balconies etc. Encouragement of practicing safer working techniques for construction workers, painters, window cleaners and tree climbers. Vertebral injuries should also be looked for in all cases of falls from height admitted to a hospital as these injuries usually co-exist with head and limb injuries and are often missed and may prove fatal.



Photograph 1: SHOWING FRACTURE OF CERVICAL VERTEBRAE DUE TO FALL FROM HEIGHT



Photograph 2: SHOWING LINEAR FRACTURE OF SKULL BONE

Conflict of Interest: None Declared.

Ethical Clearance: Taken from the Research, Review and Ethical Committee of SMS Medical College and Hospital.

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Study of Pattern of Cases on Alcoholism Recorded at GMERS Medical College and General Hospital, Vadodara

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ABSTRACT

Gujarat is a dry state for almost six decades. Now has plan to make prohibition law more stringent, particularly for locals who could end up in jail for three years and pay Rs 5 lakh fine if caught with liquor bottle. For visitors and tourists access to alcohol has been made easier. This study was carried out in GMERS Medical College and General Hospital, Vadodara. Total 1276 cases were recorded from April 2015 to march 2016. During the year number of cases found increased during the winter months and decreased during summer months. More cases are recorded from people of low economical communities. Law implementation, education, employment and reduced work stress will definitely help to reduce alcohol intake and to build nation.

Keywords: Alcohol, Season, Blood Alcohol Concentration.

INTRODUCTION

Alcohol is being used in India for ceremonial, social pleasure and other day to day purposes as a drink. As a result, abuse and overindulgence very often becomes responsible for crimes of violence, sex assaults, broken homes, juvenile delinquency, traffic accidents and many other socio-medico-psychosexual problems. ¹ From medico-legal view point, there is perhaps no other chemical substance more frequently involved as a contributory or causative factor in violent or natural deaths and also in many nonfatal incidents.²

Gujarat has a law in force that proscribes the manufacture, storage, sale and consumption of alcoholic beverages. The legislation has been in force since 1 May 1960 when Bombay State was bifurcated into the states of Maharashtra and Gujarat. The Bombay Prohibition Act, 1949 is still in force in Gujarat state; however there is licensing regime in Maharashtra with granting licenses to vendors and traders. Gujarat is the only

Indian state with a death penalty for the manufacture and sale of homemade liquor that results in fatalities. The legislation is titled the Bombay Prohibition (Gujarat Amendment) Bill, 2009.

Gujarat government clears ordinance to toughen prohibition law. The ordinance proposed imprisonment up to 10 years for those involved in the sale and purchase of liquor in Gujarat, besides a maximum fine up to Rs 5 lakh. Similarly, the liquor operators as well as those helping them would face imprisonment up to 10 years. In another major amendment, people who create ruckus or harass others in inebriated condition, would face a jail term up to three years, but not less than one year. Currently, the punishment for such behavior is just one to three months of jail and a fine of Rs 200-Rs 500.

MATERIALS AND METHOD

This retrospective study was carried out at GMERS Medical College and General Hospital, Vadodara, Gujarat. Total 1276 cases were recorded of suspected alcohol consumption during 1 year duration from April 2015 to March 2016. These cases are recorded from medico-legal register of the hospital. Out of these total medico-legal cases, 1276 cases are recorded, which are brought by police for medico-legal examination, blood sample collection

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and treatment. These 1276 cases are taken for this retrospective study. Written consent was taken from each person for analyzing result of this data. From the person 10 ml blood was collected after cleaning skin of ante-cubital fossa with soap and water by using sterile disposable needle and sterile disposable syringe under aseptic condition. Blood sample was preserved in screw capped glass bottle. 100 mg. sodium fluoride and 30 mg potassium oxalate added to 10 ml blood sample followed by thorough shaking.³ Samples were sent to FSL Gandhinagar to determine blood alcohol concentration by using gas chromatography technique. Details with result of the test were recorded in specially designed proforma, tabulation done and analysis was observed.

OBSERVATIONS AND DISCUSSION

There are large number of cases recorded for medico-legal examination and treatment of drunkenness. Total 1276 cases were recorded, which is a good proportion of all cases recorded for medico-legal examination and treatment. Out of those, only 3 cases recorded of female patient. Alcohol consumption occupied very unusual position within Indian culture. Men consuming alcohol is acceptable in society, but women drinking it is frowned upon. Earlier, the drinking alcohol beverages, was a very common practice for most people including women. Situation now a days is somewhat changed. Drinking alcohol is too much reduced in women, particularly in Gujarat. But still in some very low socio-economic class and some very high socio-economic class, women are consuming alcohol regularly. In this study, we have considered those cases which are brought by police to hospital for medico-legal examination and blood sample collection. Mostly police bring person who found drunk on roadside. Women generally drink inside their homes. And another factors being, women are generally light drinker than men are, drinking is not as important to women’s social role as it is to men’s and women who cease drinking during pregnancy and early childbearing may then not resume drinking later on.⁴ So they usually escape from being arrested by police. Means, though women drinking alcohol, they usually not brought for medico-legal examination and treatment. Police station of Gotri, Gorva, Laxmipura, and Old Padra are currently being included from where police bring medico-legal cases to GMES Medical

College and Hospital, Gotri, Vadodara. 659 (51.64%) cases recorded form Laxmipura police station. The reason being low socio-economic condition of a larger proportion of its population. 765(59.95%) cases brought by police in late evening and night time from 9 pm to 6 am. Most people consume alcohol after their jobs in evening. Stress and poor economic condition is major reason of consumption. Social occasions and celebrations are not responsible for regular intake. In cold climatic condition like in winter and in monsoon recorded cases are higher, most cases being recorded in month of September. And in summer, recorded cases are low. People who consume alcohol generally prefer pleasant conditions for drinking. Most people prefer to consume in monsoon and winter. Most cases (80.4) recorded of having blood concentration 50.1 to 100 mg %. These concentrations were recorded from reports of Forensic Science Laboratory.

Table 1: Total number and distribution of cases of alcohol according to age and sex

Age Groups (In Years)	Male	Female	Total
16-20	33	0	33
21-25	172	0	172
26-30	232	1	233
31-35	254	0	254
36-40	221	0	221
41-45	168	2	170
46-50	100	0	100
51-55	60	0	60
56-60	25	0	25
>60	8	0	8
Total	1273	3	1276

Table 2: Distribution of cases of alcohol according to area of police station

Police station	Number of cases	Percentage
Gotri Police station	238	18.65 %
Gorva Police station	219	17.16 %
Laxmipura Police station	659	51.64 %
J P Police station	160	12.53 %
Total	1276	100 %

Table 3: Distribution of cases of alcohol according to time of examination and sample collection

Time	Number of cases	Percentage
Morning (6 am -12 pm)	99	7.75 %
Afternoon (12 pm -5 pm)	205	16.06 %
Evening (5 pm-9 pm)	207	16.22 %
Night (9 pm-6 am)	765	59.95 %
Total	1276	100 %

Table 4: Distribution of cases of alcohol according to months of year

Month	Number of cases	Percentage (%)
April 15	79	6.10 %
May 15	68	5.32 %
June 15	89	6.97 %
July 15	112	8.87 %
August 15	116	9.09 %
September 15	150	11.75 %
October 15	125	9.79 %
November 15	94	7.36 %
December 15	127	9.95 %
January 16	128	10.03 %
February 16	90	7.05 %
March 16	98	7.68 %
Total	1276	100%

Table 5: Distribution of cases of alcohol according to season

Season	Number of cases	Percentage
Winter	439	34.44%
Summer	334	26.17%
Monsoon	503	39.42%
Total	1276	100%

Table 6: Distribution of cases of alcohol according to Blood Alcohol Concentrations

BAC	Total No Of cases	Percentage (%)
0-30mg %	25	1.95%
30.1-50 mg%	4	0.31%
50.1-100mg %	1027	80.4%
Total	1276	

CONCLUSION

Gujarat government clears ordinance to toughen prohibition laws related to sell, purchase and consumers of alcohol. These will surely bring good result for the society. Law will help to reduce alcohol consumption in ceremonial and social occasions. In society other main reason behind consumption is low socio-economical condition and stress. Proper education and employment of youth can solve this problem to major extent. Government can make some laws to decrease work stress. We already have law regarding working hours in government institutions. But private sectors, particularly masters of laborers are not following these rules strictly. And rules also should be made of total working hours based on type and stress of work. These will help to state and nation not to build revenue but to build good society and good living conditions. Reduced consumption of alcohol may lead to improving economical condition of families; ultimately there will be decreased broken homes, will surely leads to decreased rate of crime like violence, sexual assaults etc. So, ultimately it will help to build good living conditions for all, building of good state and good nation.

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A Cross Sectional Postmortem Study on Closure of Skull Vault Sutures with Respect to Age from 3Rd to 6Th Decades of Life

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ABSTRACT

Introduction: Age estimation by means of closure of skull sutures is a very important tool to solve complex problem in civil and criminal matters such as identification, senior citizen concession, retirement benefits, competency as witness, attainment of majority, marriage, impotency, sterility, consent, juvenile offender, kidnapping, rape etc.

Objectives: To find out the pattern of cranial vault suture closure with respect to age from 3rd to 6th decades of life, to document bilateral and gender variations in cranial suture closure and to find out the earliest age of fusion of individual sutures of the skull.

Materials and method: Study design: Cross-sectional descriptive study Study period: December 2014 to June 2016 Sample size: 150. All the autopsy cases, between 21 to 60 years of age were studied for relation between age and cranial suture closure. Ectocranial and endocranial closure pattern were studied for sagittal, coronal and lambdoid sutures.

Results: Endocranial fusion of cranial suture was more regular than ectocranial fusion, and was observed as early as 21-30 years. Coronal suture was the first to fuse. Closure was found earlier in males compared to females.

Conclusion: Cranial suture closure is yet a fairly reliable method for age estimation. Suture obliteration starts earlier on endocranial surface than on the ectocranial surface and there is significant variation in suture closure in male and female (Males showed earlier union than females).

Keywords: Suture, Sagittal, Coronal, lambdoid, Skull suture

INTRODUCTION

Age estimation by means of closure of skull sutures is a very important tool to solve many complex cases in medical justice. Therefore, testing the adequacy of the used methods on local populations is highly recommended.¹

Schmidt 1888, proposed that the basal suture united between 18 to 21 years, but possibly between 25 and 40

years and was complete between 40 and 60 years.²

Dwight 1890 identified that the posterior portion of sagittal suture and inferior portion of coronal suture shows first sign of obliteration, lambdoid closes slower than coronal and the frontal suture is the last to close.³

In 1905, Parsons FG and Box CR revised the above chronology to report that lower half of the internal coronal suture is the spot for initial commencement, followed by the internal region of the sagittal suture at obelion; the lambdoid suture being the last to close. Frederic was the first to announce that it is not possible to age a skull to within any more than 10 years^{4,5}

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In an effort to reduce the subjectivity and quantify age estimations from cranial suture closure, In 2009,

Ullas Shetty carried out study on 100 cases brought to mortuary of Maulana Azad College, Delhi, for post-mortem. He concluded that ectocranial suture cannot be used for age estimation. Suture obliteration starts earlier on endocranial suture than ectocranial, also suture closure occurred earlier in males.⁷

After the works of Todd and Lyon, criticism of suture closure as an indicator of age continued and cranial suture closure became more of a general age indicator and the last resort for individual identification.⁵

Only handful of studies has been conducted in India, Therefore, this study is intended to find out the pattern of cranial vault suture closure in 3rd to 6th decades of life with respect to age and sex of an individual in Kolar region of south India.

MATERIAL AND METHOD

This study was conducted in the mortuary of R.L.Jalappa Hospital and Medical Research Center, Kolar on dead bodies coming for medicolegal post-mortem examination, during the period of 1st December 2014 to 30th June 2016. Coronal, sagittal and lambdoid sutures of 150 subjects of age 21-60 years were studied. Acsadi and Nemeskeri method was applied to both endo and ectocranial sides of the sutures. Unknown and unclaimed bodies were not taken because of difficulty in knowing the age. Cases showing deformed or diseased or fractured skull were also excluded from study.

After reflecting the scalp, coronal, sagittal, lambdoid sutures were studied applying Acsadi and Nemeskeri scoring method. For endocranial same score system was applied after removing the calvaria by craniotome by taking due care to include complete coronal and sagittal suture. Lambdoid suture was studied in-situ. The calvarium was cleaned of soft tissues on both sides and was dried, which made the sutures more prominent. Photographs were taken in all cases depicting the suture closures. The obliteration of the sutures was ascertained endocranially as well as ectocranially. The sagittal suture was studied in three parts and coronal and lambdoid sutures two parts each on left and right side. All cases were studied with reference to ectocranial and endocranial closure of sutures using Acsadi and Nemeskeri scoring method under 5 point scale of 0 to 4. 0- Open, 1- Less than one half closed, 2- Half closed, 3- More than one half closed, 4- Totally closed.⁶

A predesigned proforma was filled up for every case, master chart was prepared. Cases were stratified into 10 year groups. Mean ectocranial as well as endocranial closure stages were calculated for the three main sutures by adding the scored closure stages of the different sections and dividing the result by number of sections which compose the suture in question. Endocranially closure indices were calculated in similar fashion adding the closure stages of all the sections and dividing the result by 16. After completion of data collection, it has been analyzed to find out pattern of skull vault suture closure in relation to various ages (Table.1). The results obtained after statistical analysis were analysed and compared with the works of previous authors (Table.2).^{14, 15, 16}

RESULTS

Majority of subjects in the study were in the age group 21 to 30 years, There was no significant difference in age distribution with respect to gender. Closure was earlier in males compared to female. Endocranial suture closure occurs early compared to ectocranial suture closure.

Table.1: MEAN VALUES OF SUTURES

SUTURES	MEAN
CORONAL	14.68
SAGITTAL	11.92
LAMDOID	9.94

Overall coronal suture closes early followed by sagittal and lambdoid respectively. To estimate the possible relation between suture closure and age at death Spearman rank correlation coefficients (2 tailed) were calculated. Significant positive correlation was observed between endo and ecto lamdoid suture scores at every point such as upper, lower on right and left in all the age group.

When ectocranial suture closure was taken it is observed that S1 closure started early followed by S2 and S3 respectively. Within the sagittal suture S1 appears to fuse much faster and S2 seems to close much slower.

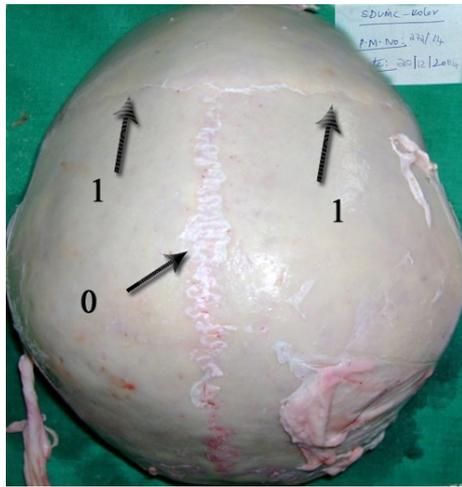


Figure 1.Skull of 50 year old male showing score of 1 in Coronal suture and score of 0 in Sagittal suture (M/3) on ectocranial surface (PM No.272/14).

When endocranial suture closure was taken it is observed that S2 closure started early followed by S1 and S3 respectively. Within the sagittal suture S1 appears to fuse much faster and S3 seems to close much slower.

In coronal suture there is no significant difference between right and left side. When ectocranial suture closure was taken it is observed that lower (L) coronal suture closure started early compared to upper (U) coronal suture. Within the coronal suture, lower (L) coronal suture appears to fuse much faster compared to upper (U) coronal suture.

When endocranial suture closure was taken it is observed that lower (L) coronal suture closure started early compared to upper (U) coronal suture within the coronal suture, lower (L) coronal suture appears to fuse much faster compared to upper (U) coronal suture.

In lamdoid suture there is no significant difference between right and left side. When ectocranial suture closure was taken it is observed that upper (U) lamdoid suture closure started early compared to lower (L) lamdoid suture. Within the lamdoid suture, upper (U) lamdoid suture appears to fuse much faster compared to lower (L) lamdoid suture. When endocranial suture closure was taken it is observed that upper (U) lamdoid suture closure started early compared to lower (L) lamdoid suture. Within the lamdoid suture, upper (U) lamdoid suture appears to fuse much faster compared to lower (L) lamdoid suture.

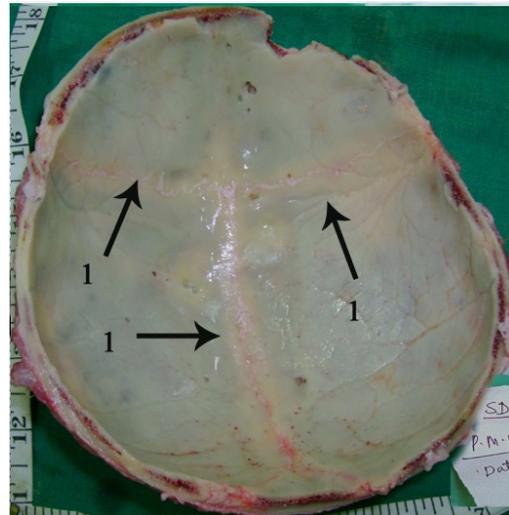


Figure 2.Skull of 25 year old male showing score 1 in Sagittal suture (M/3) and score of 1 in Coronal suture on endocranial surface (PM No.249/15).

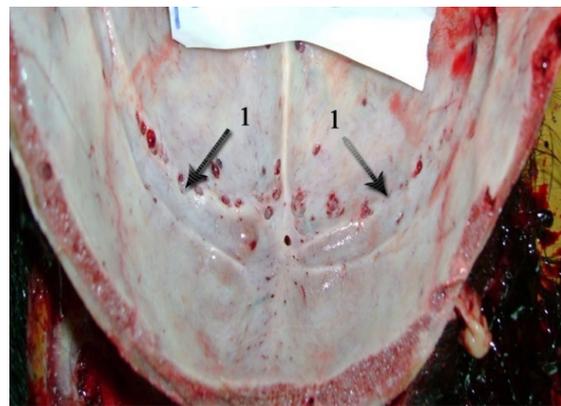


Figure 3.Skull of 50 year old male showing score of 1 in endocranial surface of Lambdoid suture (PM No. 272/14).

In coronal suture right and left side were compared and no significant difference was found. When males and females were considered separately there were no significant difference between right and left side of coronal suture.



Figure 4.Skull of 40 year old female showing score of 1 in ectocranial surface of Lambdoid suture (PM No. 49/16).

Right and left side of coronal and lambdoid sutures were compared both ectocranially and endocranially, there were no significant difference after applying student 't' test (P value>0.05). It implies that there is no bilateral variation in ectocranial and endocranial suture closure.

DISCUSSION

In the present study, macroscopic findings are studied for closure of sagittal, coronal and lambdoid suture to determine age.

Coronal suture; Endocranial fusion of coronal suture was observed as early as 21-30 years. Other workers like Pommerol (1869), Topinard:

Table 2: Age of fusion of skull sutures by different authors

Sl No	Author/Worker	Sagittal (Age group in years)	Coronal (Age group in years)	Lambdoid (Age group in years)
1	Todd and Lyon (1924)	20-29 20-32	26-50 23-35	26-31 23-31
2	Krogman (1962)		Type 1,2:24 -38 Type 3,4:26 -41	31
3	Ribbe's (1885)	Closure 21-50 years frequent between 44-45 years Ectocranially sagittal closes first then lambdoid, coronal suture		
5	Parikh	30-50	40-60	50-70
6	Rajesh verma (2002)	---	M : 42-52 F: 42-56	---
7	R.K Gorea (2004)	---	45-50	45-50
8	Pradeep et al (2004)	---	45-50	45-50
9	J.B Mukherji (2007)	35-40	40-45	45-55
10	Ullas shetty (2008) ECTO ENDO	>70 60-69	Lapsed union 40-49	>70 40-49
11	Parmar P Rathod (2012)	---	50-60	---
12	Zanzrukiya (2013-14)	---	Ant 1/3: 40-69(m) 51-64(f) Mid 1/3: 40-49(m) 35-54(f) Pos 1/3: 40-49(m) 35-49(f)	---
13	Krishan Vij (2014)	Pos1/3: 30-40 Ant 1/3: 40-50 Mid 1/3: 50-60	Lower half: 40-50 Upper half: 50-60	55
14	Reddy KSN (2014)	Pos 1/3: 30-40 Ant 1/3: 40-50 Mid 1/3: 50-60	Lower half: 40-50 Upper half: 50-60	45
15	Modi's (2016)	30-50	40-60	50-70
16	Present study ECTO ENDO	M : 41-50 F: 51-60 M : 31-40 F: 41-50	M : 31-40 F: 41-50 M : 21-30 F: 31-40	M : 41-50 F: 51-60 M : 31-40 F: 41-50

85), Ribbe (1885) reported closure between 40-50 years. However their study did not indicate whether it was ectocranial or endocranial or it was commencement or termination. There is no significant variation in suture closure of right and left sides of coronal sutures; both ectocranially and endocranially. In coronal suture lower (L) coronal suture closure started early compared to upper (U) coronal suture. Within the coronal suture lower (L) coronal suture appears to fuse much faster compared to upper (U) coronal suture.¹¹

agittal Suture: Endocranially, starts fusing at the end of 24-34 years and this observation confirms to that reported by Todd and Lyon (1924), while it is in contrast to the observation reported by Pommerol (1869) and Topinard (1885), who indicated endocranial commencement of sagittal suture at a much later age at about 40 years. In sagittal sutures S2 closure started early followed by S1 and S3 respectively. Within the sagittal suture S1 appears to fuse much faster and S2 seems to close much slower.⁵

Lambdoid suture: Lambdoid endocranially, starts fusing at the age of 27-35 years in the present context which shows that it is a year earlier than that reported by Todd and Lyon (1924). In this study it is clearly evident that endocranial union is a far better parameter for age determination than is the ectocranial union as also has been established by Todd and Lyon (1924 and 1925) and Dwight. All the previous works was done in France, Germany and United States of America under different climatic conditions and in diverse racial groups. In our country the obliteration of the skull sutures in males is earlier than that of females.

There is no significant variation in suture closure of right and left sides of lambdoid sutures; both ectocranially and endocranially. In lamdoid suture, upper (U) lamdoid suture closure started early compared to lower (L) lamdoid suture. Within the lamdoid suture, upper (U) lamdoid suture appears to fuse much faster compared to lower (L) lamdoid suture.^{2,15} In the present material all the three main sutures of the skull started closing earlier in the males than in the females. Some workers in USA and India have shown the epiphyses of the long bones fused with the metaphyses earlier in females than in males.^{7,8,9,10,11,12,13,14}

CONCLUSION

In the present study we tried the possibilities for

suture closure to contribute to one of the essential foundations of Paleodemography: age estimation. Age estimation from the skull suture is a reliable parameter. There is a need for more detailed studies (different age groups, sub samples, individual suture segments etc.) for a subject like suture closure. It is evident that, before several age indicators are combined into complex methods, as much information as possible about the separate age indicators has to be accumulated. This information can be obtained only by investigating skeletal material of known age as done in our study.

1) Cranial suture closure is yet a fairly reliable method for age estimation.

2) Suture obliteration starts earlier on endocranial surface than on the ectocranial surface.

3) Males showed earlier union than females.

4) There is no significant variation in suture closure of right and left sides of coronal and lambdoid sutures, both ectocranially and endocranially.

5) Endocranially and Ectocranially- coronal suture closes earlier followed by sagittal and lambdoid.

6) Ectocranially sagittal suture S2 closure started early followed by S1 and S3 respectively. Within the sagittal suture S1 appears to fuse much faster, S2 seems to close much slower. In coronal suture, lower (L) coronal suture closure started early compared to upper (U) coronal suture. Within the coronal suture, lower (L) coronal suture appears to fuse completely much faster compared to upper (U) coronal suture. 7) Endocranially sagittal suture S2 closure started early followed by S1 and S3 respectively. Within the sagittal suture S1 appears to fuse much faster, S3 seems to close much slower. In coronal suture lower (L) coronal suture closure started early compared to upper (U) coronal suture. Within the coronal suture lower (L) coronal suture appears to fuse completely much faster compared to upper (U) coronal suture. 8) In lamdoid suture, upper (U) lamdoid suture closure started early compared to lower (L) lamdoid suture. Within the lamdoid suture, upper (U) lamdoid suture appears to fuse much faster compared to lower (L) lamdoid suture.

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Lanthanides Toxicity and their Involvement in Biological Activities

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ABSTRACT

Toxicological studies of rare-earth elements suffered from the fact that they were contaminated with other similar elements making interpretation of the results difficult. They have a low acute toxicity with LD₅₀'s ranging from 315-585 mg/kg with numerous species. The major symptoms of acute toxicity are ataxia, laboured respiration, walking on the toes with arched back and sedation and the death rate peaking between 48 and 96 hours. Chronic intra venous injections of these elements in animal model may causes degeneration of the spleen and produces yellow atrophy and central lobular necrosis of the liver. The animals when exposed to a mixture with high fluoride content, showed acute transient chemical pneumonitis, sub acute bronchitis and bronchiolitis, focal hypertrophic emphysema and regional bronchiolar structuring. It is not surprising that biological activity is observed in a number of calcium enzymes and has been demonstrated to be good substitutes for calcium in assays of Bacillus subtiles amylase of trypsinogen to tyrosine conversion. In the present article by keeping above facts in mind the author has discuss the Lanthanide toxicity and various biological activities associated with it from reading secondary data sources i.e. e-books, research publications and various toxicological reports etc.

Keywords: Lanthanides, Rare earth elements, Toxicity, Biological Activity etc.

INTRODUCTION

Biological activity shown by any molecule has been considered to be an individual or collective nature of the constituting atoms and/or substituent. In other words the biological activity to any molecule is granted an account of its stereo specific arrangement of the groups or the constituents. As regards the stereospecific arrangements of groups or substituent in any molecule, it is assigned on the basis of the nature and property of the constituents. Some stereospecific arrangements with specific groups may exhibits extraordinary properties

whereas the same groups with positions interchanged may change the property drastically.

Thus to have an information about the expected activity of any molecule, a desired group and its positions may be predicted if a qualitative as well as quantitative survey of the structure and activity of the groups, substituent and the molecule as a whole is made available.

In other words it seems necessary to have knowledge of the structure activity relationship of the groups, atoms and their constituents. Intervention of computers in the field of structure and dynamics have facilitated the prediction of a 3D-structure of a molecule on the monitor before it is actually synthesised in laboratory and to have a pre-hand information about its energetic and structure dynamics.

Keeping this in mind large attempts was taken in hand to examine and correlate the structure and activity relationship¹. The earlier studies made from the related

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laboratory included mono-variable studies based on the properties of the acid or one of the substituent². A major part of these studies related with the correlation of properties of biologically active cation like 3d-or 4f-metal ions.

The mono-variable studies eventually led to predict and quantify the dependence of the physico-chemical properties of complex and their biological activities. In the mean a simpler attempts to determine the 4f-features based on electronic spectral studies of lanthanides have facilitated their studies and additionally the similarity of the lanthanoids with biologically active cation like Ca(II) and Mg(II) have accelerated studies of lanthanoids with biologically significant ligands.

The intervention of computer in field of chemistry and in the field of mechanistic approach has helped a chemist to presume and derive relationship between specific molecular model and structural and behaviour characteristics of a molecule, so as to use it as a probable drug.

The following few paragraph deal with the toxicity regarding rare earth element i.e. Lanthanide toxicity and various biological activities associated with it.

MATERIAL AND METHOD

The present manuscript is prepared from the data gathered from the secondary data sources such as e-journals, e-books, text books and from other relevant researches. Key search criteria were toxicity, rare earth elements, biological activities and signs and symptoms associated with lanthanide toxicity.

Lanthanide Toxicity:

Toxicological studies of rare-earth elements suffered from the fact that they were contaminated with other similar elements making interpretation of the results difficult³. The symptoms of acute toxicity include writhing, ataxia, laboured respiration walking on the toes with arched back and sedation.

There is a delayed lethality with the death rate peaking between 48 and 96 hours. Chronic intra venous injections of these elements in rabbits have shown degeneration of the spleen and produces yellow atrophy and central lobular necrosis of the liver⁴. When exposed to a mixture with high fluoride content, the animals showed acute transient chemical pneumonitis, sub acute bronchitis and bronchiolitis, focal hypertrophic emphysema and regional bronchiolar structuring.

Topical application of the rare earths to the eye results in conjunctival irritation but no irritation of the iris or cornea was reported. Physical contact of the rare earths with skin has not shown any effect on intact skin but extensive damage with epilation and scar formation occurs on abroad skin⁵.

Biological Activities:

The lanthanide ions have no known inherent biological function, and only trace amounts are found in whole body analyses. Since the ions are classified as class 'a' acids and have sizes (0.85-1.06 Å⁰) comparable to Ca⁺² (1.06 Å⁰), it is not surprising that biological activity is observed in a number of calcium enzymes. They have been demonstrated to be good substitutes for calcium in assays of Bacillus subtiles amylase of trypsinogen to tyrosine conversion and of the aequorin luminescent reaction and for Mg⁺² in isoleueyl-t RNA synthetase and adenylylated glutamine synthetase^{6, 7, 8}.

The enzyme activities of the amylase (relative to Ca⁺² as 100%) and the t RNA synthetase are most of the RE ions activities. Kayne and Cohn⁹ have demonstrated that the role of the lanthanide's and presumably divalent ions other than Mg⁺², was to stabilize the substrate t RNA in the overall reaction. Mg⁺² catalyze the formation of the ilua-AMP-enzyme complex as well, in contrast to the lanthanide ions. Since it is expected that Mg⁺² retains its water of hydration when bound to RNA or DNA¹⁰ some correlation of enzyme activity and "outer" complex binding might be expected.

Table-1: Summarises the Role of Lanthanide ions in Biological Activities

Biological Activities of Lanthanides

System	Action or application	Ref.
Lobster	Ln ⁺³ binds to the Ca ⁺² binding sites on the axon membrane and simulates membrane conductance and other calcium like actions.	11
Squid	Ln ⁺³ reduces both the influx and efflux of Ca ⁺²	12
Mammalian smooth muscle	Ln ⁺³ reduces both the influx and efflux of Ca ⁺²	13
Smooth muscle (guinea, rat, rabbit aorta), striated muscle (grog sartorius and rectus abdominis muscles), and catch muscle	Replacement of Ca ⁺² with Ln ⁺³ at sites accessible to the extracellular bathing solution provided information about Ca ⁺² movement and the mechanisms by which pharmacological agents act to initiate contractile responses in these systems.	14 15 5
Muscle	In hypertonic solutions Ln ⁺³ enters cell. Such intracellular Ln ⁺³ blocks movement of Ca ⁺² across membrane of terminal cisterane and is responsible for electromechanical uncoupling of tension and action potential.	16
Cardiac muscle	Ln ⁺³ inhibited slow inward Ca ⁺² current with a concomitant decrease in contraction.	17
Sarcoplasmic reticulum of rabbit skeletal muscle	Ln ⁺³ (Gd ⁺³ , Yb ⁺³) were weakly competitive with Ca ⁺² for specific, high affinity, binding sites believed to be important in Ca ⁺² translocation.	18
Tumors	Ln ⁺³ increased the mitochondrial uptake of calcium, in contrast to nonmalignant cells.	19
Liver mitochondria	Ln ⁺³ binds to and inhibits the specific carrier system transporting Ca ⁺² inward, and is not transported itself.	20
Cardiac microsomes	Ln ⁺³ do not affect Ca ⁺² accumulation, exchange or the Ca ⁺² stimulated ATPase.	21
Bone proteins	Ln ⁺³ compete with Ca ⁺² for the glutamic acid and aspartic acid residues.	22
Core roots	La ⁺³ binds to cell walls and along plasma membranes up to the Casparian strip, and like Ca ⁺² , inhibits K ⁺ absorption; similar binding sites for La ⁺³ and Ca ⁺² are inferred.	23
Secretory systems	La ⁺³ alters Ca ⁺² dependent secretory action. For example, La ⁺³ stimulates the spontaneous release of histamine from mast cells, but is a potent inhibitor of the calcium-dependent component of antigen-stimulated histamine release.	23

Heavy Atom Isomorphous Replacement Studies:

The lanthanides are heavy metals and could be expected to be useful in electron microscopy and in X-ray studies. Since the Ln⁺³ ions do not penetrate biological membranes under normal conditions, they have been employed in the definition of extracellular channels in animals and the cell all continuum in plants. Gd⁺³ has been employed as the heavy atom in three

dimensional studies of egg white lysozyme, it bound at a single site between the two carboxylate residues of GLU 35 and ASP 52 which define the active site of this enzyme. Calcium is needed to stabilize the thermolysin structure but is not directly involved in its catalytic activity. Electron density difference maps at 2.3Å⁰ resolution between Ln⁺³ thermolysin and the native calcium form showed that the RE replaced Ca⁺² at three of the four sites²⁴.

Fluorescence Probe Studies:

Enhanced terbium luminescence has also been reported for two other proteins, parvalbumin and alkaline phosphatase. The work of Kayne and Cohen has shown the potential of both terbium and europium fluorescence enhancement studies for probing the structure of polynucleotides²⁵.

Difference Absorption Studies:

Circular dichroism (CD) spectra of the lanthanide ions would appear to be more sensitive to environmental ligand dependent parameters than ordinary absorption spectra. Relatively strong magnetic circular dichroism (MCD) spectra are known for Sm(III) complex solution²⁶.

Relaxation Enhancement Probe Studies:

Ajazzi et al.²⁷ employed the ratio method in broadening studies of the C₂ histidine resonance of staphylococcal nuclease. This enzyme required calcium to activate it and is known to have four histidine amino acid residues in its primary sequence. All four C₂ imidazole proton resonances are observed in the aromatic region of the protein spectrum.

Lanthanides as Blood Anticoagulants:

Lanthanides have long been known as blood anticoagulant and therapeutically applications of the rare earth compounds are still in vague. The relative stabilities of some of the lanthanide's and alkaline earth salts of the acid with a view to correlate the anticoagulant activities of the former with the clot promoting activities of the latter have also been reported by Heinrich²⁸.

The proton-ligand and metal-Ligand stability constants of 3-APH with the alkaline earth and rare earth metal ions under investigation have been studied for the nature of complex formation. Through the pH-titration technique of Bierrum-calvin as modified by Irving and Rossotti and a correlation of the stability constant values with the mode of action of these metal ions in blood coagulation, has been reported by Chaltopedyay²⁹. In physiologically active prothrombin molecule, ten carboxy groups are attached to one each of the carbon atoms of the ten glutamic acid residues situated towards the NH₂-terminal region of the molecule³⁰.

Lanthanides as Structure Probe:

The substitution of metal ions in biochemical macromolecules by others of similar chemical reactivity but possessing improved physical properties has proven to be a versatile research tool. Considerable structural information has been obtained by exchanging Manganese (II) for magnesium e.g. Cobalt (II) for Zinc and thallium (I) for potassium. Vallee and Williams in 1968 suggested the potential of rare earth cations as reported sites in biological systems requiring calcium³¹.

Somewhat earlier had reported the influence of the dipyrindine adduct of Eu(thd)₃ X₂ when (x, y) on the PMR spectrum of cholesterol in carbon tetrachloride. The subsequent exponential development of the principles, methodology and application of lanthanide diketonates as NMR shift reagents in organic chemistry has been extensively documented in recent reviews. This application of lanthanide ions as structural probes is possible because of favourable physico-chemical properties³².

FINDINGS

The lanthanide ions have no known inherent biological function, and only trace amounts are found in whole body analyses.

The lanthanides are heavy metals and could be expected to be useful in electron microscopy and in X-ray studies.

According to "Kayne and Cohen" has the potential of both terbium and europium fluorescence enhancement studies for probing the structure of polynucleotides

Lanthanides have long been known as blood anticoagulant and therapeutically applications of the rare earth compounds are still in vague.

It is known that calcium ion activate many of the blood clotting enzymes especially during prothrombin activation. It also takes part in the formation of crossed linked fibrin polymer as well as an accessory factor in many other stages of blood coagulation process.

DISCUSSION

Lanthanides considered as heavy metal series and they are also known as rare earth elements and naturally the biological functions of these are not very well known. They are present in very least amount

in biological fluids so their identification is still a challenging job for researchers. They are also serving as blood anticoagulants. The substitution of metal ions in biochemical macromolecules by others of similar chemical reactivity but possessing improved physical properties has proven to be a versatile research tool. In this present study authors have tried to search real cause of toxicity occurs due to lanthanides.

CONCLUSION

The Eu EDTA serves as an informative model for europium shift studies. Neiboer have reported the informative model studies for [Eu-EDTA] as model shift probes. The temperature dependence studies have reported the presence of two species in the system. Temperature dependence of the Li (La EDTA) spectrum reported by Neiboer indicated the presence of an unbound carboxylate group. At temperature $\leq 10^{\circ}\text{C}$ a sharp single splits out from the methylenic resonance (siglet) which does not broaden as the temperature is lowered, concomitantly the remaining methylenic peak, as well as the ethylene peak, became extremely broad at the lower temperatures although no additional resonance was reported. This line-broadening has been said to be an account of its consistency with the slowing down of both ethylene and methylenic ring flipping processes that do not require La- O band breakage. The conclusion of Kostromia et al., that EDTA in the Eu^{+3} low temperature species (likely the only species for La EDTA at normal temperatures) has a lower density has been finally confirmed³³.

Podolski *et al.*³⁴ have applied chemical shift studies to the primary sequence elucidation of simple peptides. Relaxation (Mn^{+2}) and shift studies (Eu^{+3}) of both ^1H and ^{31}P nuclei in bilayers prepared from equimolar quantities of the anionic phospholipid phosphatidylglycerol and the Zwitterion phosphatidylcholine, have provided further evidence for the chemical asymmetry of vesicles. Williams³⁵ suggested that the metal ions were also found to bind preferentially to the anionic phospholipid molecules. It was concluded that essentially all the phospholipid phosphorous was located at the outer surface of the high density lipoprotein particles obtained from human serum.

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An Autopsy Record Study of Rheumatic Heart Disease

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ABSTRACT

Rheumatic heart disease is becoming rare in recent years because of early detection and medical intervention and sudden deaths becomes still rarer. Twenty Sudden deaths have occurred in 20 years due to rheumatic heart disease in our study.

Keywords: Rheumatic, heart disease, sudden death.

INTRODUCTION

The incidence of acute rheumatic fever (ARF) began to decline in developed countries toward the end of the 19th century, and by the second half of the 20th century, ARF had become rare in most affluent populations. This decline is attributed to more hygienic and less crowded living conditions, better nutrition, and improved access to medical care and to a lesser extent, the advent of antibiotics in the 1950s. Here an attempt is made to study the deaths due to Rheumatic heart disease (RHD) in our institute.

MATERIAL AND METHOD

Hearts of all patients who had sudden death were subjected for histopathological examination for 20 years in our Institute from 1997 to 2016. All the hearts were dissected according to the line of blood flow; sections were stained with hemotoxyline and eosin. In a period of 20 years a total of 1511 hearts were studied in sudden death which were brought to our hospital and conducted medico legal autopsy. Age ranged from 20-80years more commonly affecting male populations.

Rheumatic heart disease were seen in 20 cases (1.32%)out of these maximum 9 cases were seen in 3rd decade, followed by 4 cases each in 5th and 2nd decade and 03 cases in 4th decade with male : female ratio of 2:1. Maximum cases were seen in 1997, 2006 and 2007(3each), followed by 2 cases each in 1998, 2000 and 2011, 1 case each in 2001, 2002, 2003, 2004 and 2005. One case showed tight mitral stenosis (fish mouth appearance) with atrial dilatation (fig-1). Histologically myocardium showed characteristic aschoff giant cells (fig-2).

DISCUSSION

Rheumatic fever is a multisystem autoimmune disease resulting from infection with a group A streptococcus. Episodes of ARF tend to recur in the same individual unless preventive measures are instituted, and each recurrence increases the chance of long term damage to the heart valves- rheumatic heart disease. Now uncommon in developed world, ARF and RHD remain a major public health problem in developing countries and in some poor, mainly indiginous populations in wealthy countries.

According to WHO, approximately 500,000 individuals acquire ARF each year, of whom 97% are in developing countries, where the incidence of ARF exceeds 50 per 100,000 children per year. Much higher rates of 80- 500 per 100,000 have been documented in careful studies in the indiginous populations of Australia and New Zealand¹. By contrast, the incidence of ARF

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in industrialized countries is less than 10 per 100,000 children^{1,2}. There have been several outbreaks of ARF in middle- class populations in the intermountain region of the United States since the mid 1980s, associated with mucoid strains of group A streptococcus, particularly of M type of 18³.

The peak incidence of ARF occurs in those aged 5 to 15 years, with a decline thereafter such that cases are rare in adults older than age 35 years¹. First attacks are rare in the very young: only 5% of first episodes arise in children younger than age 5 years, and the disease is almost unheard of in those younger than 2 years⁴. Recurrent attacks are most frequent in adolescence and young adulthood and are diagnosed infrequently after age 45 years

ARF is equally common in males and females, but RHD is more common in females. Whether this trend is a result of innate susceptibility, increased exposure to group A streptococcus because of greater involvement of women in child rearing, or reduced access to preventive medical care for females is unclear¹. No association with ethnic origin has been found. There is some evidence that between 3% and 6% of any population is susceptible to ARF⁵.

Epidemiologic and immunologic evidence clearly implicates group A- Beta-hemolytic streptococcus in the initiation of the disease in a susceptible host. Most patients with ARF have elevated titers of antistreptococcal antibodies. Outbreaks of ARF usually follow epidemics of streptococcal pharyngitis. Adequate treatment of streptococcal pharyngitis reduces the incidence of subsequent ARF, and appropriate antimicrobial prophylaxis prevents recurrences after initial attacks^{6,7}.

It has generally been considered that certain strains of group A streptococcus are more prone to result in ARF, and this 'rheumatogenicity' was thought to be a feature of strains belonging to certain M serotypes. More recent studies suggest that rheumatogenicity may not be serotype specific. The long- held opinion that only streptococcal pharyngitis, and not streptococcal skin infections such as impetigo, may be followed by ARF has been challenged⁸. Studies in populations where ARF is common find no definite association between group A streptococcal sequence type and site of infection or ability to cause disease^{9,10}. Thus the distinction

between rheumatogenic and non rheumatogenic strains, and between those trophic for the skin or throat, is considered by some to become blurred in areas where ARF is common, and multiple different group A streptococcal strains circulate within small populations¹. Host factors have been considered to be important ever since familial clustering was reported last century. Associations between disease and human leucocyte antigen (HLA) class II alleles have been identified, but the alleles associated with susceptibility or protection differ depending on the population investigated¹¹. High concentrations of circulating mannose binding lectin and polymorphisms of transforming growth factor-B₁ and immunoglobulin genes also are associated with ARF¹²⁻¹⁴.

The molecular mimicry theory holds that antibodies or cellular immune responses directed against group A streptococci cross react with epitopes on host tissue¹⁵. Streptococcal M protein and a carbohydrate streptococcal antigen (N- acetylglucosamine in group A carbohydrate) share epitopes with cardiac myosin and valve tissue. There is no myosin in cardiac valves, the main site of human cardiac damage, but it is known that laminin in valvular basement membrane is recognized by T cells against myosin and the M protein. Antibodies to valve tissue cross react with N-acetylglucosamine in group A carbohydrate¹. In an animal model, antibodies that caused chorea bound to both the carbohydrate antigen and mammalian lysogangloside

The exact mechanism of the initial insult is unclear. Subsequent damage appears to be caused by T -cell and macrophage infiltration, which persists for years after the initial event¹¹. The pathologic lesion of ARF is the Aschoff body, a granulomatous lesion containing T and B cells, macrophages, large mononuclear cells, multinuclear giant cells and polymorphonuclear leucocytes in the myocardium¹⁶.

CONCLUSION

The present study shows that the Rheumatic heart disease remains a major public health problem in developing countries because of low socio-economic status, mainly indigenous populations in wealthy countries. However there is reduction in number of cases. This decline is attributed to more hygienic and less crowded living conditions, better nutrition, and improved access to medical care and to a lesser extent, the advent of antibiotics.



Fig 1. Specimen of cut section heart of showing fish mouth appearance of mitral valve and fibrinoid necrosis in rheumatic heart disease.

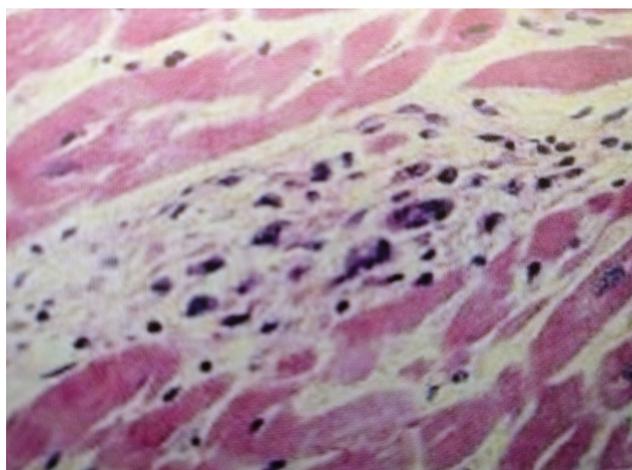


Fig-2: Histology of Rheumatic heart disease showing myocardium with characteristic aschoff giant cells.

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Conflict of Interest: None declared

Ethical Clearance: Not needed as we are presenting this study based on medico-legal autopsy.

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The Effect of Cold Stress on the Expression of Several Genes Associated with Cold Signal Transduction System Pathway in Cultivars of Canola (*Brassica napus*)

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ABSTRACT

The identification of genes that are involved in the adaptation and tolerance to cold stress especially the regulatory genes is essential. In this study the expression patterns of four cold induced-genes was investigated in two Zarfam (Resistant) and Sarigol (Susceptible) *Brssica napus* cultivars using real-time PCR technique. After RNA extraction and cDNA synthesis, expression of four genes, including, CBF17, Bn115, COR25 and NAC5-11 were studied in the seedling stage of Sarigol and Zarfam cultivars under controlled and cold stress (-4°C) condition for 0, 3, 6, 12 and 24 hours after cold treatments. The results indicated that in Zarfam the cold induced-genes generally had higher expression than Sarigol. Also, the CBF17 and NAC5-11 genes which considered as the genes induced at the early stages of plant response to cold, were highly expressed in the early hours of cold stress in the Zarfam (especially when treated for 6 hours) and then the expression levels of these genes gradually decreased, on the other hand the Bn115 and COR25 as genes involved in homeostasis process and improvement resistance to stress effects were induced after transcription factors. It is observed that the Bn115 and COR25 genes had the maximum expression in 24 hours after treatment under cold stress.

Keywords: Cold acclimation, Cold induced gene, cDNA, Real-Time PCR, RNA, Gene Expression, Transcription factors

INTRODUCTION

Cold acclimation leads to many physiological and biochemical changes in plants¹. Some experiments have been shown that changes in gene expression play an important role in increasing the plant's ability for resistance to environmental stress. Many genes including transcription factors in response to cold stress can be expressed². Research conducted in arabidopsis indicates that COR15a genes in interaction with other COR genes are used to increase resistance to cold stress³. In *Brassica napus* there is a gene that called BN115 and it is the homologous COR15a gene in arabidopsis. When CBF17 transcription factor connects to LTRE cis-element of the BN115 gene, gene expression will induce in response to the cold stress⁴. Savitch et al (2005) showed that the

induction of CBF17 transcription factor in transgenic *Brassica napus* plants makes 75% survival of plants at -8 and -12 °C⁵.

NAC transcription factors are another group of regulatory factors that are specific to plants. these group, are regulators that recently discovered and these are several roles. So that showed NAC transcription factors in response to drought, cold, wounds, shock and dehydration stress can be inducing⁶. NAC transcription factors are able in response to drought stress is regulated via both ABA-dependent and-independent regulatory pathway⁷, wherase shown that NAC transcription factor in response to cold and salt stress is regulate via ABA-dependent regulatory pathway⁸. In this study, the expression patterns of four cold induced-genes was investigated in two Zarfam(resistant) and Sarigol (sensitive) *Brssica napus* using Real time PCR technique. The analysis of gene expression patterns in response to stress and also evaluating their potential to

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acclimation to stress, will provide an effective strategy to improve the stress tolerance in crops.

MATERIAL AND METHOD

Plant varieties and growing conditions: Two *Brassica napus* cultivars namely Zarfam(resistant) and Sarigol (susceptible) *Brssica napus* were selected which they are non-transgenic and have been identified as spring(Sarigol) and winter(Zarfam) cuitivars⁹. The required seeds varieties were prepared from Seed and Plant Improvement Institute (Karaj, IR-IRAN) and were planted in some pots in a greenhouse under standard conditions. The seedling were maintained in a daylong of 16 hours , at temperature of 23 ° C and humidity of 80%.

Seedlings transferred to the incubator for cold treatment: In order to acclimation to cold, the 3 to 4 leaf stage seedlings were transferred to the incubator at 4°C. After 2 weeks the cold acclimated plants were transferred to the growth chamber at -4°C. The sampling was done for both cultivars under controlled and cold stress (-4°C) conditions after 0, 3, 6, 12 and 24 hours of cold treatment. The leaf samples were immediately freeze in liquid nitrogen and then kept in -80°C freezer.

Primer Designing

Primer were designed from the conserved nucleotide segments of Brassica relatives. Firstly, cold resistance genes were identified from NCBI database(www.ncbi.nlm.nih.gov). These data were aligned with Clastal W (www.ebi.ac.uk/t/Tools/msa/Clastalw2) , finally, primers were designed from conserved residues using Primer3Plus online tool (www.primer3plus.com).

RNA extraction, cDNA synthesis and Real-time PCR conditions: RNA extraction was performed according to the protocols TM RNX-plus kit (CINAGENE). The DNase I treatment was applied to remove residual DNA. The cDNA synthesis was performed according to Fermentas kit instructions.

RESULTS

Phenotypic differences: To conferment higher cold tolerance in Brassica napus cultivars, 18- days old seedling grown at 23°C were transferred to cold condition and exposed to 4° C for 2 weeks, and then transferred to -4°C..The cold treatment of Sarigol seedling (sensitive cultivar) at -4 ° C caused dehydration and plants

lodging in the 6th hours after cold treatment which continued to 24th hours after cold treatment compared to normal growth conditions (23°C) . While There was not a significant difference in plants lodging and wilting in Zarfam cultivar. Although, a little wilting symptom was observed after 24 hours in zarfam cultivars. The phenotypic changes in two cultivars under stress and control conditions confirmed the tolerance of Zarfam and susceptibility of Sarigol to cold stress.

Expression pattern of CBF17 and NAC5-11 transcription factors: CBF17 genes encode proteins with a molecular weight of 28 KDa that is considered largest protein among members of the CBF genes from Brassica napus [4].The CBF17 gene expression was measured under cold treatment (-4°C) using Real time PCR technique. In the early hours of freezing treatment (especially at 3th hours after stress), The CBF17 gene showed a high expression in the Sarigol cultivar, but after this period of time its expression pattern gradually declined to the lowest level. On the other hand, in Zarfam cultivar, the CBF17 gene had a slower expression level than Sarigol at the early hours of treatment, but its expression gradually increased so that it had the highest level of expression after 6 hours of cold treatment, however after this time the expression level was reduced again.

The NAC genes, a large generic family, are from transcription factors and they are considered a unique group among the plants¹⁰.It has been determined in the study of tree plants that BnNAC5-11 belongs to AFTA sub-category¹¹. The expression pattern of BnNAC5-11 in Zarfam and Sarigol cultivars showed that its expression level in the Zarfam cultivar was higher than the Sarigol. The high expression level of this gene in the 0 hours of treatment demonstrates that the processing of BnNAC5-11 activation in the Zarfam cultivar (resistant) has begun in the time of plant adaptation to the cold stress, while in the sensitive cultivar of Sarigol the process occurred in the lower rate, hence its expression in the time of applying the cold treatment was 28 times lower than the Zarfam cultivar. The rate of gene expression in the Zarfam cultivar at the 3th hour after treatment has been slightly reduced compared to time of zero, and then increased after 6th hours so that it reached to its maximum amount at this time, after that its expression level gradually decreased to the lowest level at 24th hour. However, in Sarigol cuitivar, although the gene expression level was very lower than zarfam

cultivar, but the highest rate of gene expression happened in the 6th hour after the cold stress treatment. Additionally, the major difference between these two genotypes was due to the rate of BnNAC5-11 expression at 12th hour after cold treatment, in which the gene expression in Zarfam was 40 times higher than Sarigol.

The expression pattern of the main respondent genes to cold stress, BN115 (ortholog of COR15A gene in Arabidopsis) and COR25 .

One of the respondent genes to cold stress in canola is known as BN115, which is considered as an ortholog from COR15A gene in Arabidopsis. The encoded protein by these genes can cause resistance to freezing stress¹². The expression pattern of Bn115 in the present study showed that its expression level in the Zarfam (Resistant cultivar) was more than the Sarigol. In a way that Zarfam cultivar in the early hours of stress, had a high expression level of BN115 gene, but from 6 to 12th hours after cold stress treatment a decreased expression was observed and then its expression level was increased, and finally culminated at 24th hour after cold treatment. Even though gene expression pattern in Sarigol cultivar was lower than Zarfam, but in the early hours after the cold stress from zero to 6 hours had a rising rate but from 6 to 24th hours after the cold treatment, showed low levels of expression. And the rising rate of gene expression in the early hours in the sensitive cultivar of sarigol can have the cause like exposing the plant to the cold stress consequently, a quick temporary increase in the level of calcium will happen being the requirement for adaptation of the plant to cold and thus induce of the cold response genes. The major difference between these two genotypes regarding the rate of gene expression was observed at 24th hours after cold treatment which the level of gene expression in the Zarfam was approximately 4/5 times higher than Sarigol.

BnCOR25, encoding a 25KDa protein in *Brassica napus* and there was not a document suggesting the presence of any 25KDa protein in Arabidopsis so far, and this gene may be raised as a new respondent gene toward cold stress in canola plant¹³. The overexpression of this gene in yeast and Arabidopsis causes the increase of resistance toward cold treatment and freezing stress¹³. In the early hours of cold stress, the level of the obtained gene expression in the Zarfam cultivar in comparison to the other investigated genes was low, but from 6th to 12th

hours gradually rised and finally at 24 hours after cold treatment was reached to its highest level. Therefore, it seems that this gene can be a cause for the adaptation of plant to cold stress in Zarfam cultivar in the last hours of treatment. In the sarigol sensitive cultivar, the expression pattern of BnCOR25 in the early hours of the cold stress were relatively high and after 6th hours of cold treatment it had the highest expression level. but after that time, the level of gene expression decreased, and finally in the 24th hour of cold treatment, the gene expression in the Sarigol was approximately 3 times less than the Zarfam resistant cultivar.

DISCUSSION

The results of previous experiments have shown that expression pattern of the BnCBF17 gene in the two cultivars of spring canola (westar) and the fall one (cascade) were similar to each other and the expression pattern of gene in the early hours of treatment were more than 12, 24 and 48 hours after cold stress⁴. Northern blot analyzes indicates that the over expression of the BnCBF17 and BnCBF5 genes in the spring cultivar of canola like westar cultivar intensified the resistance to freezing stress in these cultivars to the winter cultivars that have been exposed to cold adaptation, also, it was demonstrated that BnCBF17 compared to BnCBF5 caused a higher induction of COR genes (Bn115, Bn28, Bn47) in canola plant and subsequently resistance to freezing⁵. The result of present study confirmed the result of previous one about the role of BnCBF17 transcription factor in the regulation of gene expression in cold tolerance varieties. Dwayne and et al (2003) showed that six groups of the NAC transcription factors (NAC5-1, NAC5-7, NAC5-8, NAC5-11, NAC1-1, NAC14) were induced under the different treatments of the biological and non-biological treatments, among which NAC5-8 and NAC5-11 were induced in the low temperature, also it was reported that the gene NAC5-11 had a high induction in response to the low temperature and dehydration¹². Veena and et al (2001) showed that Bn115 had the highest rate of gene induction after 24 and 48 hours cold treatment at 4° C¹². Liang and et al (2011) in the study of BnCOR25 expression pattern in different of Canola (Zongyou 821 variety) at 4° C using real-time PCR identified that the expression of this gene in hypocotyl, cotyledon, stem and flower was high, while root and leaf showed lower amount of its expression. The results of our study revealed that NAC5-11 and CBF17 transcription factors could be considered as

genes that express in the early stages of canola plants exposed to cold stress, The Zarfam cultivar showed high expression of the NAC5-11 and CBF17 in the early hours of cold treatments (especially at 6th hour), and then their expression level was reduced. While, the Bn115 and BnCOR25 which are known as the gene involving in the process of homeostasis and improved resistance to stress effect, had a later induction than two TFs, and the highest amount of their expression was observed 24 hours after cold treatment. It has been shown that the influx of transient Ca²⁺ into the cell cytoplasm could be induced by cold, drought and salinity¹⁴. The presence of Ca²⁺ which could rapidly increase this influx of transient Ca²⁺ in cytoplasm, could be a reason for the rapid response of plant to cold stress. The CBF2 promoter has seven conserved DNA motifs¹⁵. One of these conserved motifs contains an element which is a binding site for Calmodulin binding transcription activators (CAMTAS) in Arabidopsis¹⁶. However, plants use different strategies against environmental stresses, so the identification of genes associated with the stress and analysis of their expression pattern will help us to improve crops tolerant to stresses using genetic engineering.

Ethical approval: Related departments should be assured about the confidentiality of the results of questionnaires.

Conflict of Interest: The authors report no conflict of interest.

Source of Funding: Self

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A Study of Organophosphorus Poisoning in Rural Area of Mandya District in Karnataka

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ABSTRACT

Background : Poisoning as a mode of suicidal death is known from antiquity. Poisoning among all age groups and both sexes is seen every where and the incidence of poisoning with reference to insecticides, pesticides and rodenticides has become more common than others in the modern times because of their easy availability, low cost, efficacy of action and rapid death. **Material and Method:** This study was done at Adichunchanagiri Institute of Medical Sciences , B G Nagar in the year 2014. All the cases of OP poisoning reported to emergency department and even the cases which were brought for autopsy following the death by poisoning was also included in the study.

During the study period total of 158 cases of organophosphorus poisoning were reported emergency department. **Results:** Majority of the cases were in the age group 20-29yr (37.8%) followed by the age group <20yrs (23.6%). Out of 127 cases 77(60.6%) were males and 50(39.4%) were females. Out of 127 cases 15 cases ended up in autopsy .Out 127 cases 81 (63.8%) were married and 46(36.2%) were unmarried. **Conclusion:.** Enforcement of laws restricting the availability and use of harmful pesticides may help in reducing such events in future. Proper health education, Interventions should be given for the population regarding the consequences which will be impacted on the family and helping them mentally to face the situation through counseling.

Keywords: OP Poison, Autopsy, Agriculture.

INTRODUCTION

Acute poisoning by Organophosphorous pesticides (OP) has reached epidemic proportions in most parts of the world, particularly in developing countries like India, where agriculture is the backbone. ¹

The toxicity of Organophosphorous poisons and paucity of appropriate medical facilities accounts for a high fatality rate. Their ease of access and socio-cultural factors play important role in choice of OP as a self-poison and the incidence is higher among young

economically active group with a common fatality ratio of 20%. In India, OP compounds cause more self-poisoning deaths in southern and central India.

Poisoning as a mode of suicidal death is known from antiquity. Poisoning among all age groups and both sexes is seen every where and the incidence of poisoning with reference to insecticides, pesticides and rodenticides has become more common. Occupational, suicidal or homicidal exposure to OPs produces a characteristic, but treatable syndrome in humans. Thus, early recognition and timely intervention of toxicity from these compounds are of great importance, to critical care providers and patients.²

The WHO estimates the number of acute pesticide poisoning at 3 million cases per year and mortality of 300000 deaths per year. 99% of cases occur in the developing world. Acute organophosphorus compound

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poisoning is a common cause of acute poisoning, in India, with high mortality. The probable causes of high mortality are high toxicity of locally available poisons, difficulty in transporting patients, paucity of health care workers, lack of training facilities and non availability of antidotes.³

The organophosphate compounds are most commonly associated with serious human toxicity, accounting for more than 80% of pesticide-related hospitalizations. Organophosphates act by irreversibly inhibiting the enzyme cholinesterase, resulting in accumulation of acetylcholine at synapses and myoneural junctions leading to cholinergic over activity.⁴

Hence with this scenario with advent use of pesticides in agriculture activities and wasyavialablity of it in the household, more cases of OP poisoning are been reported at the Adichunchanagiri Institute of Medical Sciences , B G Nagar, so this study was under taken .

MATERIALS AND METHOD

This study was done at Adichunchanagiri Institute of Medical Sciences , B G Nagar in the year 2014. All the cases of OP poisoning reported to emergency department and even the cases which were brought for autopsy following the death by poisoning was also included in the study.

During the study period total of 158 cases of organophosphoruspoisoning were reported to emergency department . The detailed approach has been based on questionnaire concerning age, occupation, marital status, brief history of case, history of ingestion of poisoning and manner of death .

Out of the 158 cases , 31 cases information could not be collected as they were refereed for higher centre for further treatment . Of the remaining 127 cases information was collected and poison consumed was also collected and sent for chemical analysis.

RESULTS AND DISCUSSION

In India organ phosphorous poisoning is most common among the rural area especially in the agriculture sector as it is commonly used as a insecticide and pesticide for the crops grown and easy availability in the home.

TABLE 1:- Distribution of cases according to age and sex

AGE	MALE	FEMLAE	TOTAL
<20years	16	14	30(23.6%)
20-29years	28	20	48(37.8%)
30-39years	17	9	26(20.5%)
40-49years	11	7	18(14.2%)
50-59years	4	0	4(3.1%)
60 and above	1	0	1(0.78%)
TOTAL	77(60.6%)	50(39.4%)	127

Majority of the cases were in the age group 20-29yr (37.8%) followed by the age group <20yrs (23.6%). Out of 127 cases 77(60.6%) were males and 50(39.4%) were females.

Majority 81.8% of the cases were below the age of 40years

With any type of domestic fights as a matter of fact to die or to create sense of fear among the family memebtrs people tend to consume it .Though the intension might not to commit suicide but few cases end up with death..

Out of 127 cases 15 cases ended up in autopsy .The autopsy rate of op poisoning was 11.8% in our study which was similar to findings of the Guptha S K⁵ et al ,PKTiwari⁶and K S N Reddy.⁷

The number of male victims was more in our study than female victims which is again due to fear of crop loss and debt made by the person for the various reasons. The female victims consumption was mainly due to fights with husband and other households . P K Tiwari⁶, Guptha SK⁵ also accounted for the more male victims than females.

TABLE 2: - Distribution of cases according to marital status

MARTIAL STATUS	MALE	FEMALE	TOTAL
MARRIED	49	32	81(63.8%)
UNMARRIED	28	18	46(36.2%)
TOTAL	77	50	127(100%)

Out 127 cases 81 (63.8%) were married and 46(36.2%) were unmarried.

Out of 77 males 49(63.63%) were married and 28 (36.37%) were unmarried. Among total of 50 females, 32(64%) were married and 18 (36%) were unmarried. Out 127 cases 81 (63.8%) were married and 46(36.2%) were unmarried.

Similar results where married had higher percentage of consumption of poison was seen in Dr. P.K. Tiwari⁶ & K.S.N. Reddy⁷ studies.

TABLE- 3 : Distribution of cases according to occupation

OCCUPATION	FREQUENCY	PERCENTAGE
Labour	43	33.85
Agriculturist	28	22.04
Housewife	27	21.25
Student	21	16.53
Others	8	6.2

Majority of the cases were Labour 33.85% followed by Agriculturist 22.04%.

TABLE 4:- Frequency of organophosphorous compound poisoning

NAME OF POISON CONSUMED	FREQUENCY	PERCENTAGES
Methyl Parathion	38	29.9
Monocrotophos	44	34.65
Phenathrothionone	5	3.9
Phorate	7	5.5
Quinolphos	20	15.75
Diamethoate	8	6.3
Dichlorphos	2	1.5
Parathion	3	2.3

The table shows the frequency of Organophosphorus compound poison consumed. Among the eight categorized organophosphates cases are of 34.65% monocrotophos and Dichlorphos holds the least proportion of 1.5%. Next to monocrotophos, methyl parathion and quinolphos contribute about 29.9% and 15.75% respectively.

CONCLUSION AND RECOMENDATION

The present study revealed that the majority of population were male and in the younger (20-40yrs) age group. Poisoning with Poisoning with suicidal

intent was more common than accidental. Agriculture workers and laborers are high risk groups and may be associated with the fact that they have easy access to the poison.

Proper health education, Interventions should be given for the population regarding the consequences which will be impacted on the family and helping them mentally to face the situation through counseling. All victims who had previous history of poison consumption should be properly counseled and encouraged to lead a normal life. Educating the village people and common population regarding the first aid measures to be done at the site following the ingestion of pison can act as a life saving measure to many people. Enforcement of laws restricting the availability and use of harmful pesticides may help in reducing such events in future.

Ethical Clearance: Taken from ethical committee

Source of Funding: Self

Conflict of Interest: Nil

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Toxic and Chemical Substances and Associated Legislations

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ABSTRACT

Toxicology is the branch of science which deals the study of poisonous substances such as as a drug, an insecticide, a pesticide or any chemical substance and relevant laws regarding their procurement, sale and manufacture. Poison may be defined as any substance may be solid, liquid or gases, administered in the human or animal whatsoever way may be ocular, injection or ingestion produced ill health disease or death. Forensic toxicology is mainly concern with legal aspects of medical practices in the solution of crime which helps in the administration of justice. Environmental toxicology is new added in the field of toxicology. There are certain laws and regulation for the toxic dose, environmental exposure, and therapeutic dose etc. in this article author has mainly about the description about the toxicity of toxic and chemical substance, their effects of human and important legislations associated with such types of substances.

Keywords: Toxic, Chemical, Acts, Toxicology TSCA, TCSCI etc.

INTRODUCTION

Toxicology is the science which deals with toxicity (i.e.) of substances such as a drug, an insecticide, a pesticide or any chemical substance and relevant laws regarding their procurement, sale and manufacture¹. Forensic Toxicology deals with their diagnosis and treatment poisoning as well as their medico-legal aspects^{2,3}. Legally, poison is a high probability of the toxic effects produced by a substance⁴. Pharmacologically, a poisonous substance has a low therapeutic index. This is defined taking into consideration the dose with regard to a particular substance⁵. Drugs are substances used for the treatment of diseases, which produce a beneficial effect with minimum bad effects⁶.

MATERIAL AND METHOD

The present manuscript is prepared from the data gathered from the secondary data sources such as

e-journals, e-books, text books and from other relevant researches. Key search criteria were toxicity, Drugs, Toxic and chemical substances, different laws concern with toxicity due to chemical and toxic substances and signs and symptoms associated with drug.

Toxic Substances Control Act (TSCA):

The Toxic Substances Control Act (TSCA) it is the law of United States and has been passed by Congress of the United States in the year 1976 and since then the administrating power is managing by the United States Environmental Protection Agency (USEPA) to regulate the introduction of any new or already existing chemicals. The main aim of this act is to regulating commerce and protects Human health and the Environment by requiring testing and necessary use limitations on convinced chemical substances, and for the other purposes⁷. There are three main key role objectives of this Act; first to assess and regulate new commercial chemicals before they enter the market, secondly to regulate chemicals already existing in 1976 that posed an “unreasonable risk to health or to the environment”, as for example PCB’s, lead, mercury and radon, and third last but not least to regulate these chemicals’ distribution and use⁸.

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Toxic Chemical Substance Control Inventory (TCSCI):

Toxic Chemical Substance Control Inventory is defined under Section 8 (b) of the Toxic Substances Control Act 1979 according to this act inventory means to compile, keep current and publish a list of each chemical substance that is manufactured or processed, including imports, in the United States for uses under TSCA and which plays a central role in the regulation of most industrial chemicals in the United States. Initially this Inventory was published in 1979, and a second version was published in the year 1982 with the listing of about 62,000 chemical substances, and today this inventory is updated with more than 85,000 chemical substances.

TSCA definition of chemical substance:

According to Toxic Substance Control Acts, chemical substance may be defined as “any organic or inorganic substance of a exacting molecular identity, including any mixture of these substances occurring in entire or in fraction as a result of a chemical reaction or occurring in nature, and any element or un combined radical. They are mainly organics, Inorganic, polymers, Pesticides, Foods and food additives, Drugs, Cosmetics, Tobacco and tobacco products, nuclear materials, or Munitions etc.

Exposure of Toxic and Chemical Substances among Susceptible Populations

A group of Environmental fairness can engage the community to crash local state and federal policy and Toxic Substance Control Act regulation can protect public health by “limiting the market for hazardous chemicals and promote safe chemical production³ .

The infants, pregnant women, the elderly and certain occupational workers cover a higher risk to diseases from exposure to toxic and chemical substances. The exposure may impair their weak immune system, and cause heart disease among other health issues from interactions with medication. Children are more susceptible towards the health impacts of environmental injustice as their immune system is immature and they cannot handle the amount of chemicals in relation to the size of their body.^{9, 10}

Children’s exposure to toxic chemicals:

Exposure of Toxic and Chemical substances in

Children can be contributing paediatric diseases. The main health problems associated with environmental chemical pollutants are asthma, lead poisoning (i.e. colic, pica) and obesity¹¹. Toxic chemicals “threaten the health of the developing fetus, babies, young children and teens¹². It is important to protect children from chemical exposures as they “are less able than adults to break down and excrete toxic compounds¹³.

Pregnant women’s exposure to chemicals:

Pregnant women exposure to toxic chemicals in daily basis “can impact the reproductive and developmental health” during critical windows of development, this may lead to a higher risk for birth defects and childhood illnesses and “disability across the entire span of human life¹⁴. Health professionals can provide information to women planning to become pregnant or already pregnant to avoid potential hazards and exposure to environmental toxic chemicals. Eating healthy food can reduce the impact of toxic chemicals, for instance consuming organic food. Mothers who are breastfeeding can expose their child to toxic chemicals in their milk. When the diet of children is modified from “conventional to organic food, the levels of pesticides in their bodies decline,” but low-income families have to prioritize their needs and buying organic food may not be possible because of a budget constraint^{15, 16}.

Occupational workers’ exposure to toxic chemicals

According to the Occupational Safety & Health Administration (OSHA) workers have the right to a safe workplace that do not pose a risk of serious harm. Occupational exposure to chemicals can happen through direct skin contact, inhalation, ingestion or eye contact. People working under certain occupations are more exposed to toxic chemicals that can have a negative long time effect in their health. If the rate of exposure exceeds the capacity of the body to detoxify and eliminate them, it can accumulate in the body and potentially harm it. Male and female fertility can be compromised from exposure to toxic chemicals^{17, 18}. For example, farm workers including a large number of seasonal migrant workers are exposed to variety of occupational risks and hazards. Communities near agricultural farms may be at higher risk for exposure to pesticides. Farm workers are exposed to pesticide-related illness from the use of chemicals that can have

delayed health effect such as cancer and reproductive dysfunction. Among the chemicals farmers get exposed, Dibromochloropropane (DBCP), a soil fumigant used to control nematodes can lead to “testicular toxicity and human reproductive dysfunction¹⁹. Other health problems from their exposure to chemicals include “acute systemic poisoning, nausea, dermatitis, fatigue and abnormalities in liver and kidney function”, farmers and their family are exposed to toxic chemicals when the farm worker leaves the field and has contact with family members wearing contaminated clothes²⁰.

Corporate sustainability for improvement of Toxic /chemical exposure

Corporations can show social responsibility by removing products from the market and introducing similar alternatives that can benefit susceptible groups and it can innovate and improve their image by responding to the increasing demand of green chemicals by consumers seeking better options to reduce their exposure to toxic chemicals^{21, 22}. Corporate Social Responsibility (CSR) is the ethical obligation of the firm “to create success in ways that honours ethical ideals and respect to communities while promoting sustainability and a good reputation²³.

Common Causes of Toxicity^{2, 24}:

An overdose: of a self-administered substance for committing suicide.

Incomplete or wrong information about any substance.

Accidental: Any substance exposed to children casually and unintentionally but consumed by children by mistake.

Sudden release: of toxic gases or chemicals e.g., Methylisocyanide (MIC) leakage in the Union Carbide Plant in Bhopal in 1984.

Any substance which may be beneficial to the mother for treating a certain disease but may adversely affect the foetus or the infants.

Role of Medical Practitioner^{2, 24}:

To identify the substance which caused toxicity?

To initiate proper and immediate measures to save the patient.

To establish the possibility of a suicide or homicide.

To establish the element of negligence on the part of the treating physician (e.g., overdose during therapy).

Law Relating to Toxic and Chemical Substances:

Various Acts have been enacted from time to time to deal with criminal offences, including the administration of toxic substances, stupefaction or intoxication of any drug/substance (irrespective of the quantity and quality) which is likely to endanger the human life.

A. The Poison Act (1919): This Act prohibit (except under & Accordance with the condition of a licence) the import, possession for sale, and sale (wholesale or retail) of any specified poison²⁵.

B. The Narcotic Drugs & Psychotropic Substances Act (1985)²⁶:

A **narcotic drug** is one that induces sleep, such as cocoa leaf, cannabis (hemp), opium, poppy straw and their derivatives.

A **psychotropic substance** is any substance, natural or synthetic, which affects the psychic function of the mind or behaviour.

Any person in the possession of any narcotic drug or psychotropic substance in *small quantity*; (whether for personal consumption or sale) shall be punishable with the imprisonment for a term which may be extended to one year or fine or both.

Small quantity means such quantity as may be specified by the **GOI**²⁷:

5 gm for opium and hashish;

250 mg for heroin smack and brown sugar;

25 gm for opium alone; **and**

500 gm for ganja

C. The Drug Act (1940)²⁸:

This Act regulates the import, manufacture, distribution and sale of drugs, e.g.,

All patent or proprietary medicines, unless displayed in the label, to give the details of their ingredients.

Vaccines, sera toxins, toxoids, antitoxins, antigens.

Vitamins and hormones.

Drugs meant for the internal and external use of human beings or animals.

Drugs intended to be used for destruction of insects which cause diseases in human beings or animals (**Drug Amendment Act 1955**).

D. The Drug & Cosmetic Act (1940)²⁸:

This Act was amended to include cosmetics under its purview. **Cosmetic** means any article intended to be rubbed, poured, sprinkled or sprayed on to the human body for cleaning, beautifying, promoting attractiveness or altering appearance.

Note: Schedule 'H' to the Rules contains a list of poisons and Schedule 'L' contains a list of antibiotics, antihistaminic and chemotherapeutic agents. These substances should be labelled with the words- **SCHEDULE DRUG Warning:** to be sold by retail on the prescription of a Registered Medical Practitioner only.

E. The Pharmacy Act (1948)²⁹:

Under this Act,

No person other than a registered pharmacist shall compound, prepare or dispense any medicine on the prescription of a medical practitioner.

Whoever violates the law shall be punishable with simple imprisonment which may extend to six months or fine or with both.

F. The Drugs & Magic Remedies (Objectionable Advertisement) Act (1954)³⁰:

It regulates the advertisement of drugs by the manufacturers so that consumers may not be misled by the manufacturers making false claims of the miracle cure of incurable disease

Indecent advertisements are also banned under this act.

FINDINGS

The findings of present study are incorporated here under:

The Toxic Substances Control Act (TSCA) is the law of United States and has been passed by Congress

of the United States in the year 1976 and since then the administering power is managed by the United States Environmental Protection Agency (USEPA) to regulate the introduction of any new or already existing chemicals.

The main aim of this act is to regulate commerce and protect Human health and the Environment by requiring testing and necessary use limitations on convicted chemical substances, and for the other purposes.

There are three main key role objectives of this Act; first to assess and regulate new commercial chemicals before they enter the market, secondly to regulate chemicals already existing in 1976 that posed an "unreasonable risk to health or to the environment", as for example PCB's, lead, mercury and radon, and third last but not least to regulate these chemicals' distribution and use.

Toxic Chemical Substance Control Inventory is defined under Section 8 (b) of the Toxic Substances Control Act 1979. Initially this Inventory was published in 1979, and a second version was published in the year 1982 with the listing of about 62,000 chemical substances, and today this inventory is updated with more than 85,000 chemical substances.

Legislations associated with Toxic and Chemical Substances are needed to amend from time to time for better management among the populations concern.

Health conscious concern campaign should be organized periodical routine to aware from harmful effects caused by these substances

CONCLUSION

The Toxic Substances Control Act (TSCA) is one of the important governing laws of the United States passed in the year 1976 since then the administering power is managed by the United States Environmental Protection Agency (USEPA) to regulate the introduction of any new or already existing chemicals. The motive of this act is to regulate the commerce and protect human health by testing and fixing the hazardous toxic and chemical substances. Legislations associated with Toxic and Chemical Substances are needed to amend from time to time for better management among the populations concern. Health conscious concern campaign should

be organized periodical routine to aware from harmful effects caused by these substances. Not only these steps there is need to literate each and every citizen of the country about the nature and toxic properties which are mainly responsible to cause harm.

Conflict of Interest: NIL

Source of Funding Agency: Self

Ethical Clearance: Not Required

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A Comprehensive Analytical Study of Railway Fatalities in Twin Cities of Hyderabad and Secunderabad

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ABSTRACT

In our country the railways have become a chief mode of transportation system due to easy access to common man. British introduced this system with the idea to improve their trade and sustain their rule in India, during post independent urbanisation in our country the Railway lines which were laid away from the dwelling places were encroached upon by people for housing and industrial purposes. As most of the Railway network in metropolis pass through the residential and commercial zones, an ever increasing tendency of human casualty from railway accidents are reported.

The present study on railway fatalities is about taking into consideration the nature of death, whether accidental, homicidal or suicidal and the type of fatality resulting in death of the person.

Keywords: railways, urbanization, fatality.

INTRODUCTION

The increase in urbanization and industrialization with emerging present day concept of globalization, there is ever increasing tendency to decrease the distance between various places. To address the distance problem the emphasis is made more on communication and transportation system. The transportation system is available in the form of Air/Rail/Road/Sea.

In our country the Railways have become a chief mode of transportation system for long distance travel unlike the western countries, and due to easy access to common man.

The Britishers had introduced this system with an idea to move their troops faster and transport goods, with a view to improve their trade and sustain their rule in India. Fortunately it proved out to be a great boon for India's all round development in post-independence era.

The injuries and deaths due to accidents are unavoidable in the modern way of living. The accidental deaths are mostly due to the road traffic accidents but the deaths due to railway fatalities are also not negligible, especially in the areas where railway traffic is higher.

A train accident is defined as a "collision, derailment, or any other event involving the operation of on-track equipments."¹

Owing to urbanization in our country, the railway lines which were laid away from dwelling places were encroached upon by people for housing and industrial purposes. The present day concept is mass rapid transport system in the form of sub-urban railway network.

As most of the railway network in metropolis pass through the residential and commercial zones, an ever increasing tendency of human causality from railway accidents are reported².

Train accidents can cause devastating damages and personal injuries including the death of the person. Trains are frequently involved in accidents that critically injured passengers and innocent bystanders. These accidents are indeed disastrous and catastrophic due to the speed that trains travel². Indeed, a train accident can definitely result in loss of one's life or his or her property as well. One of the worrying development in recent years is malicious damage caused to trains by placing objects on tracks which usually causes derailment³. There is an unfortunate accident of the school bus carrying 26

children was hit by a train when the bus driver tried to cross the railway tracks to avail a shortcut and didn't notice the oncoming train or hear the train siren as he was listening to movie songs wearing headphones.

The incidence of fatalities is on increase year after year almost all over the world and the same is the case with twin cities of Hyderabad and Secunderabad. The fatalities can occur mainly at the line when the mix of human and vehicular factors reach at a critical hazardous point at particular movement conducive with environmental factors. An omission of a single minor factor may result in causing fatal accidents. The principles of epidemiological investigation apply to the concepts of prevention with consideration of Person, Place and Time.

As per the sensex 2011, the population of Hyderabad and Secunderabad combined together is 7,106,102. People in urban area were 64.36 % and in rural area were 35.64 % respectively, these areas are connected very well by the railway network, has rapid growth in educational establishments, roads, buildings, business, energy infrastructure, industrialization and population.

Secunderabad railway station is having the heavy burden of transportation of the passengers and goods as well; therefore the incidences of railway fatalities and mishaps are also higher at this junction. Most of the reported cases of railway deaths were either directly hit by the train or recovered in the vicinity of the railway track.

It falls upon the investigating officer to determine if the death was due to accident or otherwise. It is at such adversity the role of forensic pathologist is doubled up apart from aiding in establishment of identity of the victim, time since death, nature and number of injuries.

During 2014 to 2016 the incidence of railway fatalities has reached a crescendo of 526 for which autopsies were conducted in the Gandhi Hospital mortuary

The present study is a retrospective analysis of 100 cases brought to Gandhi Hospital mortuary. This aspect of medico legal investigation accommodating the principle of epidemiology plays an important role in the analysis of reconstruction and adjudication of many railway deaths.

MATERIAL AND METHOD

The cases which were selected for this study are those brought by railway police for post-mortem examination to Gandhi hospital mortuary, Secunderabad from 1st of November 2014 to 31st of October 2016. The total number of cases that received as a consequence of railway accidents was 480 in the above mentioned period.

The preliminary data was collected from the inquest reports, history revealed from relatives, friends, etc. of the deceased where the identity was established and hospital case-sheets (in cases which were admitted in the hospital). A detailed history has been collected about the victim of railway injuries wherever possible to know whether the victim was getting into a moving train or was crossing the track or walking along the track itself etc. and also gathered information whether the deceased had any hearing or sight defect and whether he was on an alcoholic or drug addict. His socio-economic status also has been taken into account. A detailed history has been collected regarding the time and place of fatal occurrence.

RESULTS AND OBSERVATION

During the study period from 1/11/2014 to 1/10/2016 the total number of autopsies conducted at the mortuary of Gandhi hospital, Secunderabad, were 10183, out of which 816 cases were due to railway fatalities. The given table shows an increase of 1.292 %, which indicates the raising tendency of railway fatalities in accordance with the increasing urbanization.

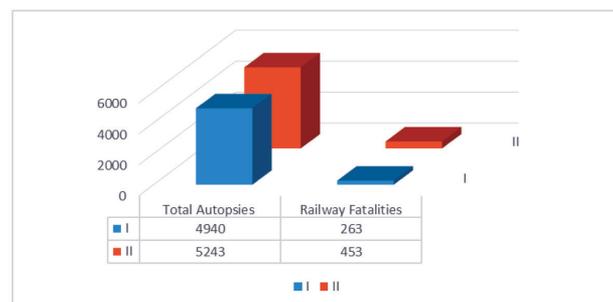


FIGURE 1: Railway fatalities in Gandhi Mortuary (2014 – 2016)

Maximum number of fatalities were seen in fourth decade of life followed by third and then second decades. The age groups with least percentage of deaths were in their sixth and seventh decades.

From the study, it is evident that males outnumbered females with a ratio of 1 : 7, this reflects vulnerability of males to railway fatalities and that the unknown cases contributed to 29% of the total case study, probably owing to the massive disfigurement of the faces in railway accidents⁴.

TABLE 1: RAILWAY FATALITIES ACCORDING TO AGE

AGE GROUP	CASES
0 – 10	01
10 – 20	19
20 – 30	22
30 – 40	37
40 – 50	11
50 – 60	05
60 – 70	04
70 – 80	01
80 – 90	00
	100

Most of the railway fatalities occurred between 6 am to 12 pm, in the cases occurring between 6pm to 6am, most of the cases are reported to police in early hours of next day, that is why a block period of 12 hours from 6 pm to 6 am has been taken as a single unit, where as for day 6 hourly intervals has been taken for study

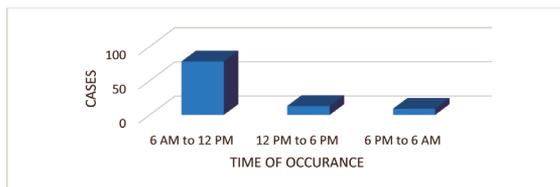


Figure 2: Distribution of cases according to time of occurrence

The railway fatalities were more of accidental nature, less frequently suicidal and very rarely homicidal. A study of different types of accidental deaths revealed that the deaths due to Railway Accidents occupied the 3rd place in I year of Study and 2nd place in the II year of Study in the order of incidence.

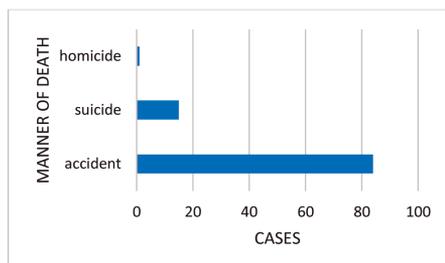


Figure 3: Railway fatalities according to manner of death

On considering the manner of death in all the cases reported as railway fatalities based on details of inquest reports and post mortem findings, it was found that majority of cases were accidental in nature followed by suicides and rarely homicidal⁵.

TABLE 2: DISTRIBUTION OF RAILWAY FATALITIES ACCORDING TO THE CIRCUMSTANCES

Row Labels	Count of Manner of Accident
attending natures calls near tracks	2
crossing the railway tracks	41
falling from overcrowded train	9
homicide	1
leaning out of train door	2
sleeping on the railway track	1
suicide	16
walking by the side of track	16
walking on track speaking on mobile phone	6
while trying to board the train	6
Grand Total	100

Out of the total Suicidal deaths reported in the I year of study, Railway Suicidal deaths contributed up to 40.17% and in the II year, contributed up to 49.26%. Thereby reflecting that there has been a drastic increase in the suicidal railway cases by 9.09%. Hence it is very unfortunate to see that the moving trains are becoming a common mode for committing suicide rather being a common mode of transportation⁶.

Decapitation and Transection of trunk are was the commonest fatal injuries seen in majority of suicidal cases⁷. Thereby we can conclude that decapitation is suggestive of Suicides unless otherwise proved⁸.

The position of the deceased in relation to railway tracks has been grouped into different categories after dividing them based on the manner of death. In suicides, whole of the body was seen in between the rails while in accidental cases, head or upper part of the body was between the railway tracks in 14 cases and the trunk was between the railway and the platform in 27 cases and in 13 cases entire body was between railway and platform.

When it comes to homicides, whole of the body was seen in most of the deaths, outside the railway tracks.

In most of the cases of Railway fatalities, the person passes away immediately. Very few people passed away on arrival to hospital and the number of people who could manage admission in the hospital and then subsequently died were only 6 in the present case study indicating the seriousness of the railway fatalities.

TABLE 3: DISTRIBUTION OF CASES ACCORDING TO CAUSE OF DEATH

Row Labels	Count of Cause of Death
crush injury	3
decapitation	15
head injury	26
Multiple Injuries	46
stab injuries	1
traumatic transection of thorax	1
traumatic transection of trunk	8
Grand Total	100

Considering the incidence of various injuries to the different parts of the body and organs, fracture of upper limbs are common owing to their involvement in both suicides and accidents followed by lower limb and pelvic fractures. Fractures of ribs and sternum come next in order of occurrence. In collisions and derailment fractures of leg and spine are produced.

In case of visceral injuries spinal cord injuries are most common⁹. In the cases of head injury, skull fractures are most common leading to extradural, subdural, subarachnoid hemorrhages. The increased frequency of cerebral trauma without corresponding to cranial trauma which is due to countercoup injuries from acceleration, deceleration forces.

SUGGESTIONS:

1. Most of the Railway fatalities are not properly investigated and enough effort is not made by the Police to establish the identity of the victim. Timely establishment of Identity helps in handing over the body to the right relatives and also helps to a very great extent in getting all the needed information to establish the motive behind the death and also the manner of death. Hence it is needless to emphasize the responsibility of the Investigating Officer in establishing the Identity.

2. Most of the Railway fatalities are investigated by the lower cadre Police Personnel, usually the head constables, who would perform the task as a routine one and never have a high index of suspicion of a homicide, due to the hassles involved in investigating a homicide. A case booked under Sec.174 Cr.P.C is usually closed in the name of either an accident or suicide and is always a welcome for the Police. In most of the cases the scene panchnama is not properly made, let alone taking the photographs of the scene. The inquest report becomes the main linking evidence in the interpretation of manner of death in the later part of the investigation before and after autopsy. Hence it is necessary that a Police Officer not below the rank of Sub-Inspector should actively take part in the investigation with integrity.

3. It is common to see people often crossing the railway track carelessly, just in front of an on-coming running train even when the level crossing gates are closed¹⁰. It is also common to see the pedestrians and two wheeler drivers crossing the railway track. It is observed that most of the accident victims are illiterate and ignorant people from low socio-economic strata. Greater public awareness and preventive measures may reduce the tremendous human and financial loss incurred due to deaths due Railway Fatalities. Preventive measures should be taken up by installing low lying level crossing gates, alarms, signal lights, warning sign boards and strict security presence at level crossing gates.

4. Proper public education through print & electronic media especially targeting the illiterate, low-socioeconomic groups and those who are more prone to such accidents should be conducted.

5. Public should be encouraged to use foot-over bridges instead of jumping from platforms and crossing the tacks to reach their platform. Strong and immediate punishment should be given to those who don't follow this to create the sense of safety. And many such over bridges and flyovers should be constructed wherever the Railway accidents are occurring after taking the required information.

6. At the unmanned level crossings there is no one to warn, regarding the fast approaching trains. The accidents are very common at such places, especially due to collision between road traffic and trains. Hence even at unmanned gates, steps should be taken to install warning devices like sirens, so that the public know that

the train is approaching.

7. Another drawback noticed with the Indian Railways is closure of railway gates sometimes 15 to 30 minutes before a train passes through that point. This results in traffic jams and unrest in the crossing public resulting in unlawful acts of crossing the tracks particularly in urban areas which in turn translates as an increase in the number of Railway Fatalities.

Hence, steps should be taken in such a way that the gates are closed very briefly with a safe breathing time before and after to avoid road traffic congestion. This can be achieved by proper co-ordination among the adjacent Station masters, Train drivers, Guards and also the Points-men when there is an oncoming train.

8. To discourage suicidal deaths steps like Reducing public access to the tracks. Improving surveillance by the Railway staff. Facilitating emergency stops. Counselling the people having suicidal tendencies, etc., should be done by both the Railways and also the NGO's involved in such work.

9. Unsafe and adventurous practices like getting up or down a running train, travelling on roof tops and standing or leaning from the doors of the compartments, should be discouraged by educating the public and if required should be penalized. It can be suggested at this juncture that, due to the heavy rush in trains, it is not always possible for the Ticket-collectors and Railway Protection Force to curb such activities, therefore the passengers should also take an initiative to avoid such activities. The Government should give the authority and also the responsibility to any Government Official travelling in a train to identify and penalize such activities like it was done in the case of smoking in public places

10. Apart from the degree of personal injury, experience of a threat to life, symptoms and problems, immediately after the accidents, difficulty in coping of these thoughts, results in emotional pain. Some survivors also suffer problems of "Re-living" the accident. This is important for the coping process. The process includes psychological integration of the accident as an important event of life.

Finally some humble suggestions to the Medical Officer who conducts an autopsy on a case. Adequate amount of interest should be shown while conducting an autopsy of Railway Fatality case. They should not be considered as just an extra burden among the

other interesting and challenging cases, since these autopsies also have their own challenges. Necessary steps should be taken to maintain the chain of custody. Reconstruction of events at the scene, study of injury pattern on the body, corroborative evidence might lead to correct diagnosis regarding the cause and nature of death, if autopsy is carried out in a proper perspective.

Ethical Clearance : Taken From Institutional Ethics Committee, Gandhi Medical College,secunderabad.

Source of Funding : Self

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Variations in the Physico-Chemical Parameters of Thio-Barbiturate Derivatives

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ABSTRACT

The barbiturates have the ability to release certain nerve cells from the inhibitory influence of certain other cells in the brain leading to mental, emotional and behavioral changes. This action possibly accounts for the emotional instability and sometime aggressive behavior of barbiturate abuses. Barbiturates are known to have toxic activities on the body and are also known to affect the metabolic activities. The mechanisms of the processes are partially known. One of the major paths of their toxic behavior is to undergo competition with biologically important metals like Ca (II) and Mg(II) in the body. The intervention of computer in field of chemistry and in the field of mechanistic approach has helped a chemist to presume and derive relationship between specific molecular model and structural and behavior characteristics of a molecule, so as to use it as a probable drug. Finally, all barbiturates have been observed to be more or less affected by body metabolism and are thus fundamentally changed in their structure. Therefore, in this article author has stated that it is desirable to take an interest in the metabolites of barbiturates, which are often present in larger amounts than the original substance. It is also necessary to know the fate of barbiturates in the body to be able to evaluate the chemical results.

Keywords: Barbiturate Derivatives, Modeling, lipophilicity, Therapeutic etc.

INTRODUCTION

Barbiturates are derived from barbiturates acid (molonyl urea) which results from the condensation of melodic acid and urea¹ Monographs on the clinical and pharmacological evaluation of barbiturates are available in literature^{2,3}.

Barbiturates are weak acids, soluble in organic solvents and can be extracted from aqueous media. They are generally classified as organic nonvolatile substances extractable from acid solutions the technique

of extraction from an acid medium is the fundamental principle for the isolation of barbiturates.^{4,5}

Barbiturates are included in the schedule of NDPS Act.1985. They are mainly termed as hypohosedatives under the psychoactive group of drugs.

A sedative is a drug, which is used to allay a patient and to make him drowsy without actually inducing sleep, where a hypnotic is a drug, which produces sleep. Barbiturates formed from pharmacological terms barbiturates formed form barbiturates. By modifying babituric acid and thio-urea in the laboratory, chemist can create various barbiturates with particular properties and effects⁶ the tendency of barbiturates to lower inhibition leads to them being used as “truth-serum”

MATERIAL AND METHOD

Barbiturate molecules selected for the studies are given under the general formula⁷

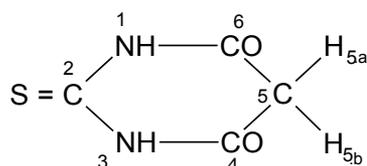
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Where R5a – alkyl (8) aryl group R5b = alkyl (8) aryl group.

Sarena software⁸ PC-Model (version 5.13) package have been utilized to observe the physico-chemical properties of Barbiturate (I). Seconal (II) Sigmadol (III), Nembutal (IV) Rutonal (V), Darmavit (VI) and Propanal (VII).

The package is able to produce window compatible output with the help of quntam chemistry program Exchange (QCPE) ver 5.04. The physico-chemical properties calculated by the package include; Minimisation energy, Dipole moments, Vander Wall forces and Molar volumes (A).

The data thus obtained have been used to discuss the effect of substituents on polarizability of the barbiturate aromatic ring and its possible dependence on the lipophilicity. Smilar such reports are cited in literature.^{9, 10}

RESULTS AND DISCUSSION

The present study is a statistical approach to derive a model molecule with respect to its substituents having greater stability, lesser strain and suitable biological activities.

Keeping in view detailed structure properties analysis of few 5a, 5b. Position substituted derivatives of barbituric acid have been under taken using computer aided durg designing and the PC-Model logical calculations of molecular dynamics. Set of 5a, 5b-disstituants with 5a as alkyl, allyl and aryl with corresponding 5b positions substituted with alkyl, allyl and aryl groups have been selected for the present study.^{11,12}

Figure A; record the variations in the E_{MM} values, figure B record the variations in the dipolemoment values, Fig. C record the variation in the vander wall forces where as Fig D records the variation in the molar volume. The figures have been drawn to show that the different 5a, 5b substituted derivatives have specific effect on the physico-chemical properties and two compounds have shown similar values for any of the

parameters. It is agrement that the structural feature is of greater importance in the case of present series of barbiturates.

The present work is a step ahead of Hansch hypothesis where the concentration dependence of drug activity has been examined using log P (hydrophobicity/lipophilicity) of the substituted molecules with the drug activity. The present work however, aims at stating the variation in molecular dynamics, dipole moments, the molar volume (parachore) and the vander wall interactions due to different substitutions at 5a, 5b-position of barbiturate derivatives.

Log P is the lipophilicity¹³ value (partition coefficient) for the barbituric acid derivatives obtained for the octanol water system. This lipophilicity of the compound is mainly responsible for the solubility of the drug molecule in the biological system. It may be stated that the physiological action of the drug is directly related to this lipophilicity value.

In the case of barbituric acid the lipophilicity for the compounds have been observed to be.

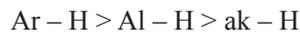
ak-ak	>	al-ak	>	H-H	wrt	Substitution
II		III		I	wrt	Compounds
2.15		1.95		1.35	wrt	log P values

Once again the H-H substituted molecules have shown greater water solubility than the allyl-alkyl (al-ak) substitution.¹⁴

To observe the overall suceptibility of the 5b-wrt 5a some sequences has been observed keeping 5a position constant.



The observed sequence, wrt to al, ak and ar groups at 5a position keeping substitute at 5b as constant is



Where as making substitutions in both 5a and 5b the observed sequence is:



An advanced explanation based on the Mopac (- Vecror AM1/ PM₃ Calculations) - obtained for the compounds is being attempted.^{17, 18, 19}

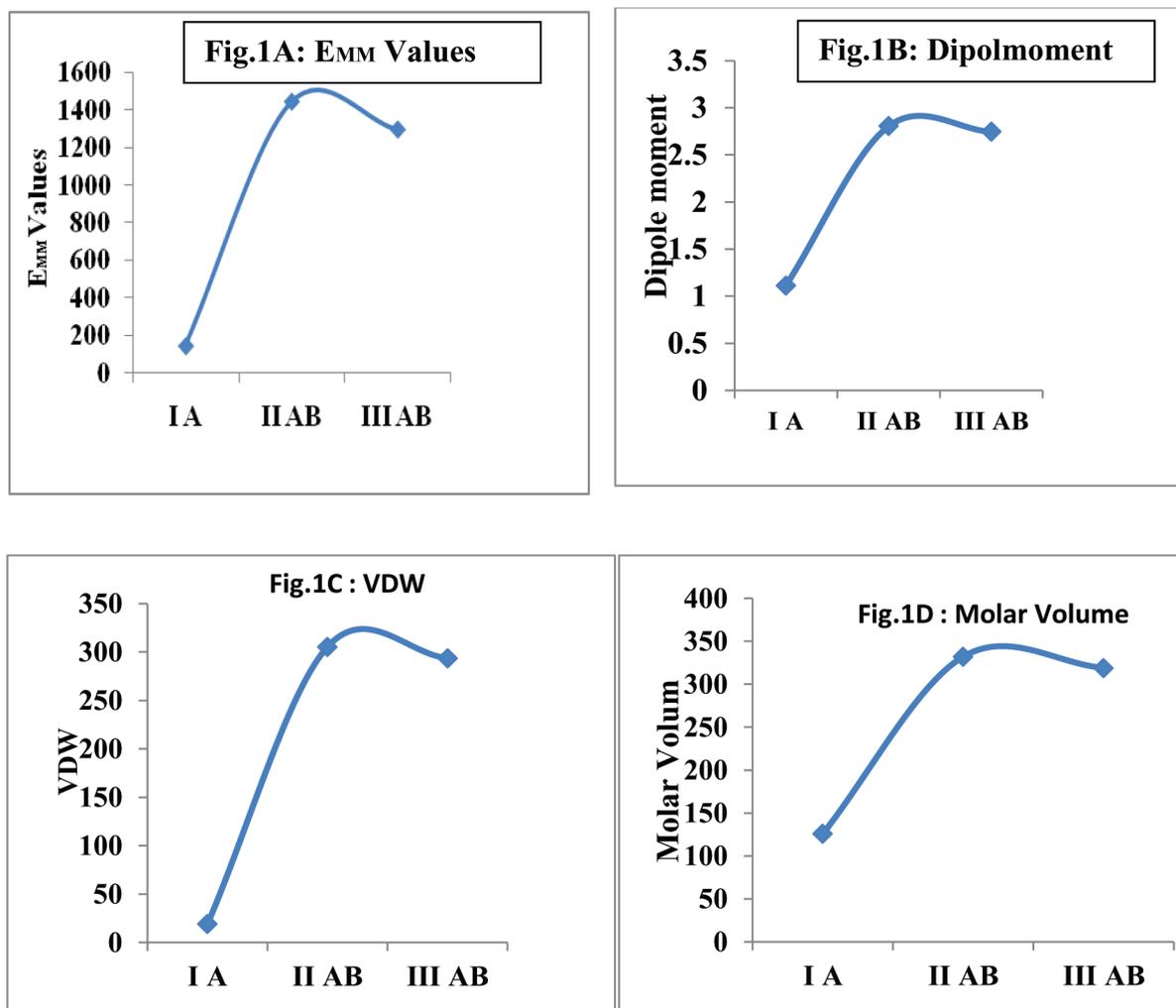


Fig.1: Variations in the physico-chemical parameters of some 5a and 5b substituted Derivatives Thio-Barbiturate (A) EMM Values (B) Dipole moment (C) Van der Waals force and (D) Molar Volume

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Conflict of Interest: NIL

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Estimation of Age and Sex using Chest Radiograph – An Useful Tool in Identification

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ABSTRACT

Background: - Age estimation among the living subjects is an important parameter in past, present and future. Due to more and more immigrants' entering the borders illegally these have become even more important and necessary to avoid any legal problems. The existing laws as per IPC [Indian Penal code], prevent employment of children below 14yrs in any type of work and is considered as an offence as per Factories Act, 1948. If there is a wrongful assessment of age estimation of an individual it creates a confusion in the justice system and also adds to the burden on the resources. The legal authorities often find themselves in a dilemma when an estimation of age is done and hence a thorough knowledge of this among the experts will definitely help the existing legal system in a long way.

Method:- A prospective study involving 160 radiographs including both male and female of varied age group were taken and evaluated for several parameters statistically.

Results:- Regression analysis showed 80% correlation between the predicted age and actual age. First cartilage ossification (FCO), Cartilage mineralization and bone demineralization were the strongest factors. Gender prediction was better for males compared to females in the study population.

Conclusions:- An accessible, time saving and cost effective method has been tried in the present study. Though there are some limitations, the study reveals that data obtained from radiograph is useful as an indicator for estimation of age of a person.

Keywords: - Chest Radiograph; Age; Sex; Identification.

INTRODUCTION

Forensic identification is the application of forensic science, or "forensics", and the use of technology to identify specific objects from the trace evidence, when the criminals/individuals leave; often at the crime scene or

the scene of an accident¹. Identification from the medico legal point of view refers to fixing the individuality of a person. Factors that help in identification are age, sex, race, stature, scars etc. Age estimation is usually done by methods like, general physical development, teeth, appearance of ossification centers in bones, age related changes etc. One of the most accurate and up to date method is by dental age assessment, according to Gustafson's criteria². Determination of age is required for admissions to school, marriage, employment in government services, availing benefits of various government schemes, national programs and policies etc. and has been the focus of forensic research for a very long time.

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Roentgenology or use of X-rays was the first ever radiological tool developed for medical purpose. Chest Radiographs are one of the most commonly known, inexpensive methods and they provide us with a wide spectrum of information of disease. However here we are using this tool in the determination of age and the present study uses various parameters found in a chest radiographs i.e. Bone Mineralization, Fusion of pieces of manubrium, rib to cartilage attachment changes, cartilage mineralization, cartilage to sternum changes and fusion of epiphysis medial end of clavicle for age assessment and thereby using a tool in determining age.

MATERIAL AND METHOD

This prospective study was conducted in the Department of Forensic Medicine, Kasturba Medical College, Mangalore over a duration of 2 months. The study involved a total of 160 people, men and women each. X-Rays were provided to three observer. Informed consent was obtained from the signatories. Three observers independently scored the X-Ray films without knowledge of the age or sex. Each X-Ray was of Posterior anterior view in erect position.

The following features are evaluated on the following scale.

1. **Bone Demineralization(BD)** : Grade 1 to 5
2. **Cartilage to sternum attachments:-** CS :- Grade 1-5
3. **Cartilage Mineralization:-** CM Grade 1-5
4. **Cartilage to Rib attachment :-** RC Grade 1-5
5. **Fusion of Medial end of clavicle:-** FC Grade 1-5
6. **First costal cartilage ossification:-** FCO Grade 1-8
7. **Contour(Costomanubrial border of first costal cartilage):-** Right or left:-Smooth and right
8. **Rib end changes:-** RE changes Flared and cupped

The Parameters 1-8 are as depicted in Figure 1 and Table-1.

The values obtained were entered in Microsoft Excel and statistically evaluated using SPSS ver.17.0 for regression analysis.

RESULTS

The study presented following observations:-

Socio demographic factors:-

The present study analyzes parameters from 104 males and 56 females across the age groups 17 to 83 years as depicted in Graph-1.

The present study showed, in respect to age had a negative correlation with Bone demineralization (BD) while all other factors show a positive correlation.

Significant ($p < 0.05$) correlation was obtained between the parameters BD, RC, CM, CS, FC, FCO while none such is seen with the other two(Contour and Rib end changes).

Age Prediction:-

Multiple regression equation was derived to predict the age as below:-

$$\text{Age} = -7.441 + (-.572x \text{BD}) + (0.801x \text{RC}) + (4.497x \text{CM}) + (0.635x \text{CS}) + (2.344x \text{FC}) + (4.384x \text{FCO})$$

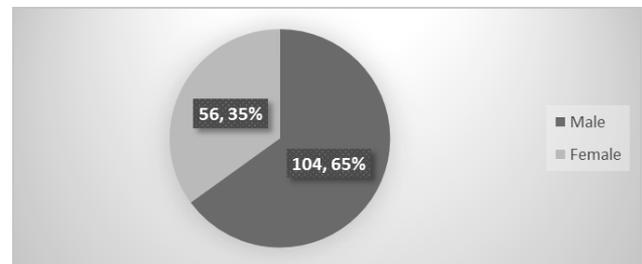
A correlation of 0.8(80%) was obtained between the actual age and age calculated by regression analysis equation and is depicted in Graph 2.

Gender Prediction:-

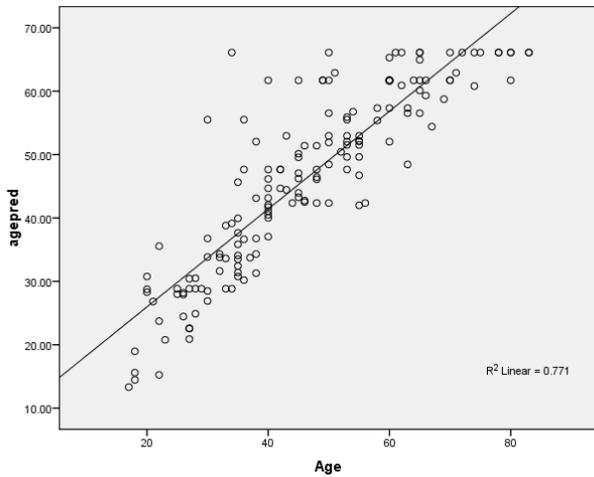
Multiple regression equation was derived to predict the gender as below:-

$$\text{Gender} = 1.529 + (\text{BD} \times -0.14) + (\text{RC} \times -0.91) + (\text{CM} \times 0.229) + (\text{CS} \times -0.166) + (\text{FC} \times 0.111) + (\text{FCO} \times -0.069)$$

If G is more than 1.45 the gender is female and if G is less than 1.45 it was Male. The formulae was able to detect 75% of the males but only 25% of the females were accurately detected.



Graph-1 Depicting socio-demographic distribution in the study



Graph 2. Comparison of age calculated by the regression equation and actual age

DISCUSSION

Age estimation has been a complicated issue but an essential feature in the Identification of a person. Many people are deprived of their basic rights in the world just because they cannot prove their identity. Using X-Rays can also be important in cases of feigned identities because little variation and tampering is possible with them as opposed to other methods.

Variations in features in the anterior chest wall with age have been known to the radiologists since earlier times. The present study is a bigger study compared to earlier study in sample size and hence it’s more accurate and takes off the differences in the findings.

The present study shows a negative correlation of bone demineralization with age which is a similar finding observed by bares et al ², as the present study shows more of subject population lying in the age group less than 30 years. However the study shows a positive correlation with all other parameters including cartilage mineralization

The correlation between age and bone demineralization was weakest, which is in agreement with bares². It was strongest for FCO (First cartilage ossification). Bone demineralization shows negative correlation with all other parameters but a significant relationship exists. No significant correlation could be found out between contour of the left or right costal cartilages or rib changes with observers.

First cartilage ossification and Bone demineralization are the best parameters for assessment and a regression analysis the final equation that comes out is as follows so that this helps in determine the gender from the given radiographs which a new finding from the earlier studies^{2,3,4,5,6,7}.

The present study attempts to predict the gender of the concerned was made using regression analysis, but correct prediction was only possible in about 75% of the males studied while only 25% of the females were correctly predicted.

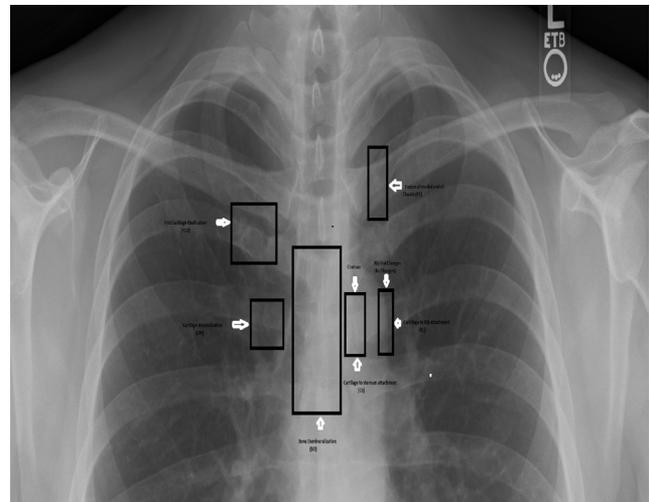


Figure 1: – Chest Radiograph P.A. showing various parameters as read by each observer

Table 1:- Showing the various characters and grades categorized with the source of taken

Character	Grade1	Grade2	Grade3	Grade4	Grade5	Source
BD(Bone Demineralization)	opacity is maximum in manubrium and body				Outline of Manubrium and body seen(inner portion is almost transparent)	Reference no. 2
CS (Cartilage to sternum attachments)	No attachment	Attachment has started	Medium gap between cartilage and sternum	Minimum gap between cartilage and sternum	Complete attachment	Reference no. 2

Cont... Table 1:- Showing the various characters and grades categorized with the source of taken

CM(Cartilage Mineralization)	Superior or inferior border is seen	Superior and inferior borders are distinct	Small amount of mineralization started in between superior and inferior borders	Mineralization increased	Entire body mineralization	Reference no. 2
FC (Fusion of Medial end of clavicle)	Ossification centre not appeared	Centre appeared but no Union	Union started but incomplete	Complete Union		Ref. no. 4
FCO (First costal cartilage ossification)	Refer to template					Reference no. 8
Contour(Costomanubrial border of first costal cartilage)	Regular(Right And Left sides)	Irregular				Reference no. 8
Rib end changes	Flared	Cupped				Reference no. 8

CONCLUSION

However as a limitation of the study the study sample were studied in smaller sample size which could be improved and also the present study has been conducted among live patients as opposed to previous where radiographs from autopsies were taken An easy, time saving and cost effective method by assessing various parameters has been tried. While the study has some limitations, the study does reveal that data obtained from radiograph with little investment and training among the required staffs as compared to other methods definitely makes as a useful indicator for age of an individual.

Acknowledgement: The authors place a sincere thanks to Department of Forensic Medicine, KMC, Mangaluru for providing the necessary data and resources to interpret them. This project is an ICMR STS project accepted in the year 2013.

Ethical Clearance: - Institutional Ethical clearance taken

Conflict of Interest: - Nill

Source of Funding: - Self

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An epidemiological Study of Road Traffic Accidents in B G Nagar, Mandya District

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ABSTRACT

Road Traffic Accident (RTA) is one among the top five causes of morbidity and mortality in South-East Asian countries.⁽¹⁾ Its socioeconomic repercussions are a matter of great concern. Efficient addressing of the issue requires quality information on different causative factors. To study the epidemiological factors and pattern of injury sustained by various groups of people involved in road traffic accident. **Material and Method:** A Cross Sectional study was conducted at Adichunchangiri Institute of Medical sciences, B G Nagar located on Bangalore – Mangalore National Highway from June 2014- December 2015. All the cases of Road Traffic Accident admitted to the hospital during the study period were included in the study. A Semi-Structured and Pre-Tested Questionnaire was used to collect the data. **Results:** Out of 200 victims, there were 128(64%) male and 72(36%) female victims. The highest number of victims, 74(37%) were between 30-39 years of age followed by 20-29 years and 40-49 years age group. About 153(76.5%) of the victims were under 40 years of age. According to the Trauma index, injuries are classified as mild injuries (0-7), moderate (8-18) and severe injuries (more than 18). Most (47%) of the injuries were mild. **Conclusion:** It is evident that multiple factors are involved in road traffic accidents. There is a need of more scientific studies on the subject and road users need to be educated on factors involved in the road accidents. Elementary concepts of road safety should be the part of curriculum from the time of preschool, school days itself.

Keywords: Accident, RTA, Injury, Fracture, Trauma.

INTRODUCTION

Road traffic accidents (RTA) are increasing in an alarming way. Globally nearly 1.2 million people killed in RTA during the year 2002. Developing and under-developed countries accounted for 80% of these deaths. RTA accounts for 2.1% of total deaths and 21% of total injury. Projected estimations reveal that fatalities due to RTA will increase by 66% over the next 20 years and will be the 3rd leading cause of death by 2020 moving from its present 9th position.¹

World Health Assembly adopted Resolution in 1974, declaring road traffic accidents [RTA] a major public health issue.²

Between 2000 and 2020, the total number of road traffic deaths worldwide and injuries is forecast to rise by some 65% and in low-income and middle-income countries deaths are expected to increase by as much as 80%.²

In India every year RTA accounts for over 1,00,000 deaths, 2 million hospitalization, 7.7 million minor injuries and an estimated loss of Rs. 55,000 crores or nearly 3% of the GDP every year. If the present scenario is continued, it is projected that deaths due to RTAs will be 1,50,000 and 2.8 million victims will be hospitalized by 2010. 1,85,000 deaths and 3.6 million victims will be hospitalized by 2015.¹

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Research concerned with gathering precise information about extent, type and other characteristics of accidents, correlating accident experiences with personal attributes and the environments in which accidents occurs, investigating new and better methods of altering behavior; seeking ways to make environments safer; and evaluating more precisely the efficiency of control measures. This area is now termed ACCIDENTOLOGY.³

The causes of accident might be various factors involving the vehicle, people and environment factors. The social and psychological suffering of the injured persons is increased and their families and also families with RTA deaths are phenomenal. It is sad to note that, life saved due to advancements in health and health related sector is now being wasted on the roads.

Road traffic accidents (RTA) have become the leading cause of injury and death among the adult population in India. As the private hospitals have business motive, many private agencies have been emerged to provide first aid care to the victims through the ambulance services to serve the purpose of saving their lives. But the drivers are untrained and not skillful in managing the victims of RTA. Many a times, the victims expire on the way to the health care setting due to lack of immediate first aid measures which was really essential at times Hence this study was taken to asses the profile of the cases admitted in emergency ward with road traffic accidents.

OBJECTIVES

To study the epidemiological factors and pattern of injury sustained by various groups of people involved in road traffic accident.

MATERIAL AND METHOD

A Cross Sectional study was conducted at Adichunchangiri Institute of Medical sciences, B G Nagar located on Bangalore – Mangalore National Highway from June 2014- December 2015. All the Cases of Road Traffic Accident admitted to the hospital during the study period was included in the study. A Semi-Structured and Pre-Tested Questionnaire was used to collect the data. Patients will be personally interviewed bedside for Data Collection. If conditions not favorable for patient to respond to questions, his immediate family member will be interviewed Appropriate Statistical

Measurement like Ratios, Percentages, Proportions was used to analyze the data.

RESULTS

Table 1- Distribution of cases according to Age and sex

AGE	MALE	FEMALE	TOTAL
<20years	16	7	23(11.5%)
20-29Years	35	21	56(28%)
30-39years	47	27	74(37%)
40-49years	26	8	34(17%)
50-59Years	2	6	8(4%)
60 and Above	2	3	5(2.5%)
TOTAL	128(64%)	72(36%)	200

Out of 200 victims, there were 128(64%) male and 72(36%) female victims. The highest number of victims, 74(37%) were between 30-39 years of age followed by 20-29 years and 40-49 years age group. About 153(76.5%) of the victims were under 40 years of age.

Table 2:- Distribution of cases according to site and severity of injury

SITE OF INJURY	Frequency	Percentage (%)
Upper limb	24	12
Lower limb	86	43
Abdomen	60	30
Multiple	30	15
SEVERITY OF INJURY		
Mild	94	47
Moderate	68	34
Severe	38	19

On analyzing the site of injuries it was observed that lower limb was most commonly (43%) involved part. The severity of injuries suffered by the victims was graded according to the "Trauma Index". According to the index, injuries are classified as mild injuries (0-7), moderate (8-18) and severe injuries (more than 18). Most (47%) of the injuries were mild.

Table 3: - Pattern of RTA

TIMING	Frequency	Percentage (%)
Morning	36	18
Afternoon	40	20
Evening	96	48
Night	28	14
Type of vehicle		
Two wheeler	76	38
Three wheeler	8	4
Four wheeler	98	49
Truck	12	6
Tractor	6	3
Type of Collision		
Head on	28	14
Sideways	94	47
Behind	42	21
NA	36	18

Most (48%) of the RTA's occurred in the evening. (6pm-12midnight). It was noticed that among all vehicle users four wheelers were most commonly affected (49%). Most of the collision was sideways (47%).

DISCUSSION

In India, according to National survey on road traffic accidents, in 2007, 6,113 people were reported in collisions, on the roads in survey, 589 people were killed and seriously injured. 37 children under the age of 16 were killed or seriously injured. 5,524 people were slightly injured. If we take the previous statistics in 2001,668, in 2002-783, in 2003-834, in 2004-875, in

2005-73, and in 2006-776, were the children under the age group of 17 years. ⁴

In Karnataka, the incidence of road traffic accidents in 2005 was, children between 5-9 years fatality rate was 448, and 10-14 yrs was 40. Seriously injured rate was 30% among them 69.4% were males and 30.6% were female children and 44% of accidents are due to wheeler crashes. 36% due to falls, median incidence is estimated that, 137.5 falls injuries / 1,00,000 in children are occurring. ⁴

In our study the majority of the population met with accidents were in the age group of 30-39 years, the findings in our study was similar to the findings of Pravin N Y⁵, Mehata S P⁶ and Jha N⁷. in our study the majority of the people met with accidents were of the economical productive group causing a major morbidity among the younger population. Similar findings were also seen in many studies. Jha N⁷ and our study showed lesser number of accidents in the 50 ages plus group.

The accident rates were twice more among the males than females in our study. Simialar findings were also seen in the Jha N⁷ and Pravin N Y⁵ studies .

Lower limbs injury was the major site of primary impact injuries in our study and in the studies done by S S Patil⁸, Paathak S M⁹ and Gunjan et al¹⁰.

The time of accident was more in the eveing and night which can be attributed due to dim light and fatigue of the drivers .in the study done by Kiran et al¹¹, Jha N⁷, Pravin N Y⁵ and Pathak SM⁹ also had similar findings as our study.

Two wheeler and four wheeler contributed to nearly 80% of accidents in our study, which is due to the presence and location of the hospital on the national highway. Jha N⁷, Dhingra N¹² and Phathak S M⁹ also observed similar findings in there studies .

CONCLUSION AND RECOMMENDATIONS

The incidence of the accidents was reported more among the male population in the 20-40 years of age group, who used two wheeler as a source of transportation. With the use of two wheeler the riders and pillion riders both are at the triple risk of the getting injured due to accident. the speed of the two wheelers, no protection, relative unstable of the vehicle increases the risk of accident for two wheelers .

It is evident that multiple factors are involved in road traffic accidents. There is a need of more scientific studies on the subject and road users need to be educated on factors involved in the road accidents. Speed has been shown to be associated with severity of injuries in the study. Proper training and strict rules to be followed while issuing the license and periodic maintenance of the vehicle can reduce the incidence of accident.

Elementary concepts of road safety should be the part of curriculum from the time of preschool, school days itself. At the end it's always at one's own responsibility to strictly adhere and follow the traffic rules at each point and this responsibility lies with both the drivers and the victims.

Ethical Clearance: Taken from ethical committee

Source of Funding: Self

Conflict of Interest: Nil

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Evaluating the Effectiveness of Couple Therapy Training to the Consultants of Crisis Intervention Center of Welfare Organization in Improving the Quality of Couples' Counseling Services (with Emphasis on Reducing the Tendency to Divorce) in Markazi Province

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ABSTRACT

This study was conducted to evaluate the effectiveness of couple therapy training to the consultants of crisis intervention center to reduce divorce tendency in Markazi Province. The initial study population included all consultants of the crisis intervention centers in Markazi province accounted for about 500 people, and the initial sample consisted of 30 counselors. A researcher-made questionnaire was used to measure the effectiveness of training on enhancing the quality of consulting services that the validity and reliability of both questionnaires were verified. The results showed that couple therapy training to the consultants raised the quality of consulting services in these centers, and a significant difference was found in the quality of consulting services in these centers before and after the trainings. On the other hand, the tendency to divorce in the post-test had decreased significantly compared to the pre-test. Therefore, it is recommended that the consultants of the consulting centers use the couple therapy technique in resolving the couples' problems. Also, it is useful to hold more training programs for the consultants.

Keywords: *Couple therapy, Welfare organization intervention centers, Couples therapy, Divorce, Couple conflict, Family preservation*

INTRODUCTION

Nowadays, many marriages are shattered shortly after their formation. Understanding the reason for failing of these marriages can turn into a solution to help couples who have marital conflicts. Guttmann (1999) argues that: "The marriage does not fail when it faces with conflict, but it fails when there is no solution to the conflict". Tendency to divorce is a common phenomenon in human societies. The phenomenon of tendency to

divorce is a multifactorial one, and a single factor cannot provide the grounds for its emergence. Several factors come together in tendency to divorce and together provide a complex network, which is unique in its kind. This study was designed due to the increasing trend of divorce in Iran and the world. According to official figures in Iran, two hundred per thousand marriages lead to divorce¹. The statistics of those who have tendency to divorce are more than those who have been divorced. The tendency to divorce is one of the factors causing disorder and confusion in marital life and impose a strong internal pressure to the mates. Tendency to divorce may be caused through failure to meet the needs and goals, poor mutual approaches, inability to manage life events and convey emotions to the spouse². On one hand, proper training for couples in relation to marital

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skills, effective communication, conflict resolution ways, etc., which prevent the tendency to divorce, is very limited in the Iranian society³.

Due to the main purpose of this study, which is to develop a couple therapy training model to the consultants, first, a pathological study on the training types and scopes in universities and other training centers in the field of consulting should be done so that a more appropriate model could be developed for training the consultants by identifying the strengths and weaknesses. In this section, merely with a glance at the status quo, we examined the deficiencies of consulting knowledge in terms of content, educational text, courses titles and headings. In evaluating the status quo of guidance and consulting in Iran, the following factors can be outlined as positive strengths: Quantitative increase in the number of students in different grades, quantitative increase in the number of female students, increasing the number of faculty members, increased number of researchers in the field, establishment and spread in most provinces of the country, increased quantitative growth of specialized publications, promoting of publications rank, relative increase of scientific societies compared to other humanities fields, increased number of specialized books publishers and incorporation of theological seminary in issues and topics scientifically and comparatively at undergraduate, master and doctorate levels in educational, research, clinical and consultation dimensions. Moreover, the attitude of society to the consulting actions, activities and services has followed a positive trend. Thus, despite the increase in number of professionals who provide specialized services, this issue has not eliminated the thirst need for psychological counseling and advice, and the need to develop psychological services is strongly felt. On the other hand, the stereotypes about consulting such as the idea only patients refer to a psychologist or counselor are fading. Radio and television, as the most popular media, have also made efforts in recent years to gradually increase specialized programs in the field of psychology and counseling, and using the experts' opinions, have approached its general programs, including dramatic programs and panel discussions, to scientific-psychological criteria⁴.

Therefore, according to the above a glimpse of counseling and couple therapy discussed in this research, we can study its deficiencies and pathologies. There are shortcomings and deficiencies in Iran's higher

education system that prevents the progress of different sciences. In technical and engineering sciences, lack of resources, space and technological features sometimes prevents the scientists in the field to reach the excellence in the science.

This study examined the effectiveness of couple therapy training to the consultants of the crisis intervention centers in increasing the quality of consulting services in Markazi province. Accordingly, this study sought to evaluate the following hypothesis:

Couple therapy training to the consultants of crisis intervention centers has a positive impact on the quality of consulting services in these centers.

Couple therapy training based on multi-dimensional ecological model affects the reduction in tendency to divorce in couples referring to the Welfare counseling centers of Markazi province.

METHODOLOGY

The single group pretest-posttest design was used to evaluate the effectiveness of couple therapy training on enhancing the quality of consulting services in crisis intervention centers of Markazi province. The initial study population consisted of all consultants of the crisis intervention centers in Markazi province accounted for 500 people. The secondary population included 200 couples who were introduced to the crisis intervention centers. From the initial population, 30 subjects were selected as samples, and 30 couples from the second population were replaced in two experimental and control groups. A researcher-made questionnaire was used to measure the quality of consulting services, which measured the quality of services from the perspective of consultants and managers. Its validity and reliability were verified. To collect the data, the consulting quality questionnaire was implemented before the start of training program based on the survey. At the end of classes and after about 4 months later, the questionnaires were completed again and the quality of consulting services in these centers were reinvestigated. Descriptive statistics methods such as mean, standard deviation, variance, etc. and inferential approaches, including t-test and analysis of covariance were used for data resulting from the tests.

RESULTS

Examining the research first hypothesis

To test this hypothesis, the t-test of relevant groups was used. The results of this analysis are presented in Table 1.

Table 1. Results of t-test of relevant groups

Variable	Number	Mean	Standard Deviation	Mean error	Upper limit	Lower limit	t-test	DOF	Significance level
Quality of consulting services	30	13.70	17.05	5.39	1.49	25.90	2.54	9	0.032

According to the results of data analysis and the above tables, and given the significance level obtained, one can conclude that there is a difference between the two groups. Thus, the quality of consulting services in crisis intervention centers at pretest and posttest times differs significantly. Since the mean of pre-test is higher than the post-test mean, one can conclude that holding training course has improved the quality of consulting services in these centers.

Examining the research second hypothesis

Given that the two-group pretest-posttest design was used to examine the hypothesis of this objective of the study, the proper analysis for this design is covariance

analysis. In general, to use the analysis of covariance test, its assumptions must be first studied. Then, the important assumptions of analysis of covariance were examined, the results of analysis of covariance test were explained.

First assumption: Randomization

According to the sampling method used in this study and how to replace the samples in the experimental and control groups, this assumption is established.

Second assumption: Normal distribution of data

Kolmogorov–Smirnov test was used to verify this assumption. The results of this test can be seen in the table below.

Table 2. Kolmogorov–Smirnov test statistic for the variable of tendency to divorce

Variable	Mean	Standard Deviation	Test Statistic	Significance Level
Tendency to divorce	1.37	2.67	0.591	0.876

According to the test statistic and achieved significance level, it is concluded that the data of tendency to divorce are normal, and the assumption is met.

Third assumption: Independency

This assumption implies that each person's scores on the associated variable (pre-test) and the dependent variable (post-test) are obtained independent from the scores of other subjects. Since in this study, the learners

and their scores are independent of each other and the score of a person does not have an impact on another's score, the validity of this assumption is confirmed.

Fourth assumptions: Homogeneity of variances

The assumption of homogeneity of variances is one of the assumptions that should be examined in the analysis of covariance test before running the test. The following table shows the F value obtained for this test and its significance level, which demonstrates the validity of this assumption is satisfied.

Table 3. Results of homogeneity of variances testing

F statistic	Between groups degrees of freedom	Within group degree of freedom	Significance level
1.428	1	28	0.242

The table above results show that the assumption of homogeneity of variances is set for the variable of tendency to significance level of 0.05 ($F = 0.124$).

Fifth assumptions: Homogeneity of regression slopes

In this assumption, it is assumed that in the community, the regression of dependent variable of "y" from the associated variable of "x" is the same in both groups. If this assumption does not hold, the analysis of covariance would be inappropriate. Thus, the attention should be paid to comparison of groups' means; but, the effect of the independent variable on the regression slopes should be considered. In this assumption, the null hypothesis is expressed as such the slopes of regression lines are homogeneous. The results of examining this assumption are given in the table below.

Table 4. Statistic of homogeneity test of regression slopes

Source of changes	Sum of squares	Degrees of Freedom	Mean of squares	F	Significance level
Pretest of tendency to divorce	970.41	1	970.41	147.59	0.001
Group * Posttest of tendency to divorce	29.22	2	14.61	2.22	0.128
Total	20.6.75	29			

As is clear from the table above, the interaction between pre-test and the experimental group is not significant. Therefore, the null hypothesis, meaning the regression slope homogeneity, is confirmed.

Given that the assumptions of the analysis of covariance for the variable of divorce tendency are observed, the analysis of covariance test can be used to compare the scores of divorce tendency in both control and experimental groups. In this test, the pre-test scores are considered as moderator and the scores of post-test are compared with each other by adjusting the pre-test scores. The results of this analysis are presented in the following table:

Table 5. Test statistics of analysis of covariance

Source of changes	Sum of squares	Degrees of freedom	Mean of squares	F	Significance Level	h Partial square
Group * Pretest	29.22	2	14.61	14.59	0.004	0.193
Error	177.52	27	6.57	2.22		
Total	5864.8	30				

As seen in the above table, the test result for testing the tendency to divorce at confidence level of 95% ($P < 0.05$) is significant ($F(1, 24) = 14.59, P = 0.004$, minor $\eta^2 \eta^2 = 0.193$). Therefore, it is concluded that due to applying the independent variable, a significant difference is seen between the rates of tendency to divorce of two groups (with adjusting the pre-test effect). However, due to the amount of Eta square (0.19), which shows the correlation between the experimental factor and the dependent variable, that is a high value. Thus, nearly 20% of the dependent variable (tendency to divorce) changes refers to the test (couple therapy) by assuming that its initial rate remains constant. This significant difference is clearly reflected in the following Figure:

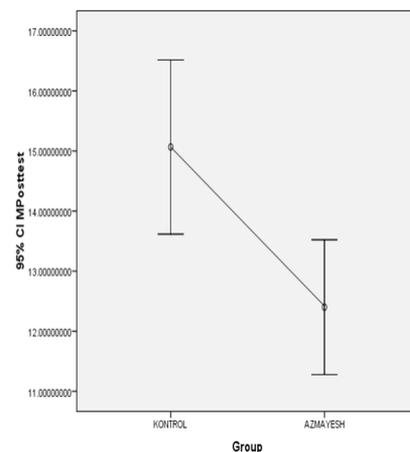


Figure: Comparing two experimental and control groups on the variable of tendency to divorce

CONCLUSION

In this study, the efficacy of couple therapy training to consultants on increasing the quality of consulting services was studied. The results showed that couple therapy training helps to improve the quality of consulting services in these centers. Hence, one can conclude that due to applying the independent variable, a significant difference was seen between the two groups on tendency to divorce (with adjusting the pre-test effect). In fact, couples therapy sessions based on the present study model have been effective on reducing the tendency to divorce. Given that the model for this research was an ecological model and specific to this research, its results cannot be compared accurately and completely with other research. However, considering that in the present study model, training workshops have been predicted for consultants and couples with respect to qualitative analysis, this part of the study can be compared with previous studies. Karami and Esmaeili have pointed to the pre-marriage trainings that due to the nature of the research, its analysis results are not consistent with this study. But in the designed model, it has been noted that the trainings should start before the marriage to increase their effectiveness⁵. Sadeghi studied the healthy family development model that part of this review results are consistent and aligned with the results of that study⁶. Soodani et al.⁷ and Soodani et al.⁸ point out the effectiveness of integrated treatment, which has been also mentioned in our designed model. Hosseini Zand et al⁹, discuss the effectiveness of couple therapy according to Islamic teachings and strongly emphasize on Islamic-Iranian culture in the process of couple therapy. This emphasis includes the original context of educational design model and couple therapy sessions in this study. In in the studied subcategories, the identifying the source of problem was mentioned, which has been also the focus of attention of researchers, including Mohsen Zadeh et al¹⁰, Dehaghani and Nazari¹¹, and Gulshan¹², and from this perspective, the results of this study are consistent with these studies. Explaining the results obtained, we can say that the therapists use the reserves and abilities of the clients in the process of changing, and this would create an image of hope for them. The therapists strengthen the sense of self-sufficiency and autonomy in their clients.

Ethical approval: Related departments should be assured about the confidentiality of the results of questionnaires.

Conflict of Interest: The authors report no conflict of interest.

Source of Funding: Self

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Correlative Study of Cranial Index with Diameter of Foramen Ovale in Maharashtra Population

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ABSTRACT

Non-pathological, dried, adult 75 (seventy five) crania were studied .45 were male ,30 were female. CI was measured by winged caliper and diameter of Foramen Ovale was measured by digital caliper. The mean value of CI in male crania was 67.17(sd+-1.06) and CI of female was 71.55cms(sd+-1.25). The mean value of diameter Foramen Ovale in male crania of right side was 0.81cms(sd+-0.07), and left side was 0.65 cms(sd+-0.08). The mean value diameter of Foramen ovale in females right side was 0.66cms (sd+-0.09) and left side was 0.53cms (sd+-0.08). and 't' =7.93 for right side , 't'=6.24 for left side of diameter of Foramen Ovale .All these values are statistically highly significant (p<0.01). Correlative coefficient of CI was 0.62 with male right diameter of Foramen Ovale 't'=0.52 with left diameter of foramen ovale coefficient value of CI was 0.56 , 't'=4.38 which were highly significant statistically (p<0.01) but logistic regression of individual was insignificant. These obtained values are quite useful to medico-legal expert because by knowing the diameter of Foramen Ovale he can explore the Crania of both sexes and vice versa. As these crania belong to Maharashtra these values have ethnic importance to the Anthropologist, Anatomist, and Radiologist .moreover to the Neuro surgeon who approaches the Brain durametre through Foramen Ovale for trigeminal rhinotomy ,electro encephalographic analysis for sizure diagnostic trans facial fine needle aspiration to rule out malignancy⁽¹⁾ Apart from that, marpho metric values of mesodermal derivatives are un-certain.

Keywords—Correlation, Coefficient, Cranial Index =C I, Foramen Ovale=FO

INTRODUCTION

FO is the oval shaped foramina situated at middle cranial fossa at base between intra cranial and extra cranial structures⁽²⁾. therefore useful in the various surgical and diagnostic procedures. It is named after its oval in shape. The structures passing through FO are mandibular nerve, Accessory meningeal artery, lesser petrosal nerve, Emissary vein. C I is more in female as compared to male due to flat shaped bones, although C I increases due to growth of brain at the expense of size of Mandible. Hence attempt was made to correlate

the C I with diameter of FO on both sides of the crania, which has Radiological, medico-legal, surgical, anthropological and Anatomical importance.

MATERIAL AND METHOD

45 male and 30 female dried, non-pathological, adult crania were selected for study. The crania were available at Anatomy and Forensic medicine department of I I M S & R. Warudi. Badnapur (tq), Jalna(dist). The broken and pathological crania were excluded .C I was measured with spreading Caliper

$$C I = \frac{\text{Maximum Breadth of Crania}}{\text{Maximum length of crania}} \times 100$$

Diameter of FO was measured with digital vernier caliper. The obtained data was analyzed by SPSS Software. The duration of the study was one year.

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OBSERVATION AND RESULTS

Table-1 –Comparison of mean values of male and Female C I .and F O (right and left)

Mean value of male C I was 67.17 (sd+-1.06) and female C I was 71.55 (sd+-1.25), 't'=15.9 which was statistically highly significant (p<0.01). Mean value of diameter of right F O was 0.81 cms (sd+-0.07) and in female diameter of right FO was 0.66 cms (sd+-0.09) 't'= 7.93 which was highly significant P value (p<0.01) Mean value of diameter of left FO in males was 0.65 cms (sd+-0.08). In females mean diameter of left FO was 0.53 (sd+-0.08) 't'=6.24 which was highly significant P value (p<0.01).

Table-2 Correlation of C I with diameter of FO (right & left) .in male and female crania.

(a)—In males correlative coefficient was 0.62 in right FO . 't'= 0.52. left FO =0.56 't'=4.38. which was highly significant p value (p<0.01)

(b)—In females correlative coefficient of C I with right F O was 0.75 't'=7.34 ,left FO was 0.66 't'=5.69. They highly significant p value (p<0.01).

Table -3 logistic regression analysis by taking sex as sex as dependent variable and C I ,diameter of FO with 95% of confidence interval independent variables are not significant.

Table-1 Comparison of Male and Female cranial index, Diameter of Rt. foramen ovale and Lt. foramen ovale

		Cranial index	Diameter of right foramen ovale(cm)	Diameter of left foramen ovale(cm)
Male	Mean	67.17	0.81	0.65
	SD	1.06	0.07	0.08
Female	Mean	71.55	0.66	0.53
	SD	1.25	0.09	0.08
Test statistic		t= 15.99 P<0.01	t= 7.93 P<0.01	t= 6.24 P<0.01

Statistically there is highly significant difference observed in male and female cranial index, Diameter of Rt. foramen ovale and Lt. foramen ovale (P<0.01)

Table-2 Correlation of cranial index with Diameter of Rt. foramen ovale and Lt. foramen ovale in male and female

		Cranial index and Diameter of right foramen ovale(cm)	Cranial index and Diameter of left foramen ovale(cm)
Male	Correlation coefficient	0.62	0.56
	P value	t=0.52 p<0.01	4.38 P<0.01
Female	Correlation coefficient	0.75	0.66
	P value	t=7.34 P<0.01	t=5.69 p<0.01

Correlation of cranial index with Diameter of Rt. foramen ovale and Lt. foramen ovale in male and female is statistically highly significant (P<0.01).

Table-3. Logistic regression analysis by taking sex as dependent variable and cranial index, Diameter of Rt. foramen ovale and Lt. foramen ovale as independent variables Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
							Lower	Upper
Cranial_index	10.644	2842.483	.000	1	.997	41926.037	.000	.
Diameter_of_right_foramen_ovale	-62.704	50885.215	.000	1	.999	.000	.000	.
Diameter_of_left_foramen_ovale	-22.444	70863.379	.000	1	1.000	.000	.000	.
Constant	-679.269	225955.352	.000	1	.998	.000		

a. Variable(s) entered on step 1: Cranial_index, Diameter_of_right_foramen_ovale, Diameter_of_left_foramen_ovale.

Logistic regression analysis is used to classify male foremena or female foramina using independent variables are cranial index, Diameter of Rt. foramen ovale and Lt. foramen ovale. But these independent variable are found non significant ($P > 0.05$)

DISCUSSION

In the present study of correlative coefficient of C I with FO in Maharashtra crania of both sexes

Mean value of male C I was 67.17 (sd+1.06) and female C I was 71.55 (sd+1.25), $t' = 15.9$ which was statistically highly significant ($p < 0.01$). Mean value of diameter of right F O was 0.81 cms (sd+0.07) and in female diameter of right FO was 0.66 cms (sd+0.09) $t' = 7.93$ which was highly significant P value ($p < 0.01$) Mean value of diameter of left FO in males was 0.65 cms (sd+0.08). In females mean diameter of left FO was 0.53 (sd+0.08) $t' = 6.24$ which was highly significant P value ($p < 0.01$). (table-1). The present values of diameter are more or less in agreement with previous studies ⁽³⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾

(a)—In males correlative coefficient was 0.62 in right FO. $t' = 0.52$. Left FO = 0.56 $t' = 4.38$. Which was highly significant p value ($p < 0.01$)

(b)—In females correlative coefficient of C I with right F O was 0.75 $t' = 7.34$, left FO was 0.66 $t' = 5.69$. They were highly significant p value ($p < 0.01$). (table-2). No literature was available in English to correlate these values between C I and diameter of FO. The probable

reason could be (a) The passage and presence/number of veins of different size and shape may cause variation in diameter of FO in both sexes. ⁽⁷⁾ (b) It is also noted that, diameter of FO is larger in males than females ⁽⁸⁾⁽⁹⁾. (c) As bone is plastic tissue next to blood hence C I has to adapt with the diameter of FO because it transmits blood vessels they vary in size, create branching to maintain hemodynamic pressure ⁽¹⁰⁾. Against the rotation of head to maintain erect posture hence occasionally there is separate foramina for maxillary artery which supplies trigeminal ganglion and portion of durametre. moreover size and shape of FO depends on duration and degree of ossification of crania. ⁽¹¹⁾ As crania has dual ossification ie partly membranous and partly cartilagenous. Rate of bone growth and maturation is influenced not only by age and sex but by economic status, individual body weight possibly by function. Regional and racial differences also required to be taken into account. (d) Lesser diameter in female FO could be due to sphenoccipital syndesmosis which has bilateral epiphyseal cartilage which fuses earlier in female than males ⁽¹²⁾.

SUMMARY AND CONCLUSION

The present correlative study of CI with diameter of FO is helpful for neuro surgeon during micro vascular compression by precutaneous trigeminal rhizotomy to treat trigeminal neuralgia, by knowing the C I he can predict the diameter (patency) of FO and protect the important structures passing through FO and also during CT guided transfacial fine needle aspiration through FO to diagnose Malignancy. BY knowing the C I radiologist can also differentiate pathological FO from patent FO. Moreover to medico-legal expert, Anthropologist, and Anatomist. This study demands further embryological,

genetic, histological study because Norma basalis has complex and intricate embryological origin hence cranium is difficult bone to model because of its unusual morphology. Moreover the factors which determine the time and degree of ossification of cranium is still obscure.

This research paper is approved by Ethical committee of IIMSC& R Warudi. Badnapur (tq) Jalna (dist). Maharashtra.

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A Study to Analyze the Impact of Hyoid Laryngeal Matrices on the Opinion of Manner of Death in Asphyxia Cases

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ABSTRACT

In asphyxial deaths specific external and internal findings over the neck along with circumstantial evidence help in concluding death due to asphyxia. In asphyxial deaths specific external and internal findings over the neck along with circumstantial evidence help in concluding death due to asphyxia. **Objective:** A Study to analyze the impact of hyoid laryngeal matrices on the opinion of manner of death in asphyxia cases. **Materials and Method:** A cross sectional observational study was undertaken in Department of Forensic Medicine and Toxicology of Adichunchangiri Institute of Medical Sciences Hospital. All unnatural deaths brought to the study area for autopsy during the period from December 2012 to May 2014 and those fulfilling the inclusion and exclusion criteria were selected as study subjects. **Results:** The present study comprises a total of 40 cases, aged above 20 years. Among them 20 (50%) were male and 20 (50%) were female. The mean distance between the tips of the superior horns of thyroid cartilage in violent asphyxial deaths was 44.22 mm and 42.90 mm in other deaths, distance between the roots of the superior horns in violent asphyxial deaths was 45.10 mm and 42.17 mm in other deaths. The mean distance between the distal parts of greater horns in violent asphyxial deaths was 42.24 mm and 43.76 mm in other deaths.

Keywords: Death, Asphyxia, Thyroid, Hyoid,

INTRODUCTION

Violent asphyxial deaths have contributed considerably to unnatural homicidal, suicidal and accidental deaths. Various violent asphyxial deaths include hanging, ligature and manual strangulation, smothering, traumatic asphyxia, choking and drowning. Hanging is one of the leading manners of suicide in which there is suspension of body by a ligature compressing the neck externally, the constricting force being the weight of the body¹. Hanging is always considered suicidal except accidental hanging in sexual perverts, homicidal in lynching and justifiable judicial hanging.

In asphyxial deaths specific external and internal findings over the neck along with circumstantial

evidence help in concluding death due to asphyxia. In asphyxial deaths specific external and internal findings over the neck along with circumstantial evidence help in concluding death due to asphyxia.

In England and Wales hanging accounts for about 2000 deaths each year and considered the most common method of suicide¹. In United States of America 92.3% of all suicides were caused by firearms, hanging and poisoning². A report from Canada has also indicated hanging as the second most common method of suicide after suffocation³. Strangulation is a form of asphyxial death in which there is compression of neck structures by a force other than the body's own weight. The force may be exerted by different means such as ligature, hands when it is known as throttling or manual strangulation, elbow (mugging) and bamboos (bansdola)⁴. Deaths by strangulation are always considered homicidal but it may be accidental as seen in cases where law enforcers use choke holds to control the suspects as well as in wrestling, commonly known as mugging i.e.

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compressing the neck against elbow folds. Choking games known by different names as “Scarf game, black out game, pass out game or space monkey”, defined as self strangulation or strangulation by another person with hands or noose to achieve a brief euphoric state have been reported amongst the youths in United States of America during 1995 – 2007⁵

In drowning the access of air to the lung is prevented by submersion of body in water or fluid medium. It may be fresh or sea water depending upon the water in which the person is drowned⁶. Death due to drowning is common globally. Studies by United Nation’s World Health organization have shown that throughout the region of South Asia, about 90,000 people drown every year. Most of the South Asian countries have higher drowning death rates than the world average⁷. Italy, in a 20 years study from 1969 to 1998 has reported 24,496 deaths due to drowning. The death rate decreased from 22.7 to 5.2 deaths per million annually over the period of study, representing 77 % decline⁷.

Fatal accidental or homicidal smothering as a result of occlusion of external air passages i.e. nose and mouth is commonly seen in infants or young children though the old, weak, debilitated adults, epileptics and person under intoxication may be smothered. There may be no finding at autopsy if a soft pillow, cloth or cushion is used even in cases of homicide. Careful examination, interpretation of history and crime scene observation may be rewarding in such cases and avoid miscarriage of justice⁸.

Another form of asphyxial death is “Traumatic asphyxia” or “Crush asphyxia” which is associated with prevention of respiratory movement due to compression of, or penetrating trauma to the chest. Traumatic asphyxia is mostly accidental. It presents with cervicofacial cyanosis, subconjunctival hemorrhages, marked petechial hemorrhages over face, neck and upper part of chest due to compressive force to thoraco abdominal regions⁹. In the present study helps to find out the variations in the hyoid laryngeal metrics between the male and female deceased in asphyxial deaths.

OBJECTIVE

A Study to analyze the impact of hyoid laryngeal matrices on the opinion of manner of death in asphyxia cases.

MATERIALS AND METHOD

A cross sectional observational study was undertaken in Department of Forensic Medicine and

Toxicology of Adichunchanagiri Institute of Medical Sciences, Hospital. All unnatural deaths brought to the study area for autopsy during the period from December 2012 to May 2014 and those fulfilling the inclusion and exclusion criteria were selected as study subjects. All PM cases aged more than 20 years excluding crush injuries and fractures of hyoid laryngeal skeleton. At the end of the study period a total of 40 cases (Males-20 and Females-20) aged more than 20 years were included in the study. Sex differentiation made as per records and confirmed with biological features. Detailed autopsy was performed using the en-mass evisceration technique, examining all organs and cavities. Neck structures before dissection were radiographed to rule out any fractures. The larynx was dissected together with the trachea from the level of hyoid bone to the 3rd tracheal ring. The cartilages were cleaned of all the extrinsic muscles and mucous membrane and then separated very carefully from each other. Points of references on the cartilages for measurements were determined. Histo-pathological examination was done wherever necessary. Hyoid - laryngeal dimensions were measured by vernier callipers and goniometers. Points of references on the cartilages for measurements were determined.

RESULTS

The present study was carried out in the Department of Forensic Medicine, Adichunchanagiri institute of medical sciences Cases brought to the mortuary of Adichunchanagiri institute of medical sciences and Hospital , B G nagar, NagamangalaMandya. 40 cases were selected for the study based on purposive sampling. Following are the observations made during our study.

TABLE 1: Age & Sex wise distribution of study subjects

Age group	Sex		Total
	Male	Female	
20 – 30 years	9	7	16
31 – 40 years	4	6	10
> 40 years	7	7	14
Total	20	20	40

The present study comprises a total of 40 cases, aged above 20 years. Among them 20 (50%) were male and 20 (50%) were female. It was observed that maximum were in the age group of 20 – 30 years. Further it was observed that among 30 males 9(45%) were in the age group of 20 – 30 years, 04 (20%) were in the age group of 31- 40 years and 7(25%) were above 40 years. Out of the 20 females 7 (35%) were in the age group of 20 – 30 years, 06 (30%) were in the age group of 31- 40 years and 7(35%) were above 40 years.

In the present study, 12 (30%) cases died due to violent asphyxia. It was observed that majority of the deaths were due to poisoning 15 (37.5%) .

Table 2: Comparison of thyroid cartilage metrics between cases of violent Asphyxial deaths and others

Measurements	Asphyxial deaths		Other deaths		P value
	Mean	SD	Mean	SD	
AA (mm)	44.22	3.22	42.90	2.96	>0.05
BB (mm)	45.10	4.97	42.17	3.83	<0.05
CC (mm)	39.83	4.95	36.76	3.68	<0.05
DD (mm)	31.89	2.43	31.87	2.61	>0.05
AD (mm)	41.7	3.17	41.43	2.43	>0.05
AB (mm)	16.54	1.65	15.24	1.37	<0.05
BC (mm)	21.78	3.24	20.31	2.94	>0.05
CD (mm)	9.19	1.12	9.32	1.22	>0.05
BE (mm)	33.17	3.82	35.16	4.68	>0.05
CF (mm)	27.89	3.41	29.76	3.54	>0.05
EF (mm)	20.87	3.47	20.78	3.87	>0.05
α ($^{\circ}$)	88.59	8.76	87.21	9.92	>0.05
β (gms)	4.22	0.63	4.84	1.01	>0.05

The above table and chart shows comparison of the average dimensional values of thyroid cartilage metrics between cases of violent asphyxial deaths and those died due to other conditions. The mean distance between the tips of the superior horns of thyroid cartilage in violent asphyxial deaths was 44.22 mm and 42.90 mm in other deaths, distance between the roots of the superior horns in violent asphyxial deaths was 45.10 mm and 42.17 mm in other deaths, distance between the roots of the inferior horns in violent asphyxial deaths was 39.83 mm and 36.76 mm in other deaths, distance between the tips of the inferior horns in violent asphyxial deaths was 31.89 mm and 31.87 mm in other deaths, posterior height of the thyroid cartilage in violent asphyxial deaths

was 41.7 mm and 41.43 mm in other deaths, length of the superior horns in violent asphyxial deaths was 16.54 mm and 15.24 mm in other deaths, posterior height of the lamina in violent asphyxial deaths was 21.78 mm and 20.31 mm in other deaths, length of the inferior horns in violent asphyxial deaths was 9.19 mm and 9.32 mm in other deaths, superior width of the thyroid cartilage in violent asphyxial deaths was 33.17 mm and 35.16 mm in other deaths, inferior width of the thyroid cartilage in violent asphyxial deaths was 27.89 mm and 29.76 mm in other deaths, anterior height of the thyroid cartilage in violent asphyxial deaths was 20.87 mm and 20.78 mm in other deaths, thyroid angle in cases of violent asphyxial deaths was 88.59 $^{\circ}$ and 87.21 $^{\circ}$ weight

of thyroid cartilage in cases of violent asphyxial deaths was 4.22 g and 4.84 g in other deaths.

Statistically significant dimensional differences between above mentioned cases in the dimensions of the thyroid cartilage were not noticed, except for the distance between the roots of the superior horns, distance between the roots of the inferior horns and the length of the superior horns

Table 3: Comparison of cricoid cartilage metrics between cases of violent asphyxial deaths and other deaths

Measurements	Asphyxial deaths		Other deaths		P value
	Mean	SD	Mean	SD	
aa (mm)	19.14	2.78	19.82	2.11	>0.05
bb (mm)	14.25	2.66	14.34	2.78	>0.05
cc (mm)	18.16	3.24	19.13	3.71	>0.05
dd (mm)	13.43	2.9	13.98	3.27	>0.05
ee (mm)	2.46	0.45	2.89	0.43	>0.05
ff (mm)	3.94	0.47	4.13	0.76	>0.05
gg (mm)	19.96	2.07	20.21	2.25	>0.05
γ(gms)	3.14	0.54	3.78	0.89	>0.05

The above table and chart shows comparison of the average dimensional values of cricoid cartilage metrics between cases of violent asphyxial deaths and those died due to other conditions. The mean outer transverse diameter of the cricoids cartilage in violent asphyxial deaths was 19.14 mm and 19.82 mm in other deaths. The mean inner transverse diameter of the cricoids cartilage in violent asphyxial deaths was 14.25 mm and 14.34 mm in other deaths. The mean outer anteroposterior diameter of the cricoid cartilage in violent asphyxial deaths was 18.16 mm and 19.13 mm in other deaths. The mean inner anteroposterior diameter of the cricoid cartilage in violent asphyxial deaths was 13.43 mm

and 13.98 mm in other deaths. The mean thickness of cricoid cartilage at the level of arch in violent asphyxial deaths was 2.46 mm and 2.89mm in other deaths. The mean thickness of cricoid cartilage at the level of lamina in violent asphyxial deaths was 3.94 mm and 4.13 mm in other deaths. The meanheight of cricoid lamina in violent asphyxial deaths was 19.96 mm and 20.21 mm in other deaths. The mean weight of cricoid cartilage in violent asphyxial deaths was 3.14 g and 3.78 g in other deaths.

It was noticed that there was no statistical significant difference in any of the dimensions of the cricoid cartilage in the above mentioned cases.

Table 4: Comparison of hyoid bone metrics between cases of violent asphyxial and other

Measurements	Asphyxial deaths		Other deaths		P value
	Mean	SD	Mean	SD	
A (mm)	42.24	2.56	43.76	2.93	>0.05
B (mm)	37.86	2.91	38.06	3.24	>0.05
C (mm)	11.89	1.23	11.31	1.07	>0.05
D (mm)	31.97	2.90	31.47	2.67	>0.05
E (mm)	26.05	3.02	26.46	3.38	>0.05
F (mm)	27.12	3.34	27.76	3.70	>0.05

The above table and chart shows comparison of the average dimensional values of hyoid bone metrics between cases of violent asphyxial deaths and those died due to other conditions. The mean distance between the distal parts of greater horns in violent asphyxial deaths was 42.24 mm and 43.76 mm in other deaths. The mean distance from anterior middle of the body to the line that connects greater horns in cases of violent asphyxial deaths was 37.86 mm and 38.06 mm in other deaths. The mean distance from anterior middle of the body to the line that connects lesser horns in cases of violent asphyxial deaths was 11.89 mm and 11.31 mm in other deaths. The mean distance between lesser horns in cases of violent asphyxial deaths was 31.97 mm and 31.47 mm in other deaths. The mean distance between lesser and distal part of the greater horn at the right side in cases of violent asphyxial deaths was 26.05 mm and 26.46 mm in other deaths. The mean distance between lesser and distal part of the greater horn at the left side in cases of violent asphyxial deaths was 27.12 mm and 27.76 mm in other deaths.

It was noticed that there was no statistical significant difference in any of the dimensions of the hyoid bone in the above mentioned cases.

ABBREVIATIONS:

AA: Distance between the tips of the superior horns

BB: Distance between the roots of the superior horns.

CC: Distance between the roots of the inferior horns.

DD: Distance between the tips of the inferior horns.

AD: The posterior height of the thyroid cartilage.

AB: The length of the superior horns.

BC: The posterior height of the lamina.

CD: The length of the inferior horns.

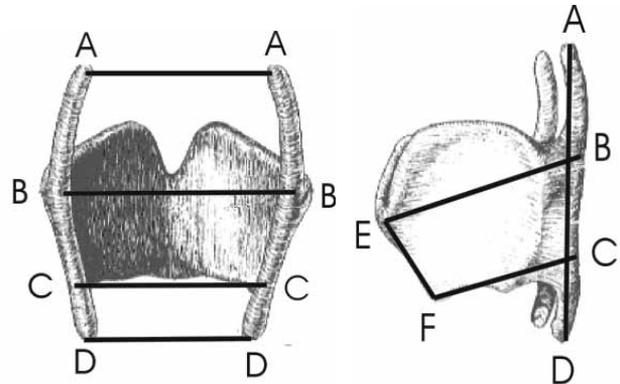
BE: The superior width of the thyroid cartilage.

CF: The inferior width of the thyroid cartilage.

EF: The anterior height of the thyroid cartilage.

α : Thyroid angle.

β : Weight of thyroid cartilage.



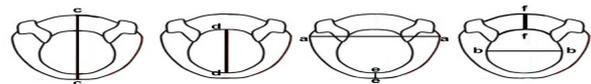
aa: Transverse diameter of the cricoids cartilage (outside)

bb: Transverse diameter of the cricoids cartilage (inner)

cc: Anteroposterior diameter of the cricoids cartilage (outside)

dd: Anteroposterior diameter of the cricoids cartilage (inner)

ee: Thickness of cricoid cartilage at the level of arch.



ff : Thickness of cricoid cartilage at the level of lamina.

gg: Height of cricoid lamina.

γ : Weight of cricoid cartilage.

A: Distance between the distal parts of greater horns.

B: Distance from anterior middle of the body to the line that connects greater horns .

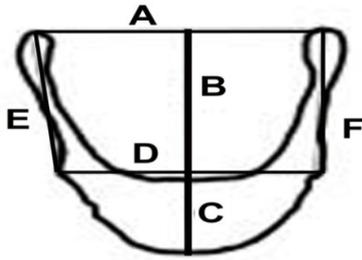
C: Distance from anterior middle of the body to the line that connects lesser horns.

D: Distance between lesser horns.

E: Distance between lesser and distal part of the greater horn at the right side.

F: Distance between lesser and distal part of the

greater horn at the left side.



CONCLUSION

The dimensions of thyroid cartilage in the cases of violent asphyxia death and normal death has significant statistical difference except for the distance between the roots of the superior horns, distance between the roots of the inferior horns and the length of the superior horns.

There was no statistical significant difference in any of the dimensions of the epiglottic cartilage, cricoids cartilage and hyoid bone when compared in cases of violent asphyxial deaths and other deaths.

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Source of Funding: Self

Conflict of Interest: Nil

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Association of Barbiturates in Biological Activities as a Toxicological Agent

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ABSTRACT

Barbiturates are known to have toxic activities on the body and are also known to affect the metabolic activities. They are weak acids, soluble in organic solvents and can be extracted from aqueous media. Therefore, they are generally classified as organic non-volatile substances extractable from acid solutions and are included in the schedule of NDPS Act. They are mainly termed as hypo-sedatives under the psychoactive group of drugs. A sedative is a drug, which is used to allay a patient and to make him drowsy without actually inducing sleep, where a hypnotic is a drug, which produces sleep. Therapeutically, they are used as sedatives, hypnotics, anaesthetics, and anticonvulsants. Biological activity shown by any molecule has been considered to be an individual or collective nature of the constituting atoms and/or substituent. Toxicological studies of rare-earth elements are very difficult because they were contaminated with other similar elements making interpretation of the results difficult. Therefore, in the present article by keeping above facts in mind the author has discuss the Barbiturate toxicity and various biological activities associated with it from reading secondary data sources i.e. e-books, research publications and various toxicological reports etc.

Keywords: Barbiturates, Rare earth elements, Toxicity, Biological Activity etc.

INTRODUCTION

Barbiturates are weak acids, soluble in organic solvents and can be extracted from aqueous media. Therefore, they are generally classified as organic nonvolatile substances extractable from acid solutions. Barbiturates are included in the schedule of NDPS Act. They are mainly termed as hypo-sedatives under the psychoactive group of drugs. A sedative is a drug, which is used to allay a patient and to make him drowsy without actually inducing sleep, where a hypnotic is a drug, which produces sleep. The barbiturates therapeutically are used as sedatives, hypnotics,

anaesthetics, and anticonvulsants. Biological activity shown by any molecule has been considered to be an individual or collective nature of the constituting atoms and/or substituent.

In other words the biological activity to any molecule is granted an account of its stereo specific arrangement of the groups or the constituents. It can also be stated that it seems necessary to have knowledge of the structure activity relationship of the groups, atoms and their constituents. Intervention of computers in the field of structure and dynamics have facilitated the prediction of a 3D-structure of a molecule on the monitor before it is actually synthesised in laboratory and to have a pre-hand information about its energetic and structure dynamics.

Barbiturates are known to have toxic activities on the body and are also known to affect the metabolic activities. The mechanisms of the processes are partially known. The intervention of computer in field of chemistry and in the field of mechanistic approach

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has helped a chemist to presume and derive relationship between specific molecular model and structural and behaviour characteristics of a molecule, so as to use it as a probable drug.

MATERIAL AND METHOD

The present article has been prepared from the data gathered from the secondary data sources such as e-journals, e-books, text books and from other relevant researches. Key search criteria were toxicity, rare earth elements, biological activities and signs and symptoms associated with barbiturate toxicity. In the present article the broad area of search study were evaluating electronic spectral parameters of Sm(III) and Eu(III) with some amino acid, drugs, computational modelling of barbiturates for their different substituent and derivatives (~15) so as to study the changes in their structural features and to correlate them with their physiological activities.

Barbiturate Toxicity

Barbiturates are derived from barbiturates acid (molonyl urea) which results from the condensation of melodic acid and urea¹. Barbiturates acid itself is not a central depressant. The first hypnotic barbiturate, diethyl-barbituric acid or barbital was introduced in 1903, under the trade name of veronal, which was a useful hypnotic that could induce sleep in both human and animals. Almost a decade later, in 1912, a second barbiturate, phenobarbitone, was introduced into medicine as a sedative-hypnotic, i.e., a drug that induced relaxation, relief from anxiety and sleep.

V. Baeyer, in 1984² detected barbituric acid in the course of an investigation of the uric acid group and noted the relation between barbituric acid and normal body components. Since then 2500 derivatives have been synthesized of these fifty compounds are of interest to the forensic scientist because they are clinically used³. A careful comparison of the barbiturates and the benzodiazepines reveals the following cogent reasons for this absoulence. These reasons are dependence liability, potential for suicide, quality of sleep, ant anxiety selectivity, safety and side effects. Nevertheless, they continue to be prescribed by a significant number of physicians⁴. Therapeutic use of barbiturates are clinically used as hypnotics anticonvulsives, narcotics, and for miscellaneous purposes (viz. antispasmodics, analgetics, sedatives, antithyroids, etc.) for soporific

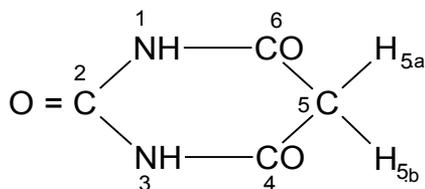
purpose barbiturates with long medium, and short action are employed.^{5, 6}

On the second day of poisoning blood, urine and the contents of a fresh blister were analysed spectrophotometrically using. The analysis of organs and tissues was possible only to a restricted extent. It was performed according to the valov extraction and the residues from the extraction were separated by paper chromatography. Mebaral and pheno barbital were separately identified by crystal optical methods⁷.

Barbirutares are readily soluble in alcohol and therefore the old stas-otto. Protein precipitation method does not lead to a considerable loss in the barbiturate extraction. Krause and Cross⁸ found that the solubility of phenobarbital in hydroalcoholic solutions reaches a maximum at 90 % alcohol. The solubility of phenoarbital in alcohol is increased by the addition of glycerin although glycerin and glycerin-water solutions are poor solvents for this compound⁹.

Historic development has shown that certain derivatives are preferred in the different countries e.g. in Germany phenobarbital, barbital, phanodorn, evipal in France, neonal in the USA, Amytal, pentobarbital, pentothal, in Denmark, diol, numal in Great Britain, phenobarbital, butabarbital, amytal. Identification in cases of addiction, it is necessary to know the metabolites accumulated, as a result of the permanent use of large doses of barbiturates. Addicts prefer using the derivatives viz., Phanodorn, medomin, amytal, seconal. Tolerance and cross tolerance have been observed in animal experiments by barbiturate use on addicted animals¹⁰.

The lethal doses for man are having been reported: Barbital 7-12g Phenobarbital 4-5g, 6-8g. Mebral above 10g; Seconal 1.2 g Dial 2.4 g (one a dose of 4g was survived). Walls estimated the quantities ingested from the examination of eighty four fetal barbiturate poisoning causes¹¹. Barbiturates are weak acids, soluble in organic solvents and can be extracted from aqueous media. Therefore, they are generally classified as organic nonvolatile substances extractable from acid solutions. The technique of extraction from an acid medium is the fundamental principle for the isolation of barbiturates.

Chemical Structure:

The general formula of barbiturate is given below:

where:

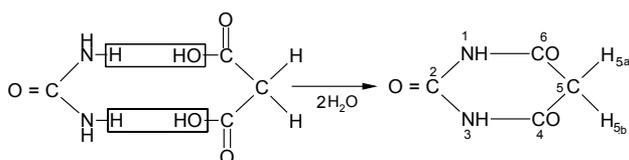
R_{5a} = alkyl or aryl group

R_{5b} = alkyl or aryl group

R_3 = H or CH_3

Group R_2 may be a barbutyl or thio group ($O=C$; $S=C$)

As mentioned earlier barbituric acid (Malonyl urea) results from the condensation of Malonic acid and urea. The reaction is depicted below.



Urea + Malonic acid

Barbituric acid

On the basis of their clinical effects the barbiturates may be classified as in the following Categories with their examples and these are mentioned in table-1: ¹²

Table-1: Shows Different Categories of Barbiturate with their Examples

S. No.	Category	Examples
1.	LAB	Barbitone, Phenobarbitone, Mebaral, Rutonal
2.	IAB	Amyobarbitone, Butobarbitone, Dormovit
3.	SAB	Phenobarbitone, Cyclobarbitone, Seconal, Narconumal
4.	UAB	Hexobarbitone, Surital, Evipal

***LAB:** Long Acting Barbiturates, **IAB:** Intermediate Acting Barbiturates, **SAB:** Short Acting Barbiturates, **UAB:** Ultra-short Acting Barbiturates.

Pharmacological Properties of Barbiturates: The Pharmacological properties are as follows:

Central Nervous System:

The barbiturates produce all degrees of depression of the CNS, depending on the dose, ranging from mild sedation to general anaesthesia.

Sedation: This action is brought about by the smallest effective doses of barbiturates and it results in a reduction in restlessness, irritability and nervousness without producing psychomotor impairment.

Hypnosis: When administered at bed, in doses three to four times higher than sedative doses, they produce a greater degree of CNS depression.

Anticonvulsive activity : Most barbiturates are capable of controlling convulsive seizures by reducing the responsiveness of normal neurons in the CNS to nerve impulses that reach of them from an abnormal brain are which is rapidly discharging repeated stimuli.

Anaesthesia: High dose of any barbiturate can produce loss of consciousness by blocking the passage of nerve impulses from the reticular activity system to the cerebral cortex. Thiopental and methohexital act rapidly when injected intravenously and cause loss of consciousness.

Analgesia: None of the barbiturates has an analgesic activity. Actually, the barbiturates are hyperalgesic and increase the reaction to painful stimuli. The sedatives effect on the barbiturates does reduce the emotional response to painful stimuli.

Amnesia: Sometime forgetfulness follows the use of moderate doses of barbiturates, Barbiturate induced amnesia and confusion may also be a factor in accidental over dosage and acute intoxication.

Disinhibition: The barbiturates have the ability to release certain nerve cells from the inhibitory influences of certain other cells in the brain leading to mental, emotional and behavioural changes.

Peripheral Nervous System:

Barbiturates selectively depress transmission in sympathetic ganglia, and this may partly account for the fall in blood pressure produced by intravenous oxybarbiturates and in cases of acute barbiturate poisoning.

Respiratory System: Barbiturates depress both

the respiratory drive and mechanism responsible for the rhythmic character of respiration.

Cardiovascular System: In sedative or hypnotic dose, the barbiturates have little effect on cardiovascular parameters, except for a slight decrease in heart rate and fall in blood pressure. Thiopental and other compounds of barbiturates decrease cardiac output and renal plasma flow, increase in the heart rate and decrease the myocardial utilization of fatty acid.

Gastrointestinal System: The oxybarbiturates decrease the tone of the gastrointestinal musculature and the amplitude of rhythmic contractions.

Hepatic Drug Metabolism:

The barbiturates have significant effects on the hepatic microsomal drug metabolism system. They combine with cytochrome P-450 and interfere with the bio-transformations of a number of substrates of this enzyme.

Genitourinary System: In hypnotic doses the barbiturates do not significantly impair uterine activity, but in anaesthetic doses they decrease the force and frequency of uterine contractions.

Tolerance and Dependence:

Since drug tolerance, which involves a decreased response to a drug after repeated use and drug dependence go hand in hand, with an individual, who regularly takes barbiturates for their sedative hypnotic effect and finds that after a while the original dose is not as effective as it used to be and that it takes a larger amount of the drug to produce the original effect.

Barbiturate Overdose and Toxicity:

Basically, barbiturate overdose results in a state of anaesthesia accompanied by general depression of the central nervous system. The temperature regulating centre in the brain may be affected, causing the body to overcool and similarly, the heart beat may slow and blood pressure may fall. Finally, shock may set in, either as a direct result of the high dose of barbiturate or because of the other factors.

Pregnant women may run some risk in taking barbiturates, within a few minutes after the injection of a short or ultra short acting barbiturate, the concentration of barbiturate in the foetus's blood

is amount the same as that of the mother. Because barbiturates are distributed to all the body tissues, small amount may appear in the mother's milk after injection of large barbiturate dose^{13, 14}.

FINDINGS

In the present article the literature based findings are as follows:

The barbiturates produce all degrees of depression of the CNS, depending on the dose, ranging from mild sedation to general anaesthesia

The smallest effective doses of barbiturates can cause reduction in restlessness, irritability and nervousness without producing psychomotor impairment.

Three to four times higher doses of barbiturates may produce a greater degree of CNS depression. For this purpose agents with short to intermediate duration like pentobarbital and amobarbital are preferred to Phenobarbital during the treatment of occasional insomnia.

Most barbiturates are capable of controlling convulsive seizures by reducing the responsiveness of normal neurons in the CNS to nerve impulses that reach of them from an abnormal brain are which is rapidly discharging repeated stimuli.

Barbiturates selectively depress transmission in sympathetic ganglia, and this may partly account for the fall in blood pressure produced by intravenous oxybarbiturates and in cases of acute barbiturate poisoning.

Barbiturates depress both the respiratory drive and mechanism responsible for the rhythmic character of respiration.

The barbiturates are themselves metabolised by hepatic endoplasmic reticulum and increase the rate of their own metabolism which accounts partly for the development of tolerance to the barbiturates.

Since drug tolerance, which involves a decreased response to a drug after repeated use and drug dependence go hand in hand, with an individual, who regularly takes barbiturates for their sedative hypnotic effect and finds that after a while the original dose is not as effective as it used to be and that it takes a larger amount of the drug to produce the original effect.

Basically, barbiturate overdose results in a state of anaesthesia accompanied by general depression of the central nervous system. Breathing is slowed, which cause a lack of oxygen in the blood.

Pregnant women may run some risk in taking barbiturates, within a few minutes after the injection of a short or ultra short acting barbiturate, the concentration of barbiturate in the foetus's blood is amount the same as that of the mother.

DISCUSSION

Barbiturates are chemical derivatives of barbituric acid and depending on their period of action, they are classified as long acting (>6 hours), intermediate acting (3-6 hours) and short acting (< 3 hours). A barbiturate binds to Gamma amino butyric acid receptors and delays the opening of chloride channels, inhibiting the excitable cells of the CNS. Barbiturates are commonly used with suicidal intent by taking over dosages. Short acting barbiturates are more dangerous than long acting. Shock and anoxia appears frequently and coma is much more severe by the use of short acting barbiturates.

CONCLUSION

In some chronically intoxicated individual, even though they have no previous history of epilepsy, major convulsive seizures are followed by sudden withdrawal of barbiturate.

Hangover and drowsiness may sometimes occur in the morning after barbiturate use. This is due to the residual depression of CNS.

Effect on sleep: Therapeutic doses produce satisfactory sleep for the first one or two week, therefore, because of CNS habituation, the drug results in anxiety, insomnia and excessive dreaming. On withdrawal a REM rebound occurs, while is associated with poor sleep and nightmares.

Paradoxical excitement: In some parents the barbiturates may produce paradoxical restlessness, excitement and delirium.

Drug automatism: The term automatism refers to a state of amnesia in which an individual takes reported doses of barbiturates, without remembering that earlier a dose has been taken, until lethal amounts are taken and acute barbiturate poisoning occurs.

Drug dependence develops rapidly with the barbiturates their addictive liability is high and they can produce both psychic and physical dependence.

Hypersensitivity relations may sometimes occur specially in patients who tend to have asthma, angioedema and similar conditions.

Accidental and suicidal deaths from acute barbiturate poisoning are encountered frequently. Treatment varies with the degree of intoxication. In general, in case of acute poisoning maintenance of respiration and cardiac function is directed, which is followed by decontamination. In severe intoxication, measures to enhance elimination of absorbed barbiturate may be necessary, such as diuresis, urine alkalinisation, and dialysis and homo perfusion.

Conflict of Interest: Nil

Source of Funding Agency: Self

Ethical Clearance: Not Required

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Stature Estimation from Foot Measurements by Regression Equation in Males of Bhavnagar - Gujarat

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ABSTRACT

Introduction: Because time is a critical factor in crime scene investigation, rapid identification of suspects is important. Stature estimation is the important parameter in forensic identification work. Various anthropometry techniques have been used to estimate the stature for long times by using statistical formulae. So, reconstruction of stature from different body parts and the relationship between them is an area of interest to forensic experts, anthropologists and anatomists. **Objectives:** To find out correlation between stature and foot measurements & also derive regression equations for estimation of stature in specific population. **Method:** In present study, total 250 healthy male individuals of 18 to 25 years of age group belongs to Bhavnagar region were selected. All the individuals were measured for foot length & foot breadth separately on right and left side and stature. All the data were subjected to statistical analysis using Microsoft Excel 2007 Software (Data Analysis). **Results:** The present study showed statistically significant and positive correlation between stature and measurements of foot. Stature had statistically significant ($p < 0.001$) and higher value of correlation(r) as 0.896 for right, left and mean foot length and 0.796, 0.793 and 0.795 for right, left and mean foot breadth respectively. Simple and multiple linear regression equations were derived for specific study population to estimate stature from foot measurements. **Interpretation & Conclusion:** Foot measurements exhibited statistically significant and positive value of correlation with stature. It is also concluded that the multiple regression formulae were the better indicator of stature estimation than simple regression equations.

Keywords: Stature, foot length & breadth, corpus delicti, regression equation

INTRODUCTION

Human stature is anatomical complex of linear dimensions, including skull, vertebral column, pelvis and lower extremities & it is assumed that significant associations exist between the total stature and these individual body parts. Therefore the relationship between them is an area of interest to forensic experts, anthropologists and anatomists.

Medical profession especially forensic medicine & anatomy and law enforcement agencies tried to work in the subject with fragmentary patch ups. The science of Forensic Medicine looked for assistance in their 'Reconstructive and Investigative medicine' towards the subject of Anthropology which is in nutshell the study of man - 'the total man'. It deals with man's physical makeup and his pattern of social and cultural behaviour in the present and past. The major two divisions may be considered as Physical and Social Anthropology. When the knowledge of Physical Anthropology is applied to crime investigation and reconstruction, it becomes the subject of Forensic Anthropology.

Many of the mutilated unknown, dismembered dead-bodies send for postmortem examination may have intact and well preserved body appendages like

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foot in many cases as compared to other body parts. So from this study, we can find out approximate stature in such cases for establishing the identity which is very important in **Corpus Delicti**.

Keeping this in mind, this study was carried out for estimation of stature of 250 healthy male individuals between 18 - 25 years of age belonging to Bhavnagar region by regression equation formula from foot measurements.

OBJECTIVES

(1) To find out the relationship between stature (Dependable Variable) and foot measurements (Independent Variable).

(2) To derive population specific regression equations for estimation of stature from the measurements of foot in male population (mainly in 18 to 25 years age group) of Bhavnagar region

METHODOLOGY

In present cross sectional study was conducted during 2014-15 in which total 250 asymptomatic, healthy male individuals between 18 - 25 years of age belonging to Bhavnagar region were selected irrespective of their caste, religion, dietary habits & socio-economic status.

Exclusion Criteria:

1. Individuals with growth disorders, deformities, bony anomalies and h/o fracture of long bones were excluded.

2. Age group below 18 and above 25 years.

IRB Ethical Committee permission was taken prior to study. The procedure, aims & objectives of the

study was explained and written informed consent was obtained from each of the participants before taking measurements.

Height (stature): Each individual was asked to stand barefoot on Standard anthropometric measuring instrument Anthropometer (stadiometer) in anatomical position with head being oriented in the Frankfurt's plane as the distance between the standing surface and vertex - highest point of head.

Foot length: With the help of spreading vernier caliper, foot length was measured in standing position as a straight distance between most posterior projecting point of the heel (Pternion) to the most anterior projecting point (Acropodion) of the first or second toe whichever is bigger, with equal pressure on both foot.

Foot Breadth: With the help of sliding vernier caliper, foot breadth was measured as a straight distance from metatarsale tibial (most medial point of the head of 1st metatarsal) and metatarsale fibula (most lateral point of the head of 5th metatarsal).

A small group of individuals were selected for taking various measurements each day at a fixed time in afternoon (12:00 pm to 3:00 pm) to avoid diurnal variations. It was measured and recorded only by the author, to avoid inter-observer error in methodology. All the measurements were recorded thrice and their mean will be calculated for accuracy. All the measurements were taken in cm. All measurements of foot were taken separately for right and left side for each individual. All the data were subjected to statistical analysis using Microsoft Excel 2007 Software (Data Analysis).

RESULTS

Table 1: Descriptive Statistics of Various Parameters

	Stature	Right Foot Length	Left Foot Length	Right Foot Breadth	Left Foot Breadth
Mean	171.09	25.18	25.16	9.59	9.56
Median	170.9	24.8	24.8	9.5	9.5
Mode	171.3	24.8	24.7	9.2	9.1
Minimum	155.6	22.2	22.1	7.9	7.9
Maximum	185.2	29.5	29.5	11.9	11.8
Range	29.6	7.3	7.4	4	3.9
SD	5.39	1.39	1.40	0.67	0.67

SD: Standard Deviation

The results of present study show mean stature \pm SD was 171.09 ± 5.39 cm, right foot length \pm SD was 25.18 ± 1.39 cm, left foot length \pm SD was 25.16 ± 1.40 cm, right foot breadth \pm SD was 9.59 ± 0.67 cm, left foot breadth \pm SD was 9.56 ± 0.67 cm in male individuals of Bhavnagar region. (Table 1)

Table 2: Table Showing Correlation(r) Between Stature and Foot Measurements

Sr. No.	Parameters	Pearson Correlation	'P' Value
1	Right Foot Length(RTHL)	0.896	< 0.001**
2	Left Foot Length(LTHL)	0.896	< 0.001**
3	Mean Foot Length(HL)	0.896	< 0.001**
4	Right Foot Breadth(RTHB)	0.796	< 0.001**
5	Left Foot Breadth(LTHB)	0.793	< 0.001**
6	Mean Foot Breadth(HB)	0.795	< 0.001**

** Correlation is statistically highly significant

Table 2 illustrates the correlation coefficients between stature and measurements of foot in males. In

Table 4: Linear Regression Equations for Estimation of Stature

DV	IV (Foot Measurements)	R ²	Adjusted R ²	SEE
Stature	$83.436 + 3.481$ (RTFL)	0.803	0.802	2.398
Stature	$84.059 + 3.46$ (LTFB)	0.802	0.801	2.401
Stature	$83.72 + 3.471$ (FL)	0.803	0.802	2.398
Stature	$109.82 + 6.39$ (RTFB)	0.634	0.632	3.266
Stature	$110.44 + 6.35$ (LTFB)	0.629	0.628	3.288
Stature	$10.044 + 6.38$ (FB)	0.632	0.631	3.273

DV: Dependent Variable, IV: Independent Variable,

SEE: Standard Error of Estimate

Table 4 shows simple linear regression equation derived for stature estimation in males from foot length and foot breadth and also the values of R², Adjusted R² and SEE mentioned in this table. The higher value of R, R², Adjusted R² and Lower value of SEE indicate relative accuracy and reliability of the formulae. So, the best simple linear regression formulae was derived for stature estimation from mean foot length for males was as follows,

$$\text{Stature} = 83.72 + 3.471 (\text{FL}) \pm 2.398$$

present study, the highest correlation coefficient was observed between stature and foot length as 0.896 and lowest value of correlation as 0.793 was for left foot breadth which was statistically highly significant ($p < 0.001$) and this relationship was also explained by graph 1 & 2 due to strong association as straight line in scatter diagrams. So from this relationship, the regression equation formulae were derived for stature estimation from foot measurements.

Table 3: Paired Samples t-Test Showing Statistical Difference Between Right and Left Side

Paired Sample		t	DF	'P' Value
Pair-1	Right Foot Length - Left Foot Length	6.43	249	< 0.001**
Pair-2	Right Foot Breadth - Left Foot Breadth	11.46	249	< 0.001**

**Statistically highly significant, DF: Degree of Freedom

Paired t test was performed to analyse statistical difference between right and left side of observations for males which showed statistically highly significant bilateral variation ($p < 0.001$) (Table 3).

Table 5: Multiple Regression Equations for Estimation of Stature

DV	IV (Foot Measurements)	R ²	Adjusted R ²	SEE
Stature	83.569 + 2.767 (RTFL) + 1.860 (RTFB)	0.823	0.821	2.277
Stature	84.115 + 2.762 (LTFL) + 1.829 (LTFB)	0.822	0.820	2.283
Stature	83.815 + 1.847 (FL) + 2.765 (FB)	0.823	0.821	2.279

Table 5 shows multiple regression equation derived for stature estimation from foot length and foot breadth measurements. So, the best multiple regression formulae was derived for stature estimation from right foot length and breadth measurements for males was as follows,

Stature = 83.569 + 2.767 (RTFL) + 1.860 (RTFB) ± 2.277

As mentioned earlier that the reliability and accuracy of formulae depends on higher value of R, R², Adjusted R² and Lower value of SEE. Thus, the observations of present study exhibit that multiple regression formulae were better predictor of stature as compared to simple linear equations.

DISCUSSIONS

Many studies in the past have been carried out by different researchers to estimate the stature from various body parts as well as long bones by using regression formulae but only precaution that can be taken in to consideration is, formulae are applicable to concerned region from which data has been collected because of inherent population variation in these measurements.

In present study, bilateral variations were statistically significant (p < 0.001) for all the measurements of foot. In present study, the mean stature of males was 171.09 ± 5.39 cm and ranged between 155.6 cm to 185.2 cm which was also consistent with previous studies like Babu RS et al¹, Sutay S et al² and Patel SM et al³.

Table 6: Comparison of Various Studies to Estimate Stature from Foot Length

Sr. No	Author’s Name	Population	Year	‘r’ Value	Regression Equation	SEE
1	Philip TA et al	Karnataka	1988	0.71	72.40 + 3.80(FL)	4.92
2	Krishan K et al	Rajputs Himachal Pradesh	2006	0.73	68.09 + 4.05(FL)	4.44
3	Patel SM et al	Gujarat	2007	0.65	75.45 + 3.64(FL)	5.13
4	Ilayperuma I et al	Galle, Sri Lanka	2008	0.724	79.04 +3.59(FL)	--
5	Jakhar JK et al	Haryana	2010	0.725	82.597 + 3.572(FL)	4.346
6	Parekh U et al	Gujarat	2014	0.979	74.75 + 3.42(FL)	2.33
7	Upadhyay MC et al	Gujarat	2015	0.752	86.96 + 3.40(RTFL)	--
8	Upadhyay MC et al	Gujarat	2015	0.769	84.63 + 3.49(LTFL)	--
9	Present Study	Bhavnagar	2015	0.896	83.436 + 3.48(RTFL)	2.398
10	Present Study	Bhavnagar	2015	0.896	84.059 + 3.46(LTFL)	2.401
11	Present Study	Bhavnagar	2015	0.896	83.72 + 3.471(FL)	2.398

Table 6 shows comparison of various studies to estimate stature from foot length in males. In present study, stature had correlation(r) of 0.896 with right, left and mean foot length respectively, which were statistically highly significant ($p < 0.001$). Various previous studies conducted by Krishan K et al⁵, Ilayperuma I et al⁶ and Upadhyay MC et al⁹ showed similar value of correlation coefficient while Parekh

U et al⁸ exhibited highest value of ' r ' as 0.979. Present study also revealed the lower value of SEE as 2.398, 2.401 and 2.398 for stature estimation from right, left and mean foot length respectively as compared to all other studies mentioned in table 6 except the study conducted by Parekh U et al⁸ as 2.33.

Table 7: Comparison Of Various Studies To Estimate Stature From Foot Breadth

Sr. No	Author's Name	Population	Year	'r' Value	Regression Equation	SEE
1	Singh SD et al	Manipur	2005	0.539	106.065 + 5.75(FB)	5.475
2	Narde AL et al	Nagpur	2013	0.975	29.6 + 13.5(RTFB)	1.585
3	Narde AL et al	Nagpur	2013	0.969	31.0 + 13.2(LTFB)	1.786
4	Present Study	Bhavnagar	2015	0.796	109.82+6.39(RTFB)	3.266
5	Present Study	Bhavnagar	2015	0.793	110.44+6.35(LTFB)	3.288
6	Present Study	Bhavnagar	2015	0.795	110.044+6.38(FB)	3.273

Table 7 shows comparison of various studies to estimate stature from foot breadth in males. In present study, stature had correlation(r) with right, left and mean foot breadth were 0.796, 0.793 and 0.795 respectively, which were statistically highly significant ($p < 0.001$). The study conducted by Narde AL et al¹¹ exhibited similar higher value of correlation with lower value of SEE, while Singh SD et al exhibited lower value of correlation and higher SEE value as compared to present study.

In present study, it was concluded that the reliability and accuracy for estimation of stature were better in multiple linear regression equations than simple linear regression formulae.

CONCLUSION

The identification and evaluation of deadbodies or dismembered body parts is become a challenging task for forensic experts. DNA analysis could be the most accurate procedure for identification but it lacks in terms of reasonableness, affordability and time consuming in developing countries like India. Hence, the identification from anthropometry like present study, involving foot and hand measurements to estimate stature could be reasonable, convenient and simple.

Both foot length and foot breadth measurements exhibited statistically highly significant value of correlation in males ($p < 0.001$). Simple and multiple linear regression equations have been calculated from data which can be useful to estimate stature from foot measurements in males for concerned study population. It is also concluded that the multiple regression formulae were the better indicator of stature estimation than simple regression equations.

Conflict of Interest: - Nil -

Source of Funding:- Self

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Medico Legal Aspects in the Cases of Flame Burn Deaths

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ABSTRACT

Injuries due to burns are known to have a very high mortality. Burn injuries occur due to a variety of thermal, electrical, mechanical products and can be accidental, suicidal or even homicidal in nature. In this study flame burn injuries are taken. According to this study in flame burn victim most of the cases was of suicide those were followed by accidental and homicidal those were found. The absence of soot in the respiratory tract does not allow in drawing the conclusion that exposure to the fire occurred after death. Apart from the soot inhalation as a vitality parameter, there are other vital signs that include, line of redness, vesicles can be seen.

Keywords: Flame Burn, Injury, Mortality, Suicidal, Homicidal, Accidental

INTRODUCTION

Man has invented fire since time immortal. The use of fire in various aspects has not only added to his comforts but also added to his misuses by increasing the risk of burns. Fire was perhaps man's first double-edged sword, evidenced throughout history; it has served as well as destroyed mankind¹. Burn injuries are dry thermal injury caused due to contact with dry heat such as flame, radiant heat or some heated solid substance like metal or glass, to the body surface.² Mammalian tissue can survive only within a relatively within narrow range of temperature, 22-44oC.³ In India below 7 year married female burn deaths are linked with Dowry death, where a young married women attempt or commits suicide in consequent to their being subjected to harassment by their husband or in-laws or his relative or cruelty constitute the offence of Dowry death, a monstrous social evil is widely prevalent and deep rooted in society in spite of most of the awareness programmers but this is due to adequate legal system but her implementation and administration are not stringent.⁴ Medico- legal

study define as study of, relating to, or concerned with both medicine and law, as when medical testing or examination is undertaken for a legal purpose.⁵ Degrees of Burns-There are four basic categories of burns, ranging from first to fourth degree, with fourth degree representing the most significant level of burn. First Degree: – these burns only affect the outer layers of skin. In most cases, first degree burns will appear as irritations on the skin, such as a bright red skin color or blotchy marks in the burned area. Usually, first degree burns will heal on their own, within about seven to ten days, although many victims of first degree burn find comfort in using soothing or medicating rubs, including aloe based products. The most common form of first degree burn is sunburn. Second Degree: – when the burn permeates through the first layers of skin and causes damage to the more substantial skin layers underneath, the burn will be classified as a second degree burn. In many cases, these burns will manifest as either clear or blood-filled blisters in the burned area. Most, though not all, second degree burns will leave scar tissue in the burned area. In some cases, skin grafting may be used to alleviate scar tissue. Third Degree: – these burns penetrate all the way through the outer layers of skin, and cause burn damage to the subcutaneous skin layers, which sit just above the muscle and bone. In almost all third degree burn cases, the burn will leave substantial scarring throughout the affected area, and will likely require skin grafts. In extreme cases, amputation may

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be necessary. Fourth Degree: – representing the most severe of all burns, a burn will be classified as fourth degree when it pierces through all layers of the skin and causes damage to the underlying muscle, bone, or internal organs. Treatment almost always requires amputation of the burned area, and in many cases, these burns cause death.⁶ In homicidal deaths, where victims are burned to hide the method of death, accelerants cannot be detected in the blood, soot cannot be found in the airways, and carboxyhemoglobin concentrations are not higher than those found in smokers. There are numerous cases in which there was no soot in the larynx or trachea, yet analysis of blood for carbon monoxide revealed lethal levels.⁷ Introduction of soot into the trachea, either during incision on the charred neck at autopsy or by disintegration from burning, gives the false impression of smoke inhalation.⁸ Aspects such as pain and tenderness, formation of blisters, appearance of the dermis, whether pink, white, grayish yellow, or reddish brown, and whether it blanches or not help guide this decision.^{9,10, 11, 12} Addition of a pin-prick test in adults¹³. A full thickness wound with an intact blister could conserve enough heat to lead to a false diagnosis of a partial thickness wound.¹⁴ These drawbacks seemed to be more evident within the first 4 days after injury. Although the technique continued to be used in Poland and Russia,¹⁵⁻²⁰



Fig-2: Superficial Flame Burn

Fig-3: Superficial Flame Burn in Depth

METHODOLOGY

The present work is autopsy-based study. 109 cases were collected from the department of forensic medicine and toxicology, CIMS Bilaspur C.G. Out of 109 cases 22 were of Burn cases and among them 15 were of Flame burn victims. The total tenure of data collection was three months i.e. January to march 2016.

Relevant history taken from police & relatives detailed information of each case was recorded on the pre-coded proforma.

Table-1: Distribution of total no. of subjects (N=109)

Types of cases	No.	%
RTA	36	33.02
Poisoning	28	25.68
Burn	22	20.18
Hanging	18	16.51
Drowning	05	4.58
Total	109	100.00

Table-2: Sex Wise Distribution of the Subjects (N=109)

Sex	No.	%
Male	73	66.97
Female	36	33.02
Total	109	100

Distribution of Marital Status of the Subjects

Marital Status	No.	%
Married	11	73.33
Unmarried	04	26.66
Total	15	100.00

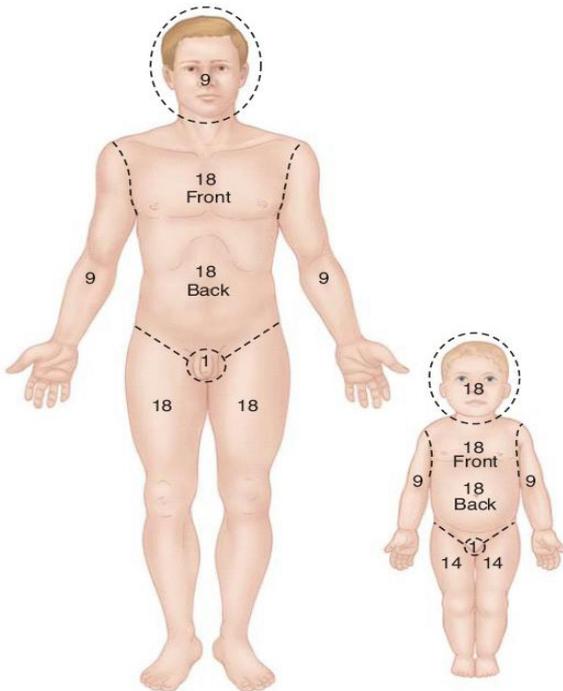


Fig-1: Explaining the Rule of Nine

Table 3: Distribution of subject in Burn (n=22 cases)

Age range (in years)	Male		Female		Total	
	No.	%	No.	%	No.	%
0-14	01	4.54	01	4.54	02	9.08
15-24	02	9.09	04	18.18	06	27.27
25-44	02	9.09	09	40.90	11	50
45-64	01	4.54	Nil	0.0	01	4.54
65 and above	01	4.54	01	4.54	02	9.09
Total	07	31.81	15	68.18	22	100

Distribution of Burn Victims in case of Flame Burn (15cases)						
Type of Burn	Male		Female		Total	
	No.	%	No.	%	No.	%
Flame Burn	03	20	12	80	15	100

Table-4: Condition of Subject when Brought To Hospital

Condition	No.	%
Alive	04	26.66
Dead	09	60.00
Unconscious	02	13.33
Total	15	100.00

Table-5: Suicide Note Present or Not

Suicide Note	No.	%
Present	05	33.33
Absent	10	66.66
Total	15	100.00

Table-6. Distribution of number of Cases as per Mode of Incidence

Socio-Status	No.	%
Accidental	04	26.66
Suicidal	09	60.00
Homicidal	02	13.33
Total	15	100.00

RESULT

Among the total number of cases i.e. 109, the cases of road traffic accidents was maximum in number i.e. 36 the second largest group of death incidence was poisoning those were 25.68 % and burn was the third largest group covering 20.18 % cases whereas cases of drowning was found least in number i.e. 05 .

As per gender distribution it was found that male was predominant and those were 66.97 % as compare to female those were 33.02 %.

The burn cases those were 22 in number was the third largest group among total number of the subjects. Among 22 burn cases male were found 7 in number and female were 15 in number.

Out of 22 cases of burn 15 were flame burn cases. In case of flame burn female were found 80 % i.e. 12 in number.

The place of incidence in most of the cases of flame burn was indoor happenings those were 73.33 %.

In most of the flame burn cases those were brought to the hospital at spot death was found i.e. 60 %.

Among total flame burn cases the suicide note was found only in five cases

As per duration survival period the death those were taken place within 24 hours was found maximum in number i.e. 7. There was a single case who survive more than a week.

Married burn victims were found maximum in number i.e. 11 as compare to unmarried those were found 26.66 %.

In flame burn victim most of the cases was of suicide those were 60 % followed by accidental and homicidal those were found 26.66 % and 13.33 %.

CONCLUSION

An important observation in fire deaths is the inhalation of smoke, as confirmed by examination of the upper-airway trachea/bronchi for surface soot. The absence of soot in the respiratory tract does not allow in drawing the conclusion that exposure to the fire occurred after death. Apart from the soot inhalation as a vitality parameter, there are other vital signs that include, line of redness, vesicles / blisters contain serous fluid, infection, inflammation of the base of the blister, healing with granulation tissue, inflammatory reaction, increase in enzyme reaction and >5% COHb in blood

A well-coordinated burn center team, having surgeons, nurses, physical/occupational therapists, social workers, psychologists and pain specialists, is required to both optimize survival and minimize dysfunction in the burn patients. 20.18% which forms a considerable bulk and draws attention to the grievousness of this problem:

Body surface area and degree of burn significant affect burn death.

Educating the people about safety measures through various programmes, television, and other media, warning label or cautionary information accompanying the sale of gasoline, kerosene or petrol into any container and Running anti-dowry campaigns.

Ethical Clearance- Not Required

Source of Funding- Self

Conflict of Interest – Nil

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Retrospective Record Study of Syphilis

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ABSTRACT

Introduction: Syphilitic heart disease is becoming rare in recent years and it may be the cause of sudden death due to cardiac complications in tertiary syphilis.

Aims and Objectives: To know the cause of sudden deaths in hospitalized patients and brought dead cases.

Materials and Method: A total of 1500 hearts were studied over a period of 20 years from 1997 to 2016.

Result: A total of 1500 hearts were studied over a period of 20 years from 1997 to 2016. Syphilitic heart disease was seen in 17 cases (1.13%). All cases were seen in males only with age range of 35-70 years. Maximum cases were seen 5th decade (11 cases) followed by 2 cases each in 4th, 6th and in 7th decades. One case died due to rupture of aortic aneurysm in 70 year old male.

Conclusion: Syphilitic heart disease can cause sudden death

Keywords: Syphilis, Aneurysm, heart, sudden death.

INTRODUCTION

Sudden unexpected (natural) death can be defined as death occurring instantaneously or within an estimated 24 hours of the onset of symptoms or signs¹. Ischaemic heart disease is the most common cause of death and commonest cause is atherosclerosis of coronaries. Ischaemic heart diseases include coronary atherosclerosis, hypertensive heart diseases, Rheumatic heart diseases, Syphilitic heart diseases, Infectious heart diseases, valvular heart diseases, anomalies of coronary circulation, other systemic arterial diseases, congenital heart diseases and cardiomyopathies. In modern scientific days because of urbanization, education and increasing incidence of HIV and its associated opportunistic infections and extensive use Benzathine penicillin the syphilitic infections are becoming rare and cardiovascular syphilis are still uncommon. The cardiac

manifestations clinically are aortic regurgitation/incompetence and pathologically the lesions are characterized by classic tree bark appearance, raised coronary ostia or aortic aneurysm.

MATERIALS AND METHOD

The present study was conducted at the department of pathology, KIMS, Hubballi, a tertiary teaching hospital located in north Karnataka. All the sudden deaths which happened in hospital from 1997 to 2016 were included in the study. In 20 years (1997-2016) nearly 1500 hearts were studied for sudden deaths in our institute. All the hearts were dissected according to line of blood flow and sections were stained with Hemotoxyline and Eosin.

RESULTS

A total of 1500 hearts were studied over a period of 20 years from 1997 to 2016. 37.6% were in the age group of 40-49 years, followed by 26.8% in 30-39 years age group. Only 0.5% of subjects were observed in 10-19 years. Male subjects constituted about 59.2%, while female 40.2% (Table-1). Age ranged from 20-80 years,

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more commonly affecting male populations. Syphilitic heart disease were seen in 17 cases (1.13%), out of these maximum cases were seen in 1999(5 cases) followed by 3 cases in 2014, 2 cases each in 1997 and 1996, and 1 case in each 2001, 2003 and 2007. All cases were seen males only with age range of 30-70 years. Maximum cases were seen 5th decade (11 cases) followed by 2 cases each in 4th, 6th and in 7th decades. One case died due to rupture of aortic aneurysm in 70 year old male. (fig-1&2).

Table 1: Age and sex wise distribution of study subjects

Indicators	Number	Percentage
Age(in years)		
10-19	07	0.5
20-29	53	3.6
30-39	401	26.8
40-49	564	37.6
50-59	388	25.7
60 and above	87	5.8
Sex		
Male	889	59.2
Female	611	40.8
Total	1500	100



Fig 1. Specimen of cut section of heart showing syphilitic aortitis with ruptured aortic aneurysm.

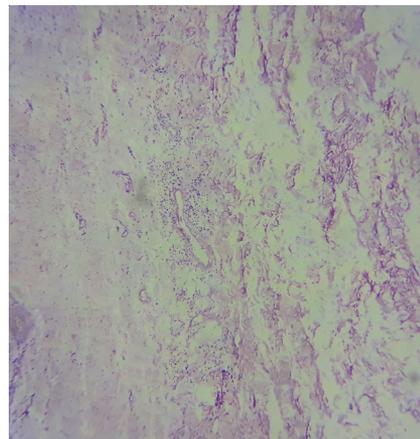


Fig 2. Section of syphilitic aortitis showing perivascular cuffing around vasa vasorum (end arteritis obliterans) characterized by chronic inflammatory cell infiltrate rich in plasma cells and lymphocytes.

DISCUSSION

Syphilis of the cardiovascular system becomes clinically manifest after a latent period of 15-30 years. Most patients are between 40-55 years of age at onset, and men are affected 3 times as often as women. Reasons for the male predominance are unclear, and some have speculated that susceptibility was increased in persons undergoing hard physical labor for prolonged periods. There is really no clear evidence as to why some develop neurosyphilis, others develop cardiovascular syphilis, and others – the majority of untreated patients – never develop symptomatic late disease. Penicillin and other antibiotics appear to have nearly eliminated late cardiovascular syphilis, even in AIDS patients. It is unclear why this is so.

Cardiovascular syphilis may lead to aortic aneurysms, aortic insufficiency, coronary artery stenosis, and rarely myocarditis. Its clinical presentation is characterized by the functional disorder resulting from cardiac involvement and at times it may be difficult to distinguish cardiovascular syphilis from other more common varieties of cardiac disease². The cardiovascular system is not clinically affected in the early stages of syphilis, but older pathology studies suggests that such involvement was common in tertiary- stage disease³. However, clinical manifestations of cardiovascular syphilis occurred in only 10% or less of patients with tertiary disease. Aortic, coronary ostial, valvular, and myocardial lesions have been described, but aortitis was the most common lesion accounting for the majority of clinical manifestations^{4,5,6}. *T pallidum* presumably spreads to the heart during the early stages of syphilis,

possibly via the lymphatics, and the organisms lodge in the aortic wall, where they remain dormant for years. The spirochetes appear to have a predilection for the vasa vasorum of the aorta, particularly the proximal aorta, producing transmural inflammatory lesions resulting in endarteritis of these vessels. The proximal portions of the coronary arteries near the ostia sometimes are involved by the obliterative endarteritis. This inflammatory process, which is rich in perivascular lymphocytes and plasma cells, continues for years, long after evidence of early syphilis has passed. This suggests that the lesions of late cardiovascular syphilis have an immunologic basis, as has been proposed for other forms of tertiary syphilis.

Treponemal infection produces chronic aortitis in approximately 10% of patients with untreated tertiary syphilis and is the primary cause of death in about the same proportion of cases, but there is evidence of the process at autopsy in about ½ of patients who have had untreated syphilis for more than 10 years³. During the spirochetemic phase of primary syphilis, *Treponema pallidum* organisms lodge in the adventitia of the vasa vasorum and initiate an inflammatory response characterized by perivascular lymphocytic and plasma cell infiltrate. This is followed by obliterative endarteritis, resulting in patchy medial necrosis, elastic fiber fragmentation, weakening of the aortic wall, and aneurysm formation. The intima of the aorta has a characteristic wrinkled appearance, frequently with superimposed atherosclerotic plaques. Because the infection is seeded through the vasa vasorum, the process is most severe in the ascending aorta and the arch, where the density of these vessels is greatest. Leucic aneurysms are typically saccular and involve the ascending aorta whether or not the transverse and descending portions are also affected. Aortic aneurysms resulting from cardiovascular syphilis follow interruption of the elastic fibres as a result of peri aortitis and mesoaortitis, which thicken but weaken the aortic wall. Rupture is the major complication, but the enlarging aneurysm may also compress or erode adjacent structures of the mediastinum. Because the inflammatory process tends to interrupt the medial layer by transverse scars, dissection is distinctly uncommon.

Recently Roberts and colleagues⁷ have described the features of syphilitic aortitis at surgery in hopes of permitting intra operative identification and prompt institution of treatment. The distinguishing features

include sparing of the aortic root, involvement of the tubular portion of the ascending aorta, uniform involvement of all of the surface area of the affected aortic portions, and inflammation in all three layers of the aortic wall.

The most important vascular lesion of tertiary syphilis, *coronary ostial stenosis*, which is seen in up to 4% of patients with tertiary syphilis^{8,9,10} can occur independent of aortic involvement¹¹.

Although the initial insult is primarily to the small nutrient vessels of the aorta, all three layers of aortic wall are affected by the process. Probably because of obliteration of the lumen of the vasa vasorum, the aortic media develops patchy necrosis with subsequent focal scarring. The medial destruction is also associated with the destruction of the important elastic tissue of the media, which sets the stage for subsequent aortic dilation and aneurysm formation. The adventitia, which contains the prominently inflamed vasa vasorum, undergoes fibrous thickening. The overlying aortic intima becomes diffusely diseased, with atherosclerotic changes involving virtually the entire intimal surface of the affected aorta. The extensive plaque formation has been described as “tree barking” and the calcification accompanying these complicated atherosclerotic plaques accounts for the eggshell calcification of the proximal aorta that is often evident radiographically.

Syphilitic aneurysms, the most common manifestations of tertiary syphilis, virtually always involve the thoracic aorta, particularly the ascending aorta immediately at and above the sinuses of Valsalva. Over 60% involve the ascending portion of the thoracic aorta; 25% involve the transverse arch. Rarely, syphilitic aneurysms of the innominate artery present with cerebral emboli¹². These aneurysms are typically fusiform or saccular in type. Syphilitic aneurysms do not dissect, probably because of the medial scarring and wall thickening of the chronic inflammatory process⁴. Characteristically, syphilitic aneurysms remain asymptomatic for many years, before they are detected. Symptoms eventually develop when an aneurysm encroaches on surrounding structures or ruptures. In some cases, aneurysms erode through the chest wall and present as a chest wall mass. More typically, the patient presents with persistent chest pain or with symptoms of a mass lesion compressing adjacent structures, such as hoarseness from recurrent laryngeal nerve pressure. A

rare presentation may be with the superior vena cava syndrome and, in association with cough, dyspnea, dysphagia and hemoptysis, may be misdiagnosed as a lung cancer¹³. If aortic insufficiency is not present, there may be no detectable abnormalities on cardiac examination. The chest radiograph may be normal or show a mediastinal mass with typical eggshell calcification outlining the aneurysm which may also be a feature in severely atherosclerotic aortas/ aortas from advanced age. The coronary arteries may be primarily involved in syphilis, but almost always only the ostia or the most proximal few millimeters of the coronary arteries are affected. The pathogenesis of the coronary arterial disease is an obliterative endarteritis. When the leucic process significantly narrows the coronary ostia, it may lead to ischemic heart disease, including angina pectoris or sudden death¹⁴. Ordinarily, the acute coronary occlusion would involve such an extensive mass of left ventricular myocardium that the patient would not likely survive long enough to evolve a clinically apparent myocardial infarct. The diagnosis of syphilitic coronary disease should be considered in a patient who has been shown, by coronary angiography, to have isolated right or left main coronary ostial narrowing without atherosclerosis in the rest of the coronary tree and who has a history of syphilis or other signs of cardiovascular syphilis.

Gumma in the heart which is well recognized in heart characterized by diffuse, focal, subacute or chronic myocarditis and spirochetes were demonstrated in the lesions¹⁵. Syphilis infection of heart comprises either congenital interstitial myocarditis in the newborn or stillborn or a gummatous myocarditis as a late manifestation of syphilis in adults. The presence of myocardial fibrosis and mononuclear cell infiltration is non-specific even when combined with positive serologic tests for syphilis. These myocardial changes and the accompanying cardiac failure are usually attributable to narrowing of coronary ostia, secondary syphilitic aortitis or atherosclerosis. The diagnosis of syphilis may be accomplished in several ways. In the primary and secondary stages, as well as in early congenital disease, lesions contain numerous spiral-shaped treponemal organisms surrounding small vessels and within macrophages, and they can be visualized with the Warthin-Starry stain, immunohistochemistry, or dark-field microscopy. Serologic techniques are currently the mainstay of diagnosis and include both treponemal

(specific) and non treponemal (nonspecific) antibody tests. Nonspecific test include the Venereal Disease Research Laboratory (VDRL) and the rapid plasma reagin(RPR) tests, which are rapid and inexpensive and traditionally have served as screening tests. Specific tests such as fluorescent treponemal antibody-absorbed assay (FTA-ABS) should be performed for confirmation of the diagnosis. No single test should be used alone in making a diagnosis of syphilis¹⁶.

CONCLUSION

The most important angitic infections affecting the coronary arteries are syphilis and syphilitic arteritis. All three stages of syphilis show arteritic features.

Source of Funding: Nil

Conflict of Interest: None declared

Ethical Clearance: Not needed as we are presenting this study based on medico-legal autopsy.

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Does a Higher Educational Level Protect against Anxiety and Stress of Candidate Patients for Protective Aggressive Procedures?

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ABSTRACT

Aim of this study was to examine whether higher educational level protects against anxiety and/or stress in Candidate Patients Undergoing Upper Gastrointestinal Endoscopy. This study was designed as a single-blind randomized controlled clinical trial. Endoscopy was performed on 95 patients. Hand and foot reflexology massages were performed for 20 minutes prior to endoscopy in intervention groups. Stress and anxiety levels prior to intervention and immediately prior to endoscopy were measured in the three groups. Depression Anxiety Stress Scales (DASS-21) was used to collect the required data. Demographic questionnaire was used to assess the level of education. The findings of the study and the results of Kruskal–Wallis test showed that anxiety and stress scores had a significant and reverse relationship with the level of education ($p = 0.007$) and ($p = 0.032$). Higher levels of education have a protective role against the stress and anxiety of candidates for aggressive procedures. From the results of this research can be deduced that people with less educated have false anxiety, feelings of being harmed and insecure and worried. On the other hand, increased education leads to emotional well-being and less anxiety.

Keywords: *Depression; Massage; Anxiety Disorders*

INTRODUCTION

We live in the era that despite technological improvements, disorders such as depression, anxiety and stress are common diseases of the century¹. Gaining comfort and confidence and avoiding from depression are the most innate human needs and have always been among the fundamental human issues². Emotional state is one of the issues that in spite of the progress of science and technology, has always been associated with human and no man has ever been able to completely avoid it³.

Depression and anxiety with the prevalence rate of 10-20% in the year in the general population, is among the most common psychological disorders^{4,5}. Stress has been described as “erosion of the body” from medical perspective⁶. Actually stress is an essential integrate of the human life and perhaps is the most general problem of today human life⁷.

Anxiety is a fundamental problem of the patients waiting for diagnostic procedures. In fact, endoscopy-causing anxiety is a serious problem in the patients who visit the centers for gastrointestinal diseases, diagnosis and treatment⁸. unrecognized anxiety creates stress⁹ which may subsequently harm the patient and delay recovery¹⁰.

Diagnostic methods for gastric diseases are widely progressing. Endoscopy is a diagnostic aggressive method^{11,12}. Esophagogastroduodenoscopy(EGD) is a

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common and an important diagnostic and therapeutic method for assessment and examination of the upper gastrointestinal tract¹³. Endoscopy is studied in clinical trials due to obvious diagnostic advantages and therapeutic use of this method¹⁴. However, this method causes high levels of stress and anxiety in the patients¹². In general, the patients waiting for endoscopy are usually anxious¹⁵. In this case, the person is not in calm and balanced and feels under pressure. The desire to cope with stress and anxiety is a positive way to gradually improve health¹⁰.

In addition, education, as a source of human capital, may enable people to succeed more generally and may prove effective in pursuing fundamental ends that include emotional well-being. Education has a significant positive effect on the sense of control. The sense of control has a significant, positive direct effect on healthy lifestyle¹⁶. Higher education teaches people to think logically and rationally, to see many sides of an issue, and to analyze problems and solve them¹⁷. Habibi Sula has reported that the level of education is related to the quality of life so that people with higher education have higher social quality and this maybe because of higher income levels and higher social welfare¹⁸. The relationship of education to the experience of anxiety and stress throughout adult life is unclear. Our knowledge of this relationship is limited and inconclusive.

OBJECTIVES

The aim of this study was to examine whether higher educational level protects against anxiety and/or stress in Candidate Patients Undergoing Upper Gastrointestinal Endoscopy.

MATERIAL AND METHOD

This study was designed as a single-blind (before the intervention - after the intervention) randomized controlled clinical trial. The study was conducted on 95 endoscopic candidate patients who visited the Polyclinic in 22-Bahman Hospital in Nishabur. Using adequacy of the sample size formula, 30 patients were selected for foot reflexology massage, 30 patients for hand reflexology massage and 30 for control. A demographic questionnaire and Depression Anxiety Stress Scales (DASS-21) were used to collect the required data. Demographic questionnaire: Includes seven dimensions of age, sex, marital status, income, occupation, place of residence and education level, The level of education was

divided into the ability to read and write, primary school, high school, diploma or higher. Depression Anxiety Stress Scales contain 21 items, which are scored as follows. Each subscale of stress, anxiety and depression (DASS-21) is a self-report questionnaire designed and developed by Loewy in 1995¹⁹. The scale evaluates three psychological states of anxiety, depression and stress. The scale contains various items relevant to signs and symptoms of depression (7 items), anxiety (7 items) and stress (7 items). The questionnaires were filled out by the patients. Each question was scored as not at all (0), low (1), medium (2) and high (3). Total acquired scores by the patients estimate levels of depression, anxiety and stress.

Psychometric characteristics of this questionnaire was evaluated by Afzali *et al.* in Iran in 2007. They studied 40 high school students and approved the questionnaire. The findings of the former study showed correlations of depression scale in this test with the Beck Depression Inventory test (0.849). Zung anxiety test (0.831) and Stress Inventory (0.757). Alphas for depression, anxiety and stress were respectively as 0.94, 0.85 and 0.87²⁰. Get the questionnaire from Sepehri and Samani in Mehkarsa and register for Edaz and related code. The questionnaire was also evaluated by Neil in 2006. Alphas for depression, anxiety and stress were respectively reported as 0.89, 0.84 and 0.68. It should be noted that only two subscales of stress and anxiety were assessed in this study²¹. The ethics committee approved the sampling procedure. For this purpose, the author visited the Polyclinic in 22-Bahman Hospital in Nishabur. Names of candidate endoscopic patients who had visited the clinic in the previous day were prepared. Informed consent forms were distributed among the patients. Objectives the study were explained to the patients. Then, eligible individuals were selected for the study based on inclusion criteria. Inclusion criteria was as follows: a prescription for upper gastrointestinal endoscopy, aged from 18 to 60, capability to speak and understand Persian, no sign of deafness and vision impairment, no history of endoscopy, no prescription for emergency endoscopy, no history of mental illness, not using opium, no intake of tranquilizers, Iranian nationality, no history of neuropathy diseases such as diabetes and myasthenia gravis. Exclusion criteria was as follows: a history of psychological problems or known anxiety disorders, using hypnotics and tranquilizers, having severe pain due to nature of the disease (e.g.

cancer), drug addiction or addiction to strong painkillers, no willingness to cooperate in the study, loss of a relative at the time of the project and stressful events except endoscopy in the last month (such events as marriage, divorce, death of a close relative, loss of job, immigration and severe accident). Sampling procedure was as follows. The author visited the Polyclinic in 22-Bahman Hospital. Informed consents of the patients were obtained. Eligible individuals for the study were selected based on inclusion and exclusion criteria. The selected individuals were randomly assigned to the three groups of control, hand reflexology massage and foot reflexology massage. Demographic questionnaires were completed by the patients. The author gave necessary explanation about stress and anxiety scales and determinants of severity of anxiety and stress to the patients. Then, the patients were asked to mark their levels of stress and anxiety in the questionnaires before the intervention. It is necessary to mention that the scales of stress and anxiety were filled out by the patients immediately before endoscopy. The intervention involves hand and foot reflexology massages conducted by the author and his assistant. Reflexology massages were performed in the hospital by the authors as follows. Half an hour before endoscopy, the patient was placed in supine position. Prior to main techniques, general massages to warm the hands and feet were performed for one minute. Then, reflexology massages were performed for the head, pituitary gland, diaphragm, lung and kidney / adrenal in the experimental groups for 10 minutes on the hands and feet. The locations of the reflection points in different organs were as follows: the head was the base of the thumb upwards, in the pituitary gland was the center pad of the thumb tip, in the diaphragm was along diaphragmatic belt, in the lung was along horizontal lines of the fingers and in the kidneys was inside the edge of large pad at the base of the thumb²². It should be noted that the steps, time and location of reflexology massage for the foot were the same as the ones for the hand. In this study, the required

data was collected from the three groups in two stages (before intervention, after intervention). The required data was collected by the author and a research assistant. SPSS version 19 was used for statistical analysis. Chi-square test, Kruskal–Wallis and Wilcoxon tests were used in order to compare and find the exact relationship between studied variables. The significance level was considered as 0.05 for all tests.

RESULTS

The findings of this study showed that the highest percentage of subjects (53.68%) were in the age group of 20-40 years. Most of the participants in the study were women (67.6%)

36% of the units had diploma education and higher. The lowest frequency of education (8.73%) was reading and writing in all three groups. The distribution of the research units according to marital status showed that the majority of them (88.5%) were married and (11.5%) were single. Considering that about 54% of research units were in the age group of 20-40 years, the ratio of married people in the research sample is justified.

Most of the patients (60.3%) were housewives in this study. In terms of location of research units, the results showed that the majority (68.2%) lived in the city and (31.8%) were rural. The main complaint of the majority of research units (78.2%) was stomach pain at the time of referral.(table 1)

The findings indicated no difference between the patients in intervention and control groups in terms of demographic variables. In other words, the three groups were matched in terms of demographic characteristics.

The findings also showed that there is a significant and inverse relation between educational level, anxiety and stress scores ($p < 0.05$). As the amount of higher education, anxiety and stress are significantly lower. While other demographic factors were not associated with anxiety and stress in patients.

Relationship between demographic factors and anxiety / stress score in patients

Demographic factors		anxiety	P-value	stress	P-value
sex	male	(48/11)71/18	911/0	(45/11)26/22	708/0
	female	(32/13)19		(54/13)94/22	
place of residence	nishabur	(90/11)25/18	517/0	(28/12)18/22	434/0
	rural	(35/14)33/20		(14/14)87/23	

Cont... Relationship between demographic factors and anxiety / stress score in patients

marital status	single	(56/11)54/16	572/0	(07/11)45/21	692/0
	married	(86/12)21/19		(11/13)88/22	
Education level	ability to read and write,	(28/12)75/32	007/0	(58/11)25/34	032/0
	Primary school	(87/12)12/20		(82/13)25/22	
	High school	(99/13)67/18		(92/13)28/22	
insurance	diploma or higher	(26/9)65/14	213/0	(38/10)70/20	283/0
	health Service	(73/11)04/17		(22/12)70/19	
	rural	(24/13)12/22		(09/13)73/24	
occupation,	Social Security	(63/12)31/17	197/0	(13)14/23	187/0
	employee	(11/9)15/12		(17/10)46/16	
	free	(38/18)25		(14/14)24	
	retired	(71/11)43/18		(36/12)56/21	
income	housewife	(35/13)42/20	225/0	(34/13)56/24	136/0
	0	(43/13)72/20		(28/13)72/24	
	<1000000rial	(09/12)63/16		(12/13)89/19	
age	>1000000rial	(03/10)44/15	145/0	(13/10)22/19	740/0
	The correlation coefficient	15/0		03/0	

DISCUSSION

The findings of the study and the results of Croxal Wallis test showed that anxiety and stress scores had a significant and reverse relationship with the level of education (p = 0.007) and (p = 0.032)

Ingvar Bjelland study,entitled’ Does a higher educational level protect against anxiety and depression?’ States that people with higher level of education is less anxious and depressed²³. Zandi and colleagues also found in their study about frequency of depression, anxiety and stress in military nurses that anxiety has a significant and inverse relationship with the level of education. In other words, with high level of education will be less anxiety²⁴.

In a study by Mahboubi et al. 2014 entitled “The Relationship between Daily Spiritual Experiences and Dying Fear in Hemodialysis Patients, university-educated people had more death anxiety than high school students²⁵. Kristie Nienaber, in his article on **Death Anxiety and Education: A Comparison Among Undergraduate and Graduate Students** ,stated that people with higher education levels had less death anxiety²⁶.

In article entitled “Death Anxiety Relationship with Spiritual Experiences and Life Satisfaction in the Elderly”, Taghi Abadi and her colleagues concluded that people with higher education levels had less anxiety than others²⁷. The study by Azaiza et al. 2014 states that older people with lower education had lower death anxiety²⁸. The results of his study were inconsistent with the results of this study, Perhaps one of the contradictory reasons is the low number of people with academic education in the statistical population of the study.

The results of this study indicate that higher levels of education have a protective role against the stress and anxiety of candidates for aggressive procedures. From the results of this research can be deduced that people with less educated have false anxiety, feelings of being harmed and insecure and worried. The presence of false beliefs, including the possibility of choking and the emergence of extreme pain due to endoscopy, or severe concerns about the possibility of infect transmission through the endoscope, can exacerbate anxiety in these patients. On the other hand, increased education leads to emotional well-being, financial and less anxiety.

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Investigating the Effect of Using a Workshop based on Emergency Deterioration Index Instrument on the Performance of Nurses

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ABSTRACT

Aim: The aim of this study was to determine the effect of applying emergency deterioration index instrument on the indicators of emergency department

Method: This research is a quasi-experimental study before and after an intervention. Performance Evaluation (DOPS) checklists were used to evaluate the performance of triage nurses. One month before the triage training workshop about emergency deterioration profile; researcher by using DOPS checklist evaluated the performance of triage nurses. after triage training workshop, again the performance of these nurses was evaluated for 3 consecutive months by the method before the workshop.

Results: The results of performance of triage nurses by regarding the emergency deterioration index system showed, Nurses' performance was significantly changed before intervention and in the first month after intervention (holding a workshop) ($p = 0.001$). The results of the first and second months ($p = 0.004$) and the second and third months ($p = 0.252$) did not show any significant difference after the intervention. So, it can be stated that after improving the performance of triage nurses after an intervention, nurses' performance has been stabilized.

Conclusion: Results show training of triage by emergency deterioration profile and using this tool could significantly improve the performance of triage nurses but these results are affected by variables such as, emergency room, departmental standards, available equipment, Human resources, and even the status of the clients who come to this section.

Keywords: *Emergency department, Emergency ward profile, performance of nurses*

INTRODUCTION

The triage nurse is one of the key members of the Emergency Department ^[1]. Determination of the initial triage of patients has the most important effect on the time of patient's transfer to hospitalized areas ^[2]. For effective functioning, the triage nurse must have the examinational skill, the ability to perform and explain interviews, organizational skills as well as a broad scientific basis of illness, and with cleverness and

experience could find key clues for ill patients ^[3]. The evaluation of these functions shows the quality of triage nurses performance^[4]. There are different and new methods and standardization of performance, according to, the division of pyramid of Miller, one of the various methods for evaluating performance is Direct Observation of Practical Skills (DOPS) ^[5]. ESI triage determines the deterioration of the patient on the basis of the stability of the patient's vital signs and the level of threat to the life or to the parts of body, then the triage nurse anticipates the use of resources for the patients who are in good condition, Therefore, responsible nurses of the triage, in addition to familiarity with the algorithm,

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should have sufficient experience [6]. If the Triage ESI algorithm is correctly understood, the triage nurse will be able to classify the patient with high speed and accuracy in one of those 5 classes, otherwise, it will result in a negative effect for the patient [7]. The use of this system in Australia has increased job satisfaction, improved organization of the emergency department, and reduce the wait time of the client [8]. In the study by Wuerz et al., The Emergency severity index Profile (ESI) was a valid and consistent approach and leads to better allocation of resources and manpower and a better segmentation of patients to receive appropriate treatment [9]. In another study by Kariman and colleagues, it was found that the Persian version of the triage system of the emergency deterioration profile has a high degree of accuracy in the triage and can be used as an efficient Hospital Triage system [10]. Until the present study, Khatam-al-Anbia hospital in Iranshahr did not use any standard triage device. The geographical extent which hospital covered and the number of patients referred to the emergency room all of them reflect the need for more organization in this section. With regard to the content presentation on the importance of the emergency department and the provision of quality services through a standard triage device to the patient, the researcher aimed to investigate the performance of nurses of the emergency part of Khatam-al-Anbia hospital in Iranshahr by using this tool.

METHOD

Design and Participants

The present study is a semi-experimental single-group study before and after an intervention. The community of this study is Triage nursing behaviors based on an emergency deterioration profile one month before intervention (training workshop on how to use the emergency deterioration profile) and within 3 consecutive months after the intervention. The criteria for entering the triage nurses were to have a bachelor's degree in nursing, to stay all the time in triage rooms, and to complete shifts and to have written consent for participation in the research. Regardless of the continuation of the research, the change in the department and the occurrence of any unforeseen (medical rest) problem were the criteria for expulsion from the study.

Collecting data

Samples of this study were triage nursing behaviors based on an emergency deterioration profile and this study was performed in a complete way in one month before intervention and within 3 consecutive months after the intervention (training workshop on how to use the emergency deterioration profile). A total of 24 observations from each nurse (4 nurses) were performed. The sampling was conducted in an accessible and continuous manner. Performance of nurses was monitored by using the DOPS checklist before performing the triage of the emergency ward profile, one month before the intervention. After the intervention at the end of the first month, the second month and also the third month, performance of nurses was assessed by using the DOPS checklist randomly in different shifts (2 in the morning shift, 2 in the evening and 2 in night shifts in 3. The research environment was an emergency department of the Khatam-al-Anbia Hospital in Iranshahr. The reason for choosing this location was the presence of samples, and easy access to them, and in which the ESI trilogy is actively running. The tools used in this research to collect data are:

1- DOPS Checklist (Assessment of Performance Measurement): The checklist of the evaluation of performance measurement is in direct observation which is a self-made checklist that ESI Triage Protocol was used in its compilation. This tool has 9 headings and 33 partial entries in which according to Likert criterion was classified in 3 levels of excellent, good and weak. The performance of the triage nurses was evaluated by using this checklist and direct observation of the researcher. The quality of the triage performance of nurses was qualitative, and in each entries score 3 was the excellent, the score of 2 was good, and the score 1 was poor option. In terms of the number of entries expressed in each heading the total score obtained in this checklist was between 33 and 99. The researcher's definition of the excellent score was to perform the procedure according to the standard principles as well as to observe all the terms of each heading that place overall score between 66 and 99. If the nurse did not complete the course in each entry; so, the overall score was between 33-66, it was good or medium. And when the nurse met the minimum score for each entry of heading, the overall weak score was between 1 and 33, and in terms of performance, it was considered weak. This total score was given by the researcher to the performance of the nurses of the

triage during a six-time observation of performance (observation at 2 shifts in the morning, 2 shifts in the evening and 2 shifts of the night). The maximum score of 99 (excellent) and the minimum score of 33 (weak group) were defined. Accordingly, based on average scores of 6 observation participants ranked excellent, good, or weak in one of the performance categories

2- Knowledge Survey Questionnaire consists of two parts: the first part is demographic data, including the following: gender, degree, work experience in the emergency department, work experience in the special department and work shift in the emergency department. The second part of the questionnaire contained 10 questions in a scenario from patients referred to the emergency department which was assigned to nursing staff triage emergency deterioration profile method. Content validity was used to determine the scientific validity. The data gathering tool which researcher used are library studies and available resources including books, journals valid websites and research on research topics and the checklist in order to determining the credibility was prepared under the supervision of the supervisors and advisors and from the corrective comments of 10 people from the members of the Emergency and Crisis Center of the Ministry of Health and Medical Education of the country and the and Emergencies of Tehran. In order to determine the reliability of the instrument, a pilot study conducted on ten nurses, the result of the Cronbach's alpha coefficient was 0/896, which is consistent with the study of Jahanathyah regarding the reliability of the DPS checklist.

DATA ANALYSIS

Statistical analyzes were used to analyze the data which, so the type of data were: descriptive statistics as demographic information in the demographic table and analytical statistics were used in Frequency distribution table, relative distribution table and paired t-test. In all data calculations, version 16 of SPSS software was used.

RESULTS

Demographic characteristics of study participants

The nurses participating in the study were 4 male and with nursing bachelor degrees. They also participated in the triage workshop using the Emergency Card Profile. All participants had at least 6 months of work experience in the emergency department (one of them had a job in the special department). The performance of all triage nurses in morning shift (24 views), evening (24 views) and night shift (24 views) were investigated. (table1)

Table1: Demographic characteristics of the tripartite nurses participating in the research

Variable	Number
Degree (Bachelor's Degree)	4
Experience in the emergency department for more than 6 month	3
Hours of work in the special section	1
Number of observations in working shift (morning, evening, night)	Morning 32 Evening 32 night 32

Effect of using a workshop based on Emergency Deterioration profile on the performance of nurses

The results of paired t-test showed a significant difference ($p = 0.001$) between the mean scores of a month before the intervention and the first month after the intervention. But there is no difference between the mean scores of the first month and the second month after the intervention ($p = 0.004$) and the second and third months after the intervention ($p = 0.252$). This means that the information obtained during the workshop has been steady and stable enough (Table 2). The results of paired t-test showed a significant difference ($p = 0.001$) between the mean scores of the month before the intervention and the first month, before the intervention, and the second ($p = 0.001$) month before the intervention and the third month after the intervention. This means that the use of information from the workshop has been steady and stable (Table 3).

Table 2: Comparison of Mean Scores of Triage Nursing Practical Skills Assessment Form through Direct Observation (DOPS) of the previous month and the first, second and third months after intervention

Time of intervention	Average	difference in averages	Standard deviation	The result of study by using paired t-test
Previous month	76.21	37/16-	8.80	P= 0.001
The first month later	92.58		1.95	
The first month later	92.58	37/0-	1.95	P=0.4
The second month later	92.95		1.33	
The second month later	92.95	45/0-	1.33	p= 0.252
The third month later	93.41		1.44	

Table 3: Comparison of Mean Scores of Triage Nursing Practical Skills Assessment Form through Direct Observation (DOPS) of the previous month and the first, second and third months before intervention

Time of intervention	Average	difference in averages	Standard deviation	The result of study by using paired t-test
Previous month	76.21	37/16-	8.80	P=001/0
The first month later	92.58		1.95	
Previous month	76.21	33/1	8.80	001/0p= 0/001
The second month later	92.95		1.33	
Previous month	76.21	44/1	8.80	p=0.001
The third month later	93.41		1.44	

DISCUSSION

The present study was conducted with the general purpose of “determining the effect of using emergency deterioration tool on the performance of nurses”. The sample in the study on determining the performance of nurses was all male. From age-old point view, they were in all age groups. The results of this study showed that nurses’ performance was significantly changed before using the emergency deterioration tool and the first month after using the emergency deterioration index . However, after applying the emergency deterioration index there was no significant difference between the results of the first and second months (p = 0.004) and the second and third months . so, it can be stated that after intervention by enhancing the performance of triage nurses, the performance of nurses has been stabilized. The results of this comparison are in line with the Hay 2001 study conducted in Occupied Palestine [11]. Also,

these results are consistent with the study of Meybodi et al., 2014 carried out in Iran. In this study, knowledge, and practice of nurses were improved by the training of triage workshop through using the emergency deterioration profile improved [12]. The results of this study are in line with the Khazaee et al. 2014 study conducted in Iran [13]. In this study, after triage education, the deterioration profile of the PBL showed a significant increase in the triage nursing function (p = 0.001) and also reduced triage time nurses (p = 0.001). Also, the results of the study are in line with the study of the study (Haghdost et al. 2010) in Iran. This study also showed that triage training to emergency nurses significantly increased awareness and performance of emergency nurses.

CONCLUSION

The results of the analysis of the findings show that training of triage by using the emergency deterioration

profile and using this tool by nurses of the triage could significantly increase their performance. Although the nursing practice is upgraded and confirms the current hypothesis, the percentage is still high

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Recognition of the Most Effective Components of Hospital Marketing in Iran

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ABSTRACT

Background: Organizations, including Health Care centers to survive, need to satisfy its customers and to achieve this important, think about promoting of effective delivery of services. Marketing in the Health care services, particularly hospital services, through challenges and fundamental changes in different aspects has found great importance.

Materials and Method: This study is applied research. The method of collecting data was a questionnaire that was set based on the scientific literature and various articles. After validity and reliability, was completed by 74 of hospital administrators. Then through the software SPSS 21 and Lisrel 8.50 and using exploratory and confirmatory factor analysis related and effective variables of hospital marketing were extracted.

Results: Results showed that from 82 identified components, 56 components as influencing hospital marketing in factor analysis was extracted. Through these components, impressive appearance of hospital (0.82), staff hospitality morale (0.77), discounts in the billing patients (0.76), and quality of services (0.74) was the most effective marketing components that extracted from the factor analysis.

Conclusion: Attention to the effective hospital marketing components not only causes economic prosperity but also provides patient satisfaction in the hospital.

Keywords: Marketing, Hospital, Health Care.

INTRODUCTION

Globalization and technological advances have altered the environment for almost all industries. Competition is driving organizations to build in more differentiation. Patients are now consumers, and they are more specific in their requirements⁽¹⁾. Health organizations are opposed with many challenges in the 21st century and changing the landscape of their today and building a new model for the future.

Health organizations for developing along with the international developments and increasing people's expectations and also growing of the health services provider organizations and using the latest technologies in providing the services for the new needs, require the marketing knowledge⁽²⁾. Hospitals as the largest and most costly operational unit of health systems are important and assigned the large amount of health resources⁽³⁾.

In Iran 40% of government health expenditure is related to hospital care. On the other hand, the hospitals, especially in developing countries, generally are known by inefficient management of resources, low productivity, providing services as non- friendly and non- professional, nonflexible and hierarchical organizational structure, ineffective non-financial and

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administrative control and lack of performance-based incentives. This poor management of hospital leads to waste of resources, including money and Manpower ⁽⁴⁾.

The main reason for inequality of a visit between the public and private sector is that the full needs of the people are not provided in the public sector. Certainly in the realm of Outpatient Services for care, health and prevention, raising the visit of public sector represents a good accountability of the government system to the health needs and expectations related to non-health aspects of people. Nevertheless, at the same arena for receiving the health care services, raising the visit of private sector represents that the public sector is not accountable for the health needs of society. Whatever these services are more specialized; accountability aspect will be intensified ⁽⁵⁾.

BOR (Bed occupancy rate) indicator in medical centers of the country is below the international standards (85%). Considering that human and capital resources impose huge costs to the hospitals, it is necessary that the officials of medical centers with proper planning and systematic need's assessment to lead to absorb the inputs ⁽⁶⁾. Another point is that 87 % of hospital beds in our country are related to the state, while the 13.35 percent of the country's health funds are devoted to them. In the contrary, the private sector with having 13 % of the country's hospital beds, the amount received by them is about 19.6 percent of the health sector credit ⁽⁷⁾. For this, the public hospitals should also be familiar with the marketing science and use it in the health care services for having a greater share in the health care services' market. After recognizing the need in the target community through marketing researches, an organization with the right combination of a marketing mix can provide the desired product or service.

MATERIALS AND METHOD

This study was applied and cross-sectional. First, through review in current theoretical resources related variables in hospital marketing identified and extracted. Then for the localization and validation of these variables, field study was performed. Data-gathering Tools were a questionnaire include 82 questions and questions of the questionnaire based on the Likert five-choice range. The content validity was confirmed in three stages by 15 persons, including specialists, professors of health management, and executives in

hospitals. Cornbrash's alpha was calculated equal to 96 % showing the instrument had high reliability. Data analysis tools were spss 21 and Lisrel 8.50. The factor analysis technique has been used to analyze the data and identify the most important variables in the hospital marketing.

RESULT

Kaiser-Meyer-Olkin (KMO) and Bartlett test results showed that the data to perform exploratory factor analysis are appropriate. In the exploratory factor analysis, the variables loaded from the output of spss software showed that of 82 designed questions, 55 variables have the load factor higher than 0.5 that remained in the subsequent analysis (Table1).

Table1: Results of exploratory factor analysis in output of spss:

Var. No	Variable Name
1	Appearance, view and outside environment of hospital
2	Appropriate facilities and comforts for patients and relatives
3	Have parking available for patients and relatives
4	Suitable Light system
5	Internal design and decoration
6	Soft music playing in the waiting room
7	Use air conditioning and a pleasant smell in the hospital environment
8	Color and variety
9	A food menu of choice for patients
10	Internal Magazine published by the Hospital
11	Discount in statement of accounts
12	Seasonal discount
13	Free part of services
14	Contracts with various health and supplemental insurances by hospital
15	Provide transparent financial information of bill
16	Send the bill to the patient timely
17	Provide financial facilities for patients
18	The lower price hospital services
19	Adequate manpower
20	Timely answering to patients questions
21	vulnerability morale by Hospital staff
22	The spirit of personnel hospitality for clients
23	Cheerful of personnel dealing with patients
24	Value to emotions, feelings and needs of patients by staff
25	Training patient communication skills to staff
26	Symmetry clothing, appearance and uniformed staff

Cont... Table1: Results of exploratory factor analysis in output of spss:

27	Services process development and promotion systems
28	Informing of services details in wards and departments to patients
29	Patient Complaint audit systems
30	Using Pamphlet, signals and guide booklets
31	Using network and HIS systems
32	Polling of patients from services presentation manners
33	Distinct services toward other hospital
34	Quality of services in hospital
35	Service quality higher than patient expectations
36	Variety in services
37	Design and provide new services
38	Providing services after discharge
39	Consultant services if patient needs
40	Complete services in first refer
41	Front line services development
42	Continue and complete care in home
43	Transfer system for patients
44	Peripatetic presentation possibility in part of services

45	Admission possibility from phone and website
46	Presence hospital deputy in health centers and clinics in city
47	Reduction in waiting time for receive services
48	Direct mailing
49	Website allocation for hospital
50	Advertisement animations and banners in crowded sites
51	Periodically reports from hospital functions to peoples
52	Using ceremonies for introduce strengths hospital
53	Provide medical advice by telephone
54	Comments reflect the experiences and outcomes of patients
55	The use of information boards in the hospital environment

In the next phase, using Lisrel software, factor analysis performed to determine the effect of variables on the main dimension. Variables divided to 7 dimensions and in each dimensions related variables with higher Standard Estimate Coefficient was sorted. (Table 2).

Table 2- Factor analysis results of the first order and coefficients rate of explaining the variance coefficients of most effective variables associated with each dimension in the standard estimating and T-Value modes:

dimention	Variables	Standard estimate coefficient	T-Value coefficient
service	Distinct services toward other hospitals	.71	6.63
	Quality of services in hospital	.74	7.01
	Service quality higher than patient expectations	.69	6.45
price	Discount in statement of accounts	.76	4.56
	Seasonal discount	.68	6.24
	Free part of services	.70	6.53
place	Continue and complete care in home through contract with private centers	.69	6.24
	Transfer system for patients	.74	6.84
	Peripatetic presentation possibility in part of services	.71	6.45
promotion	Direct mailing	.72	6.81
	Website allocation for hospital	.78	7.67
	Advertisement animations and banners in crowded sites	.71	6.63
	Periodically reports from hospital functions to peoples	.70	6.50

Cont... Table 2- Factor analysis results of the first order and coefficients rate of explaining the variance coefficients of most effective variables associated with each dimension in the standard estimating and T-Value modes:

Physical evidence	Internal design and decoration	.76	7.54
	Appearance, view and environment	.82	8.51
	Color shape and variety	.81	8.21
	Suitable Light system	.82	8.46
process	Services process development and promotion systems	.68	6.18
	Patient Complaint audit systems	.68	6.19
	Informing of services details in wards and departments to patients	.73	6.68
	Using Pamphlet, signals and guide booklets	.76	7.09
people	Adequate manpower	.65	6
	Timely answering to patients questions	.69	6.45
	Criticism accepting	.76	7.45
	Customer caress morale of personnel	.77	7.54
	Cheerful to meeting patients	.68	6.30

As table 2 shows, Quality of services in hospital, Discount in statement of accounts, Transfer system for patients, Appearance, view and environment, Suitable Light system, Using Pamphlet, signals and guide booklets and Customer caress morale of personnel in each dimension had the most effect from other variables.

DISCUSSION

One of the important factors in the delivery of health services in hospitals is quality of service. Hospitals still have problems, such as the time-consuming administration process from registration to the payment process, which results in patient dissatisfaction and, subsequently, poor quality of hospital services ⁽⁸⁾. Service's quality score in this study was estimated as 0.74. Weingart et al. (2006) showed that the decline in the quality of services in a study on 228 adult patients in a teaching hospital in Boston was strongly associated with inpatient satisfaction ⁽⁹⁾.

Price is dealt with words of service tariffs and method of payment by the patients. Qoli Pour Soleimani (2008) indicated cost factor as the highest priority on customer satisfaction between the marketing elements of Hospitality ⁽¹⁰⁾. Rezayian & Rezazadeh Barfooyi (2007) concluded that the price element associated with the promotion in the marketing elements has the highest ranking in the insurance industry ⁽¹¹⁾. In another study, Haghshenas Kashani (2003) showed that price is the highest role in customer's attraction ⁽¹²⁾.

This study showed that the discount on the cost of patient's billing is an important variable in price dimension in hospital marketing (0.76 in Table 2). Ketabi, Ansari and Nasser Taheri (2006) mentioned the offering of the discounts and installment sales in the dimension of the variables is the price dimension ⁽¹³⁾.

Hospitals can maintain their relationship with customers and satisfy them with providing a part of their own services free of charge to patients (For example, making free for the cost's para clinical services and medical examinations in the treatment of some diseases). Offering the seasonal discounts (Services in a particular season or a specific time which has fewer referrals must be offered with cheaper tariffs) of the other important variables is in the price dimension. Hospital policy on diversity of service's tariff can fill hospital empty capacities in these days. Souba, Haluck and Menezes have cited using the flexible pricing strategies of health care ⁽¹⁴⁾. Lee and Sheih (2009) also concluded in their research that strategy of the price variability in dental services can be used ⁽¹⁵⁾.

Accessibility to hospital services is one of the most important factors in providing health services. Rao, Peters and Roche, (2006) identified the availability of medical services is the main dimension of quality understood by patients ⁽¹⁶⁾. In a study which was done by Macintyre, Ruth, and Ansari (2002) has been emphasized on this issue that the cost of hospital at

home specifically is cheaper than patient care within the hospital⁽¹⁷⁾. Thus, the hospitals can offer a part of their services that is possible, without the patient's presence in the hospital at home that it can be done by hospitals or contracting with institutions authorized to provide the medical services at home. Paul and Hanna (1997) in a study concluded that the lack of means of transport and transferring the patients as an important factor for low-income people and elderly patients were identified. Performing a part of hospital services in the mobile form is the third factor⁽¹⁸⁾.

Many services such as changing the dressing, pulling stitches, sampling for examining the patient, response delivery of experiment para clinical actions, physician preliminary examinations, opening plaster, splint. These services can be performed by the hospital mobile unit. The patient should be able to communicate with the hospital, to provide their required documentation, to get the clinical results and follow up the date of referrals through the website. The successful hospitals should be equipped with this feature. Customer care morale of personnel is a variable with 0.77 score. Internal marketing is an increasingly important strategy, treating the employees as internal customers with deep communication and supports, so that they may feel customer experience and provide more satisfying services to customers with customer oriented.⁽¹⁹⁾

CONCLUSION

Considering the aforementioned components obtained from this study is a complete tool for hospitals. Using this tool can improve health care marketing management.

Furthermore, it is recommended to implement this model in the country's hospitals, establishing the marketing unit in hospitals to be done. Because the hospitals for their continued survival in the competitive market should be entered into the realm of marketing, establishing this unit in the hospitals not only isn't costly but also for hospitals tries to earning.

Conflict of Interest: Nil

Ethical Clearance: Authors of this article declare that the procedures followed were in accordance with the ethical standards of the responsible committee on

human experimentation (institutional and national) and with the Helsinki Declaration of 1975, revised in 2000 (5).

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The Effect of Continuous Care Model on Care Burden and Coping Behavior of Diabetic Older Adults' Caregivers in Poldokhtar City

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ABSTRACT

Background: World population is rapidly aging and forms one of the most important challenges of the world. Continuous care model is one of the models which has shown positive impacts, in this regard, the aim of this study is to investigate the effect of continuous care model on care burden and coping behavior of diabetic elderly caregivers in Poldokhtar City.

Materials and method: This is an intervention study that was conducted in 2017 in Poldokhtar City. 80 elderly caregivers of diabetic adults were classified into control and test groups (each group had 40 members). The data were collected by Zarit and coping strategies questionnaires. Before education for control and test group, care burden and coping strategies questionnaires were filled up by the patients, then, intervention was performed on the test group and three months after the intervention, the questionnaires were filled up by caregivers. The results were analyzed by descriptive and inference statistical tests.

Results: Results showed that, before intervention, there was no significant difference between care burden and coping strategies of the two groups ($p>0.05$). But after the intervention, the caregivers of the test group experienced less care burden and better coping strategies in comparison with the control group.

Conclusions: Regarding the positive impact of continuous care model in reducing the care burden and improvement of coping strategies for caregivers of diabetic adults, such interventions are recommended for these caregivers.

Keywords: *continuous care model, caregivers, care burden, coping strategies.*

INTRODUCTION

Population is rapidly growing old ^[1-4] posing one of the important challenges of the glob ^[5]. Industrialization of societies has changed the lifestyle and habits of people. These changes have intensified during these years and the number and diversity of stressful conditions that elderlies are facing have highlighted this necessity ^[6].

Increasing population of order adults has resulted in prevalence of chronic diseases ^[7]. Among these chronic diseases, cardiovascular diseases ^[8-11], chronic renal failure ^[12] and diabetes ^[13] can be mentioned. Diabetes is one of the chronic diseases with numerous complications for the patients ^[14, 15].

Care burden is one of the consequences of diabetes for the families ^[16]. Family has a crucial role in preventing from the consequences of diabetes and regulation of blood sugar for the patients and family support will result in more adaption and survival of the patients ^[17,18]. Moreover, the trend of taking care of the patients in the house has resulted in care burden for

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caregivers^[16]. One way to improve the health condition of the patients is health enhancing interventions. Thought deviation technique^[19], self-care^[20], spiritual intervention^[21], Cognitive Behavioral Therapy^[22], family-based intervention^[23], yoga and Benson Relaxation^[24, 25], health belief^[26], home care^[27,28], group consulting^[6], sport techniques^[29] and motivating interviews^[3] and continuous care model^[31-34] are some of these interventions.

Continuous care model has shown positive results in numerous studies. This model has been designed in Iran and includes 4 stages which exhibited positive results in different studies^[31, 32, 35-37]. Given the prevalence of type 2 diabetes^(42, 46) and an increase in the elderly population⁽⁴⁴⁾, the aim of this study is to determine the effect of continuous care model on care burden and coping behavior of diabetic elderly caregivers in Poldokhtar City, Lorestan in 2017.

MATERIALS AND METHOD

This is an intervention study that was conducted in 2017 in Poldokhtar City. 80 elderly caregivers of diabetic adults were classified into control and test groups (each group had 40 members). The caregivers aged in the

range of 18-65 who lived in Poldokhtar were entered to the study. They would be excluded in case of being absent for more than 3 sessions. Ethical considerations of this study included being gratitude, getting the required permissions for authorities, randomized grouping of the samples and obtaining an ethical code from the Medical Science University of Isfahan.

The data were collected by Zarit^[38] and coping strategies^[39] questionnaires. Coping strategies questionnaire includes 66 questions and evaluated a wide range of thoughts and actions that a man would do in stressful condition. This tool possesses 66 statements in general format of problem-oriented coping strategies (with 4 sub-scales of searching for social support, problem solving, programming, re-evaluation and responsibility) and emotion-oriented coping strategies (with 4 sub-scales of facing, self-controlling, getting distance, escaping and avoiding)^[39]. Before education for control and test group, care burden and coping strategies questionnaires were filled up by the patients, then, intervention was performed on the test group (table 1). Three months after the intervention, the questionnaires were filled up by caregivers. The results were analyzed by descriptive and inference statistical tests. 2 samples were excluded as they did not attend the CCM sessions.

Table 1- stages of CCM model

row	Stages	Description
1	Orientation)	Getting to know the aims of the interventions, describing the methods of contacting for the caregivers, initial educations for reducing the care burden and increase the coping strategies, recommending the caregivers to not quit the interventions
2	Sensitization)	Involving the caregivers in the processes of care, their knowledge about the nature of old age, diabetes and its limitations in the old ages, exclusive educations to reduce the care burden and enhance the coping strategies, recommending them to not quit the interventions, these method should be followed up and the results of the drug therapies were implemented.
3	Control)	Keeping contact with the caregivers by phone and face-to-face sessions
4	Evaluation)	The care burden and coping strategies questionnaires were filled up again and their results would be compared with those of before intervention

RESULTS

The results of Table 2 showed that the Matching was done between the test and control groups($p>0.05$)

Table 2. Demographic characteristics older adults' caregivers in Poldokhtar city

Variable		Group		p
		Experimental	Control	
Gender	Male	13(34.2)	15(37.5)	0,76
	Female	25(65.8)	25(62.5)	
job	The worker	5(13.2)	8(20)	0.30
	Employee	19(50)	21(52.6)	
	Free	7(18.4)	6(15)	
	Unemployed	4(10.5)	3(7.5)	
	Student	3(7.9)	2(5)	
Education	Elementary	5(13.2)	3(7.5)	0.69
	Cycles	16(42.1)	20(50)	
	Diploma	12(31.6)	10(25)	
	Associate Degree	5(13.2)	7(17.7)	
marital status	Has spouse	11(28.9)	15(37.5)	0.43
	No spouse	27(71.1)	25(62.5)	
Age (Mean±SD)		38.21(8.73)	39.45(9.82)	0.55

Table 3. Comparison of the average care burden of family carers in patients with heart failure in the experimental and control groups before and after intervention

Measure time	experimental group	control group	Inter-group statistics
	Mean(SD)	Mean(SD)	
Before intervention	59.26(13.39)	58.42(14.10)	P=0.81
after intervention	26.39(8.90)	58.50(13.85)	P=0.000
In-group statistics (t pair)	P=0.000	P=0.78	

The findings of Table 3 showed that after the implementation of the model CCM the caregiver's care pressure was significantly reduced($p<0.05$)

Table 4. Comparison of the average coping behavior of family carers in patients with heart failure in the experimental and control groups before and after intervention

Measure time	experimental group	control group	Inter-group statistics
	Mean(SD)	Mean(SD)	
Before intervention	34.31(8.95)	33.12(7.14)	P=0.79
after intervention	65.22(7.67)	32.11(7.25)	P=0.000
In-group statistics (t pair)	P=0.000	P=0.89	

The findings of Table 4 showed that after the implementation of the model CCM coping behavior of family carers significantly Increase ($p<0.05$)

DISCUSSION

According to the findings of this study, CCM reduced the care burden and increased the coping strategies in diabetic older adults' caregivers. CCM has been used in numerous studies. Hakim et al. determined the effect of CCM on the knowledge of parents and their ability to control the symptoms and recurrence of nephritic syndrome. CCM resulted in improvement of systolic blood pressure and awareness of the patients^[40]. Study of Fadaei et al addressed the effect of CCM on emotional health and quality of life of infertile women. After CCM, the quality of life of these women improved socially and emotionally^[34] which are in line with the result of the present study.

Hojati et al. showed that CCM will improve sleep quality and dialysis efficacy in hemodialysis patients^[35]. Study of Akbari et al showed that CCM will result in increase of self-efficacy among *myocardial infarction patients*^[41]. Molazem et al also indicated that CCM can improve the lifestyle of myocardial infarction patients^[33]; Borji et al showed that CCM managing the BP^[45] all of these results are in agreement with the results of this study indicating that CCM can improve the health condition of diabetic older adults' caregivers.

CONCLUSION

Regarding the positive impact of continuous care model in reducing the care burden and improvement of coping strategies for caregivers of diabetic adults, such interventions are recommended for these caregivers.

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Nutritional Status Assessment of Elder People based on MNA Tool

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ABSTRACT

Background and Aim: Average of life expectancy through the worlds is increasingly year by year, leading to an overall increase of geriatric population. Ageing is a complex process with changes in physiological, psychological and social factors that may impact on nutritional status. As prevalence of malnutrition rises with age the aim of current research was to assess the nutritional status of elderly people Based on MNA tool.

Materials and Method: A cross sectional study conducted on 303 elderly people, aged 60 years and above. The study approved by Ethics Committee of Zabol University of Medical Sciences, Iran, in 2016. A written informed consent was taken from eligible participants. The Mini Nutritional Assessment (MNA) is an instrument for identifying older people at risk of malnutrition. Anthropometric assessment (such as weight height, BMI, Mid Arm Circumference Calf Circumference) and demographic assessment are used through the MNA tool to assess the nutritional status of elderly people. Data analyzed by SPSS18 p-value of <0.05 was considered to be statistically significant

Results: Mean age of participants was 70.8(8.4) year, weight was 65.0(12.1) kg, height was 164.1(9.5) cm and BMI was 24.1(4.0) kg/m². Analysis of data by student t. test showed a significant difference between males and females at 5% level. The mean weight, height and BMI in male participants were higher than females (p<0.05).The nutritional status of elder people based on MNA tool showed 57.1 % of them were at risk of being malnourished, 18.5% of them were malnourished and 24.4% of them were in the normal status. A significant relationship indicated between BMI and educational levels (p<0.05), while relationship between BMI and monthly income was not significant. Data analysis showed a significant relationship observed between nutritional status with place of life and monthly income (p<5%), while relationship between nutritional status with gender was not significant.

Conclusion: Prevalence of under nutrition in elderly population differs according to health status and living conditions, which by itself poses risk for higher morbidity and mortality. It is therefore especially important to evaluate their nutritional status to improve their prognosis.

Keywords: Nutritional status, Elderly People, MNA tool, Anthropometric indices

INTRODUCTION

The health of the elderly is an important issue defining the health status of a population ^[1, 2]. The

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prevalence of malnutrition rises with age. Currently, the prevalence of malnutrition in the community of people aged over 65 is 5.8% ^[3]. Many changes associated with the process of ageing ^[4]. Aging is coupled with increased risk of malnutrition. Malnutrition in elderly people is very common because daily food consumption decreases with old age. Also, the consumed food that is low in calories, contributing to nutritional deficiencies

and malnutrition. Multi-morbidity associated with increasing age is common and is found to be more frequent in developing countries [2, 5]. Older patients may be at greater risk of not being able to recover from malnutrition [6].

Ageing is a complex process with changes in physiological, psychological and social factors that may impact on nutritional status [7, 8]. Moreover with advancing age, there is an increase in the number of chronic disease and cognitive impairment [8, 9]. These factors may contribute to changes in motor functions in elder people. Creating a serious public health problem [8, 10]. Some studies suggest that nutritional status is an indicator of health and important associated with motor performance limitation [8, 11, 12] and disability relating to basic and instrumental activities of daily life [8, 11-13].

In Iran, proportion of people aged 60 and over was 5.4% in 1975. It is estimated that this will rise to 10.5% and 21.7% in 2025 and 2050 respectively [14]. Good nutritional status can promote the quality of life in elderly people and can decrease their mortality and morbidity. There is no published evidences in relation to nutritional status in elderly people in Zabol city, we aimed to assess the nutritional status of elderly people living using MNA tool.

MATERIAL AND METHOD

A cross sectional study conducted on 303 elderly people, aged 60 years and above. The study approved

by Ethics Committee of Zabol University of Medical Sciences, Iran, in 2016. A written informed consent was taken from eligible participants.

Sample size was determined by help of a statistician, by using formula, with 5% marginal error, 95% CI and p 27% [15]. Finally 303 elder persons selected through simple randomized method.

Mini Nutritional Assessment (MNA) is an instrument for identifying older people at risk of malnutrition. However, MNA tool, was used in the present study. Anthropometric assessment, and demographic assessment are used along with the MNA to assess the nutritional status of elderly people. According to MNA tool, a total score below 17(out of 30) is considered malnourished, a score between 17-23.5 is at risk of malnutrition and a score above 23.5 is considered normal. Weight and height measured using standard methods, Body Mass Index (BMI) calculated as weight (kg) divided by the square of the height (m).

A non-stretchable measuring tape was used to measure the circumferences of mid upper arm and calf. Data analyzed by SPSS ver.18. A p-value of <0.05 was considered to be statistically significant. Continuous variables were expressed as mean \pm SD; qualitative data were presented as frequency (percent). One-way ANOVA, Student independent sample t test, Exact Fischer Fisher test and χ^2 test were used to determine relationship between variables.

RESULTS

The mean (SD) of anthropometric indices are tabulated in Table 1.

Table1: Anthropometric indices of elder participants (n=303)

Variables	Mean	SD	Min	Max
Age(year)	70.8	8.4	60	102.0
Weight(kg)	65.0	12.1	38	100.0
Height(cm)	164.1	9.5	139	184.0
BMI(kg/m ²)	24.1	4.0	14.9	38.6

Among 303 elder persons that participated in current study, 52.5% of them were male. Majority of them(60.7%) live at home with their relatives, and 39.3% of them live at elderly homes, and more than half of them were illiterate (54.8%). Least 16 persons (5.3 %) were educated (Table 2).

Table 2: Distribution of elder participants based on their demographic characteristics

Variables		N (%)
Gender	Female	144(47.5)
	Male	159(52.5)
Place of life	At home	184(60.7)
	Elderly home	119(39.3)
Monthly income	<7000000	199(65.7)
	7000000-15000000	90(29.7)
	>15000000	14(4.6)
Educational levels	Illiterate	166(54.8)
	Primary	55(18.2)
	Secondary	28(9.2)
	High school	38(12.5)
	Educated	16(5.3)

Nutritional status of elder people based on MNA tool presented in the Table3.

Table3. Nutritional status of elder participants based on MNA tool

Nutritional status	N (%)
Normal	74(24.4)
Risk of being malnourished	173(57.1)
Malnourished	56(18.5)

Comparison of the anthropometric indices between males and females elders are presented in Table 4.

Table 4: Comparison of the anthropometric indices between males and females elders

Variable	Sex	n	Mean± SD	P. Value
Weight(kg)	Male	159	67.4±12.1	0.000
	Female	144	62.2±11.5	
Height(cm)	Male	159	168.5±7.9	0.000
	Female	144	159.1±6.5	
BMI(kg/m ²)	Male	159	23.7±3.8	0.046
	Female	144	24.6±3.5	

Relationship between BMI and demographic characteristics are presented in Table 5.

Table 5: Relationship between BMI and demographic characteristics

Variables		N	Mean±SD	P.value
Gender	Male	159	36.7±3.6	0.04
	Female	144	24.6±4.2	
Place of life	At home	184	24.3±3.7	0.15
	Elderly home	119	23.7±4.2	
Disease	Yes	207	24.5±4.1	0.04
	No	96	23.3±3.5	
Monthly income(In million Rials*)	<7	199	24.0±4.1	0.336
	7-15	90	24.5±3.8	
	>15	14	23.1±3.2	
Educational levels	Illiterate	166	23.6±4.2	0.005
	Primary	55	25.5±3.4	
	Secondary	28	25.6±4.2	
	High school	38	23.8±3.2	
	Educated	16	22.5±3.0	

* Rials(Iranian Currency)[1 Euro equal Rials 47000 And 1USD equal Rials 38000

Relationship between nutritional status with demographic characteristics showed in Table 6.

Table 6: Relationship between nutritional status with demographic characteristics

Variables		Nutritional status			p-value
		Normal	At risk of malnutrition	Malnourished	
		N (%)	N (%)	N (%)	
Gender	Male	44(57.1)	88(49.4)	27(56.3)	0.44
	Female	33(42.9)	90(50.6)	21(43.8)	
Place of life	At home	59(76.6)	102(57.3)	23(47.9)	0.002
	Elderly home	18(23.4)	76(42.7)	25(52.1)	
Monthly income(In million Rials*)	<7	45(58.4)	113(63.5)	41(85.4)	0.02
	7-15	27(35.1)	56(31.5)	7(14.6)	
	>15	5(6.5)	9(5.1)	0(0)	
Educational levels	Illiterate	28(36.4)	99(55.6)	39(81.3)	0.001
	Primary	21(27.3)	33(18.5)	1(2.1)	
	Secondary	10(13)	17(9.6)	1(2.1)	
	High school	13(16.9)	18(10.1)	7(14.6)	
	Educated	5(6.4)	11(6.2)	0(0)	

* Rials(Iranian Currency)[1 Euro equal Rials 47000 And 1USD equal Rials 38000

DISCUSSION

The mean anthropometric indices such as age, weight and BMI of elder people in current study were lower than the mean same parameters in elder participants that evaluated by payahoo et al (2013) (70.8year, 65 kg, 164cm and 24.1 kg/m² vs. 69.4year, 73kg, 160cm, 28.5kg/m² respectively) while mean height of participants in recent finding was higher (164.1 cm vs. 160.9 cm). In a study that conducted by Fernando and Wijesing (2010) in Sri Lanka, the mean age of elder participants was 75 years, and anthropometric indices such as weight, height and BMI were 49.8kg, 148.7cm and 23kg/m² respectively. Comparison anthropometric indices in elder participants that reported by Fernando and Wijesing (2010) with current finding showed mean of anthropometric indices were lower than our study [16]. Also analysis of data, in current study, by student t. test showed a significant difference between males and females at 5% level, as presented in the Table4, weight, height and BMI in male participants were higher than females(p<0.05).

According MNA tool information 18.5% of elder people in current study were malnourished and about 46% of them were at risk of malnutrition, while in Payahoo et al study demonstrated 6% of elder people

were malnourished and about 46% of them were at risk of malnutrition. Their finding also showed females had high level of malnutrition than males but analysis of data showed this difference was not significant (p=0.057). Joghataei, Nejati in their research showed 5.8% of elder people were malnourished and about 68.3% of them were at risk of malnutrition and 25% of them were normal [17]. Percentage of malnutrition in our finding was higher than payahoo et al and Joghataei, Nejati studies results(18.5% vs. 6% and 5.8%) while in Nabavi et al study percentage of risk of being malnourished, malnourished and normal status in Bojnour elder people were 62.2%, 7.5 and 30% respectively [15]. In Aliabadi et al report percentage elder people in Khorasan with normal, malnourished and risk of being malnourished were 42.7%, 12% and 45.3% respectively. Masomy et al showed 87.1% of participants had normal nutrition, 12.9% of them be at risk of malnutrition and finally 4% were malnourished. Analysis of data showed among demographic factor, gender and income were related significantly with nutritional status of elder people (p=0.002 and p<0.013 respectively) [19]. Danielewicz et al used from BMI to assess the nutritional status of elder population. Their results showed 8.2% of study population were underweight, 38.8% of them had normal weight and 53% of them were overweight. The

mean age participant in Danielewicz et al was 73.26 years. In Fernando and Wijesing study distribution of elder participants based on their nutritional status was as follow: 3.8% of them were malnourished, 59.1% were at risk of being malnourished and 37.1% of participants had normal status. Based on BMI classification 16.2% were underweight, 55.2% were normal and 28.6% were overweight. It's noticeable, aging itself doesn't effect on nutritional status, but the under nutrition in the elderly always reflects certain physical or social and economic conditions such as the inability to chew, poverty, educational levels, income levels or loneliness and diseases. As obvious above results of different studies that used from MNA tool are shown data on the percentage of risk of malnutrition, malnourished and normal status in elderly differ considerably according to the population.

According to Student t-test analysis a significant relationship observed between BMI and gender; BMI and educational levels ($p < 5\%$) (Table 5), while relationship between BMI and place of life was not significant. According One-way ANOVA analysis, a significant relationship was indicated between BMI and educational levels ($p < 0.05$), while analysis of data showed that the relationship between BMI and monthly income was not significant (Table 6). Based on exact Fisher test and χ^2 test a significant relationship observed between nutritional status with place of life and monthly income ($p < 5\%$), while relationship between nutritional status with gender was not significant (Table 5).

Aliabadi et al (2007) found a significant relationship among MNA score with some socio-economic factors^[18] ($p = 0.001$). Their finding showed the percentage of prevalence of malnutrition in females were higher than males, malnutrition in rural elderly was higher than urban elderly. Our finding showed prevalence of malnutrition in illiterate elderly was higher than educated, similar results reported by Aliabadi^[18]. The variables of gender, age, education are usually associated with nutritional status^[8]. Low education level could influence the family income, accesses to health services and adequate food, resulting in disability^[20] and under weight^[21].

CONCLUSION

Prevalence of under nutrition in elderly population differs according to health status and living conditions, which by itself poses risk for higher morbidity and

mortality. The MNA is available instrument in identifying older people at risk of malnutrition.

More focus on diet and possible nutritional intervention are required. Lower income group receive particular attention to meet their special needs. The promotion and intervention of low cost prevention – based initiatives such as health, nutrition and physical education could significantly enhance. The possibility of maintaining good nutritional status for the elderly.

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The Effect of Adlerian Group Counseling on the Level of Assertiveness among Midwifery Students in Clinical Setting

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ABSTRACT

Background and Objective: Assertiveness as an affecting factor on mental health is a useful social skill in daily interactions in educational-clinical settings. Regarding this effect on mental health, academic educators' awareness about inhibiting and facilitating factors of assertive behavior increases students' achievement. The aim of this study was to determine the effect of Adlerian group counseling on assertiveness level of Midwifery students in clinical setting of Bam Nursing and Midwifery faculty, in 2016.

Research Method: This clinical trial (ethic code: IR.KMU.REC.1395.346 and IRCT code: IRCT2017061934631N1) was performed among 54 third and fourth grade Midwifery students. Research instrument was Begley and Glackens's Assertiveness Questionnaire. Firstly, assertiveness level of all eligible students was determined and they were divided into intervention and control groups by applying stratified random sampling. For the intervention group, 6 (2/week) Adlerian group counseling sessions were conducted.

Results: Data analysis showed that the difference between the mean of pre-test assertiveness scores was not significant between two groups ($p < 0.05$) but there was a significant difference between the mean of post-test assertiveness scores between two groups ($P < 0.0001$).

Conclusion: Independency, decision-making abilities, and respecting patients' rights are characteristics of assertive obstetricians. Adlerian group counseling led to increase the level of students' assertiveness. This approach can be suggested to promote Midwifery students' social skills in the clinical settings.

Keywords: Adlerian group counseling, Assertiveness level, Midwifery students, Clinical setting

INTRODUCTION

Human being is a social creature and needs to communicate with others ⁽¹⁾. One of the most important and basic social skills is decisiveness or assertiveness, which is part of the broad concept of interpersonal

and behavioral skills ⁽²⁾, and is very useful in everyday interactions and in specialized environments. One of the characteristics of decisive behavior is that one can defend his rights by considering the rights of others, and can express his thoughts, feelings and beliefs honestly ⁽³⁾. Decisiveness is considered as one of the most important factors affecting students' mental and psychological health ⁽⁴⁾.

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In the process of social and cultural development of the community, efficient human resources play a decisive role. Undoubtedly, attention to various aspects of the life

of educated forces is one of the important factors of this development⁽⁵⁾. Some of the challenges faced by young forces who are studying are anxiety, depression and a low level of decisiveness. The simultaneous presence of low decisiveness and high anxiety in students disrupts their academic performance, interrupts their learning, weakens their ability and prevents their flourishing, and not only jeopardizes their mental health, but also deprives them of a healthy and prosperous life⁽⁶⁾. Sixty percent of students suffer from shyness and inability to act decisively, and this disability affects their learning and practical effectiveness in 40% of the cases, while students with higher levels of decisiveness have less compatibility problems and are less likely to suffer from loneliness^(7, 8). In addition, they are more self-efficacious in terms of academic achievement; this self-efficacy can be due to more academic interactions and asking for help in educational affairs⁽⁸⁾. Students must develop social skills such as communicating with others correctly, solving problems, behaving with decisiveness and decision making in order to reduce the sense of inability⁽⁹⁾.

Human beings are the only creatures who exchange ideas with their fellows and consult with them to understand and solve their own problems⁽¹⁰⁾. Today, counseling acts as a contributing profession to help people who have difficulty in growth, adaptability, decision-making, family relationships, social skills, and lifestyle; and counseling helps them find the right solution to the problems⁽¹¹⁾. Counseling can help to facilitate the growth and promotion of health in addition to intervention in damages⁽¹²⁾. Adlerian group counseling emphasizes the unity of personality and the subjective and purposeful nature of the behavior of individuals; and because of the emphasis on responsibility, the attempt to prevail, search for value and meaning in life is a developmental pattern. This study intends to investigate the effect of Adlerian group counseling on the level of decisiveness of midwifery students at Bam Nursing and Midwifery Faculty in clinical workplace in 2016.

MATERIAL AND METHOD

The present study is a clinical trial (IRCT2017061934631N1) conducted on 54 third and fourth year undergraduate students in Bam Nursing and Midwifery Faculty who were passing obstetric and pregnancy internship units during the first semester of the academic year 2016-2017. Willingness to attend

counseling sessions, lack of previous participation in counseling and educational workshops and classes on decisiveness, lack of getting physical and psychological illnesses (self-declaration), and non-use of psychiatric drugs were the criteria for entering into this study; and the exit criterion was being absent for more than two sessions.

Available sampling was used in this study. At first, the code of ethics (IR.KMU.REC.2016.346) and the clinical practice code was obtained from the vice-chancellor for research in Bam University of Medical Sciences, then all the third and fourth year midwifery students (56 people) were given a group motivational interview for 15 minutes with the aim of selecting the samples based on the requirements of entry into the study. After obtaining informed consent and completing their personal information form, fifty-four students were selected for the research. The level of decisiveness of all eligible students was determined using Begley and Glackens standard questionnaire.

Validity and reliability of this questionnaire were reported to be acceptable in the studies of Beagle and Glacier (2004) and Deltsid (2009)^(15, 14, 16). In this study, the validity of the questionnaire was evaluated based on two CVI, CVR indices that were equal to 0.81 and 0.98 respectively. Data was analyzed using SPSS software. For analyzing the data, independent t-test, paired t-test, Chi-square and Fisher exact test, Spearman correlation test and Mann-Whitney U test were also used.

FINDINGS

In this study, there were not any significant differences between the intervention and control groups in terms of the entering year, mother being alive, father being alive, mother's education level, father's education level, mother's occupation, father's occupation, interest in the field of study and economic status; and the distribution of these variables was the same in the two groups. But there was a significant difference between marital status ($p=0.03$) and employment status ($p=0.01$). Demographic characteristics separated by groups were presented in Table 1. The results of independent t-test and one-way ANOVA did not show a significant relationship between the level of decisiveness of the studied groups and demographic characteristics.

According to table 2, the results of t-test showed that there was no significant difference between the

mean scores of decisiveness of the two groups before the intervention. Therefore, the two groups were homogeneous in terms of decisiveness before the intervention ($p < 0.05$).

In the intervention and control groups, there is a high correlation between the scores of decisiveness before and after the intervention. Therefore, ANCOVA was used to compare the two groups after the intervention, and also considering that the two intervention and control groups were not homogeneous in terms of the variables of marital status and job status, these two variables were also controlled in the covariance analysis. In the intervention group, the mean of decisiveness was 79.03 before the consultation, and reached to 96.33 after the intervention. According to Table 3, the results of two-sample t-test showed that there was a significant difference ($P < 0.0001$) between the mean of decisiveness in the intervention group before and after counseling. There was no significant difference in the decisiveness scores in the control group before and after counseling. Table 4 shows that there is a significant difference between the mean of decisiveness scores in the two intervention and control groups after counseling, which indicates the effect of counseling on the degree of decisiveness in the students.

Table 1. Distribution of Age and Number of Family Members

Variable	Group		Result of statistics test
	Intervention	Control	
Age	0.27 ±21.159	0.68±22.107	t=1.18 p=0.24
Number of family members	2.20±5.11	2.13±5.00	t=0.18 p=0.85

Table 2. Comparison of Two Groups of Intervention and Control in Terms of Students' Decisiveness Score before the Intervention

Decisiveness score before the intervention		Standard deviation ±Mean	T*	P
Group	Intervention	79.03±8.76	1.38	0.17
	Control	81.96±6.63		

*t-test

Table 3. Comparison of Decisiveness Score between Two Intervention and Control Groups before and after Intervention

Control group			Intervention group	
Decisiveness score in group	Standard deviation ±Mean	Result of statistics test	Standard deviation ±Mean	Result of statistics test
Before intervention	81.96±6.63	t: 2.31 0.29<P	8.76±79.03	T:8.70 0.0001>P
After intervention	1.64±79.75		2.23±96.71	

Table 4. Comparison of Decisiveness Score after Intervention between Two Intervention and Control Groups Using ANCOVA

Decisiveness variable		Standard deviation ±Mean	Result of statistics test
Group	Intervention	2.23±96.71	F:75.77 0.0001>P
	Control	1.64±79.75	

DISCUSSION

The results of the present study showed that the mean of students' decisiveness score before intervention

was 79.03 in the intervention group and 81.96 in the control group. The results of the present study are in line with the results of the study by Berimnejad et al. (2013) who reported the level of nurses' decisiveness as 76⁽¹⁷⁾.

The results of the study are almost consistent with the result of the research by Taghavi et al. (2013)⁽¹⁸⁾.

Ibrahim (2011) showed that 39.6% of Egyptian nursing students had a low degree of decisiveness⁽¹⁹⁾. Nevertheless, the acceptable level of decisiveness among midwives can involve their professional activities. In this regard, Yin (2011) also believes that decisiveness will lead to increased professional dignity for the midwives; and people with high degree of decisiveness can improve their power to deal with their professional problems and avoid wrong judgments through expressing their feelings and personal views at the right time and place⁽²⁰⁾. Lien (2011) and Mahmoudi et al. (2002) also argue that people who are not highly decisive implicitly get an anxious personality. In fact, the person is unable to express their feelings or disagreement because of the lack of desirable daring due to the fear of losing friends and respect, and thus becomes anxious due to fear of rejection and negative evaluation⁽²¹⁾.

These findings is compatible with the study conducted by Lin et al. (2004) who measured the effect of decisiveness training on decisiveness, self-esteem and satisfaction with interpersonal communication in nursing and medical students⁽²²⁾. They are also compatible with the results of the research by Mohebbi et al. (2012) who studied the effect of decisiveness training on decisiveness level of high school second grade students⁽²³⁾. In addition, the results are consistent with the results of the study by Nota and Soresi (2003) who measured the effect of decisiveness training on decisiveness and anxiety of the students of different disciplines in Italy⁽²⁴⁾. Other studies, such as Acedo et al. (2003), Paezi et al. (2010) and Hazaweie et al. (2008), also achieved similar results, and their results were consistent with the results of this study^(25, 26, 27).

The findings of this study were incompatible with the results of the study by Shannon (1999), who investigated the effect of decisiveness training program on the level of decisiveness of high school students⁽²⁸⁾, as well as Stephens' (1992) research, which indicated that the intervention was not effective on the level of decisiveness of American nursing students⁽³⁰⁾. Perhaps the inconsistency between the results of this study and the first study mentioned above was due to insufficient time of training, the inadequacy of training by the researchers, and the differences in the educational environment and the research community⁽²⁹⁾.

Based on the results of the research in all of the studied groups, the degree of decisiveness in the students who were interested in their field of study was more than those who were not interested in their field. This finding is consistent with the results of the study by Taghavi et al. (2013)⁽¹⁸⁾. The research also showed that the decisiveness of the senior students was significantly higher than the junior ones. This finding is consistent with the results of the study by Begley and Glacken (2004), who aimed to determine the level of decisiveness of nursing students at the beginning and end of the course. They believe that as students complete their three-year period, their levels of decisiveness gradually increase⁽¹⁵⁾.

It is also necessary to conduct further research to determine the conditions that prevent the use of decisive behavior in midwifery students. In order to overcome the existing scientific gap in the field of decisiveness, it is suggested that research studies are conducted to compare the degree of decisiveness of the students of different academic disciplines.

CONCLUSION

Decisiveness or assertiveness is one of the most important and most fundamental social skills in the clinical field, which forms part of the broad concept of interpersonal and behavioral skills. In this research, the decisiveness of the students increased after the intervention, and therefore the research hypothesis was confirmed. This result will help the authorities hold training courses on how to behave decisively in the form of workshops or curriculum units for the midwifery students who have not received this training in order to promote their mental health.

Conflict of Interest: Nil

Ethical Clearance: Authors of this article declare that the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, revised in 2000 (5).

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Palatal Rugae Pattern Identification to Determine Family Lineage in Minangkabau, West Sumatera, Indonesia

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ABSTRACT

Background: This paper discusses palatal rugae patterns and their contribution in the identification of individuals and the determination of family lineage in West Sumatera, Indonesia. Identifying an individual is a prerequisite for the issuance of death certificate as well as for personal, social and legal reasons. The most common techniques used in this context are dental records, fingerprint and DNA comparisons. However, under certain circumstances, these cannot always be used. But interestingly, palatal rugae patterns are preservable because they are impervious to disasters and hostile conditions and can be used as alternative human identification techniques. This paper argues that the study of palatal rugae (rugoscopy) cannot only help to reveal a person's identity but also to determine their family lineage.

Objective: The present study was carried out to ascertain whether there is any hereditary patterns in the palatal rugae patterns of the mother, father, and the offspring in one family.

Method: This is a cross sectional study of 48 samples consisting of 12 families in *Luhak Nan Tigo*. The parents and offspring (son or daughter) of each family were randomly selected. Palatal rugae impression was recorded using alginate while palatal rugae patterns were noted and recorded. *One Way ANOVA* test (SPSS 17) was used as statistical analysis method.

Result : The study shows that there is a significant similarity in curved, wavy, and straight rugae patterns ($p > 0.05$) as well as in primary, secondary, and fragmented rugae based on the family tie between the father, mother, sons and daughters of the *Minangkabau* ethnic. Unilateral and circular rugae tests are insignificant ($p < 0.05$).

Conclusion : This is a cross sectional study whose results are only based on 48 samples consisting of 12 families, therefore further studies are needed with a larger sample quantity. The results of this study indicate the role of factors in the patterns of palatal rugae.

Keyword: *Palatal Rugae, Pattern Identification, Minangkabau Family Lineage.*

INTRODUCTION

In the last decades, Indonesia has dealt with more than 400 natural disasters of which floods, fires,

typhoons and landslides are the most common. In addition to this, disasters such as earthquakes, tsunamis and volcano eruptions also occur on a yearly basis.¹ These natural disasters have caused the death of ten of thousand people in West Sumatran, one of the disaster-prone areas in Indonesia. Sadly however, many of these victims had not been identified due to lack of financial or material means to conduct identification procedures. Identifying an individual is a prerequisite for the issuance

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of their death certificate and for personal, social and legal reasons. In forensic, the main methods of human identification used are the DNA test, retina, fingerprints and dental characteristics. However, many of these methods may not be totally effective or conclusive.² Hence the need for the study of palatal rugae as an alternative method for the scientific identification of individuals. Forensic odontology has played a key role in the identification of persons in mass disasters, crime investigations, ethnic studies, and in the identification of decomposed and disfigured bodies like that of drowned persons, fire victims, and victims of motor vehicle accidents.³ The various methods employed in forensic odontology include rugoscopy, cheiloscopy, bite marks, tooth prints, radiographs, photographic study, and molecular methods. When these methods of identification are unavailable, rugae may be considered as an alternative source of information to facilitate the identification process.² There are several classifications of palatal rugae. But the most frequent used is the classification given by Thomas and Kotze,² which classifies Palatal rugae in three categories based on their length: Primary rugae (more than 5 mm in length), secondary rugae (3-5 mm in length) and fragmented rugae (<2 mm in length). The patterns of the rugae are classified into curved, wavy, straight and circular types. Straight patterns have a direct course from the point of origin to their insertion in a straight line. Curved patterns have a crescent shaped pattern with a mild curvature. Wavy rugae are serpentine in shape. Rugae with specific continuous ring type morphology are classified as circular. Unified rugae are united either in their origin or in their insertion giving a forked appearance. These are the patterns involved in this study conducted to assess the association of palatal rugae patterns among family members of the *Minangkabau*, a subgroup of the *Deutro Malay* ethnic, which consist of *Aceh, Malay, Minahasa, Bugis, Makasar, Sasak, Bali, Java, and Minangkabau*.⁵

METHOD

This research was conducted in *Luhak Nan Tigo* located at *Guguak, Situjuh, and Tanjung* Sub-districts in the District of *50 Kota, Tanjung Baru* subdistrict situated at the District of *Luhak Tanah Datar*, and in *Baso, Banuhampu, and Tanjung Raya* Subdistricts located at the District of *Luhak Agam*. The study was conducted from January to June 2017. A total of 489 palatal rugae were observed in 48 palatal rugae models from 12 families. The study was conducted with the

door to door system in each subdistrict. Prints of jaws of the respondents were obtained after the research was explained to them and informed consent was provided. The Committee of the Research Ethics of the Faculty of Medicine, Andalas University, with regard to the protection of human rights and welfare in medical health research has carefully reviewed the research protocol with Ethical Clearance number 073 / KEP / FK2017 on March 2nd 2017.



Figure 1 : Delineation of palatal rugae pattern on dental casts

Maxillary impression using irreversible hydrocolloid alginate. The impression were casted using dental stone type 3. The jaws were printed using irreversible hydrocolloid material i.e., alginat. The result of the jaw printing was casted using dental stone tipe 3. The maxillary cast analysis was performed single-blind by two different observers to get accurate measurements and reliable results, then classified based on Thomas- Kotze and Sunita Kapali classification method. Observers are dentists of the Faculty of Dentistry University Andalas who have good eyesight, understanding and perception. The same procedure was used in length measurement and observation of palatal rugae patterns. The Result Measurement of each observer was tested using Technical Error of test Measurement (TEM) intra-observer and inter-observer. TEM test was performed on 20 samples of maxillary cast having primary rugae and secondary rugae.

RESULTS

This study was conducted to assess the similarity of palatal rugae patterns between family members, i.e., father, mother, sons and daughters of the *Minangkabau* ethnic. A total of 489 palatal rugae were observed in 48 palatal rugae models from 12 families. *One Way Anova*

test results of curved, wavy, and straight rugae are $p > 0.05$, which indicates that there is a significant similarity in the shape patterns. The results of the unilateral and circular rugae form test are $p < 0.05$, which also indicates that there is an insignificant similarity in the patterns of uniform and circular form. The results of the primary, secondary, and fragmented rugae test are $p > 0.05$, indicating a significant similarity in the palatal rugae patterns based on the family tie between the father, mother, sons and daughters of a *Minangkabau* family. The average number of palatal rugae and p value in this study are as follows:

Tabel 1: Average Amount of Palatal Rugae

Rugae Pattern		Mother	Father	Son	Daughter	P
Shape	Curve	2,92±1,67	4,08±1,92	3,08±1,78	2,92±1,37	0,28
	Wavy	2,92±1,67	3,42±1,92	4,05±2,19	4,75±2,52	0,11
	Straight	2,00±1,70	1,75±1,28	2,50±1,44	1,83±1,11	0,56
	Unified	1,50±1,16	0,50±0,90	1,08±0,99	0,50±0,67	0,03
	Circular	0	0	0,08±0,28	0,42±0,66	0,02
Size	Primary	7,25±1,81	7,83±1,26	8,33±1,07	8,17±1,26	0,24
	Secondary	1,67±1,37	1,83±1,40	2,17±1,74	1,75±1,13	0,83
	Fragmented	0,42±0,66	0,08±0,66	0,75±1,71	0,05±0,90	0,47

DISCUSSION

Sumatra, located on the westernmost extremity of Indonesia, is the second biggest island in Indonesia and the sixth biggest in the world. Its Western side largely corresponds with the cultural sphere of the *Minangkabau* people. *Luhak Nan Tigo –Luhak Agam, Luhak Tanah Datar and Luhak Lima Puluh* are areas where the traditions of the *Minangkabau* people were handed down on a large scale in the inland region of West Sumatra.⁶ This is the reason why the research was conducted at these locations. Palatal rugae are irregular, asymmetric ridges of mucous membrane extending lateral from the incisive papilla and the anterior part of the median palatal raphe, which is just behind the maxillary central incisor teeth.⁷ The use of palatal rugae as a method of personal identification was first suggested by Harrison Allen in 1889. The term “Palatal rugoscopy” was proposed in 1932, by a Spanish investigator named Trobo Hermosa.² Palatal rugae appears towards the third month of intrauterine life, from the covering connective tissue in the palatal process of maxillary bone, and its development and growth is mutually controlled by epithelial-mesenchymal interactions, where specific extra cellular matrix molecules are spatiotemporally expressed during development. Palatal rugae patterns are unique. The proposed individuality of palatal rugae patterns may facilitate their use in postmortem identification. This is reinforced by the fact that palatal rugae can resist postmortem decomposition changes for up to 7 days after death and can withstand massive thermal insults like third degree burns. Palatal rugae

can also resist other forms of massive trauma because their location is protected by the tongue, dentition, and cheeks.⁸ The identification of a person through DNA examination has limitations such as contamination and high cost. While the use of palatal rugae can provide ideal parameters because of its uniqueness, stability, resistance, and simple and inexpensive method. The potential use of palatal rugae in forensic identification has advantages because it is sufficiently able to discriminate between individuals as no two palatal rugae configurations are alike. Certain rugae patterns are specific to a particular population and may also have utility in population differentiation.⁹ Observing rugae patterns, Selvamani et al found that wavy patterns are common in males and females, followed by curved and straight patterns. Circular patterns are very few in number but significant ($P = 0.05$).¹⁰ Some scientists claim that environmental factors are unlikely to affect the formation of rugae and believe that its patterns are determined by genes. Genes influence the orientation of the collagen fibers during embryogenesis and govern rugae patterns in different populations.¹¹ Observing the length of rugae, it appears that primary rugae are most prevalent than secondary and fragmented rugae.¹² Examining the types and origins of palatal rugae according to the Lysell classifications, the study of Beatrice’s (2013) showed that the palatal rugae of males is different from that of females. Primary and Secondary rugae are all found in males compared to females, whereas fragmented rugae are more common in females than males. Primary rugae

derived from raphae are found in males, whereas medial origin is found in many women, the study concludes.

Another study carried out by Patel to assess whether there is any hereditary pattern in palatal rugae patterns between the offspring and their parents. The study showed that there is a positive correlation of palatal rugae patterns between the offspring and either of their parents.¹³

Finally, a study by Indira suggests that the comparison of palatal rugae patterns among family members also shows different patterns. Although in one family few forms were similar, rugae patterns are not identical. This means that the role of heredity is uncertain in determining the orientation of rugae patterns.

CONCLUSION

The patterns of palatal rugae in *Minangkabau* family has the same number of rugae based on the significant shapes i.e., curved, wavy, and straight, and based on the significant length i.e., primary, secondary and fragmented. Because the results of this study are rather partial as they rely on a data consisting of only 48 individuals from 12 families, a more detailed follow-up study is needed with a larger sample size to reach an ultimate conclusion. The results of this study indicate that there are hereditary factors in the rugae patterns, which makes them very useful for the identification of individuals. Chemical, disease, heat, and trauma cannot alter palatal rugae patterns. Cheeks, lips, tongue, buccal pad of fat, teeth and bones protect palatal rugae from trauma and high temperature. Although we acknowledge that the limited number of families studied does not allow us to reach a final deduction, it is important to note that rugae patterns may be used as genetic markers for further research. We hope this research is a contribution of data in the field of forensic odontology on individuals, especially the *Minangkabau* and the *Deutro Melayu*.

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A Study to Explore Bullying and its Impact on the Psychosocial Wellbeing among High School Students of Udupi District, Karnataka

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ABSTRACT

Introduction: Bullying is an intentional, senseless abuse of power by one or more adolescents. It causes mental distress and physical pain to the victim. No studies have been conducted in southern part of India to rule out the prevalence of bullying. Hence this study would be a new initiative in this field and also more awareness can be aroused among the public.

Aim: The study aimed to explore bullying among high school students, assess the psychosocial wellbeing, determine the relationship between bullying and psychosocial wellbeing, association between bullying and psychosocial wellbeing with selected socio-demographic variables.

Settings and Design: Selected English Medium Schools, Byndoor block of Udupi District. Descriptive survey design was used.

Method and Material: A total of 460 students were selected through simple random sampling between the age group of 13-17 years. Illinois bullying scale was used to explore bullying and the psychosocial wellbeing was assessed by psychosocial wellbeing scale.

Karl Pearson's correlation coefficient was used to determine the correlation between bullying and psychosocial wellbeing and Chi square test was used to determine the association between bullying and psychosocial wellbeing with selected socio-demographic variables.

Results: On the basis of mean and standard deviation bully behaviour was found to be higher compared to fight and victim 7.31(SD=5.55). Bullying had a negative correlation with psychosocial wellbeing ($r = -.26$, $p < .05$) which indicates as bullying increases psychosocial wellbeing decreases.

Conclusion: Bullying is significantly associated with gender and area of residence whereas; psychosocial wellbeing is significantly associated with family monthly income.

Key-words: *bullying, psychosocial wellbeing, high school students.*

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INTRODUCTION

Bullying is an intentional, senseless abuse of power by one or more adolescents. It causes mental distress and physical pain to the victim. In India Bullying amongst students has been reported historically but in recent years the incidents have increased and new methods of bullying are being used. [1] The Indicators of

School Crime and Safety: 2013 reported that about 28 percentage of students between the age group of 12–18 reported being bullied at school during the school year. [2]The National Centre for Education Statistic stated that nearly one third of all the students aged 12-18 reported having bullied at school in 2007, some almost daily.[2]

According to bullying statistics 2010, there are about 2.7 million students being bullied each year by about 2.1 students taking on the role of the bully. There are about 160,000 children that miss school every day out of fear of being bullied. 61% of students believed students shoot others at school because they have been victims of physical violence at home or at school.No studies have been conducted in the Southern part of India to rule out the prevalence of bullying. So this study would be a new initiative in this field so that more awareness can be aroused among the public.

The objectives of this study was to explore bullying among selected high school students, assess the psychosocial wellbeing of the high school students , determine the relationship between bullying and psychosocial wellbeing of the high school students, determine the association between bullying and selected socio-demographic variables, determine the association between psychosocial wellbeing and selected socio-demographic proforma.

MATERIAL AND METHOD

The study group consisted of high school students belonging to age group of 13-17 years studying in English Medium Schools, Byndoor block, Udupi District, Karnataka

A total of 460, class 8th, 9th and 10th standard students were included in the study. After complete description of the study, written assent was obtained from the students and informed consent from the parents.

The block was selected using simple random sampling (chit method), followed by simple random sampling again to select the schools in the particular block.

A survey was conducted to explore bullying using Illinois Bullying Scale, an 18 item questionnaire which consists of three subscales ie; bully, victim and fight. To elicit data regarding demographic characteristics (age,

gender, year of study, education of mother, education of father, occupation of mother, occupation of father, number of siblings, type of family and area of residence), a socio-demographic scale was used. The psychosocial wellbeing of the students was also assessed by using psychosocial wellbeing scale.

The data collected was tabulated and analysed by using the Statistical Package for Social Sciences (SPSS) version 20. Chi-square test was carried out to test the association between variables. A probability level of less than 0.05 was considered significant.

RESULTS

Frequency and percentage of demographic characteristics:

Most of the samples (61%) belonged to the age group of 13-14 years. 64% were males, 39% of the samples belonged to class IX, 32% of the students' mothers were educated till PUC, 23% of the students' fathers were educated till PUC, 84% of the students' mothers were housewives, 44% of the students' fathers were involved in farming, 42% had a monthly family income above Rs.20,001. 54% of the students had two siblings, 65% belonged to nuclear family and 94% of the students were staying in hostels.

Table 1: Mean and Standard deviation of the subscales of Illinois Bullying Scale

N=460

Domains	Mean	Standard deviation
Victim subscale	5.62	3.94
Bully subscale	7.31	5.55
Fight subscale	4.05	3.73

The mean and standard deviation of subscales of Illinois Bullying Scale illustrates the mean victim subscale score as 5.62(SD=3.94), the mean bully subscale score as 7.31(SD=5.55), the mean fight subscale score as 4.05(SD=3.73). Based on the mean value it can be interpreted that bully behaviour was found to be high among the students compared to being victimized and getting involved in fights.

Table 2: Correlation between bullying and psychosocial wellbeing N=460

Variables	(r) value	p value
Bullying		
Psychosocial wellbeing	-.26	.000*

There is a negative correlation between bullying and psychosocial wellbeing ($r = -.26$, $p = <0.05$) which indicates that when bullying increases psychosocial wellbeing decreases.

Table 3: Association between bullying and selected socio-demographic variables. N=460

	Overall Bullying		χ^2	df	p value
	\leq Median(14)	$>$ Median(14)			
Age					
13-14	148	132	1.392	1	.238
15-17	85	95			
Gender					
Male	112	182	51.392	1	.000*
Female	121	45			
Year of study					
Class VIII					
Class IX	99	77			
Class X	80	97	4.315	2	.116
Family income/month in Rs.					
\leq 5000/-	17	13			
5,001-10,000/-	51	56	.975	3	.807
10,001-20,000/-	67	61			
Above 20,001/-	98	97			
Number of siblings					
None	0	0			
One	32	24			
Two	130	121	4.862	3	.182
Three	49	46			
Above three	22	36			
Type of family					
Joint	84	76	.335	1	.563
Nuclear	149	151			
Area of Residence					
Home	76	125			
Hostel	153	97	21.526	2	.000*
Paying guest	4	5			

The Chi square test value shows a highly significant association between gender and bullying ($\chi^2=51.392$, $p<0.05$) and present area of residence and bullying ($\chi^2=21.526$, $p<0.05$).

Table 4: Association between psychosocial wellbeing and selected socio-demographic variable. N=460

Variables	Psychosocial wellbeing score		χ^2	df	p value
	Low-Medium	High			
Age					
13-14	117	163	2.987	1	0.84
15-17	90	90			
Gender					
Male	140	154	2.258	1	.133
Female	67	99			
Year of study					
Class VIII	74	102	1.006	2	.605
Class IX	83	94			
Class X	50	57			
Family Monthly income (In Rs)					
<= 5,000/-	9	21	9.922	3	.019*
5,001-10,000/-	61	46			
10,001-20,000/-	53	75			
>20,001	84	111			
Number of siblings					
None	1	1	5.807	3	.121
One	18	38			
Two	117	134			
Three	41	54			
Above three	31	27			
Type of Family					
Joint	65	95	1.897	1	.168
Nuclear	112	158			
Area of Residence					
Home	97	104	1.846	2	.397
Hostel	107	143			
Paying Guest	3	6			

The above table shows the association between psychosocial wellbeing and selected socio-demographic variables where the psychosocial wellbeing has been divided into low (21-45) moderate (46-70) and high (71-105) scores. The Chi square test value shows a highly significant association between family monthly income and psychosocial wellbeing ($\chi^2=9.922$, $p<0.05$).

DISCUSSION

The present study was conducted with a total of

460 samples of 8th, 9th and 10th grade students for the purpose of exploring bullying among high school students, the psychosocial wellbeing of the high school students, and the impact of bullying on psychosocial wellbeing and to find an association between bullying and selected socio-demographic variables, psychosocial wellbeing and selected socio-demographic variables. The results showed that Mean and Standard deviation of bully subscale score was 7.31(SD=5.55), fight subscale score was 4.05(SD=3.73) and victim subscale score was 5.62(SD=3.94). Based on the mean and standard

deviation values it was interpreted that bully behaviour was found to be higher among the students compared to being victimized and involved in fights.

The study finding is supported by a study conducted by Arslan, Hallett, & Akkas (2012) to examine the prevalence and manifestation of bullying and victimization among male and female students aged 11–15 years. A total of 1,315 students belonging to 5th, 6th and 7th standard were selected from three schools in Western Turkey. The results showed that 80% of the participants were found not to be involved in any kind of bullying whereas, 20% of the students were found to be involved in the cycle of bullying (5% as a bully, 8% as a victim, and 7% as bully–victims).^[3]

The present study findings disclose that there is a negative correlation between bullying and psychosocial wellbeing ($r = -.26$, $P = .000$) which indicates that as bullying increases psychosocial wellbeing decreases.

The study finding is supported by a study conducted in Vietnam to check for the association between bullying and mental health. The study was conducted among 1424 middle school and high school students. The results showed high level of victimisation leads to higher levels of depression; ($p < 0.05$) and psychological distress.^[4]

The findings of the present study shows that there is a significant association between bullying and area of residence ($(c^2) = 21.526$, $p = .000$), bullying and gender ($(c^2) = 51.392$, $p = .000$).

A study conducted in Macau among 365 participants aged between 10 and 17 to examine the effect of self-control on bullying behaviours indicated that bullying behaviours are negatively associated with the participants self-control level. Participants residing in a school dormitory are found to manifest more bullying behaviours, to exhibit more risk-seeking behaviours, and to be more self-centred than their non-boarding.^[5]

CONCLUSION

Bullying is unwanted, aggressive behaviour among school aged children that involves a real or perceived power imbalance. The behaviour is repeated, or has the potential to be repeated, over time. Bullying includes actions such as making threats, spreading rumours, attacking someone physically or verbally, and excluding someone from a group on purpose. The incidence of

bullying is on the rise and if not resolved at the earliest it can lead to mental health problems in later adulthood.

Conflict of Interest: There are no conflicts of interests

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethics Committee of Kasturba Medical College, Manipal

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Investigation of Anxiety of Patients Undergoing Coronary Angiography in Imam Hossein Hospital of Mehran in 2016

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ABSTRACT

Introduction: Patients who undergo coronary angiography often experience stress and anxiety. The aim of this study is to determine the level of anxiety in patients undergoing coronary angiography in Imam Hossein Hospital of Mehran in 2016.

Materials and Method: the presented descriptive-cross sectional study was conducted on 63 patients (age range of 35-70) who had coronary angiography. The research tool was Spielberger State-Trait Anxiety Inventory (STAI). The data were then analyzed by SPSS V20 software. X², Mann-Whitney, independent T test and Covariance analysis were also employed.

Results: 33 participants were men and 30 of them were women, 88.8% of them were married. The majority of participants (74%) had medium level anxiety; 12% of them reported medium anxiety while the anxiety level of 14% of the participants was evaluated as severe.

Conclusion: As most of the samples had anxiety, presenting educational films, pamphlet and holding educational classes can reduce their anxiety. Some information could be also provided on the angiography in the form of CDs.

Keywords: anxiety, angiography, patient.

INTRODUCTION

Cardiovascular diseases are among the major health issues of today's societies [1-5]. One of the main tasks of nurses is to improve this condition [6]. Currently, definite diagnosis of cardiac disease without seeing the structure of heart and getting information on its physiologic performance is impossible [7,8]. To determine the severity and extent of coronary arteries involvement, different invasive and non-invasive methods are applied; but the golden standard is angiography [9].

As any diagnosis method can have some side effects, application of cardiac diagnostic methods including angiography could result in complications such as cardiac arrhythmia, cardiac muscle rupture, thrombosis, and artery embolus. However, anxiety is one of the major complications in angiography which can drastically affect the results of this test [10,11]. Chronic disease patients are usually experiencing anxiety [12-16]. From the viewpoint of patients, the main sources of anxiety are fear of unknown results, probable threatening complications, test results, necessity of surgery, fear of catheterization and unknown future. Fear of unknowns can cause anxiety [17-19]. As one of the parasitic factors, anxiety can cause headache, sleep disorders and stress [20].

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In this regard, psychological condition of the patients, especially those undergoing invasive procedures, is of crucial importance. If the psychological signs of anxiety

emerge during an essential procedure, the time and difficulty of the procedure will be probably increased. To avoid the negative consequences of anxiety, psychological preparation of the patients could be helpful [21, 22]. Studies have shown that psychological preparation of the patients, presenting necessary information about the procedure of cardiac catheterization and education of the methods of adaption will decrease the patients' anxiety [23]. Because these educations will increase the knowledge of the patient about the clinical actions and how to take care of him/herself; in this way, the anxiety of the patient will be decreased [24]. Mental health plays an important role in human health [34, 35]. Regarding what mentioned above, the researchers are aimed to measure the anxiety level of coronary angiography candidates referring to Imam Hossein Hospital in Mehran in 2016.

MATERIALS AND METHOD

This is a descriptive- cross sectional study on 63 patients undergoing coronary angiography. The formula for means comparison was considered by confidence level of 95% and test power of 90% to determine the sample volume. The study population included the admitted patients in cardiac department and CCU department who had undergone coronary angiography in Imam Hossein Hospital in Mehran (under supervision of Ilam medical science university, ir.medilam.ac.rec1396.17) in 2016. First, the patients were selected by accessible method according to inclusion criteria: having the age between 35 and 70 years old, having minimum knowledge of writing and reading, having no effective vision or hearing disorders, no addiction to drugs, tranquilisers or alcohol, having coronary angiography for the first time, having no history of using meditation or guided imagination and not being exposed to any other invasive procedures such as echocardiography through esophagus. The exclusion criteria were no consent to continue participation, receiving tranquilisers in last 8 hours, serious complications such as dangerous arrhythmia during angiography and patient death.

Two following forms were used for data collection: 1- demographic data questionnaire asking about age, sex, marital status, job, history of previous hospitalization and 2- Spielberger State-Trait Anxiety Inventory which included two scales of evident and hidden anxiety and evaluated the anxiety in to forms of state and trait. Any of these scales possessed 20 statements in 4-option Licort scale. In answering to the evident anxiety, the

participants express their feeling at the moment while hidden anxiety scale involves the normal feeling of the participants in most of the times. Any of these statements will be assigned to a score ranging from 1 to 4. The sum of scores for any of these scales will be in the range of 20-80 [25, 26]. To evaluate the validity of questionnaires' content, they were assessed by 15 academic members and their comments were used. Reliability of the questionnaires was also determined by Cronbach's Alpha test (0.8). The data were then analyzed by SPSS v 20. X², Mann-Whitney, independent T test and Covariance analysis were also employed.

RESULTS

63 patients (33 men and 30 women) in the age range of 35-70 were investigated. The average age was 58.9 in both sexes and 88.8% of the participants were married and the remaining were single. The majority of participants (74%) had medium anxiety. As above figure shows, 12% of the patients had mild anxiety, 74% of them reported medium anxiety level and the anxiety level of 14% of the participants was evaluated as severe.

There was a significant relationship between the age and anxiety ($P=0.034$), in a way that by increase of age, the anxiety level increased as well. Moreover, a significant relationship was observed between the sex and anxiety ($P=0.042$) as women had higher levels of anxiety. However, other demographic parameters showed no significant relationship with anxiety level ($P>0.05$).

DISCUSSION

Regarding the prevalence of coronary artery diseases, numerous tests have been used for diagnosis of these diseases. One of these methods is angiography which has been employed as a definite standard method for diagnosis of coronary artery diseases. In spite of its numerous advantages, coronary angiography could result in several problems [27]. As examination of psychological problems of patients have to be done prior to any intervention on coronary angiography patients, this study was conducted with the aim of determining the stress, anxiety and depression of the patients before coronary angiography.

Anxiety is a common experience among all people. Anxiety is an unpleasant and ambiguous feeling characterized by a series of physical symptoms such

as heart palpitations, sweating and dyspnea. Most of hospitalized patients have some degrees of anxiety among which pre-coronary angiography anxiety is one of the common ones [28].

Numerous studies on psychological preparation of the patients have shown that preparation techniques especially emotional and perceptual information and modeling can be effective in reducing the anxiety and stress of patients in different conditions including cardiac catheterization [29]. Application of non-medication nursing cares could be also effective in decreasing the anxiety and if the patients requests and was willing to use these anxiety-reducing interventions, they can be used in stressful conditions for instance before the diagnostic-invasive surgeries.

Zals et al. reported that education of the causes of the disease and the advantages of surgery can decrease the pre-surgery anxiety and the pain in the second hour after the surgery. These are in accordance with the results of this study, however, these educations had no effect on the pain in the first hour after the surgery, hospitalization duration, amount of tranquilliser application and the level of satisfaction [30]. Other study addressed the effect of education on anxiety, depression and hopefulness of women suffering from cancer. The results revealed that logotherapy education is efficient in reducing the depression and anxiety and increasing the hope of these women [31]. The results of the mentioned study are in line with this study. It can be said that application of non-pharmaceutical methods (education) can significantly reduce the anxiety and prognosis of the surgery.

A significant relationship was observed between the age and anxiety. A significant relationship was also observed between sex and anxiety in a way that the level of anxiety was higher in women. However, other demographic variables showed no significant relationship with anxiety which is in line with the results of other studies [32].

The results of this study could be a step in better control of stress, anxiety and depression in patients by the nurses before the angiography or other invasive diagnostic procedures. In this regard, implementation of educational programs can be effective in obtaining more cooperation of the patients during these diagnostic methods and also its post-treatments. To facilitate the preparation of the patients, it is better to provide more

facilities for more effective preparation of the patients which would reduce the anxiety and therefore accelerate the improvement after cardiac catheterization. The results of this study could be also applied in training the working staff to teach the nursing group these newly discovered researches. This study was conducted about the patients who were hospitalized one day before angiography as this intervention requires proper time. Therefore, one of the limitations of this study is its application on emergency angiography patients. In this study, the stress and anxiety and depression of the patients before the surgery were not evaluated. Therefore, it is recommended to measure both before and after intervention stress, anxiety and depression in future studies. In this way, in addition to comparing with the control group, the condition of the groups could be investigated before and after the intervention [33]. Overall, high levels of anxiety in these patients highlight the necessity of treatment group attention to reduce the anxiety and application of proper interventions to decrease these problems. This could be achieved when the causes of anxiety are determined.

CONCLUSION

As most of the samples had anxiety, presenting educational films, pamphlet and holding educational classes can reduce their anxiety. Some information could be also provided on the angiography in the form of CDs.

Conflict of Interest: There is no conflict of interest between authors.

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Ethical Clearance: Informed consent, No cost to the patient

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Attitude Towards Euthanasia among Students of Arts College – A Comparative Study

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ABSTRACT

This study was undertaken to study the awareness and perception about euthanasia among arts students and to compare the regional differences, if any. This cross-sectional study was conducted at different colleges in Mangalore (representing south) and Srinagar and Jammu (representing north) among 400 arts students. The students responded to self-administered questionnaires that comprised of ten questions. A total of 400 students participated in the study, 200 from South and 200 from North between the age group of 17 to 21 years. The majority of participants (85%) from north and 70% from south were against introducing a law permitting the practice of euthanasia. 78% of participants from north and 46% from south were of the opinion that it should not be allowed. The participants were questioned that if euthanasia is allowed, who according to them should do it, and it was found that majority of the participants from north were of the opinion that euthanasia should be decided by the family whereas participants from south believed that euthanasia should be decided by the doctor. The main concern of respondents in south (52%) regarding euthanasia was that it can be misused in different situations, whereas in north the participants (55%) were against euthanasia based on their religious belief. Majority of students were against the legalization of euthanasia. Further study should be conducted to know the awareness and perception of euthanasia among the general population.

Keywords: Awareness, Euthanasia, Perception, Arts students.

INTRODUCTION

Physicians in developing countries come across situations where issues like euthanasia are raised with increasing frequency.¹ Euthanasia also known as mercy killing is an issue of debate in the field of medicine.² ³ Euthanasia is further divided into active or passive. Active means that the physician administers lethal drugs that will end the life of the patient. Passive euthanasia is withdrawing or withholding of life supporting medical procedures or treatment, which indirectly leads to the death of the patient.⁴ It is a practice of granting a painless

death to person suffering from painful and incurable illness or from debilitated physical disorder.⁵ Passive euthanasia has been recognized by law in France in November 2004. Switzerland accepts patients from different countries for the termination of life according to the wish of the patient. Euthanasia is legalized in Holland, Belgium and Luxembourg. Uruguay has approved the “right to die” and physician assisted suicide is legalized in Switzerland and Germany, whereas all types of euthanasia are illegal and punishable in Greece⁶. The Supreme Court of India in the case of Aruna Shanbaug permitted passive euthanasia in May 2009, in certain situations, either on the request of the parents or the spouse or other close relatives. In the absence of any of them, such a decision can be taken by a friend or by the doctor but it should be in the best interest of the patient. In the meantime “The Supreme Court also asked the parliament to frame guidelines in this respect” and at the same time, passed a judgment that

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active euthanasia of patient suffering from acute disease was illegal⁷ (www.supremecourtindia.nic.in/outtoday/wr1152009) accessed on 7/6/2016. As euthanasia, has been gaining worldwide importance, present study was undertaken at different colleges in Mangalore and Jammu and Srinagar to explore the attitude of Arts students towards euthanasia.

MATERIAL AND METHOD

A cross sectional study was carried out in different colleges in Mangalore Dakshin Kannada (Karnataka) and Srinagar and Jammu (Jammu and Kashmir) with a sample size of 400. Of these 200 were from Mangalore and 200 from Srinagar and Jammu age ranging between 17 to 21 years. The study was taken up to assess the knowledge and attitude of arts students towards euthanasia and to compare regional differences if any towards euthanasia. Questionnaire also was used to collect information on gender, age, religion and attitude of respondents toward euthanasia. It was anonymised. Ethical clearance was taken from Institutional Ethics Committee for the study. Data was collected through validated self-administered, structured questionnaire prepared by studying the literature and the content of the questionnaire was validated by three experts. All the respondents were briefed about the study before administering the questionnaire and consent was taken for participating in the study. P value of less than 0.05 was taken as significant using the formula $n = Z\alpha^2Pq/d^2$, Where P is the Proportion of students in favour of euthanasia, d is the difference and $Z\alpha = 1.96$.

RESULT

A total of 400 students participated in the study from different arts colleges in Mangalore (South), Srinagar and Jammu (North) belonging to age group of 17 to 22 years. From north majority of students (32%) belonged to the age group of 17 years whereas from south majority of students 38% were of 18 years, 152 students were female (30% from north and 46% from south) and 248 were male (70% from north and 54% from south). Out of 200 students from south, 61% were Hindu, 27% were Muslims and 12% were Christians and out 200 students from north 60% were Muslims and 40% were Hindus.

When asked about the knowledge of euthanasia, more than half of students (57%) of participants from south and 54% from north were aware of it. A brief explanation was given about euthanasia to those who

were unaware of it quoting the Aruna Shanbaug case.

In response to a query asking whether the doctor should remove a 60 year old male from ventilator on the request of family members 61% of participants from north and 31% from south were against it.

When asked whether a hopelessly ill patient suffering from cancer with widespread disease should be given a lethal dose on her request to end the suffering, More than three fourths (78%) of participants from north and more than half (55%) of participants from south were against it.

Concerning whether a patients suffering from cancer esophagus, financially not sound and cannot afford the treatment should be allowed discharge from hospital, 60% of participants from north and 67% of participants from south were against it.

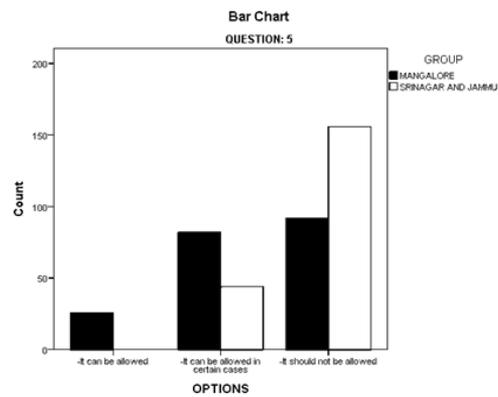


Fig 1: Views on euthanasia (mercy killing)?

When asked about their views on euthanasia, 46% of participants from south and 78% from north were of the opinion that it should not be allowed whereas 41% of participants from south and 22% from north were in favour of allowing it in certain cases.

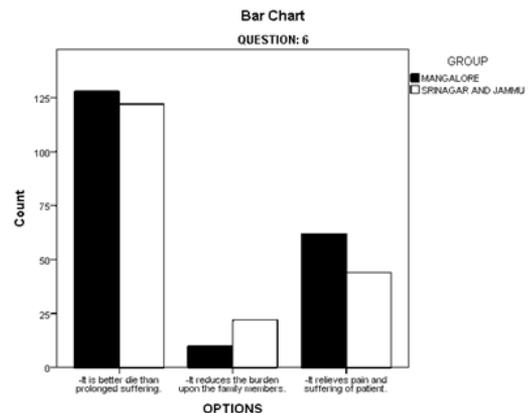


Fig 2: Reasons for supporting Euthanasia

When asked for reason supporting euthanasia 64% of participants from south and 64.9% from north believed that it is better to be allowed to die than prolong the suffering while 31% from south and 25% from north were of the opinion that it relieves pain and suffering of the patient.

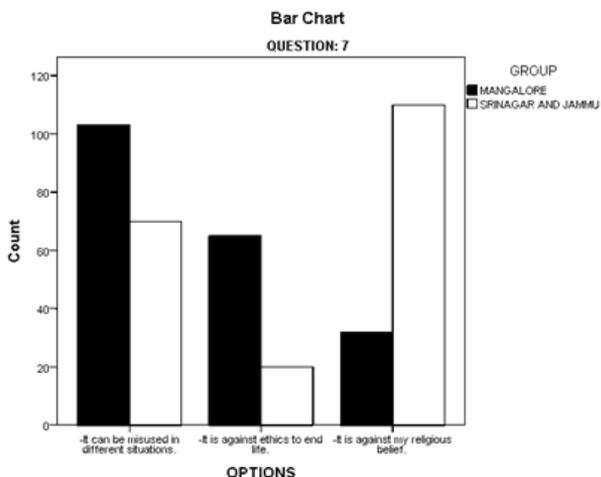


Fig 3: Reasons for opposing Euthanasia

Reasons for opposing euthanasia were asked and it was found that 55% of the participants from north said that it was against their religious belief and 52% of participants from south were of the opinion that it can be misused, whereas 32% of participants from south said it's against ethics to end life. (Calculation was done based on single best option).

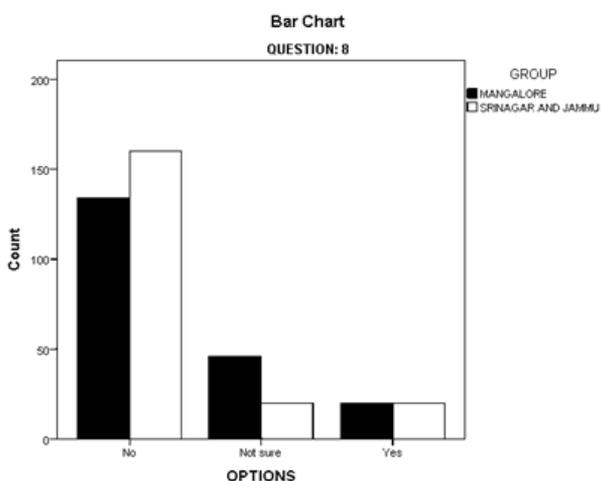


Fig 4: Should the terminally ill patients have the option to request a lethal medication (high dose of a drug or injection) to die?

Should the terminally sick patients should have the option to request a lethal medication to die, 80% of participants from north and 67% of participants from south were against it.

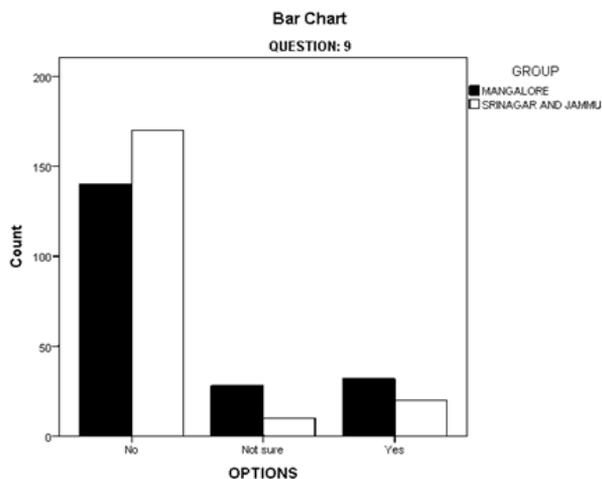


Fig 5: Should a law be introduced to allow Euthanasia?

When asked if a law permitting the practice of euthanasia should be introduced, 85% of participants from north and 70% of participants from south were against it.

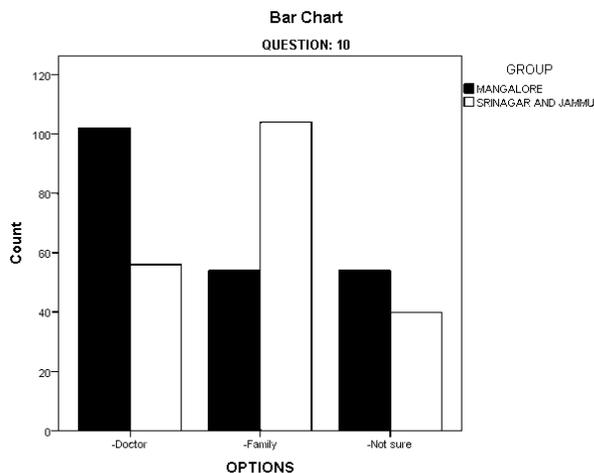


Fig 6: If euthanasia is allowed who should do it according to you?

When asked, if euthanasia is allowed who should do it, 52% of participants from north believed that it should be decided by the family and then doctor must be approached in this regard, whereas 48.6% of participants from south were of the opinion that it should be decided by the doctor. Statistical analysis was done and P-value was less than 0.001 which is significant.

DISCUSSION

In this study, we examined the attitudes and

knowledge of arts students towards euthanasia in order to find out any difference in their opinion as most of the studies have been carried out on medical students and nurses. This study suggested that majority of students have adequate knowledge, (57% of participants from south and 54% from north were aware of it) regarding euthanasia and students from both north and south were of the opinion that it should not be allowed. Majority of the students opposed the legalization of euthanasia. Students from north were of the opinion that euthanasia should be decided by the family whereas from south the students believed that it should be decided by the doctor. The main concern of respondents in south, regarding euthanasia was that it can be misused in different situation whereas in north students were against euthanasia based on their religious belief. When religion forms the basis of decision, the decision regarding life, death and suffering may not have been seen from patients prospective. In 2007 Aramesh K carried out a study at Tehran University of Medical Sciences, Iran and found that the majority of the participants were against euthanasia based on their religious belief¹. Even in case of study conducted by Atlay ES on female psychology students in Sudan, the majority i.e. 79% opposed euthanasia whereas 21.4% supported euthanasia³. A study conducted by Nick A on 599 Greek student nurses showed that majority of students have low knowledge regarding euthanasia and were against euthanasia based of their personal belief⁶. In a study conducted by Kitchener BA on 1218 Australian nurses from the Australian Capital Territory it was found that 72% of nurse supported voluntary active euthanasia, 71% of nurse supported physician assisted suicide, 61% of nurse supported voluntary active euthanasia if it were legal and 63% believed in patient care⁸. Cartwright C carried out another study on critical care nurses in Australia and was found that 57% participants were in favour of euthanasia whereas 76% were against it⁹. In a study conducted by Asia A on nurses and doctors of Japanese Association of Palliative Medicine it was found that 33% of doctors and 23% of nurses supported voluntary euthanasia and agreed that the law should be changed to legalize voluntary euthanasia¹⁰. Adchalingam K conducted a study on 400 medical students at the University of Malaysia and found that 71% of participants were against the idea of active euthanasia, 32% of participants favored the legalization of euthanasia in Malaysia and 67% of them were strongly against it whereas 61% of participants believed that they would not practice euthanasia as a

doctor nor would they have performed on themselves if or when it became legal⁴.

CONCLUSION

Finding of study indicated that students were having some knowledge about euthanasia. Majority of the students from North were against euthanasia based on religious belief. Participants from both north and south were against the legalization of euthanasia and believed that it should not be allowed however a small number of students were of the opinion that it can be allowed in certain cases. More extensive studies should be conducted to know the awareness and perception of euthanasia among the general population.

LIMITATION OF THE STUDY

Sample may not be truly representative of the north and south population.

Conflict of Interest: Nil

Ethical Clearance: Taken from Yenepoya University Ethics Committee

Source of Funding: Self

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Biological Rhythms, Sleep Quality and Postpartum Depression Disorder

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ABSTRACT

Postpartum Depression Disorder (PDD) is one of the most recent major depressive episodes, many of which begin with symptoms during pregnancy and become more intense after childbirth. The aim of this study was to investigate the role of biological rhythms and sleep quality in the prediction of PDD. The research method was descriptive-correlational. The statistical population of this study included all women with PDD who referred to health centers of Talesh city (Iran) in the second half of 2016. A total of 110 women were selected through purposive sampling and responded to the Biological rhythms interview, Pittsburgh's Sleep Quality Questionnaires and Beck's Depression Inventory. Data was analyzed using Pearson correlation coefficient and multiple regression analysis. The results showed that postpartum depression has a positive correlation with the disturbance of biological rhythms and sleep problems. The results of regression analysis also showed that biological rhythms and sleep quality predict 44% and 43% of postpartum depression in women under study. These results indicate that disturbance in biological rhythms and sleep, arose at postpartum period, may be a major risk factor for postpartum depression.

Keywords: Postpartum depression disorder (PDD), Biological rhythms, Sleep quality.

INTRODUCTION

Depression disorder can begin during pregnancy or after delivery. If the mood symptoms begin 4 weeks after delivery, it is referred to as postpartum depression disorder (PDD)¹. Many women develop malaise in postpartum period. Most of them report signs of a child's sadness, which is a transitory mood change characterized by mood insecurity, sadness, loneliness, mental confusion, and crying. These feelings, which may take several days, have attributed to changes in the level of hormone of women, the stress of childbirth and the addition of motherhood, but if these symptoms last longer than two weeks, assessment of postpartum depression is necessary². This disorder is seen in 5-25% of women. Severe insomnia, mood instability and tiredness are common symptoms³. Many women are

more vulnerable to psychiatric illness during pregnancy and postpartum⁴. Statistics show that 50 percent of women who have experienced pregnancy depression suffer from postpartum depression⁵. Research has shown that pregnancy and childbirth can make women susceptible to sleep disorders^{6,7}.

Changes in biological rhythms during pregnancy and childbirth can be another important factor for postpartum depression. Biological rhythms are very important in sleep / awakening cycles, body temperature, hormonal levels, cognition, attention and mood, and are strongly associated with mood disorders⁸. Disturbances in biological rhythms occur in many mood disorders and may cause mood swings in vulnerable people⁹. Boland and Alloy⁹ showed that among the biological rhythms, sleep disorder becomes apparent more frequently in comparison with other symptoms such as activity, eating, and social patterns. Jackson, Cavanagh & Scott¹⁰ showed that sleep disturbance disorders are one of the most common disorders in patients with bipolar disorder. Jansena, Cardoso, Magalhães, Benicio, Osesa & et al¹¹

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showed that there is a significant relationship between depression and disorder in people's biological rhythms. Studies showed that patients with depression have fewer motor functions during the day and this disrupts biological rhythms¹². In addition, it has been suggested that diet patterns play a role in the treatment of bipolar disorder¹³. Also studies have showed that people with bipolar disorder and major depression have shown a disorder in biological rhythms¹⁴.

Complications and sleep disorders in the first month of labor can be important factors in PDS. With the onset of fertility, the pattern of sleep changes in women¹⁵. With almost 79% of women having it, sleep disturbance is one of the most common problems of women in this period¹⁶. Statistics show that sleep disorders have been widely found in Iran^{17,18} and it has risen even up to a limit of 59 percent in adults¹⁹. People who are suffering from sleep deprivation are at greater risk of depression and depression is the strongest former indicative disorder²⁰. Half of people who develop depression complain of sleep problems²¹. Louise, Narcoma & Gomes²² showed that half of the mental illness during pregnancy is associated with anxiety and depression. Research has shown that sleep quality is associated with depression during pregnancy and postpartum²³. Additionally, Karami, Momeni & Alimoradi²⁴ showed that depression and stress have a significant correlation with quality of sleep in pregnant women and can predict sleep quality significantly.

Due to the fact that the labor process is associated with disturbances in biological rhythms and after delivery, women's sleep quality is also at risk, the present study aims to investigate the role of biological

rhythms and sleep problems in predicting postpartum depression disorder.

MATERIAL AND METHOD

The research method is correlational. The statistical population of this study consisted of whole women with PDS who referred to the health centers of Talesh city in the second half of 2016 (N = 450). The sample size was selected based on the sample size estimation method in Cohen et al. Correlation research²⁵. Accordingly, 110 women were estimated from community size and samples were selected through nonrandom purposive sampling.

Beck's depression inventory, Pittsburgh Sleep Quality index (PSQI) and Biological Rhythms Interview were used to collect data.

PROCEDURE

all women who referred to the center for postpartum delivery were asked to respond to the Beck Depression Inventory and women who had a score of over 17 were included in this study. After explaining the research objectives, they were asked to respond to biological rhythms and sleep quality questionnaires in the center. Having a child in the last three months, the age range of 20-40 years old, and having a score of over 17 in the Beck depression test were the main inclusion criteria and having a disabled child and the lack of cooperation for participation in the research are also among the criteria for withdrawal of subjects from the present study. Finally, the collected data was analyzed by Pearson correlation test and multiple regression analysis.

FINDINGS

A total of 110 women with PDS participated in this study, with an average age of 27.83 and a standard deviation of 3.28.

Variable	M±SD	1	2	3	4	5	6
Sleep rhythm	11.04±4.79	1					
Rhythm of daily activities	11.38±3.5	0.57±0.001	1				
Rhythm of social activities	9.07±3.5	0.24±0.015	0.54±0.001	1			
Food rhythm	9.40±4.19	0.53±0.001	0.46±0.001	0.29±0.003	1		
The dominant rhythm of life	6.76±3	0.57±0.001	0.46±0.001	0.47±0.001	0.70±0.001	1	
Postpartum depression	25.97±5.62	0.28±0.001	0.43±0.001	0.51±0.001	0.16±0.001	0.26±0.001	1

Based on the results presented in Table No 1, there is a significant, positive relationship between depression and disturbance in sleep rhythm, depression and disturbance in the rhythm of daily activities, depression and disturbance in rhythm of social activities, depression and disturbance in rhythm of food and depression and disturbance in dominant rhythm of life.

Table No 2: Correlation coefficient of postpartum depression with sleep disturbances

Variable	M±SD	1	2	3	4	5	6	7	8
Low subjective sleep quality	1.30±1.15	1							
Sleep latency	1.14±1.09	0.57±0.001	1						
Sleep duration	1.24±1.15	0.24±0.001	0.54±0.001	1					
Habitual sleep efficiency	1.04±1.02	0.53±0.001	0.46±0.001	0.29±0.002	1				
Sleep disturbance	1.09±1.13	0.57±0.001	0.46±0.001	0.47±0.001	0.70±0.001	1			
Sleep medication	1.21±1	0.28±0.001	0.43±0.001	0.51±0.001	0.16±0.001	0.26±0.001	1		
Daytime dysfunction	1.14±1.03	0.40±0.001	0.53±0.001	0.36±0.001	0.29±0.001	0.34±0.001	0.66±0.001	1	
Postpartum depression	25.97±5.62	0.52±0.001	0.36±0.001	0.24±0.001	0.57±0.001	0.57±0.001	0.21±0.19	0.30±0.002	1

Based on the results presented in Table No 2, there is a significant, positive relationship between depression and low subjective quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, sleep medication and daily dysfunction.

Table No 3: Multiple regression analysis results in postpartum depression disorder based on disturbances in biological rhythms

Variable	B	SE B	β
The width of the source	13.70	1.63	
Disturbance of sleep rhythm	.260	1.65	.222
Disturbance of the rhythm of daily activities	.35	.12	.266*
Disturbance of the rhythm of social activities	.32	.12	.203
Disturbance of rhythm of food	-.10	.15	-.079
Disturbance of the dominant rhythm of life	.50	.13	.269
R ² = .44			
F = 136.64***			

*p < .05, **p<.01, ***p<.001

Regression results show that 44% of variance of postpartum depression is predicted by biological

rhythms. The following beta coefficients have been reported: sleep rhythm with a beta of 22%, daily rhythm with beta of 26%, social rhythm with a beta of 20%, and dominant rhythms of life with a beta of 26% can positively predict postpartum depression in women.

Table No 4: Multiple regression analysis results in postpartum depression disorder based on disturbance in sleep quality

Variable	B	SE B	β
Constant	21.43	0.868	
Low subjective sleep quality	1.14	0.55	0.23*
Sleep latency	-.162	.624	-.032
Sleep duration	-.41	.55	-.085
Poor sleep efficiency	1.53	.68	.28*
sleep disorder	.37	.69	.06
Daily dysfunction	.23	.67	.04
R ² = .43			
F = 8.92***			

*p < .05, **p<.01, ***p<.001

Synchronous regression model shows that 43% of variance of postpartum depression is predicted by sleep disturbances. Further, the beta coefficients reported indicate that subjective sleep quality with a beta value of 23%, sleep efficiency with a beta of 28% and sleep disturbances with a beta of 26% can positively predict postpartum depression in women.

DISCUSSION

The results of this study showed the biological components of sleep rhythm, rhythm of daily activities, rhythm of social activities, food rhythm and dominant rhythm of life could predict PDD. These findings are consistent with the results of Boland and Alloy's⁹ study which was conducted in order to investigate the abundance of the disturbance of biological rhythms in mood disorders which may lead to mood swings in vulnerable individuals; among biological rhythms, sleep disorder becomes more apparent in comparison with other symptoms such as activity, eating, and social patterns; this is consistent with the results of studies^{11,12} suggesting that patients with depression have problems with their biological rhythms. The biological rhythms of the human body in areas such as food, sleep rhythm, rhythm of daily activities, and social rhythm cause coordination between the physical system and the environment; thus, since daily activity is disturbed during and after childbirth and, partly due to physical disabilities, the women experience the loss of responsibility and their work, social communication is reduced and the postpartum women become vulnerable against feelings of sleep disturbance and loss of friends and relatives. Therefore, the biological rhythms of the human body change and become incompatible with the environment; normal functioning becomes complicated and the ordinary course of life is disrupted, leaving the individual woman in mental stress and signs such as becoming unemployed, anxious, and depressed.

The results also showed that depression are related to sleep disturbances. These findings are consistent with the previous results²² on the significant relationship between poor quality of sleep and depression and Caningo et al²⁶ which reported that sleep disorders are more common in women after childbirth; Skuteris et al²⁴ which showed that sleep quality is associated with postpartum depression; Lord et al⁶ and Mindell and et al⁷ according to which pregnancy and childbirth make women vulnerable against sleep disorder. The findings

of the present research are, also, close to the results of Karami et al²⁵ which showed that there is a significant relationship between depression and sleep quality in pregnant women. Sleep has widespread effects on the lives of people and the quality of sleep and activities that a person performs during waking hours, greatly affects mental health and the incidence of mental disorders. Therefore, it appears that since new mothers would probably suffer sleep disturbances due to inadequate physical condition, taking care and feeding the infant, and providing daily and nightly nurture for the infant, the quality and durations of the sleep of mothers decrease. Increased sleep disturbance is a life-threatening factors which affects several dimensions of the life of the individual; additionally, in case of women who have just undergone childbirth, symptoms such as lack of enjoyment of life, depressed mood, impatience and early fatigue are manifested and can be seen in PDD.

Some of the main limitations of the present study include the inability to control the some of disturbing variables, such as the history of women's mental status, the duration of marriage, the age of marriage and the number of children, and the limited sample. Because of the strong relationship between disturbance in biological rhythms and the quality of sleep in depression, it suggest that the programs to prevent postpartum depression must be provided for specific period of time.

CONCLUSION

In sum, the findings of this study generally indicate that biological rhythms and sleep quality play a significant role in the rate of postpartum depression in women; decrease in sleep quality causes the collapse of women's biological rhythms in postpartum period, in such a way that providing care for the newborn and postpartum problems cause daily and night-time mishaps and sleep problems (biological rhythms), which, ultimately, lead to psychological stresses in women.

Ethical Clearance – Taken

Source of Funding– Self

Conflict of Interest -Nil

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Relationship of Fingerprint with Blood Group among Medical Students in Mangalore

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ABSTRACT

This study was undertaken to study the relationship of fingerprint with blood group among medical students in Yenepoya Medical College over a period of one year. This prospective study was carried out with a sample size of 400, out of which 200 were males and 200 were females, belonging to age group of 17 to 21 years. In this study medical student, dental students, physiotherapy students and nursing staff/students were included. The study revealed that majority of participants belonged to blood group 'O' followed by 'B', 'A' and 'AB' respectively. The study also revealed that maximum n=371 (93%) participants belong to Rh positive group whereas Rh negative group was present only in small number of participants n=29 (7%). Majority of participants in both male and female population were having blood group 'O' followed by blood group 'B'. Loop was the most common pattern followed by whorl and arches respectively. Using the Chi Square test P value was found to be <0.001, which is significant.

Keywords: Fingerprint, Blood group, Medical students

INTRODUCTION

The likelihood of fingerprint being identical in two different individual is extremely small in the world's population, even in case of identical twins where the finger print pattern may be similar but the configuration and sequence of ridge pattern are unique and like that of two unrelated individuals and therefore fingerprint is most accepted and widely used method to establish the identity^{1,2}. Fingerprints collected at a crime scene can be used to identify suspects, victims and even perpetrator. Fingerprint scans can be used to validate electronic registration, cashless catering and library access especially in schools and colleges. Secretions in fingerprints contain residues of various chemicals and their metabolites

which can be detected and used for Forensic purposes³. The human ABO blood group system was discovered by Karl Landsteiner in 1900 for which he was awarded noble prize in the year 1930⁴. Only 'ABO' and Rhesus group are of clinical importance. 'ABO' system is further classified into 'A', 'B', 'AB', and 'O' blood group depending on the presence of specific antigen in the plasma. Rhesus system is classified into 'Rh positive' and 'Rh negative' depending on the presence or absence of 'D' antigen^{4,5,6}. As important the fingerprints are, so it was thought to be blood group, therefore this study is an attempt to correlate the fingerprint pattern with 'ABO' system of blood grouping.

METHODOLOGY

A prospective study was carried out with a sample size of 400 in Yenepoya Medical College over a period of one year. In this study medical student, dental students, physiotherapy students and nursing staff/students were included. A Proforma was prepared on plain paper which included the name, age and gender of the subject and it was divided into two, marked as right hand and

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left hand, and each further into five columns marked as thumb, index –finger, middle- finger, ring- finger and little- finger beginning with the right thumb as number one (1) and ending with the left little finger as number (10). Ethical clearance was taken from Institutional Ethics Committee for the study. Subjects were asked to wash their hand thoroughly with soap and water and dry them using a towel. He/she was then asked to press his/her fingerprint on the stamp pad and then to the paper to transfer the fingerprint impression and the same method was repeated for all the fingers of both hands. Fingerprint patterns were studied with the help of magnifying lens. Blood group of all students was verified and confirmed from driving license and college identity card. The distribution of fingerprint pattern in both the hands of an individual and its relationship with

blood group was evaluated and analyzed statistically using the formula $n = z^2 pq/d^2$, Where p is the prevalence, q= 1 – p, d= margin of error (Considering 60% prevalence of loops). Those with birth defect or disease, hand deformity due to injury, permanent scar on fingers or thumbs, worn fingerprints, extra webbed or bandaged finger, congenital absence of fingerprint and blood disorder and recent blood transfusion were excluded from the study.

RESULT

A total of 400 hundred students participated in the study, out of which 200 were males and 200 were females, belonging to age group of 17 to 21 years. Majority of participants belonged to blood group ‘O’ followed by ‘B’, ‘A’ and ‘AB’ respectively. Loop was the most common pattern followed by whorl and arches respectively.

Table No 1: Sex Wise Distribution of Fingerprint Pattern

Distribution Pattern	Males		Females		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Arches	69	3.4%	198	9.9%	267	6.7%
Loops	1198	59.9%	1074	53.7%	2272	56.8%
Whorls	733	36.6%	728	36.4	1461	36.5%
Total	2000	100%	2000	100%	4000	100%

Table No 2: Sex wise distribution of blood groups

Blood group	Male (%)	Female (%)	Total (%)
A+	46 (23.0%)	40 (20.0%)	86 (21.5%)
B-	11 (5.5%)	7 (3.5%)	18 (4.5%)
B+	55 (27.5%)	53 (26.5%)	108 (27%)
O-	0 (0.0%)	11 (5.5%)	11 (2.8%)
O+	77 (38.5%)	81 (40.5%)	158 (39.5%)
AB+	11 (5.5%)	8 (4%)	19 (4.8%)
Total	200 (100%)	200 (100%)	400 (100%)

Table shows that more than half of participants n=158 (39.5%) belong to ‘O’ group followed by ‘B’ group n=108 (27%) and ‘A’ group n=86 (21.5%), ‘AB’ group shares the minimum percentage n=19 (4.8%) of study participants. There is significant difference in blood group distribution in gender. Majority of females are ‘O’negative and ‘O’positive n=81(40.5%), and all ‘O’negatives n=11 (5.5%) were females. Whereas majority of

‘B’negative were males n=11(5.5%), this association is significant with a p value of <0.001.

Table No 3: Distribution Of Rh Factor

RH Factor	A (%)	B (%)	AB (%)	O (%)	Total (%)
RH +ve	86 (21.5%)	108 (27%)	19 (4.8%)	158 (39.5%)	371 (93%)
RH -ve	0 (0.0%)	18 (4.5%)	0 (0.0%)	11 (2.8%)	29 (7%)

Table shows that maximum n=371 (93%) participants belong to Rh positive group whereas Rh negative group was present only in small number of participants n=29 (7%). Majority of participants in both male and female population were having blood group ‘O’ followed by blood group ‘B’.

TABLE 4: PATTERN OF FINGERPRINTS AMONG ABO & RH BLOOD GROUPS

Fingerprint	A+ (%)	B+ (%)	AB+ (%)	B- (%)	O+	O-	Total
Loops	554 (64.4%)	609 (56.4%)	126 (66.3%)	110 (61.1%)	814 (51.5%)	59 (53.6%)	2272 (56.8%)
Whorls	258 (30%)	396 (36.7%)	51 (26.8%)	70 (38.9%)	635 (40.2%)	51 (46.4%)	1461 (36.5%)
Arches	48 (5.6%)	75 (6.9%)	13 (6.8%)	0 (0.0%)	131 (8.3%)	0 (0.0%)	267 (6.7%)
Total	860 (100%)	1080 (100%)	190 (100%)	180 (100%)	1580 (100%)	110 (100%)	4000 (100%)

Comparing blood groups and fingerprint pattern it was found that ‘O’negative,

‘O’positive and ‘B’negative was having higher percentage of whorls with 46.4%, 40.2% and 38.9% respectively. Similarly the percentage of loops were more in ‘AB’ group n=126 (66.3%) and less in ‘O’negative group n=59 (53.6%) and the percentage of arches were more in ‘O’ group n=131 (8.3%) and was absent in B-negative and ‘O’negative group

DISCUSSION

This study is an attempt to associate fingerprint pattern with gender and blood group of an individual, which will help in identification and detection of criminals.

Table 5: Comparison of ABO Blood Group Pattern Among Various Studies

AUTHOR	YEAR	SAMPLE SIZE	STUDY POPULATION	RESULT (BLOOD GROUP)
Bharadwaja A et al ⁷	2001	N=300 MALE: Female 2.4: 1	Ajmer population	A- 16.67% B- 36.6% O- 38.33% AB- 8.33%
Sangam MR et al ⁸	2009	N=506 Male: Female 1.12: 1	Chinakakani, Guntur, India	A- 18.2% B- 32.2% O- 42.9% AB- 6.7%
Deopa D et al ⁹	2010	N=140 Males=65 Females=75	Haldwani, India	A- 18.75% B- 39.06% O- 28.13% AB- 14.06%

Cont... Table 5: Comparison of ABO Blood Group Pattern Among Various Studies

Fayrouz NE et al ¹⁰	2010	N=305 Male: Female 1.2: 1	Libyan population	A- 33.1% B- 12.8% O- 48.9% AB- 5.2%
Eboh EO ¹¹	2011	N=490	Abraka population	A- 15% B- 15.75% O- 58.25% AB- ABSENT
Mehta AA et al ¹²	2011	N= 200 Males- 127 Females- 73	Nagpur population	A- 22.50% B- 41.50% O- 30.5% AB- 5.50%
Bhavana D et al ¹³	2013	N=200 Males=100 Females=100	Dharwad Karnataka	A- 21% B- 37% O- 35% AB- 7%
Umraniya YN et al ¹⁴	2013	N=304 Males=216 Females=88	Gujarat population	A- 16.45% B- 36.51% O- 38.49% AB- 8.55%

Rastogi P et al ¹⁵	2014	N=200 Males=100 Females=100	Mangalore population	A- 28% B- 32% O- 35.5% AB- 4.5%
Ekanem AU et al ¹⁶	2014	N=400 Males=200 Females=200	Nigerian population	A- 15% B- 15.75% O- 58.25% AB- ABSENT
Manoranjitham RMS et al ¹⁷	2015	N=600 Males=267 Females=333	Perambalur South India	A- 21.3% B- 33.5% O- 39.2% AB- 6%
Verma U et al ¹⁸	2015	N=200 Males=87 Females=113	Rohtak India	A- 19.5% B- 43.5% O- 28% AB- 9%
Radhika RH ¹⁹	2016	N=100 Males=27 Females=73	Chittur, Palakkad, India	A- 14% B- 27% O- 40% AB- 4.4%
Present study	2016	N=400 Males=200 Females=200	Mangalore population	A- 21.5% B- 27% O- 39.5% AB- 4.8%

In our study we found that 'O' was most common n=158 (39.5%) blood group and

'AB' n=19 (4.8%) was the least common blood group which was consistent with study done by Bharadwaja et al (2001)⁷ on Ajmer population, Sangam MR et al (2009)⁸ on Chinakakani, Guntur population, Fayrouz NE et al (2010)¹⁰ on Libyan population, Umraniya et al (2013)¹⁴ on Gujarat population, Rastogi P et al (2014)¹⁵ on Mangalore population, Manoranjitham RMS et al (2015)¹⁷ on Perambalur population and Radhika.R.H (2016)¹⁹ on Chittur, Palakkad population. However studies done by Deopa D et al (2010)⁹ on Haldwani population, Mehta AA et al (2011)¹² on Nagpur population,

Bhavana D et al (2013)¹³ on Dharwad population and Verma U et al (2015)¹⁸ on Rohtak population, observed 'B' as most common blood group and 'AB' as the least common blood group pattern whereas studies conducted by Eboh EO (2011)¹¹ on Abraka population and Ekanem AU et al (2014)¹⁶ on Nigerian population showed the absence of 'AB' blood group.

Table 6: Comparison of RH factor among various studies

Author	Year	Sample size	Study population	Result (Rh factor)
Bharadwaja A et al ⁷	2001	N=300 MALE: Female 2.4: 1	Ajmer population	Rh+ve-95.67% Rh-ve-04.33%
Deopa D et al ⁹	2010	N=140 Males=65 Females=75	Haldwani, India	Rh +ve- 91.4% Rh -ve-8.6%
Fayrouz NE et al ¹⁰	2010	N=305 Male: Female 1.2: 1	Libyan population	Rh +ve- 87.2% Rh -ve-12.8%
Eboh EO ¹¹	2011	N=490	Abraka population	Rh +ve- 100% Rh-ve-ABSENT
Mehta AA et al ¹²	2011	N= 200 Males- 127 Females- 73	Nagpur population	Rh +ve- 95% Rh -ve-5%
Bhavana D et al ¹³	2013	N=200 Males=100 Females=100	Dharwad Karnataka	Rh +ve- 95% Rh -ve-5%
Umraniya YN et al ¹⁴	2013	N=304 Males=216 Females=88	Gujarat population	Rh+ve-96.38% Rh -ve-3.62%

Cont... Table 6: Comparison of RH factor among various studies

Rastogi P et al ¹⁵	2014	N=200 Males=100 Females=100	Mangalore population	Rh +ve- 96% Rh -ve- 4%
Manoranjitham RMS et al ¹⁷	2015	N=600 Males=267 Females=333	Perambalur South India	Rh +ve- 94% Rh -ve- 6%
Verma U et al ¹⁸	2015	N=200 Males=87 Females=113	Rohtak India	Rh +ve- 94.5% Rh -ve- 5.5%
Radhika RH ¹⁹	2016	N=100 Males=27 Females=73	Chittur, Palakkad, India	Rh +ve- 85% Rh -ve- 15%
Present study	2016	N=400 Males-200 Females-200	Mangalore population	Rh +ve- 93% Rh -ve- 7%

Present study showed that maximum n=371 (93%) participants belong to Rh positive group whereas Rh negative group was present only in small number n=29 (6%) of participants and these findings are consistent with the studies done by Bharadwaja et al (2001)⁷ on Ajmer population, Deopa D et al (2010)⁹ on Haldwani population, Fayrouz

NE et al (2010)¹⁰ on Libyan population, Bhavana D et al (2013)¹³ on Dharwad population, Umraniya et al (2013)¹⁴ on Gujarat population, Rastogi P et al (2014)¹⁵ on Mangalore population, Manoranjitham RMS et al (2015)¹⁷ on Perambalur population, Verma U et al (2015)⁴⁴ on Rohtak population and Radhika.R.H.(2016)¹⁹ on Chittur, Palakkad population. However in the study conducted by Eboh EO (2011)¹¹ on Abraka population reported that in his study participants no Rh negative blood group was seen.

DISTRIBUTION OF FINGERPRINT PATTERN IN DIFFERENT ABO BLOOD GROUP

Present study showed that 'O'negative, 'O'positive and 'B'negative were having higher percentage of whorls with 46.4%, 40.2% and 38.9% respectively, which is similar to the findings of Rastogi P et al (2014)¹⁵ on Mangalore population and Deepa D et al

(2010)⁹ on Haldwani population, who observed that whorls were associated with blood group 'O' and contrary to the findings of Bharadwaja et al (2001)⁷ on Ajmer population who observed higher percentage of whorls in 'AB' blood group and higher percentage of loops in 'A' blood group. Present study showed that percentage of arches were more in

'O' group n=131 (8.3%) and was absent in B-negative and 'O'negative group, similar results were observed by Manoranjitham RMS et al (2015)¹⁷ on Perambalur population, in which the highest percentage of arch was observed in blood group 'O' (7.8%). In present study it was found that percentage of loops were more in 'AB' blood group n=126 (66.3%) and less in 'O'negative blood group n=59 (53.6%), whereas

Sangam MR et al (2009)⁸ on Chinakakani, Guntur population, observed high frequency of loops in

‘O’negative (59.1%) blood group and least in ‘AB’negative (45%) blood group, Mehta

AA et al (2011)¹² on Nagpur population and Radhika.R.H. (2016)¹⁹ on Chittur, Palakkad population, observed high frequency of loops in ‘O’ blood group (61.8%) and lowest in

‘AB’ blood group and Umraniya et al (2013)¹⁴ on Gujarat population observed more

Loops in ‘A’ blood group and more whorls in ‘AB’ blood group.

CONCLUSION

Present study revealed correlation between fingerprint pattern and blood group. Loop is the most common fingerprint pattern observed in all blood groups followed by whorl and arches. Maximum participants belong to Rh positive group whereas Rh negative group was present only in small number of participant. Majority of participants in both male and female population were having blood group ‘O’ followed by blood group ‘B’. Arch and whorls were more in ‘O’ group, whereas loops were present in higher number in ‘AB’ group. This association is significant with p value of <0.001. The study also showed a significant difference in blood group distribution in gender as majority of the females were having ‘O’ positive and ‘O’ negative blood groups respectively, whereas majority of males were ‘B’ negative and this association is significant with ‘p’ value of <0.001.

LIMITATION OF THE STUDY

Limitations of the study are:

Since the study is carried out in a Medical College, it may not represent the universe.

ii. The preponderance of blood group, Rh factor and finger print is less likely to be significant due to limited inclusion of various populations.

Conflict of Interest :None

Ethical Clearance: Taken From Yenepoya University Ethics Committee

Source of Funding: Self

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Protective Effect of Baicalin in Rats Exposed to Arsenic-Induced Testicular Toxicity

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ABSTRACT

Arsenic exposure causes testicular injury through oxidative and nitrate stress, inflammation, and apoptosis. Baicalin has anti-inflammatory, antioxidant, and antiapoptotic activities. The aim of this work was to investigate the possible testicular protection of baicalin in rats intoxicated by arsenic. Sodium arsenite was given at a dose of 10 mg/kg/day for 2 days. Baicalin (10 mg/kg/day) was administered for 7 days. Administration started 5 days before the arsenite insult. It was revealed that Baicalin significantly decrease elevations of testicular malondialdehyde, tumor necrosis factor- α , nuclear factor- κ B p65 unit, and inducible nitric oxide synthase caused by arsenic. Baicalin ameliorated arsenic-induced reductions of serum testosterone, and testicular superoxide dismutase and reduced glutathione. Moreover, baicalin attenuated the pathological changes, and reduced caspase-3 expression in arsenic-exposed rat testes.

In conclusion, Arsenic-induced testicular toxicity was significantly reduced by using baicalin that antagonizes inflammation, oxidative/nitrosative stress as well as the process of apoptosis.

Keywords: arsenic, baicalin, testes, rats

INTRODUCTION

Inorganic arsenic is a common environmental pollutant, mainly arsenite. The major source of exposure is ground water containing high arsenic levels, which exceed the permissible limit recommended by WHO in many countries.^(1, 2) Acute and chronic arsenic toxicity cause serious harmful effects on the testes leading to suppression of androgenesis and spermatogenesis, male reproductive dysfunction and infertility.^(3, 4) The pathophysiology of arsenic-induced testicular toxicity is not yet well understood. However, many authors have stated that inflammation, stress and apoptosis may lead to this condition⁽⁵⁻⁸⁾. Nevertheless, nitrate stress may be triggered by the increased production of reactive nitrogen species (RNS) via inducible nitric oxide synthase (iNOS)^(9, 10) previous reports showed that antioxidants and anti-inflammatory agents significantly ameliorated arsenic-mediated testicular injury.⁽¹¹⁻¹³⁾

Baicalin (BN) is the main active flavonoid isolated from the medicinal Chinese herb, *Scutellaria baicalensis*. BN has many activities, including antioxidant, anti-inflammatory, antimicrobial, antidiabetic, antiallergic, immunostimulant, and antineoplastic effects.⁽¹⁴⁻¹⁶⁾ Recent studies demonstrated that BN inhibited the heat stress-induced sertoli cell apoptosis, and ameliorated the injury caused by torsion-detorsion of rat testes.^(17, 18)

MATERIALS AND METHOD

Drugs

Sodium arsenite (NaAsO₂) (Sigma-Aldrich, USA) dissolved in physiological saline. BN (Sigma-Aldrich, USA), prepared in carboxymethylcellulose (CMC, 0.5%). Selected doses of NaAsO₂ and BN in this study are consistent with previous studies.^(5, 19)

Animals

Forty Sprague-Dawley (SD) male rats, weighing 230-260, housed at 25°C with 45% humidity, 12 h /12 h

diurnal rhythm, adaptation for 1 week before the study, fed with *ad libitum* supplementation with a provided tap water.

Induction of testicular injury

Testicular toxicity was induced by giving NaAsO₂ in a daily dosage of 10 mg/kg/day given via gavage, for 48 hours.

Design of the study

Rats underwent a random allocation into four groups. Each one contained 10 rats. In group one; which is the control, received physiological saline daily for 2 days. Those in both second and third groups received NaAsO₂ for 2 days. Additionally, rats of second group received CMC, while those of third group received BN (10 mg/kg/day) for 7 days, starting 5 days before NaAsO₂ administration. Only BN was given to the fourth group for 7 days.

Sampling and biochemical analyses

Rats underwent anesthesia 24 h after the last dose of NaAsO₂ via intraperitoneal thiopental (100 mg/kg.). Then, blood was collected via a cardiac puncture to determine the serum testosterone level using the ELISA technique. Dissection of testes was performed by homogenization of right testes using a cold potassium phosphate buffer (pH 7.4) inducing a homogenates to be centrifuged at 4000 rpm for 10 min at 4°C. Following that, a colorimetry was used to measure MDA, GSH, and SOD in the testicular homogenates (BioVision, Inc., USA). Following that, ELISA kits were used to measure testicular TNF- α (R&D Systems, USA), and iNOS (Cusabio, China).

A homogenate portion underwent a centrifuging rate of 15,000 rpm for 10 min at 4°C.

The pellet (nuclear part) obtained to measure NF- κ B p65 unit using the ELISA technique

Additionally, parts of the testicular tissue dried at 80°C overnight. After recording the dry weight, samples were digested in 30% H₂O₂ and 70% HNO₃ (1:1). Determination of arsenic ion level at 193.69 nm took place using a spectrometry of a coupled plasma optical emission (Optima 2100 DV, PerkinElmer, USA).

Histopathology

Fixing left testis took place using Bouin's solution

and alcohol before being embedded in paraffin. Then, sections of Five- μ m thickness were cut to be hematoxylin and eosin (H&E) stained Slides underwent a blindly examination under light microscope.

A semi-quantitative analysis was used to assess degree of testicular injury. The slides were examined to elucidate the presence of hemorrhages, leukocytic infiltration, epithelium damage, and seminiferous tubular necrosis and atrophy. The adopted scale was as follows; zero = normal, 1 = slight (< 25% abnormal findings), 2 = moderate (from 25 to 50% abnormal findings), and 3 = severe (> 50% abnormal findings).⁽²⁰⁾ Spermatogenesis was also assessed in 100 seminiferous tubules in each slide using a scale from one to 10, as one reflects atrophy with no spermatogenesis, while 10 expressed normal spermatogenesis⁽²¹⁾

Immunohistochemistry

Deparaffinisation of sections was done before being rehydrated, using a 3% H₂O₂ in methanol in order to inhibit endogenous peroxidase. Following that, they all subjected to microwave pre-treatment in a citrate buffer (pH 6.0), before incubation in rabbit polyclonal antibody for rat caspase-3 (Thermo Scientific, USA, 1:1000). Followed by incubating the sections with biotinylated goat anti-polyvalent, streptavidin peroxidase, and DAB acting as chromogen.

Hematoxylin staining took place, and immunostaining for light microscopy evaluation of immunoreactive area (μ m²). The mean and slandered deviation in each group were calculated.

Statistics

Data subjected a statistical analysis using spss program version 21; significance was considered when $p < 0.05$.

RESULTS

Biochemical biomarkers

Significant increase of testicular MDA, TNF- α , NF- κ B p65, and (iNOS), together with significant reductions of MDA, GSH and SOD observed in rats received NaAsO₂ in compared to the corresponding values of the controls ($p < 0.05$). Treatment with BN resulted in significant decreases of TNF- α , NF- κ B p65 and (iNOS). (Figure1) and significant increases of GSH, MDA and

SOD in rat testes in comparison to NaAsO₂ group that was not treated with BN ($p < 0.05$) (Figure2).

Histopathology and immunohistochemistry

Figure 3 demonstrates seminiferous tubular cells' necrosis, desquamation of the epithelium and vacuolization from NaAsO₂ administration. BN treatment caused marked protection of the testes and minimized the damage induced by NaAsO₂ (Figure4). Moreover, BN significantly preserved spermatogenesis, in comparison with NaAsO₂ group, which did not receive BN.

The significant increase in caspase-3 expression of testes for rats receiving NaAsO₂ as regard the control group was demonstrated in (Figure5). Contrarily, BN administration caused a significant reduction of testicular tissue caspase-3 expression in comparison with NaAsO₂ group who was not treated with BN ($p < 0.05$).

Baicalin resulted in a significant decrease of testicular injury score ($p < 0.05$), and a significant increase of Johnsen score ($p < 0.05$) compared to the corresponding values of NaAsO₂ non-BN treated group (Figure 6).

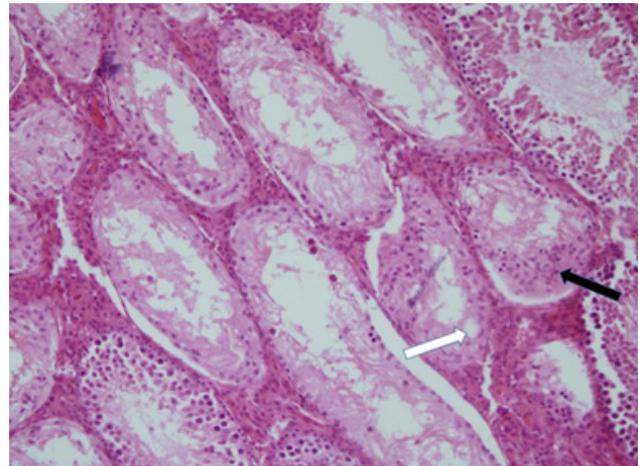


Figure 3. Photomicrographs of rat testes (H&E),(A, 200×) from Arsenic (As) + carboxymethylcellulose (CMC) group showing necrosis of seminiferous tubular cells, epithelial desquamation (black arrow) and vacuolization (white arrow).

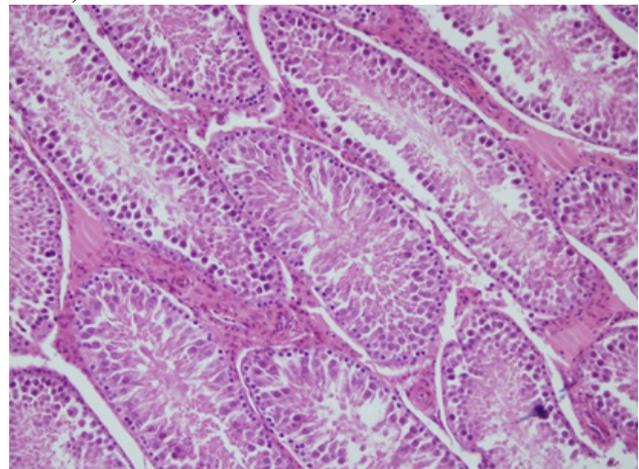


Figure 4 .Photomicrographs of rat testes (H&E),(A, 200×) from Baicalin (BN) + As group showing marked improvement with minimal damage.

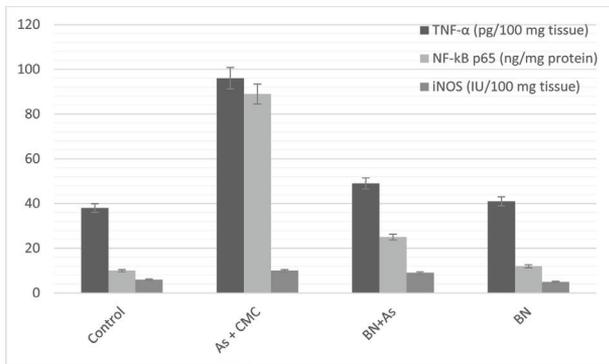


Figure 1. Effects of baicalin (BN) on tumor necrosis factor- α (TNF- α), nuclear factor- κ B p65 (NF- κ B p65), and inducible nitric oxide synthase (iNOS).

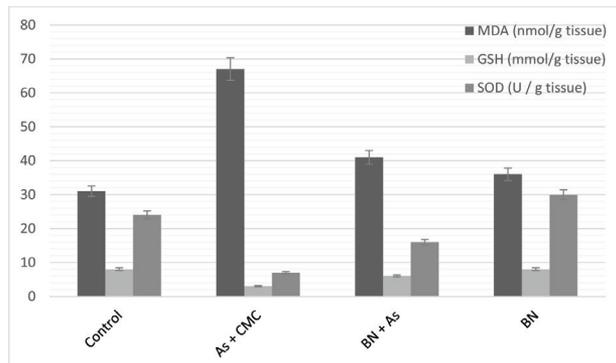


Figure 2. Effects of baicalin (BN) on malondialdehyde (MDA), reduced glutathione (GSH), and superoxide dismutase (SOD).

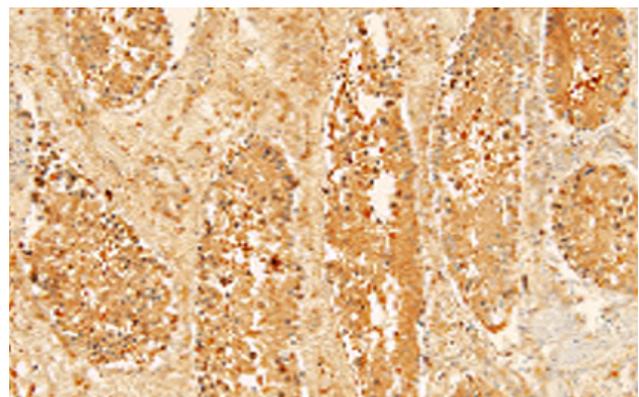


Figure 5. Immunohistochemistry (200×) of caspase-3 from Arsenic (As) + carboxymethylcellulose (CMC) group showing a significant elevation of caspase-3 immunostaining.

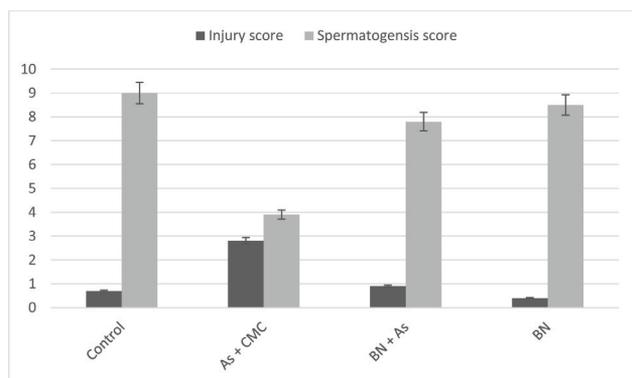


Figure 6. Testicular injury score and spermatogenesis score .

DISCUSSION

The present investigation showed that BN (10 mg/kg/day, for 7 days) inhibited membrane lipid peroxidation, as it significantly decreased MDA production, and maintained antioxidant defenses (SOD activity) in rat testes exposed to arsenic toxicity. BN also down regulated the inflammatory responses as evidenced by reduced levels of the major pro-inflammatory mediator, TNF- α in testicular tissue. Moreover, BN significantly inhibited iNOS activity in rat testes denting the suppression of nitrative stress. This goes in accordance with previous reports, that indicated the anti-oxidative, anti-nitrosative, and anti-inflammatory properties of BN. (14-16) .Some reported the Oxidative/nitrative stress, increase generation of ROS and RNS, and inflammatory responses to be directly related to arsenic-induced damage of testes. (22,23) Recent studies revealed that BN acts as a scavenger of ROS, and RNS, prevents peroxidation of cell and mitochondrial membranes, and arrest the progression of inflammatory cascades responsible for testicular tissue injury. (17,18)

Moreover, exposure to arsenic is known to activate the signaling pathway of NF- κ B, resulting in transcription of TNF- α , and iNOS genes. (24) Suppression of TNF- α and NF- κ B significantly attenuated the arsenic-inducing tissue damage in previous investigations. (25) The NF- κ B p65 unit is crucially sequestered in the cytoplasm, as it binds I κ B proteins to be inactivated. Increased generation of ROS and TNF- α cause rapid degradation of I κ Bs increasing the release of NF- κ B p65, which translocate to the nucleus, where it up-regulates TNF- α , and iNOS gene transcription. (26) This intensifies the inflammatory reactions, and enhances the production of RNS and nitrative stress. The present study, in agreement with previous ones, demonstrated the significant inhibitory effect of BN on TNF- α , and iNOS in rat testes, which

can be attributed to the decreased nuclear translocation of NF- κ B p65 observed with BN treatment.

Moreover, Caspase-3 is one of the main indicators of a cell's entry into the apoptotic death, as it causes DNA degradation, and chromatin margination. (27-29)

Although, the metal-chelating effect of BN was detected in previous investigations, (30) the reduction in testicular tissue level of arsenic ion induced by BN in this work was statistically insignificant. This may be explained as a higher dose of BN or a longer experimental study may be required than that used in the present study.

Histopathology of rat testes showed major seminiferous tubular cell necrosis, epithelial desquamation, loss of spermatogenesis, interstitial edema, and congestion following arsenic exposure. Similar observations were reported following arsenic intoxication. (22, 25) The current study revealed BN ameliorate testicular tissue affection and significantly preserved spermatogenesis in arsenic-exposed rat testes.

In conclusion, BN may significantly have a protective effect on rat testes against arsenic-induced damage. The anti-inflammatory, antioxidative, antinitrative, and anti-apoptotic activities of BN are the possible mechanisms.

Conflict of Interest: None

Statement of Human and Animal Rights

Institutional and national guides for the care and use of laboratory animals (environment, housing and management) were followed.

Ethical Clearance: The Research Ethics Committee, King Faisal University, approved the study proposal (approval number: 150097)

Source of Funding: Deanship of Scientific Research, King Faisal University, Saudi Arabia.

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Forensic Clinical Photography: A Game Changer in Medicolegal Investigation and Forensic Science

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ABSTRACT

Photography is a critical factor in solving out the mysteries behind the crimes by giving out critical information applicable to criminal, legal investigation. It was initially based on manually operated camera and film strips and later adopted digital technology for recording and storing the visuals. Digital evidence can show the relative position of evidence at the scene, establish the relative dimension of the evidence and also cross compliment other evidence collection techniques. The inadequate and improper collection, preservation and presentation of evidence can lead to crime scene errors and fewer conviction rates. Training in forensic photography is vital, and a game changer in the medico-legal investigations.

Keywords: Forensic Photography, Photo colposcopy, Digital evidence, Cinical photography

INTRODUCTION

Photography as a digital evidence¹ is an integral part of any legal systems in the world. Digital evidence is incredibly vital in solving and preparing court cases. Photo-documentation also improves the likelihood of detecting injuries, increases the accuracy of diagnosis, and allows experts to comment on the evidence without being present at the time of forensic and medical examination.

INDIAN SCENARIO

The medical and surgical emergencies reported are mostly taken care by the emergency department team which consist of medical professionals, nurses and other paramedical professionals of hospitals who do not have specialized training in forensic science.² The curriculum of M.B.B.S has a Para-clinical subject of 'Forensic

Medicine including toxicology' which does not include Forensic photography as a subject. When considering the nurses in the emergency departments, they lack Forensic training in any forms. The syllabus of Bachelor of Science in Nursing (BSN) does not have forensic science as a subject or coursework³. Nurses also have a significant role in fields of; crime scene investigation, toxicology, emergency & trauma care, and correctional settings. Forensic nurse examinations are reliable sources of evidence that leads to higher conviction rates and fewer crime scene errors.⁴

FORENSIC CLINICAL PHOTOGRAPHY

Photographic evidence of the injuries and trauma prior to treatment is very critical in the forensic assessment and future criminal investigation.⁶ The purposes of forensic photography is to record and preserve as found conditions of the scene, show the relative position of evidence at the scene, establish the relative dimension of the evidence, cross compliment other evidence, collection techniques and preserve as found scene for future reference or second investigation.

Types of Camera

The 35-mm camera was the benchmark standard

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for forensic and other clinical specialists where close-up images and views of the head and neck were needed. It was also equipped with a 90- to 105-mm lens with macro capability.⁷ The Digital Single Lens Reflex (D-SLR) camera is the newest option available to the forensic expert which allows them to change the parameters such as aperture, shutter speed, and exposure – the three most important variables in photography.⁸

The aperture

These are a small set of blades in the lens that controls the light entering the camera, and it is measured by 'f-stops.' or 'f-ratio' (the ratio of the focal length of the lens to the diameter of the entrance pupil of the camera). The lower 'f-stop' (f-4) indicates that the aperture hole is wide and allows more light and a higher one (f-20) denotes that the aperture hole is very narrow.

The shutter speed

The shutter is a small 'curtain' in the camera that quickly shuts over the image sensor and allows light to shine onto the sensor for a fraction of a second. The shutter speed determines the brightness of the image; the slow shutter speed allows light to shine and make the image brighter. Contrarily, rapid shutter speed produces dark picture by allowing the light to touch the imaging sensor for a slight fraction of a second.

ISO Rating:

ISO is a measure of the digital sensor's sensitivity to light. ISO settings of the DSLR cameras range from 100, 200, 400, 800 up to 12800. The greater the ISO number, the more sensitive the sensor is to light. A change in ISO number from 100 to 200 effectively doubles the light. Higher ISO numbers are used to capture, low-light images. However using a higher ISO number can make the image noisier.

The Exposure

The digital cameras have automatic exposure capability. The fill-in-flash attachment helps the forensic experts to increase the exposure capabilities of the camera. Exposure is controlled by a combination of aperture, shutter speed and ISO. One must balance these components to get an optimum exposure and desired result.

The photographic experts are doing bracketing by intentionally taking an overexposed and an underexposed images in addition to the normally lit photographs to compare the photographs to an item of real evidence.¹⁰

Bite mark Photography

A bite mark found on a victim is considered a non-accidental pattern injury frequently associated with sexual and physical violence.¹¹ T J David and M N Sobbel were successful to photograph 5 month old bite mark on the shoulder of a rape victim using reflective UV photography. Hence old bite-marks can be appreciated using reflective UV photography.

Photo-colposcopy

Colposcope is used for the visualization of genital injury not readily visible to the bare eyes. It can be attached with a 35mm camera or a video camera and can function as a photo colposcopy. The photographs generated using colposcopy precisely give location and extent of the injury caused by sexual abuse.¹² Colposcopy allows the examiner to perform a magnified (4x to 25x) visual inspection of the internal and external genitalia for microscopic injury as well as bruising, tears, abrasions, and lacerations.

Protocols for Forensic Photography

When forensic photography is used adequate protocols also need to be implemented in the areas of safety & security such as encryption, password protection, and storage in safe location. Protocols also need to be developed for getting consent from the victims/survivors of abuse and violence for legal proceedings, peer review and teaching.¹³

Use of identifiers

Use of small labels that identifies the patient in the photography improves the storage and recollection of the evidence. This will also orient the viewer regarding the details of the patient in future. A label can be made from a white sticky paper with relevant information regarding name of the patient, date of birth, medical record number, medico-legal case number, current date and photographer's name & initials. Use of colored labels such as 'L' (left) and 'R' (right) help the viewers to orient the close-up shots.¹¹ An L-shaped ruler must be visible in all pictures for recording of dimensions.

Use of log

The photos need to be entered in the log as and when it is taken. The log should include identification data of the subject, date and time of the photography, name of the law enforcement agency, case number (medico-legal), and medical or hospital number, type of examination conducted, device specification, identification of the expert photographer, chain of custody form, specification of storage device and location of the storage.

Use of ruler

Using of a ruler while photographing demonstrate the exact size of the wound in measurable terms. The ruler can be placed parallel to the injury or in the same plane of the body. Use, indicating scale such as hinged L-reference scale, angled rulers, standard rulers and tape measures are recommended for accurately measuring the sizing of the injury. Using an American Board of Forensic Odontology (ABFO) 2 ruler also helps the expert to judge the white balance of the picture and can rule out the incorrect white balance as in case of a highly yellowish skin due to jaundice.

Use of anatomical landmarks

To definitely locate the position of the injury the image has to include an anatomical landmark. Anatomical landmarks orient the viewer regarding the exact location and direction of the injury. Additional 'overview photos' also help to locate the injury when macro photos of the injuries were taken.

Use of Macro-photography (Extreme close-up photography)

Extremely close-up photography is vital in forensic examination especially the photographing small skin lesions. The major challenge associated with macro photography is the reporting of 'magnification.' Magnification is the relationship of subject size with image size on the film or image sensor.¹⁴

Use of a tripod:

A tripod is a portable three-legged stand device used to stabilize camera while taking images. Using a tripod while taking images eliminates the likelihood of having blurred photos resulting from shaky hands. It is essential to use a tripod when working on slow shutter

speeds.

Number of shots:

It is ideal to have three or four photo photographs of a single object.

An overall view: Covers the overall view of the crime scene. Helps in understanding the relative position of the subject in the field.

A Medium view: Picture of where the piece of evidence is in reference to other items.

A Close-up view: A close-up view focuses on the details of the object.

Challenges in Forensic Photography

Consenting for forensic photography

A written informed consent must be obtained from the victims before photography if the victim is able to provide informed consent. It must include a statement that the "photographs are the part of the patient's medico-legal records and the photographs may be used for presentation before courts, oral presentations, and lectures." When the photos of the suspects are taken for the purpose of law enforcement getting consent is not a must. The photographs taken without the consent should be in the individual's best interest. In case of accused of a crime consent can be requested but even in absence of it reasonable force as is necessary can be used, acting at the request of police officer not below the rank of sub inspector to take photographic evidence on the discretion of a registered medical practitioner as per 53(1) Cr.P.C.

A well-written informed consent should include the reason for requesting the photograph, risk, and benefit of the photograph, how the photograph may be used, how the photographs will be stored and who will have the access to view the photograph. It should be specified that the photographic evidence can be for or go against the person concerned in the court of law.¹¹

Poor quality of the photographs

The compromises in the quality of the photographs can generally lead to poor presentation of evidence and reexamination of the victim. If the images are poor in quality, no opinion can be made about the anatomy from the images. Blurry photographs have little use in the

investigation. Using a Colposcope can overcome this challenge and capture magnified good quality images.¹⁵ Taking photographs which are tack sharp is critically important to forensic photographers.¹⁶

Overexposed or underexposed images

When a photograph need to survive the challenges in the court it has to be properly exposed. A grossly overexposed or underexposed photograph can be inadmissible pointing to the fact that these photograph won't accurately represent the scene.¹⁰

Narrow window of time for recovering evidence

Forensic examinations will likely to yield evidence when it happens within 72 Hours of the alleged assault.¹⁷ The timing or the collection of forensic evidence also depends on the type of assault.

Cyber Jurisprudence in India

The issues concerned with the regulatory aspect of the technologies are also on the looming.¹⁸ The Information Technology (Amendment) Act of 2008¹⁹ is a centralized statute exclusively for the cyberspace which has the applicability in the generation and storage of electronic documents and information such as digital photographs and videos. It also governs the electronic signatures used to authenticate electronic records with signer authentication, message authentication, and message integrity.

Admissibility and relevancy of the digital evidence

Section 65B(4) of the Evidence Act deals with the admissibility of the digital evidence in the court. Any electronic document is permissible when certain conditions were satisfied. a) There must be a certificate which identifies the electronic record containing the statement. b) The certificate must describe the manner in which the electronic record was produced. c) The certificate must furnish the particulars of the device involved in the production of the record. d) The certificate must deal with the applicable conditions mentioned under Section 65B(2) of the evidence act and e) The certificate must be signed by a person occupying a responsible official position in relation to the operation of the relevant device. In case of digital photography, the person who took the photography should say that the photograph he has taken on such day and place has not been tampered with it. The expertise required by such

a person is to an extent that he should be contractually capable to use the tools required to view and print/copy the said computer output.

Authenticity of the digital evidence

Unedited raw photographs will be accepted as evidence in Indian courts, but the genuineness, veracity or reliability of the evidence is seen by the court only after the stage of relevancy and admissibility.²⁰ Question can arise at any point regarding the authenticity of the document. When such things happens the 'Metadata' may reveal when the digital evidence was created, how many times it was edited when it was edited and the nature of the edits.

Encryption of forensic records and photographs

One of the major concerns faced by the forensic experts is encryption of records or photographs. People who carry patient photos and data on either laptops or flash drives are vulnerable to data leaks, unauthorized access to the patient information due to chances of devices being lost or stolen. It is also advised to not use personal cameras and smartphone cameras to document anything related to the patient. Images captured with these gadgets are always vulnerable to hacking, security breach and use for personal purpose.

Proper protocols regarding photographs need to be in place for ensuring security and safety of the image within the ethical and legal boundaries. The protocol should describe how the encryption, protection, and storage of photographs are being done and it also should have a provision to obtain informed consent which include all the aspect of their use (legal proceedings, peer review and education)

Availability of photographs to the defense council or the perpetrator during trial

The availability of the photographs of private part of the victims to the defense counsel or the perpetrator in the trial cause negative repercussions for the victim.²¹

CONCLUSION

Photographs are adjuncts to, not substitutes for, clear and concise written documentation. Photo-documentation have both clinical and forensic benefits. Choosing the right camera, and right technique can capture neutral and accurate representation of the crime scene or evidence.

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Investigating the Effect of Self-Care Group Training on the Level of Resilience of Patients with Type 2 Diabetes

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ABSTRACT

Self-care training is one of the important components of diabetes control; if this training is done in groups it can bring upon appropriate behaviors and targeted choices in a patient. The purpose of this study was to determine the effect of self-care training plan on the resilience of patients with type 2 diabetes. This was a semi-experimental interventional study of two groups in diabetes centers of Ahvaz in 2016-2017. Subjects were divided into two groups of 60 in control and case groups in this study. The data collection method was based on a researcher made questionnaire, Conner-Davidson Resilience Scale Questionnaire. For all participants when entering the study, educational and support needs were assessed by interview before the intervention, then self-care training sessions were held in groups for each of the case groups for 4 weeks and one session of 1 hour weekly. Topics discussed in these sessions were held in the form of 4 dimensions that included physiological, social, emotional and spiritual dimensions. In this study, no training intervention was performed for the control group. Data were analyzed using SPSS.16 software. The results of this study showed that research units did not have a significant difference in terms of demographic characteristics, but the level of resilience that was not significantly different before intervention in the two case and control groups ($P=0.856$), had a significant difference after intervention in the two case and control groups ($P<0.001$). Results showed that self-care training in groups is effective in increasing the level of patient's resilience, therefore, it seems that attempting to increase self-care training plans for all age groups with chronic diseases and especially diabetes is essential.

Keywords: Resilience, Type II diabetes, Group training

INTRODUCTION

One of the most common chronic diseases is diabetes, whose prevalence not only not diminished, but is also increasing day by day despite all the advances in medical science¹. The World Health Organization names diabetes as a "silent epidemic" and according to the latest estimates by the International Federation of Diabetes, more than 285 million people in the world have diabetes, which will reach over 438 million by the year 2030².

The global prevalence of diabetes is increasing, affecting individuals in developed and developing countries, and it is estimated that the number of patients will reach 366 million by 2030³. Darwishpour et al. (2013) in their study reported the prevalence of diabetes in Iran between 1.2-14.8% in different regions, which is generally higher than the global average⁴. According to the studies of complication prevalence, 30-40% is reported for retinopathy, 20-30% for nephropathy, 14.2-26% for microalbuminuria, 12-26% for macroalbuminuria and 30-40% for diabetic neuropathy⁶. According to the studies, in addition to physical complications, diabetes causes a number of mental problems, including depression, anxiety, stress, anger, aggression, reduced self-confidence, and a change in the subjective image of one's body in the individual. In recent years, attention has been paid to stress sources and strategies to deal

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with it in different groups. One of the coping strategies that help a person to cope with stressful situations and to be rescued from the disease disorders is resilience⁷. Resilience and positive emotions enhance the effective coping strategies of the disease and reduce its complications. Resilience is defined as one's confidence in his ability to overcome stress, knowing coping abilities, self-esteem, and emotional stability⁸. Self-care is an important component of disease control and it is a relative process that brings about targeted behaviors and choices, reflecting the attitude and knowledge of each individual⁹. It seems that persons with high emotional and psychological support are more concerned with self-care behaviors and self-management, and in turn, better respond to the threatening stressors of life¹⁰. The two main methods of organized training are individual education and group training¹¹. In spite of the various benefits of individual education, due to some limitations, researchers have used group training as an effective method to train patients¹². Given the high prevalence of diabetes and the need to control this chronic disease to improve the quality of life, promoting physical, mental, social and spiritual health and the need to reduce its undesirable effects in patients and to reduce the heavy financial burden on the health system and the weakness of training programs because of insufficient monitoring on training and that these training programs are not continuously carried out as well as the necessity to support patients with diabetes to change the desired behavior, to use an effective group training would be effective. Therefore, as a nurse, the researcher decided to do a study aimed at determining the effect of a self-care training plan on resilience of patients with type 2 diabetes.

MATERIALS AND METHOD

This was a semi-experimental study of two groups. After obtaining a license from the university's ethics committee and a referral letter from the research deputy visited the research environment and while introducing himself and explaining the exact objectives, obtained the consent of the relevant authorities to carry out the research. The researcher, while completely introducing himself and presenting the referral letter, the required explanation about the goals and importance of the study, and the confidentiality of the information were given to the participants in the research, and, after obtaining informed consent, the participants trusted to complete the questionnaires. Using randomized block allocation

method, the patients were divided into two groups of case(60) and control(60) groups. The inclusion criteria included living in Ahvaz, confirming the diagnosis of diabetes by the doctor, not receiving self-care training in groups up to the time of the plan, not having a history of uncontrolled underlying diseases such as epilepsy, etc. willing to attend the training courses. The division of the selected subjects to each of the study groups was done using 6 rows of quadruple blocks (ABAB-BABA-ABBA-BAAB-AABB-BBAA). The instructional materials were provided to the case group as a booklet and compact disc after the completion of the study. After the end of this period, a secondary test was held two weeks, and one month after the last training session. The data collection tool included a researcher-made questionnaire Conner-Davidson Resilience Scale Questionnaire; Conner-Davidson Resilience Scale Questionnaire was developed by Conner, Davidson in 2003. Its scoring is the 5-point Likert scale. The scores devoted to each item is as follows: Always false(0); Rarely true(1); Sometimes true(2); Often(3); and Always true(4). The range of test scores is between 0 and 100 in this questionnaire. In this way, a score of 80 or more is defined as highly resilient, 65-80 as better than most people, 50-65 as low but suitable, 40-50 as you are struggling, and 40 or lower as ask for less help. Used the Cronbach's alpha method to determine the reliability of the Conner-Davidson resiliency scale and reported that as 89%¹³. In the study of Samani (2007), Cronbach's alpha coefficient was obtained as 78% for its reliability¹⁴. After the post-test, the booklet was provided to the control group. Descriptive statistics including mean, standard deviation, tables and charts were used in this study and the Chi-square, paired t-test and independent t-test were used to compare the groups. SPSS-22 was also used. The significance level was considered as 0.05.

FINDINGS

In this study, 116 diabetic patients (60 in the test group and 56 in the control group) were studied. The frequency of age group 3 in the test group (35%) and control (33.3%) was higher than the other age groups, and generally, there was no significant difference between the mean age in different age groups in the test and control groups ($P=0.09$). Most of the subjects were married in the test group (93.3%) and control group (96.5%), and there was no significant difference between the two groups in terms of marital status ($P=0.43$). The frequency of people with degree of education lower than

diploma in the test group (65%) and the control group (75.4%) was higher than other degrees of education and there was no significant difference between the two groups in the degree of education ($P=0.46$)(Table 1). Based on the results, there was no significant difference in the duration of the disease in the two groups of test and control ($P=0.23$) (Table 2). There was no significant difference in the level of resiliency before intervention in both the control and test groups ($P=0.856$), but after intervention, the difference in resiliency level became significant ($P<0.001$).

Table 1. Frequency distribution and percentage of demographic characteristics in the two test and control groups

Variables	Groups	Test group (60 people)		Control group (56 people)		P-value
		Frequency	Percentage	Frequency	Percentage	
Age group	<35	9	15	6	10.5	0.091
	45-54	23	38.3	15	26.3	
	55-64	21	35	19	33.3	
	65>	7	11.7	17	29.8	
Gender	Man	22	36.7	16	28.1	0.321
	Female	38	63.3	41	71.9	
Marital status	Married	56	93.3	55	96.5	0.439
	Single	4	6.7	2	3.5	
Education	Lower than diploma	39	65	43	75.4	0.462
	Diploma	16	26.7	11	19.3	
	Higher than diploma	5	8.3	3	5.3	
Number of children	One child	12	22.6	7	16.3	0.123
	Two children	27	50.9	16	37.2	
	Three children	4	26.4	20	46.5	

Table 2. Frequency distribution and percentage on the duration of disease in both case and control groups.

Duration of the Disease	Test group (60 people)		Control group (56 people)		P-value
	Frequency	Percentage	Frequency	Percentage	
1-4 years	20	33.3	17	29.8	0.230
5-9 years	12	20	21	36.8	
10-14 years	13	21.7	12	21.1	
15-19 years	10	16.7	5	8.8	
20> years	5	8.3	2	3.5	

DISCUSSION

The purpose of this study was to investigate the effect of self-care group training on the resilience of type 2 diabetic patients, and the fact is that humans should be encouraged to change their lifestyle so that with the help of training, reduce their problems and be able to take responsibilities¹⁵. Self-care training confirms the person's ability to care for him and reduces disappointment in the person¹⁶. Regarding the effect

of demographic characteristics of individuals such as gender, age, education, marital status, duration of the disease, and blood pressure and fat status on the degree of self-care and resilience of diabetic patients, these parameters were assessed in both the test and control groups; and the results of this study indicate the identical status of the test and control groups in terms of these variables and there was no significant difference ($P>0.05$). The results of this study in the field of the importance of group training are similar to the results of

the study by Mahboubeh Firouz et al., which is done on the effect of group training on the emotional dimension of self-care of patients with type 2 diabetes and showed that the level of self-care significantly increased in the counseling group and group training compared to the control group, indicating that not only group training, but also group counseling can help improve the emotional dimension of self-care of patients with diabetes and both methods are effective¹⁷. Karlsen et al., who examined the effect of group counseling on stress, compliance, mental health and metabolic control in patients with type 1 and type 2 diabetes, concluded that the disease related stresses and self-blame significantly decreased ($P < 0.02$)⁴. According to their research, Fakhari et al. suggested that group counseling with a meaning therapeutic approach increased mental health, decreased mental health and stress ($P < 0.015$), and reduced social disorder in elderly women's social activities ($P < 0.005$)¹⁸. People who have entered the program with a low level of emotional well-being or with poor self-care models or glycemic control have been significantly improved¹⁹. The results of the study by Yonesi et al., showed that group training led to significant decreased resilience in the mean of stress scores in the test group compared to the control group. As a result, group training plan on resilience can be used as a useful intervention to reduce mental stress²⁰. Norris et al., who meta-analytically studied the effect of self-care training on glycemic control in type 2 diabetic patients, concluded that there was a decrease in the level of glycemic in the intervention group as compared to the control group, and this decrease was more as the increase in hours and training periods and even led to a decrease in the number of hospitalization of patients with type 2 diabetes and all these relationships were statistically significant ($P < 0.05$)²¹. The results of the study by Naghibi et al. also confirm that the mean score of awareness about self-care behaviors in the stage before the intervention was 44.5 ± 7.95 and at the stage after the intervention it was 52.7 ± 8.78 , and this relationship was statistically significant ($P < 0.001$)²². Jalilian et al. also conducted a study to investigate the effect of educational program on self-care increase in type-2 diabetic patients, and concluded that training plan had a positive effect on awareness raising and self-care ($P < 0.000$) of the intervention group²³. Based on their study, Jenifer et al. state that the hope therapy in groups, led to increased resiliency ($P < 0.001$), and hope therapy also, increased the life expectancy of patients with breast cancer ($P < 0.001$). Overall, results showed that group-

based hope therapy can help cancer patients in a variety of ways, life expectancy, resilience and quality of life²⁴. Therefore, all of these studies emphasize the importance of group training on the behavior and performance of the individuals who have been studied.

CONCLUSION

The results of this study, as well as similar studies, suggest the effect of self-care training on increasing the level of resilience of patients. Therefore, it seems that efforts to increase self-care training plans for all age groups that are suffering from chronic diseases, especially diabetes, are necessary and training can be considered as an appropriate, effective and unproblematic treatment to control and reduce diabetes and other chronic diseases.

Ethical Clearance: This research project was approved by the ethics committee of Ahvaz University of Medical Sciences.

Source of Funding: Ahvaz, University of Medical Sciences.

Conflict of Interest: None

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Morphology of Lip Print Patterns among Indian and Malaysian Population- A Tool for Racial and Gender Identification

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ABSTRACT

Introduction: Lip prints are like finger prints; Unique and never same in two different individuals. Lip prints are distinctive and do not change during the life of the person. Cheiloscopy can be of special interest in cases where there are no finger prints available and as a necroidentification technique

Aims: To identify different types of lip print patterns in North Indian, South Indian and Malaysian populations. To assess gender based on lip print patterns among Indian (North and South) and Malaysian population.

Methodology: A cross-sectional study was conducted among 128 subjects - 102 were Indians and 26 were Malaysians. Lip prints were analyzed based on Tsuchihashi's classification.

The data was analyzed using SPSS version 16.0 for Pearson's Chi-Square tests and p-value.

Results: Lip print pattern findings were found to have accordance with few other researches done in similar population setting. Among Indian subjects - Type 2 and Type 4 patterns are predominant. Among Malaysian population - Type 2 and 1' are predominant. In Indian and Malaysian male population - Type 2 and Type 4 are predominant. In Indian and Malaysian Female population - Type 2 and Type 1 are predominant.

Conclusion: In the study, different types of lip print patterns in North Indian, South Indian and Malaysian population with respect to ethnicity and gender were studied. Further research on this topic, with a larger sample, would help to increase the accuracy of this study, strengthen the research field of Cheiloscopy and make this study fruitful.

Keywords: Cheiloscopy, Racial Identification, Indian population, Malaysian population, gender determination.

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INTRODUCTION

Establishing individual's identity is most important aspect in forensic investigations. Finger print analysis and DNA comparisons are most commonly used technique for the purpose, however less known equally efficient technique is lip print analysis.¹ Lip prints patterns can be seen clearly as early as 6th week of intra uterine life; they are unique to every individual, except

for monozygotic twins.² They are similar to finger prints, palm print and foot prints whose characteristic grooves and furrows can be used for identification. Lip prints also recover completely after any injury, inflammation and viral infections like herpes.³ Previous studies have shown that lip print patterns vary in different population thus necessitating population specific studies.^{4,5,6} Study of lip prints is known as chelioscopy. During crime scene investigation, lip prints can be recovered from glasses, clothing, cigarette buds and body parts, hence could play a vital role in identification of offender.⁶ Contrast in lip print patterns may help in sex determination of an individual hence it could be valuable in forensic investigations.⁷

MATERIAL AND METHOD

A total of 128 healthy individuals aged between 18-26 years were selected for the study. Study population comprised of 102 Indians (51 – SIs (South Indians),

51 – NIs (North Indians), 25 males and 26 females in each group respectively) and 26 Malaysians (16 males and 10 females). Subjects with lip inflammation, ulcers, congenital defects, surgical scars and history of hypersensitivity reaction to lipsticks were excluded. Non-glossy red lipstick was applied in a single stroke and the lip prints of individual were obtained on a strip of white bond paper. Transparent cellophane tape applied immediately to prevent distortion of the print obtained. Middle quadrant of upper lip was considered for the recording the lip print as this fragment is mostly visible even in the traces of lip print. Tsuchihashi et al in 1974 proposed a scheme for classification of lip prints.⁸ Accordingly lip prints were classified in to 5 types based on shape and course of grooves as shown in figure 1. The lip prints collected was grouped, compared with the original classification (Fig 1) and the data was statistically analyzed using SPSS (Statistical Package for Social Sciences 16.0 for windows) for Pearsons Chi-square tests and p value.

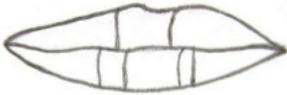
STAGE	SCHEMATIC REPRESENTATION	APPEARANCE
I		
I'		
II		
III		
IV		
V		

Fig-1: Comparison of schematic representation of lip prints according to Tsuchihashi classification and lip prints obtained in current study.

RESULTS

Our results revealed that Type II pattern (36.7%) was predominately noted among Indians and Malaysians followed by Type IV (23.4%). Least common pattern was Type V (3.9%) and Type III (4.7%). Among Indians, Type II and Type IV were common and Type II and Type I' were predominately noted among Malaysians irrespective of sex differences. Pearson chi- square test showed significant difference in the lip print pattern between Indians and Malaysians. ($p < 0.05$) (Table-1) When Lip print patterns were compared between South Indian, North Indian and Malaysian population, Type II (36.7%) and Type IV (23.4%) were predominately seen. (Table-2) Indian male population, Type II and Type IV were commonly seen when compared with their counterpart Malaysian males, Type II and Type I' were predominant. ($p < 0.05$) (Table-3) Among Indian females Type II, Type IV and Type I were commonly seen when compared with their counterpart Malaysian

females, Type I and Type I' were predominant. ($p > 0.05$) (Table-4). In South Indian males and females, Type II and Type IV lip prints were predominant with 37.3% and 31.4% however when both sex were statistically compared difference was not significant. ($p > 0.05$) (Table-5). In North Indian males and females, Type II, Type IV and Type I lip prints were predominant with 35.3%, 23.5% and 23.5%, however statistically compared between the genders, values are non-significant ($P > 0.05$) (Table 6). Individually Type II and Type IV pattern of lip prints are predominant in North Indian males and Type II and Type I pattern of lip prints are predominant in North Indian females. ($p > 0.05$) (Table-6). In Malaysian males and females, Type II and Type I' lip prints were predominant with 38.5% and 30.8%. Individually Type II and Type I' pattern of lip prints are predominant in Malaysian males and Type I and Type I' pattern of lip prints are predominant in Malaysian females ($p < 0.05$) (Table-7).

Table 1: Comparison of Lip print patterns between Indians and Malaysians

Patterns	Indians (%)	Malaysians (%)	Total (%)
Type 1	20 (19.6)	6 (23.1)	26 (20.3)
Type 1'	6 (5.9)	8 (30.8)	14 (10.9)
Type 2	37 (36.3)	10 (38.5)	47 (36.7)
Type 3	6 (5.9)	0 (0.0)	6 (4.7)
Type 4	28 (27.5)	2 (7.7)	30 (23.4)
Type 5	5 (4.9)	0 (0.0)	5 (3.9)

χ^2 (Pearson Chi-square) = 18.137, $p = 0.003$

Table 2: Comparison of Lip print patterns between South Indian, North Indian and Malaysians

Patterns	South Indian (%)	North Indian (%)	Malaysians (%)	Total (%)
Type 1	8 (15.7)	12 (23.5)	6 (23.1)	26 (20.3)
Type 1'	3 (5.9)	3 (5.9)	8 (30.8)	14 (10.9)
Type 2	19 (37.3)	18 (35.3)	10 (38.5)	47 (36.7)
Type 3	4 (7.8)	2 (3.9)	0 (0.0)	6 (4.7)
Type 4	16 (31.4)	12 (23.5)	2 (7.7)	30 (23.4)
Type 5	1 (2)	4 (7.8)	0 (0.0)	5 (3.9)

χ^2 (Pearson Chi-Square) = 22.701, $p = 0.012$

Table 3: Comparison of Lip print patterns in Male population among Indians and Malaysians

Patterns	Indians (%)	Malaysians (%)	Total (%)
Type 1	16	6.2	13.6
Type 1'	4	31.2	10.6
Type 2	40	50	42.4
Type3	2	0.0	1.5
Type 4	16	12.5	27.3
Type 5	6	0.0	4.5

Pearson Chi- Square =12.587, p= 0.028

Table 4: Comparison of Lip print patterns in Female population among Indians and Malaysians

Patterns	Indians (%)	Malaysians (%)	Total (%)
Type 1	23.1	50.0	27.4
Type 1'	7.7	30	11.3
Type 2	32.7	20	30.6
Type3	9.6	0.0	8.1
Type 4	23.1	0.0	19.4
Type 5	3.8	0.0	3.2

Pearson Chi- square= 10.009, p= 0.075

Table 5: Comparison of Lip print patterns between males and females of South Indian Population

Patterns	Males (%)	Females (%)	Total (%)
Type 1	4 (16)	4 (15.4)	8 (15.7)
Type 1'	1(4)	2 (7.7)	3 (5.9)
Type 2	11(44)	8 (30.8)	19 (37.3)
Type3	0(0.0)	4 (15.4)	4 (7.8)
Type 4	8(32)	8(30.8)	16 (31.4)
Type 5	1(4)	0 (0.0)	1 (2)

Pearson Chi- square= 5.790, p= 0.327

Table 6: Comparison of Lip print patterns between males and females of North Indian Population

Patterns	Males (%)	Females (%)	Total (%)
Type 1	16	30.8	23.5
Type 1'	4	7.	5.9
Type 2	36	34.6	35.3
Type3	4	3.8	3.9
Type 4	32	15.4	23.5
Type 5	8	7.7	7.8

Pearson Chi- square= 2.982, p=0.703

Table 7: Comparison of Lip print patterns between males and females of Malaysian Population

Patterns	Males (%)	Females (%)	Total (%)
Type 1	6.2	50.0	23.1
Type 1'	31.2	30.0	30.8
Type 2	50	20	38.5
Type3	0.0	0.0	0.0
Type 4	12.5	0.0	7.7
Type 5	0.0	0.0	0.0

Pearson Chi- square= 7.797, p=0. 050

DISCUSSION

Cheiloscopy could be considered as one of the important tool for personal identification in forensic investigations by comparing ante-mortem and post-mortem records.⁶ Tsuchihashi's classification is considered as gold standard for lip prints and it is most commonly used in practice since it describes all common patterns in a schematic pattern making interpretation easier.⁸ However this classification also has few shortcomings such as most of the lip prints usually consists several types superimposed which makes interpretation difficult, and also two or more individuals might have similar lip print pattern but might differ in detailed morphology.⁹ Leveque et al suggested that furrows and grooves on the lips acts as

a path for passage of saliva to prevent the dehydration of the lips. They also suggested that central part of the upper lip shows better groove pattern compared to other areas.¹⁰ Thus we opted to record lip print pattern on upper middle quadrant zone. Vermillion border of the lips contain sebaceous glands, along with the salivary moisture content produces visible or latent lip prints. The latent prints can be raised using Nile Red, Lysochrome, aluminum powder, cobalt oxide and magnetic powder.^{4,11} Numerous factors like thinned lips, inverted lips, more prominence on either middle or lateral part of the lips, excessive curvature of the lips, faint groove pattern on the lips can affect the quality of the lip print recording.¹² This mandates detailed physical examination of subject's lips before selecting for the study.

Sivapathasundharam et al. conducted a study on 200 Indo-Dravidan subjects from Chennai and found that Type III pattern was the predominant and Type IV the least commonly occurring.³ Koneru et al. compared lip prints between Dravidans (Kerala) and Manipuri (Tibeto- Burman) populations of 30 subjects each in the age group of 18-21 years and found that predominant patterns were Type I, Type I' and Type I, Type IV respectively. (4) Xu et al. studied the lip prints of 88 Malaysians, 36 Chinese, and 10 Indians in the age group of 20-26 years and concluded that Type II was the predominant pattern among the Malaysians, while Type I was predominant among the Indians and the Chinese.¹³ According to Durbakula K et al predominant lip pattern in all the four quadrants for Indians was Type II irrespective of gender and for Malaysians it was Type I'. The predominant pattern for Malaysian males in all the four quadrants was Type I', while the predominant pattern for Malaysian females in quadrants I, II, and IV was Type I'. Overall analysis of lip prints showed that there is a significant difference ($P < 0.05$) between the different patterns of Malaysian and Indians.¹⁴ Nagpal B et al analysed the lip prints from 60 subjects, 30 each from Indian and Malaysian origin and concluded that Type I pattern was the most common in both and there was no statistical difference in lip print pattern between the genders among Indian & Malaysian students.⁶ Deepthi et al conducted study on south Indian population and concluded that Type II is most common pattern invariable of gender followed by type I.¹⁵

Present study showed predominant lip print pattern among Indians is Type II followed by Type IV, and among Malaysians Type II followed by Type I'. Results

obtained is partially in accordance with Durbacula et al and Deepthi et al. where authors found predominant lip print pattern in Indians as Type II, and in Malaysians as Type I'.^{14,15} While comparing the gender, majority of Indian and Malaysians males showed predominantly Type II pattern, followed by Type IV in Indians and Type I' in Malaysians. However, Indian females exhibited Type II pattern while Malaysian females showed predominantly Type I, followed by Type I' in both categories. This is partially in accordance with results of Durbakula et al¹⁴ and Deepthi et al¹⁵. The studies including ours supported the fact that lip print pattern differs in different population. However, disparity in the results may be due to smaller sample sizes, dissimilar techniques and different quadrants of lips used to record the lip prints in various studies.^{4,6,14,15}

CONCLUSIONS

- The predominant lip print pattern among Indians are Type 2 followed by Type 4.
- The predominant lip print pattern among Malaysians are Type 2 followed by Type 1'
- The predominant lip print pattern among Indian Males are Type 2 followed by Type 4
- The predominant lip print pattern among Indian Females are Type 2 followed by Type 1 and Type 4.
- The predominant lip print pattern among Malaysian Males are Type 2 followed by Type 1'
- The predominant lip print pattern among Malaysian Females are Type 2 followed by Type 1.
- The predominant lip print pattern among South Indian Males and Females are Type 2
- The predominant lip print pattern among North Indian Males are Type 2
- The predominant lip print pattern among North Indian Females are Type 2 followed by Type 1.

According to the data, lip prints could be classified based on the shape, length and course of the grooves thus establishing the uniqueness of lip prints. As the present study involved smaller sample size participation among Malaysian population, better alignment with the Indian counter part could not be arrived scientifically. Further research on this topic, with a larger sample size would help increase the accuracy of the study, give concrete guidelines regarding racial and gender prediction and strengthen the research field of Cheiloscopy.

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Conflict of Interest: None declared

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Pattern of Injuries Due to Road Traffic Accidents Involving Motorized Two Wheeler Vehicles in Mangalore based on Autopsy Reports

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ABSTRACT

Introduction: Motorized two wheeler accidents have become increasingly common, especially in developing countries like India. The main focus of this study was on motorized two wheeler accidents and the pattern of injuries caused due to it.

Methodology: STUDY DESIGN: Retrospective analysis of autopsy reports of Road Traffic Accidents involving motorized two wheeler vehicles.

STUDY SETTING: Study was carried out in Forensic Department of Kasturba Medical College, Mangalore.

SAMPLE SIZE: 172 autopsy reports of motorized two wheeler accidents during 2015-2016.

Results: A total of 172 autopsy reports were studied, majority of the victims were males. 82.65% of the accidents took place due to over speeding and negligence. City roads and junctions were most common site of such accidents. There were a total of 630 external injuries, 56.5% of which were abrasions. Complications of head injury accounted for 77.9% of cause of death in such cases. Linear fractures were most common type of fractures seen in the skull.

Conclusion: Obeying the traffic rules, riding safely by wearing helmet and avoiding over speeding and negligence and taking necessary safety precautions such as wear safety gears while using two wheelers, can help in reducing such accidents to a great extent.

Keywords: Motorized two wheeler accidents, Victims, Pattern of injuries

INTRODUCTION

There is an increase in the number of motor vehicles especially in developing countries like India, and along with this comes the risk of Road Traffic Accident (RTA). Road Traffic Accident is an accident which

took place on road between two or more objects, one of which must be any kind of a motor vehicle¹. Accidents are most often due to poor road infrastructure, unsafe traffic conditions, violation of traffic rules like driving after consumption of alcohol. It can also be caused due to carelessness, ignorance and over confidence. In India presently there is a drastic increase in the number of two wheeler accidents and deaths due to such accidents.

According to a study by National Transportation Planning and Research Centre, New Delhi, a person is killed or injured by a RTA in every 4 minutes in India². In our country, 11% of the deaths due to non-communicable diseases are due to injuries and 78% of the injury deaths are due to Road Traffic Accidents³.

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It has become one the important causes for the death of young individuals most of whom are students or are coming under working population. Almost 80000 people, in India, die in road traffic crashes annually, 1.2 million are injured seriously, and 3,00,000 are disabled permanently⁴.

Nowadays motorized two wheeler accidents have become increasingly common. Most of such accidents leads to death. The main focus of this study will be on motorized two wheeler accidents and the pattern of injuries, both external and internal, caused due to it. It will also try to find out the major cause of death after such accidents and also identify the sociodemographic pattern of the victims.

METHODOLOGY

This study is a retrospective analysis of autopsy reports of Road Traffic Accidents involving motorized two wheeler vehicles that took place in Mangalore in 2015 and 2016. It was carried out in the Forensic Medicine Department of Kasturba Medical College, Mangalore.

RESULTS

1) Sociodemographic Profile

A total of 172 autopsy cases of RTAs involving motorized two wheelers happened in the year 2015 and 2016 in Mangalore. Out of this 76(44.2%) people were in the age group 21-40 years, followed by 63(36.6%) in the age group 41-60 years, followed by 20(11.6%) in the age group >60 years.

According to this study, deaths due RTAs involving motorized two wheelers are more in males.

Gender	Frequency	Percentage
Male	154	89.5
Female	18	10.5
Total	172	100

Taking victim status into consideration majority of the victims were the driver, which accounts to 96(55.8%) people.

Victim status	Frequency	Percentage
Driver	96	55.8
Pillion	39	22.7
pedestrian	37	21.5
Total	172	100

When these 172 cases are distributed according to the month of occurrence, highest number, that is, 20(11.6%) occurred in the month December, followed by 18(10.5%) accidents in February. Month wise distribution of two wheeler accident was done and a year was divided based on two seasons, rainy season (June-September) and non-rainy season (October-May). Majority of these accidents, 126(73.2%) took place in non-rainy season. Most of the accidents took place in the day time. 108(62.8%) accidents out of total 172 accidents took place in the day time (5am – 6pm) and 64(37.2%) accidents took place at night (6pm -5am). 142 accidents, that is, 82.65% of the accidents took place due to over speeding and negligence. City junctions and city roads are the most common sites where such two wheeler accidents occurred. About 83(48.3%) accidents took place in such junction / city roads, followed by 58(33.7%) accidents that took place in highways.

Site of Accident	Frequency	Percentage
Highway	58	33.7
Junction/city roads	83	48.3
Village road	31	18.0
Total	172	100

2) Pattern of External Injuries

There were a total of 630 external injuries. Out of this 630 external injuries 356(56.5%) were abrasions, 105(16.7%) were lacerations, 98(15.6%) were contusions and 71(11.2%) were fractures.

a) Abrasions:

A total of 356 abrasions were present. Highest number of abrasions (i.e. 110) were seen to be present

on both upper and lower limb separately. 76 abrasions were seen on the head neck or face region followed by 60 abrasions on the trunk region.

b) Lacerations:

A total of 105 lacerations were present out of which highest number (i.e. 39) of lacerations were seen in the head, neck or face region followed by 37 lacerations on the lower limb and 25 lacerations on the upper limb and 4 lacerations on the trunk.

c) Contusions:

A total of 98 contusions, out of which most of the contusions (i.e. 31) are seen on the head and neck region. 26 contusions were present in the upper limb followed by 22 on the trunk and 19 on the lower limb region.

d) Fractures: Most of the fractures were seen in the lower limb in the thigh and leg region.

fractures of arm	10
fractures of forearm	7
fractures of thigh and hip	14
fractures of leg	24
Fractures of face	16
Total number of fractures	71(11.2%)

Pattern of Internal Injuries

a) Injuries in the scalp and skull

According to this study, majority of the deaths in two wheeler accidents 134(77.9%) were due to complications of head injury.

A total of 216 injuries were seen in the skull and scalp. Out of which, 108(50%) were sub scalp contusions. Rest of the injuries were fractures sustained which were divided into linear, comminuted diastatic / hinge fractures and were studied.

Types of fractures	Frequency	Percent
linear fracture	84	77.8
comminuted fracture	17	15.7
diastatic, hinge fracture	7	6.5
Total	108	100

b) Intra cranial hemorrhages:

According to this study there are 265 intra cranial hemorrhage injuries were seen in intra cranial compartment out of which the highest is subarachnoid hemorrhage which constitutes 114(43%), followed by subdural hemorrhage constitutes 98(37%), extradural hemorrhage 22(8.3%), pontine hemorrhage 19(7.2%) and intra ventricular hemorrhage 12(4.5%).

c) Pattern of Internal injuries of Thorax

There were a total of 66 internal injuries to the thorax. Out of this the highest was rib fractures that constitutes 36(54.6%) followed by pleural haemorrhage 20(30.4%). Heart lacerations and lung lacerations were also seen. Lung lacerations constituted 6(9%) followed by heart lacerations 4(6%).

d) Pattern of internal Injuries of Abdomen

There were 23 internal injuries sustained by the abdomen. Out of which 12(52.3%) were peritoneal haemorrhage, 7(30.4%) were lacerations of liver and 4(17.3%) were lacerations of spleen.

DISCUSSION

A total of 172 cases of RTA involving motorized two wheelers underwent medico-legal autopsy in Mangalore in the year 2015 and 2016. According to another study conducted in Mangalore in the period 2000-2004, a total of 1231 two wheeler accidents took place, out of which 1076 were accidents involving motorized two wheeler vehicles⁵.

In a study on pattern of organ fatality in RTAs involving all types of vehicles, conducted in Mangalore during 2015, males were 6 times more exposed to RTAs than females⁷. Similarly, according to this study, deaths due RTAs involving motorized two wheelers are more in males. There were 154(89.5%) male victims, whereas the number of female victims are 18(10.5%). Therefore, males are almost 8 times more exposed to such accidents.

In this study 76(44.2%) accidents involved young and middle aged adults in the age group 21-40 years and 63(36.6%) accidents involved adults under age group 41-60 years. Therefore, it shows that young and middle aged adults were mostly affected by such accidents. In a similar study conducted in Mangalore, majority i.e.

73.7% of the victims belonged to the age group 18-44 years which is similar to the findings of this study⁵.

Most of the accidents took place in the day time. 62.8% of the accidents took place in the day time (5am – 6pm) and 37.2% of the accidents took place at night (6pm -5am). Another study has accounted that most of the accidents took place during 9am-12noon and 6pm-9pm¹⁰. Another study showed that most of the accidents took place during the time interval 6pm-12 midnight⁶.

Taking victim status into consideration, this study shows that drivers are most commonly affected (55.8%) followed by pillion (22.7%) and pedestrians (21.5%). A study conducted in Hyderabad, showed that pedestrians and riders were most commonly involved victims of RTAs⁹. While another study has reported injuries in only 2% of pillion¹.

Most of the two wheeler accidents (48.3%) were found to have taken place in city roads or junctions and 33.7% of the accidents took place in the highway roads and only 18.0% of the accidents took place in the village and rural areas. In a study conducted in Bangalore, it was observed that the occurrence of RTA was more in the urban areas (74.29%) as compared to rural areas (25.71%)⁶.

A total of 630 external injuries were recorded in this study. Out of this 630 external injuries 356(56.5%) were abrasions, 105(16.7%) were lacerations, 98(15.6%) were contusions and 71(11.2%) were fractures. In a similar study done in Punjab, a total of 134 external injuries were recorded, 29.85% of these injuries were abrasions, 29.10% were lacerations, 9.7% contusions and 31.34% fractures⁸.

Internal examination showed in this study shows that majority of the deaths in two wheeler accidents (77.9%) were due to complications of head injury. A study on pattern of head injuries in fatal road traffic accidents conducted in Maharashtra, showed that head injury was the commonest cause of death¹¹.

A total of 216 injuries were seen in the skull and scalp. Out of which, 108(50%) were sub scalpal contusions and the rest of the 108 injuries were fractures to the skull. Out of the total 108 fractures to the skull 77.8% of the skull fractures were linear fractures. In a similar study conducted in Bangalore same findings were observed in which linear fractures were the most

common type of skull fractures⁶. Fissured fracture (linear fracture) was also the most commonly observed fracture in study of Menon A et al and Shivakumar BC et al^{12,13}.

Out of 265 total intracranial hemorrhages seen, highest is subarachnoid hemorrhage which constitutes (43%), followed by subdural hemorrhage constitutes (36.9%) and extradural hemorrhage (8.3%). But a study done by R. Ravikumar et. al. showed that commonest type of Intra Cranial Hemorrhage was subdural hemorrhage followed by sub arachnoid hemorrhage⁶.

There were a total of 66 internal injuries to the thorax out of which rib fractures were most common. In case of abdomen there were 23 internal injuries, out of which most common was peritoneal hemorrhage. A study by SS. Oberoi et. al. the maximum deaths in fatal two wheeler accidents were due to head injuries (66%) followed by chest injuries (12%) and abdominal injuries (8%)⁸.

CONCLUSION

This study was done in Mangalore city based on the autopsy reports of road traffic accidents involving motorized two wheeler vehicles. This study showed that males are almost 8 times more exposed to such accidents. Young adults and middle aged working populations were more involved in these accidents. Most commonly the drivers were involved. Majority of the accidents took place during the day time.

City roads or junctions were most common sites of accident followed by highway roads. Therefore, urban areas are the most common sites. This may be due to the increasing traffic present in the urban areas. Majority of two wheeler accidents were due to over speeding and negligence. So it is important to drive safe abiding by the rules. This can help reducing risk of such two wheeler accidents.

Taking external injuries into consideration, abrasions were the most common type of external injury. Abrasion to upper limb and lower limb were more common. Under lacerations, head/neck/face and lower limb regions were the most common sites where lacerations were present. Contusions were mostly present on the head/neck/face region followed by upper limb. Fractures were most commonly found in the lower limb region that consists of the hip, thigh and the leg

region.

Head injuries are seen to be the most common cause of death in two wheeler accidents. This shows the importance of wearing helmet. Helmet helps in reducing the risk of such head injuries. Linear fractures were most common type of skull fracture.

In case of injuries to the thorax, rib fractures were most common. Peritoneal hemorrhage was most common complication in case of abdominal injuries.

Obedying the traffic rules, riding safely by wearing helmet and avoiding over speeding and negligence and taking necessary safety precautions such as wear safety gears while riding, can help in reducing such accidents to a great extent.

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Perinatal Outcomes of Intimate Partner Violence (IPV) During Pregnancy: A Systematic Review Protocol

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ABSTRACT

Background: Pregnancy and childbirth is a crucial developmental phase in the life of a woman and her newborn(s). It becomes increasingly challenging if the pregnant woman is exposed to any Intimate Partner Violence (IPV) or domestic violence during this period. Neonatal outcomes depend largely on the mother's health and wellbeing. Though IPV could be present even during pregnancy, it is not reported especially in a patriarchal culture. It also seems to be neglected in the perinatal health care by the health care professionals. It is pertinent for health care professionals to be aware of this during pregnancy, so that the mother and her newborn do not face any adverse outcomes.

Objective: To identify the perinatal outcomes in pregnant women (who had experienced Intimate Partner Violence (IPV) during their pregnancy) and their newborns.

Method: A comprehensive literature search will be made in the following databases: PubMed, MEDLINE, CINAHL, Google Scholar, Proquest, IndMed and ScienceDirect for retrieving the related studies. This systematic review will be conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A search strategy will be formulated. Data will be collected and analyzed according to the objective. Data extraction and data evaluation for its quality will be done. This review will include observational/analytical studies like cohort, case-control, cross-sectional studies and prevalence surveys. Narrative reviews, dissertations, case-reports, letters to the editor will be excluded.

Conclusion: Though there is a growing evidence suggesting that IPV can cause serious consequences, it is unclear as to what are the specific perinatal outcomes that may affect a woman when she suffers from IPV during the period of her pregnancy. The proposed study would help in adding to the existing evidence.

Keywords: Intimate Partner Violence, pregnant women, newborns, perinatal outcomes

BACKGROUND

Intimate partner violence (IPV) is considered a societal evil having not only societal but also clinical

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implications. The definition of IPV is "Behavior within a current or former intimate relationship that causes physical, sexual or psychological harm, including acts of physical aggression, sexual or psychological abuse and controlling behaviors". IPV is synonymously referred to as "Domestic violence, domestic abuse, battering, violence against women or gender based violence".¹ Pregnancy causes a drastic transition in the lives of couples and is considered to be a major developmental milestone. It is also an equally challenging period. This

period could contribute to IPV due to the vulnerability of the period in terms of physical, emotional, social and economic demands that pregnancy necessitates. This vulnerability extends to the perinatal period as well. The health of the mother during pregnancy is essentially important because the health of the fetus depends largely on that.

IPV has the potential to lead to health problems during pregnancy. A study done in India also found that women who reported IPV were more likely to report illness during the index pregnancy.² There are many inherent risks to the fetus(es) of a pregnant woman exposed to IPV that lead to many potential negative perinatal outcomes. A study, which determined the effects of IPV before, during and after pregnancy, where IPV was restricted to moderate to severe physical IPV, found a slightly lower average birth weight (3,036 g vs. 3,155 g, $p = 0.003$) in mothers reporting IPV during pregnancy.³ It is also evident from literature that preterm birth^{4,5} and low birth weight⁶ occur in neonates born to mothers exposed to IPV. Nevertheless, IPV during pregnancy is present but not reported and seems to receive less attention in the perinatal care when compared to other health conditions that occur during pregnancy and the perinatal period^{7,8} and may contribute to negative perinatal outcomes.

Why it is important to do this review?

Through the recent years, research from developing and developed countries have witnessed evidence of violence being associated with effects on the physical and mental health of the women and children. Perinatal outcomes associated with IPV such as low birth weight, preterm delivery, infection, miscarriage/abortion, placental abruption, fetal injury and perinatal death may occur. Adverse mental health consequences and behavioral risks including depression, anxiety disorders, post-traumatic stress disorder, suicide (attempts) and delayed entry into prenatal care, poor maternal nutrition and use of tobacco, alcohol and illicit drugs are consistently associated with IPV around the time of pregnancy.

There are consensus that routine enquiry is an effective practice and an important step in tackling IPV in general. However, a lot remains unclear about how to deal with IPV in the perinatal care and which interventions should be adopted to minimize or prevent

any negative perinatal outcomes that may occur consequently. Neonates of mothers who experienced IPV during their pregnancy may also experience adverse outcomes that could be detrimental to their future growth as well as their development. Though there is a growing evidence suggesting that IPV can cause serious consequences, there is unclear evidence as to what are the specific perinatal outcomes that could be affected when a woman suffers from IPV during the period of her pregnancy. So a review in this direction is desired to understand the existence of IPV during pregnancy, which may have serious effects on the perinatal outcomes of pregnant women who were exposed to IPV during their period of pregnancy.

OBJECTIVE

The objective of this study is:

- to identify the perinatal outcomes (maternal and neonatal outcomes) of pregnant women exposed to IPV during their pregnancy

Search methods:

The MeSH, Boolean operators and text word terms for <perinatal outcomes> combined with MeSH Boolean operators and text word terms for <Intimate Partner Violence>. Synonyms will also be used in place of IPV like “domestic violence, domestic abuse, battering, violence against women or gender based violence”. These will then be combined with text word terms for <exposure of women during pregnancy to IPV>”.

Literature search would be performed in PubMed, MEDLINE, CINAHL, Google Scholar, Proquest, IndMed and Science Direct for retrieving the related studies. All databases will be searched from inception. Studies will be selected on the basis of guidelines. Conference proceedings for which there are no full text papers will be excluded. Letters, editorial and records which does not have abstract will not be involved.

Criteria for considering studies for this review

This systematic review will be conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.⁹ The PRISMA checklist encourages authors to describe eligibility criteria using the PICO reporting system (which describes the participants, interventions, comparisons, outcome(s),

and study design of the included studies).

Participants/ population

Studies reporting on maternal (normal labour) and neonatal outcomes (Apgar scoring) of pregnant women (from confirmation of pregnancy to term gestation) exposed to IPV.

Intervention(s), exposure(s)

The exposure of interest will be IPV during pregnancy

Comparator(s)/ control

Studies with comparison with other parameters like assessing the mental status or identifying the physical trauma to the women and neonates will also be considered for the study

Outcome(s)

Primary outcomes:

Perinatal outcomes like:

- Maternal physical and mental outcomes (preterm labor, complications during labor process, prolonged labor, precipitate labor, type of delivery, assisted delivery, fear, anxiety, stress, postpartum depression, decreased bonding, refusal to breastfeed)
- Neonatal outcomes (intrauterine growth restriction, weak cry or failed to cry at birth, stillbirth, preterm birth, low birth weight, small for gestational age)

Secondary outcomes:

- Birth spacing
- Preference for postnatal contraceptives
- Decision to use terminal methods of family planning
- Neonatal: admission to Neonatal Intensive Care Unit (NICU)

Types of studies to be included:

Studies that are published in English in peer-reviewed journals that have the following quantitative approaches

- Cohort studies (including those following a cohort of patients previously enrolled in a randomized controlled trial or controlled trials)
- Case-control studies
- Cross sectional/Descriptive studies
- Prevalence studies

- Case series

Types of studies to be excluded:

- Studies published in foreign languages
- Studies with methodology other than quantitative approaches
- Narrative reviews
- Dissertations
- Case-reports
- Letters to the editor

Settings:

Studies selected could be conducted at home, community, or facility-based settings will be chosen.

Reference lists

The reference lists of systematic reviews will be checked to search for potential studies for inclusion.

Key words

Combinations of key words like:

- * Population (pregnant*, woman*, young woman, childbearing woman)
- * Outcomes
 - Maternal physical and mental outcomes (preterm labor, complications during labor process, prolonged labor, precipitate labor, type of delivery, assisted delivery, fear, anxiety, stress, postpartum depression, decreased bonding, refusal to breastfeed)
 - Neonatal outcomes (intrauterine growth restriction, weak cry or failed to cry at birth, stillbirth, preterm birth, low birth weight, small for gestational age)
- * Survey (cross- sectional, prevalence, cohort, descriptive)
- * IPV (domestic violence, domestic abuse, battering, violence against women or gender based violence)
- * Type of IPV (physical, sexual or emotional)

DATA COLLECTION AND ANALYSIS

Selection of studies: One author will initially screen titles and abstracts and eliminate those obviously not relevant to this review. Two authors will independently screen the remaining titles and abstracts for their eligibility for inclusion. Ineligible studies will be excluded at this stage, and the authors will record the reason for rejection. When the title and abstract do not provide all the information concerning the criteria,

full paper copies will be retrieved and screened. Disagreements between the two reviewers will be resolved by discussion, with the involvement of a third author. The PRISMA template will be used to produce a flow chart showing details of studies included and excluded at each stage of the study selection process.

Quality criteria for assessing the studies

Each study will be assessed for

- Adequate sample size - studies will be included if they mention about sample size calculation and 'inadequate' if the study do not mention it explicitly
- The appropriateness of the methods for sampling the population under study (Representativeness of the sample from the universal population).

Data extraction and management

A proforma for data extraction will be prepared and evaluated by two reviewers. Data will be extracted from abstracts as well as full-text articles by the first reviewer and will be reviewed by a second reviewer. Disagreements will be discussed with a third reviewer and consensus will be drawn. Authors will be contacted in order to obtain any missing data. Findings (perinatal outcomes – both maternal and neonatal outcomes) will be reported regardless of their direction.

The following information will be extracted from the studies:

- Participant characteristics including demographic characteristics (e.g. age, ethnicity).
- Obstetrical information of the participants
- Geographic location of the study
- Timing of assessment for perinatal outcomes.
- Any adverse events reported by studies

Risk of bias (quality) assessment

All studies will be evaluated for bias using the Newcastle-Ottawa Scale, and specific areas of bias assessed will include selection bias (i.e. loss to follow-up), information bias (assessors were blinded for outcome assessment), and confounding biases.

Data synthesis

Data will only be pooled if it is clinically meaningful

and appropriate to do so. Otherwise, a narrative synthesis of the data will be conducted.

Data analysis

Overall description of IPV among pregnant women in first trimester, second trimester & third trimester will be calculated based on the results of all the studies and outcomes of the neonate and the maternal. Important heterogeneity will be identified for the collective estimate

DISCUSSION

The proposed review will add to the literature in several ways. Women's health care is given importance since the future of the nation depends largely on that. It is essential that women are healthy especially during their pregnancy so that their unborn child (ren) is/are safe. IPV during pregnancy, be it physical, emotional or sexual may cause or lead to several negative perinatal outcomes. This review could provide evidence of any perinatal outcomes, be it adverse or otherwise that occur if a woman is being exposed to any type of IPV during her pregnancy.

Conclusion: Though there is a growing evidence suggesting that IPV can cause serious consequences, it is unclear as to what are the specific perinatal outcomes that could affect a woman when she suffers from IPV during the period of her pregnancy that could not only affect her but also her newborn. This study is proposed to add to the existing evidence on perinatal outcomes of pregnant women exposed to IPV.

Ethical Considerations: The study protocol is approved by the Institutional Review Committee (IRC), Manipal College of Nursing, Manipal University, Manipal. Since this is a systematic review the Institutional Ethical Committee clearance will not be applicable.

Sources of Support: Nil

Conflicting Interest: Nil

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Prevalence and Determinants of Intimate Partner Violence During Pregnancy in Central India

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ABSTRACT

Background: Violence against women is significant but under-reported and less discussed public health problem. Despite its negative consequence both for maternal and neonatal health; the magnitude of intimate partner violence among pregnant women is not assessed routinely. **Material and Method:** We conducted a hospital-based cross-sectional survey covering 3,839 women admitted in the postpartum ward of the nine public hospitals located in three districts of Madhya Pradesh. Data about physical, psychological, and sexual intimate partner violence was collected using the questionnaire. Adjusted odds ratios along with confidence interval were calculated to determine the predictors of physical intimate partner violence during pregnancy. **Results:** The prevalence of physical, psychological and sexual partner violence during the recent pregnancy was 8.73%, 19.35% and 13.13% respectively. Among multiple parous women, 6.30% faced physical violence during past pregnancies but not in present pregnancy. Most women facing physical IPV during pregnancy sustained multiple injuries; upper limb was the most common site. Factors predicting physical intimate partner violence during pregnancy included; alcohol consumption by husband; lack of formal education; low per capita income; living in a nuclear family; having ≥ 2 daughters and belonging to the rural background. **Conclusions:** Considerable proportions of women experience some type of intimate partner violence during pregnancy. Health-care providers should be trained to screen, identify, respond, and counsel pregnant women and refer them for availing legal help.

Keywords: Partner, Violence, Pregnancy, India.

INTRODUCTION

Intimate Partner Violence (IPV) during pregnancy is a serious but underreported and less debated public health issue with significant negative health consequences both for women and the unborn child.^{1,2} Women may experience violence at any point in their lives. Although there is no conclusive evidence that the risk of IPV escalates during pregnancy, it is clear that a significant subgroup of women is exposed to violence at this vulnerable time.^{3,4}

Violence can affect pregnancy through direct and indirect mechanisms. Pregnant women are more likely to be struck in the abdomen⁵ and such blunt trauma may cause adverse outcomes, including foetal injury and death or lead to complications, such as preterm labour.^{6,7} A large body of literature describes factors associated with and determinants of IPV and the intersection of such violence with negative reproductive health outcomes.^{8,9} However, the vast majority of published work to date has focused on women of reproductive age and has not looked specifically at pregnant women. The desire for a male child is rampant in Indian communities and exerting pressure on women bearing a male child is very common.^{10,11} Cultural norms may play an important role in affecting the degree to which women are protected from domestic violence at the family level.^{10,11} Pregnant women facing IPV or any other form of domestic violence should be; identified as early as possible; categorised as a high-risk group; provided

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counselling including legal help to reduce the negative health outcome associated with IPV.^{8,9} Regardless of these issues, IPV during pregnancy go unreported in India.

There is a paucity of data on IPV during pregnancy in India. In most instances, the only source of information is either the police records or media reports. A population-based study undertaken across the country reported the prevalence of physical domestic violence to be.¹⁰ In addition, some clinic-based studies revealed that 22% to 48% of women report physical domestic violence during pregnancy.¹¹⁻¹² But specific data on the IPV is lacking and inconclusive in India particularly in central India. Hence, we conducted the present study with the objective to determine the prevalence of women facing Intimate Partner Violence (physical, psychological and sexual) during pregnancy.

MATERIAL AND METHOD

Study Setting: This was a hospital-based cross-sectional study. The total duration of the study was 11 months, from March 2016 to January 2017. The period of data collection was 6 months (June 2016 to December 2016). The present study was conducted in three districts of Madhya Pradesh, India. The study was conducted at multiple government hospitals where women come for childbirth. **Sampling technique:** The study employed two-stage sampling. In the first stage, one block was selected from each district using simple random sampling technique. In the second stage, 1 community health centre and 2 primary health centres were randomly selected from each pre-selected block. In this manner, we selected 3 community health centres and 6 primary health centres for recruiting study participants. **Study participants:** women of all ages and parity coming for labour at selected hospitals. Exclusion criteria included (i) any women (pregnant or post-partum) or her newborn that had to be referred out to the higher facility for any complications and; (ii) women who did not give consent for the study. **Participant's recruitments:** The time of participant recruitment and data collection was the period of post-partum stay at the facility. The data was collected minimum 12-24 hours after delivery to allow women to breastfeed, recover, and rest before the interview. Because of the sensitivity of the study topic, the data was collected when women were alone in the post-partum ward to avoid bias (concealment of information) due to embarrassment/

fear/inhibition in front of relatives/in-laws/spouse. This strategy was finalised after the pilot testing of the questionnaire. **Outcome variable:** The three principal forms of IPV were selected as the outcome variable for our analysis: (i) physical; (ii) psychological; and (iii) sexual.¹³⁻¹⁵ **Data Collection tool:** To construct the questionnaire for the study, we conducted a systematic search on PubMed and Internet for the pre-validated questionnaire and relevant studies carried out in past on similar topic.⁵⁻¹⁵ The questionnaire was translated from English to native language (Hindi). The questionnaire was pre-tested on 30 women admitted to post-partum ward of the district hospital of one of the selected three districts. The final version of study questionnaire had a reliability of $\alpha = 0.94$. To be included in data analysis a woman needed to answer all the questions in the questionnaire. **Data Collection:** The data collectors were nurses/ANM posted in the health facility. We trained three nurses/ANMs from each selected hospital. All data collectors from all facilities of a selected block were simultaneously trained for data collection, conducting an interview and counsel the women about seeking legal help in case of need. Due to the transfer of four data collectors (nurses) during the period of the study, we had to train new nurses for data collection. New data collectors were given onsite training during the routine visit (s) by the authors. Before collecting data, the consent form was given/read out to participants and data was collected only after obtaining the informed oral consent from the participants. Participants were informed that they can withdraw their consent any time during the interview. After completion of the interview, all study participants irrespective of their status were given information about the women helpline number, where and how to seek help in case of emergency. **Data analysis:** Descriptive analyses were conducted to study the distribution of dependent variables among study participants. *P* value < 0.05 was considered statistically significant. Multivariate linear regression analysis was conducted to examine the relationship between the outcome and dependent variables. Adjusted odds ratios (AOR) and their 95% confidence intervals (CI) were used as to measure the strength of association.

RESULTS

During the period of data collection, data collectors approached a total of 4,280 women who came for childbirth at the selected health centres; 63 (1.5%) refused to participate in the study, 268 (6.3%)

mother-newborn pair were referred out to higher health facility, questionnaire of 110 (2.6%) women were incomplete thus excluded, and hence, a total of 3,839 (89.7%) women were included in the final data analysis. The details about the background characteristics, pregnancy outcome and antenatal care received during the pregnancy are detailed elsewhere.¹⁶

The prevalence of physical, psychological and sexual domestic violence during the recent pregnancy was found to be 8.73%, 19.35% and 13.13% respectively

(Table 1). The lifetime prevalence of physical IPV during all previous (including recent) pregnancy was 4.75%. Most women facing physical IPV during recent pregnancy sustained injuries on multiple body parts; upper limb is the most common site, followed by head & face and the least common site being chest (for details see table 1).

Table 2 highlights all factors which were significantly associated with physical IPV during pregnancy. With regard to physical domestic violence;

rural residence; alcohol consumption by husband; leaving in a nuclear family; having 2 or more daughters; low spacing between birth; low per capita family income; illiterate couples were the factors which predicted physical IPV among study participants. Among study participants whose husband consumed alcohol highest chances of physical IPV was seen among those who consumed alcohol on daily basis.

Table 1: Prevalence and type of intimate partner violence faced by study participants

Study variable	n	%
Type of IPV faced in recent pregnancy (n=3,839)		
Any form of IPV	849	22.12
Physical	335	8.73
Psychological	743	19.35
Sexual	504	13.13
Lifetime prevalence of physical IPV during pregnancy*** (n= 2650)		
During previous pregnancies but not in recent pregnancy***	167	6.30
Both during the present and past pregnancies***	126	4.75
Localizations of physical injuries during present pregnancy^^^ (n=335)		
Head & Face	234	
Neck	132	
Upper Limb	321	
Chest	54	
Abdomen	87	
Back	154	
Lower limbs	210	
***- among multiparous women only ^^^ - total is more than sample size because of multiple injuries in many women.		

Table 2: Determinants of intimate partner physical violence during pregnancy; results of multivariate analysis			
Variable	Adjusted Odds Ratio	95 % Confidence interval	P-value
Resident			
Rural	1.98	1.13-3.12	0.041
Urban	Ref		
Type of family			
Nuclear	3.54	1.73 - 5.19	0.038
Joint	Ref		
Husband consumes alcohol			
Yes	4.80	2.21 - 7.43	0.021
No	Ref		
The frequency of alcohol consumption by Husband			
Daily	18.48	14.43 - 31.43	<0.001
More than once a week but not daily	7.82	5.42 - 11.32	<0.01
More than once a month but not weekly	3.12	2.58 – 6.58	0.031
< once per month	Ref		
Number of children			
≥3	2.89	1.45 – 5.17	0.032
2	1.39	0.89-1.91	0.059
1	Ref		
Number of daughters			
≥2	8.28	4.12-14.32	< 0.01
1	3.32	1.39 - 7.53	0.046
0	Ref		
The gap between last two childbirth			
< 18 month	6.43	3.14 - 10.82	0.011
18-24	3.19	1.81 - 5.24	0.039
	1.68	0.87-2.26	0.059
>30	Ref		
Social class			
SC	2.85	1.64 - 4.82	0.041
ST	2.12	1.14 - 3.73	0.037
OBC	1.16	0.82-1.78	0.069
General	Ref		
Educational qualification of participants			
Illiterate	9.18	7.64 - 16.82	<0.001
Literate without formal education	6.16	4.34 - 8.79	0.024
School-educated	2.75	0.91-4.81	0.054
College educated	Ref		

Cont...Table 2: Determinants of intimate partner physical violence during pregnancy; results of multivariate analysis

Educational qualification of Husband			
Illiterate	11.15	9.31 - 19.08	<0.001
Literate without formal education	8.68	5.18 - 14.07	0.024
School-educated	2.87	0.84-4.12	0.064
College educated	Ref		
Per capita income(in Indian National Rupees)			
<1000	15.82	11.19 - 22.86	<0.0001
1000-3000	10.12	7.52 - 16.76	<0.01
3000-5000	4.23	2.14 - 6.56	0.044
>5000	Ref		

DISCUSSION

Prevalence and pattern of IPV: In our hospital-based survey, we observed that about 22.12% of women experienced some type of IPV in their last pregnancy. The prevalence of physical IPV during last pregnancy was higher than the prevalence of physical IPV in the women’s lifetime (8.73% vs 4.75%). In addition, we observed that 6.30 % of all multiparous women faced physical IPV during previous pregnancies but not in recent pregnancy. Talking about other forms of IPV viz. psychological and sexual violence; we in our study observed that about 19.35% and 13.13% of women faced psychological and sexual violence from their husbands. In conclusion, we noted that physical form of violence was least common among all other types of IPV. Similar to our findings Babu and Kar (2012) also noted that physical form of violence was a least common form of domestic violence.¹³ In our study most common site for sustaining the physical injuries were upper limbs; followed by head& face and the least common site was abdomen. Hedin & Janson (2000) also observed that most common site for sustaining self-reported physical injury was upper arm followed by head and neck.¹¹

Predictors of IPV: We observed that alcohol consumption by the husband was among the most important predictor of IPV during pregnancy. Among women whose husband consumes alcohol; consumption of alcohol on daily basis increased the odds of IPV by more than 18 times in comparison to those whose husband consumes alcohol less than once a month. In India, alcoholism is usually a cause of spousal conflict, as women questions husband’s habit of alcohol consumption.^{9,10} Thus alcoholism can lead to a quarrel

between couples leading to one or another form of IPV.^{9,10}

In our study, we observed that living in rural areas increased the odds of facing IPV as compared to living in rural areas. However, Babu and Kar (2012) observed that living in urban areas was found to be a risk factor than living in rural areas.¹³ This can be explained due to the difference in the rural and urban culture across the geographical areas where our and the other study was undertaken. We also observed that living in a nuclear family increased the odds of sustaining the IPV by more than three times. In a nuclear family, the husband is almost always the head of a family with no supervision from elder members of the joint family which might explain our observations.^{7,8} In our study, we observed that lower educational status of both the husband as well the wife was positively associated with the IPV. In addition, we also observed that belonging to the lowest income group (per capita income < 1000 INR) was also associated with the increased odds of facing IPV. Similar observations were also reported by Babu and Kar (2012) in their study.¹³ They noted that higher levels of education and family income were protective against the risk of domestic violence during pregnancy. Other studies have also noted that attaining higher education was repeatedly been found to reduce the likelihood of domestic violence even in developed communities.¹⁰ Women with higher education are financially self-dependent, enjoys more autonomy and skills necessary to better recognize and terminate a potentially abusive relationship.^{7,8}

It is important to recognize the fact that any pregnant women belonging to any social, financial

or educational background are equally vulnerable to encounter either IPV or domestic violence in any form.^{11,12} We also observed that not all episodes of physical IPV are reported to concerned authorities neither all women sought any kind of help against abuse. Thus it is important for health workers viz. doctors, nurses, auxiliary nurse housewives and ASHA workers to look and probe for any kind of IPV on every contact with every woman in general and pregnant woman in particular.^{9,10} Our results provide some crucial information to develop policies and interventions for preventing and providing help to women facing IPV or domestic violence during pregnancy. We recommend that feasibility studies need to be conducted to study the benefits and cost-effectiveness of universal screening for domestic violence in pregnancy.

Ethical Clearance Obtained from board of Institutional ethical board of RKDF Medical College.

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

Source of Funding: None

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The Effect of Participatory Care Model on Sleep Quality and Quality of Life in Cardiovascular Patients

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ABSTARCT

Background: In the last century, according to previous studies, aging has led to a growing trend. Among the problems created for this group, it is possible to increase the number of cardiovascular patients. Participatory care model is one of the nursing models that has been used in various studies and has had positive effects. Considering that this model is a native model of Iran. For this reason, the researcher conducted a study to determine the impact of participatory care model on the quality of sleep and quality of life in patients with cardiovascular disease.

Materials and method: The present study was a quasi-experimental study in patients with cardiovascular diseases hospitalized in Ilam in 2016. PCM was implemented for patients. After completing the training provided to the patients according to the model of PCM, the collected questionnaires were entered into the SPSS software. Then the data entered was analyzed.

Results: According to the findings, after implementing the PCM, the status of quality of sleep and quality of life of the patients increased significantly.

Conclusions: It seems that in previous studies, the implementation of this model has been very useful and effective.

Keywords: *Participatory care , Sleep quality, Quality of life, Cardiovascular patients,*

BACKGROUND

In the last century, according to previous studies, aging has led to a growing trend⁽¹⁻⁴⁾. Among the problems created for this group, it is possible to increase the number of chronic diseases, such as diabetes⁽⁵⁻⁷⁾ Cancer⁽¹⁴⁻⁸⁾, chronic renal failure^(15, 16), and cardiovascular disease^(17, 18), which has led to an increase in the incidence of cardiovascular disease in the last century^(19- 22).

Among the problems associated with heart patients, sleep disturbances^(23, 24) and the quality of life, support network, Spirituality of these patients have been noted which have a significant negative effect on patients^(19, 25).

One of the ways to increase health-related parameters is through the use of training and interventions by nurses. Among nurses trained interventions, we can use the Orem self-care model⁽²⁶⁾, nursing care at home

⁽²⁷⁾, follow-up care model, participatory care model^(28, 29), and other educational methods. Done to nursing caregivers such as Ayurveda^(23, 30).

Participatory care model is one of the nursing models that has been used in various studies and has had positive effects^(28, 31-33). Considering that this model is a native model of Iran. For this reason, the researcher conducted a study to determine the impact of participatory care model on the quality of sleep and quality of life in patients with cardiovascular disease in Ilam during 2016.

MATERIALS AND METHOD

The present study was a quasi-experimental study in patients with cardiovascular diseases hospitalized in Ilam in 2016. In this study, a questionnaire including

Pittsburgh sleep quality questionnaire and SF-36 quality of life questionnaire⁽³⁶⁾ were used in previous studies. Sample size According to previous studies, 60 patients were randomly assigned to the experimental and control groups and each group was equally assigned to 30 persons. In the pre-intervention phase, the questionnaires were used. Were completed by patients. After this stage, interventional model of intervention was performed and after 3 months after the completion of two interventions, the quality of life and quality of life questionnaires were completed. Cooperative care model is a native model that has the following steps^(27,31,32).

1- step motivation:

The intervention group initially participated in the analysis of information for the motivation stage, and all members of the team participated in the research. In this study, 5 groups (6 groups in total) were formed and questionnaires were evaluated in the presence of the treatment team. At this point, the care needs were defined and the patients needed them.

2- stage preparation and engagement

This phase included visits for educational participation in 3 sessions and follow-up visits from the first and second sessions.

During the first visit, the educational participation visits tried to familiarize patients with their current problems and conditions and to provide them with the necessary explanations.

During the second visit, the patient tried to get the

patient ready to take care of himself and continue the treatment. At this point, the patient tries to learn and apply methods that improve the quality of sleep and life.

In the third visit, this stage was discussed with the patient in the event of negative thoughts in the client and his inability to solve these problems and he was trying to resolve these problems.

Participatory visits were followed by educational participation visits. It was done in two sessions. The interval between each session was two weeks. These visits, while examining the problems of patients, have positive and negative results of educational activities and the guidance needed to correct the problems was presented.

3- Evaluation

In the next stage of the evaluation, the questionnaires were completed again by patients.

After completing the training provided to the patients according to the model of participatory care model, the collected questionnaires were entered into the SPSS software. Then the data entered was analyzed.

RESULT

The findings showed that there was no significant difference between the patients in the experimental and control groups in terms of demographic characteristics ($P > 0/05$). Of the 60 patients under study, 39 were male, had a post-secondary education, had average income, had hospital records.

Table 1. Comparison of sleep quality before and after intervention

Group	Test group	control group
Pre intervention	18.01(2.11)	18.76(2.23)
post intervention	9.12(1.98)	17.98(2.45)
p-value	$P < 0/001$	$P > 0/05$

According to the findings, after the implementation of the PCM model, sleep quality, the patients in the experimental group showed a significant increase ($P < 0/001$).

Table 2. Comparison of quality of life before and after intervention

Group	Test group	control group
Pre intervention	44.23(12.8)	43.16(11.2)
post intervention	68.39(14.19)	42.09(8.8)
p-value	$P < 0/001$	$P > 0/05$

According to the findings, after the implementation of the PCM model, quality of life, the patients in the experimental group showed a significant increase ($P < 0/001$).

DISCUSSION

According to the findings of this study, the effect of PCM on improving sleep quality and life of this model could have a positive effect on improving the health status of patients. In many studies, the impact of the implementation of this model has been used. Such studies can be used to study Beri et al.⁽¹⁾ that the implementation of participatory care model had a great impact on improving the social support and self-efficacy of the elderly, Study is in the same direction. In the study of Parnian Nasab et al.⁽²⁾, the training provided by this model led to a decrease in depression in adolescents with thalassemia major, which is in line with the results of this study. It should be noted that in the study of Alijani et al.⁽³⁾, the implementation of this model has increased the quality of life in children, which is in line with the results of this study.

CONCLUSION

It seems that in previous studies, the implementation of this model has been very useful and effective. Therefore, it is suggested that clinicians, especially nurses, take care to improve the condition of this particular group. Nurses, as people who spend more time with the patient, need to use these interventions well to put our patients in the best position.

Ethical Clearance: Taken from Ilam University of Medical Sciences committee, Informed consent, The cost was not taken from the patient.

conflict of Interest: There is no conflict of interest between authors.

Source of Funding : Ilam University of Medical Sciences.

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