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Case Report

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Extremely High Triglycerides in a Beta Thalassemia Minor Patient: A Case Report

Anannya Ghosh[1], Sanchayan Sinha[2], Neepa Chowdhury[3]

[1,3]Consultant Biochemist, Suraksha Diagnostics Private Limited, Kolkata, [2]Demonstrator, Department of Biochemistry, College of Medicine and Sagore Dutta Hospital, Kolkata, Orchid ID: https://orcid.org/0000_0001_9061_9824.

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Abstract

Introduction: Hypertriglyceridemia in pediatric population whether familial or acquired is associated with Diabetes Mellitus type 1, uremia, hypothyroidism, nephrotic syndrome etc. abnormal serum lipid levels are associated with premature atherosclerosis. It is also seen that there is an association of hypertriglyceridemia with beta thalassemia in some cases which indicates the poor prognosis.

Materials and methods: In this context here, we are reporting a case of beta thalassemia minor with extremely high triglyceride level. A 2-year-old male child with history of failure to thrive and mild to moderate anemia was investigated for complete blood count (CBC), hemoglobin typing, lipid profile, renal function test, liver function test, thyroid profile and the electrolytes.

Result: The Hb typing showed elevated HbA_2, CBC showed microcytic hypochromic anemia, triglyceride level was 2010 mg/dl. His father and mother are both beta thalassemia minor patient

Conclusion: As hypertriglyceridemia in beta thalassemia is reversible, care should be taken to prevent persistent hypertriglyceridemia which increases chance of atherosclerosis and pancreatitis

Key words: hypertriglyceridemia, thalassemia, atherosclerosis

Introduction

Hypertriglyceridemia is defined as conditions with plasma triglycerides carrying lipoproteins levels > 150 mg/ dl. Hypertriglyceridemia can be familial or acquired, reflecting increased hepatic synthesis or decreased catabolism. In pediatric patients, acquired hypertriglyceridemia has been found to be associated with diseases like Diabetes Mellitus Type I, uremia with or without dialysis, hypothyroidism, nephrotic syndrome, obesity, certain drugs use etc. Literatures have revealed strong association of abnormal serum lipid levels [low total cholesterol (TC) and HDL-cholesterol (HDLc), high triglycerides (TG) and

Corresponding Author: Sanchayan Sinha, Demonstrator, Department of Biochemistry, College of Medicine and Sagore Dutta Hospital, Kolkata.

E-mail: Sanchayan.sinha82@gmail.com

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TC: HDL ratio] with premature atherosclerosis in children with Beta- thalassemia major, though rare, often high triglyceride in patients being referred to as Hypertriglyceridemia – thalassemia syndrome [1]. Though the association of hypertriglyceridemia with the beta thalassemia is not so much well established, and its effect in the thalassemia is not clearly understood, but according to some recent litreatures the effects of dyslipidemia have poor prognostic consequences. [2] In this context, we present a case report of rare association of extremely high triglyceride level in a Beta thalassemia minor patient to underscore the necessity of estimation of lipid profile even in Beta thalassemia minor cases for prevention of complication and timely management.

Case Report

A 2-year-old male child born out of consanguineous marriage was referred to the pediatric OPD in College of Medicine and Sagore Dutta Hospital with chief complaint of pallor, weight loss & learning difficulties for estimation of Complete Blood Count, Hemoglobin HPLC, lipid profile, liver function test & renal function test. He was delivered by normal vaginal delivery. Birth weight being 2.15 kg and following neonatal hyperbilirubinemia (non-immune) on day 3, phototherapy was given for 2 days and he recovered uneventfully. He was exclusively breast fed and immunized for age. Later the parents found the child to have poor growth & weight gain. The child was having learning disabilities due to lack of concentration as well.

On physical examination, he was found to have mild pallor, however there was no icterus. Weight of the child was 7.5kg and height was 70.5cm were below 3rd & 5th percentile for age and sex respectively with a head circumference at the 75th percentile (49.1 cm). There was no feature of skin rash, edema, lymphadenopathy, ascites or bleeding manifestations. All systemic examinations were within normal limit excepting a mild hepatosplenomegaly.

The complete hemogram showed Hemoglobin was moderately reduced (7.8 g/dl), reduced hematocrit (22.93%), mean corpuscular volume (MCV) (58.8fL) and mean corpuscular hemoglobin (MCH) 19.5 pg level. The WBC count and platelet were within normal limit. The differential count shows relative lymphocytosis (Neutrophil 23% and Lymphocyte 72%).

Peripheral blood smear showed reactive lymphocytes along with hypochromic, microcytic RBC pictures along with presence of target cells.

The hemoglobin typing was done by HPLC method which revealed HbA0 77%, elevated HbF (8.2%) and elevated HbA2 (6.0%)which clearly indicated the patient was suffering from beta thalassemia minor.

Both his parents on screening with Hemoglobin HPLC (Figure 2 & 3) revealed them to be beta thalassemia minor as well as their Peripheral blood smear showed microcytic hypochromic / polychromatic RBC with and occasional target cells.

However, serum obtained for assaying the other biochemical parameters was found to extensively lipemic. Serum sample on processing gave extremely high Triglyceride (2,010 mg/dl). Extensively high triglyceride interfered with estimation of serum HDL, LDL, Alanine Aminotransferase.

(ALT); Aspartate Aminotransferase(AST), sodium, potassium, uric acid, urea (BUN), creatinine by SIEMENS ADVIA CHEMISTRY Auto- Analyzer. Triglyceride being above the cut off level as indicated by the manufacturer the results of sodium, potassium uric acid, urea (BUN), creatinine was not given due to possibility of risk of missing clinically significant abnormality.

The child had no evidences of tonsillar hypertrophy, corneal arcus, tendon or tuberous xanthomas which ruled out primary hypertriglyceridemia. Post transfusion the child came back to us after 4 weeks when his lipid profile showed consequent changes and this time liver function test parameters, thyroid profile, renal function test could be reported a appropriate clinical history taking could negate Secondary hypertriglyceridemia observed in children in association with diabetes mellitus, obesity & nephrotic syndrome.

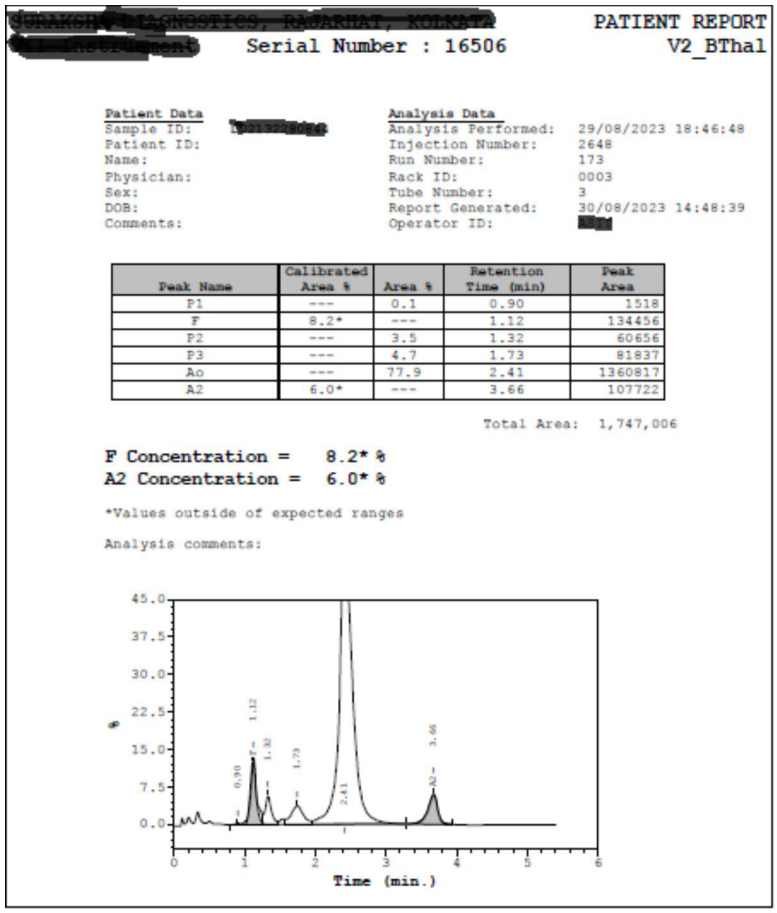


Fig 1: hemoglobin typing report of the baby

Table 1: Biochemical parameters of the patient:

Parameters	Value (Day 1)	Value (4 weeks)	Bio Ref. Interval
Total cholesterol	223mg/dl	286mg/dl	Desirable: < 200 mg/dl Borderline high: 200-239 mg/dl High: > or =240 mg/dl
Triglyceride	2010mg/dl	422mg/dl	Normal: < 150 mg/dlBorderline High: 150-199 mg/dl High: 200-499mg/dl Very High >500mg/dl
HDL	5 mg/dl	41 mg/dl	< 40mg/dl - Low 40-59 mg/dl- Optimum 60mg/dl - High
LDL	35	160	optimal: <100 mg/dl, Near optimal:100-129 mg/dl, Borderline high: 130-159 mg/dl, High: 160-189 mg/dl, Very high: >=190mg/dl

Continue.....

VLDL	183	84 mg/dl	< 40 mg/dl
UREA	*	8.6mg/dl	15-43mg/dl
CREATININE	*	0.16 mg/dl	0.19-0.49mg/dl
SODIUM	*	135 mEq/l	132-146 mEq/l
POTASSIUM	*	3.5 mEq/l	3.5-5.5 mEq/l
URIC ACID	*	3.2mg/dl	2-5mg/dl
TSH	*	0.815µIU/L	0.67–4.16 µIU/L
T3		1.84ng/ml	1.05–2.07ng/ml
T4		12.5µg/dl	5.5–12.1µg/dl
TOTAL BILIRUBIN	*	1.0mg/dl	0.3-1.2 mg/dL
SGOT	*	19U/L	8-60 U/L
SGPT	*	20 U/L	7-55 U/L
ALKALINE PHOSPHATASE	*	310 U/L	142-335 U/L
TOTAL PROTEIN	*	8.1g/dl	6.0-8.0 g/dL
ALBUMIN	*	4.7g/dl	3.8-5.4 g/dL

Discussion

Hemoglobinopathies are the commonest inherited disorder in India out of which Beta thalassemia has always been a concern considering the burden on the healthcare system of the country. Data on Prevalence of Beta thalassemia amongst different ethnic groups in India has been scarce. Literatures have shown that the prevalence of β-thal trait in Central India ranges between 1.4 and 3.4%, whereas 0.94% β-Thalassemia Major was reported among the anemic patients screened. In South India, however, the prevalence of β-thal trait was found to be between 8.50 and 37.90% and β-Thalassemia Major was between 2.30 and 7.47%. Northern and Western India have shown a higher thalassemic burden while in Eastern India, data have showna higher burden of β-thal trait (0.00-30.50%), β-Thalassemia Major (0.36-13.20%) amongst tribal populations than nontribal populations mostly due to the prevalence of endogamy or consanguinity in marriage [3]

Considering the huge burden of the disease on the society, it has been extremely essential to reach out to the patients and prevent any health complication that may affect the survival. Beta thalassemia Major has been found to be associated with Reversible Hypertriglyceridemia which has been evidenced in several literatures as hypertriglyceridemia–thalassemia syndrome. However, literatures on Beta thal trait patients have been found not to show association much with reversible hypertriglyceridemia comparable to normal population.

However, in our case we revealed a very high triglyceride in the patient's sample which interfered with the biochemical analysis of other parameters like HDL, LDL, VLDL, urea, creatinine, Thyroid profile , electrolytes , liver function tests. Lipemia causes interference in measurement by several mechanisms, non-specific interactions by Lipoproteins can interfere with antigen-antibody reaction by blocking binding sites on antibodies even with antibodies bound to a solid surface resulting into falsely elevated or falsely decreased result depending on the nature of interaction. [4] Not only that, in grossly lipemic sample where the proportion of lipid phase increases up to 25% (over 17 mmol/L of triglycerides), analytes distributed in the aqueous part of the sample (i.e. electrolytes), accounts for only 75% of the sample. Thus, Methods like indirectpotentiometry, measuring concentration of electrolytes in the total plasma volume (including the lipid phase), will report falsely

decreased concentration of electrolytes because of the high dilution prior to analysis. Multiplying the obtained result after the measurement to the full plasma volume, will provide an erroneous electrolyte concentration. [5] Not only that

Lipoprotein particles in the sample can absorb light, the intensity of which is inversely proportional to the wavelength and decreases from 300 to 700 nm, with no specific absorption peaks. Thus, the highest absorbance being in the lowest wavelengths of the spectra, methods using lower wavelengths are more affected by lipemia. Methods for assays like ALT, AST, using reaction NAD(P)+ ↔ NAD(P)H + H+ as an indicator reaction (the change of absorbance measured at 340 nm,) for determining concentration or activity of the analyte, are mostly interfered by lipemia. [5]

Not only the interference, literatures have shown increasing hyperlipidemia (particularly hypertriglyceridemia) is associated with increased hemolysis which may be attributed to the mechanism of increased lipid concentrations altering the composition of the erythrocyte membrane, causing to increased erythrocyte fragility, followed by leakage of cellular content such as hemoglobin which happens overwhelmingly while sample collection due to sheering stress through needles & gel pores.

Malnutrition is known to contribute in causing hypertriglyceridemia, mechanism behind being release of interferons, TNF alpha and other cytokines associated with wasting syndromes. This needs to be taken into account considering the socioeconomic status of our population.[6]

While Hypertriglyceridemia in thalassemia trait being reversible, care should be taken to prevent persistent hypertriglyceridemia which may cause long-term complications with increased risk of atherosclerosis and acute pancreatitis. Thus, our case points towards increased necessity for beta thalassemia trait patients as well to undergo routine investigations alike beta thalassemia major patients for prevention of increased burden of diseases due to deranged lipid profile.

Conclusion

As hypertriglyceridemia in beta thalassemia is reversible, care should be taken to prevent persistent hypertriglyceridemia which increases chance of atherosclerosis and pancreatitis

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Review Article

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Understanding the Pattern of Fatalities during Extreme Heat Waves: A Comprehensive Analysis of Hot Summer-Related Deaths

Karen Harshitha

Assistant Professor, Department of Forensic Medicine and Toxicology, Vydehi Institute of Medical Sciences and Research Institute, Bangalore.

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Abstract

There is widening data gaps in heatwave deaths in India amidst record-breaking temperatures. Heat related morbidities and mortalities are poorly defined and identified in a developing country that is bearing the onslaught of extreme heat waves that worsen every summer. Discrepancies are highlighted between data reported by various agencies regarding heat-related fatalities, raising concerns about the accuracy and consistency of information. The guidelines and policies that are in place to deal with this emergency are not adequate in comparison to the severity of the issue at hand.

Clinicians and medical officers who declare death and perform postmortem examination are not fully sensitized as to the importance of certifying an illness or death to be consequent to effects of heat waves.

Further, the lack of research into the corelation between crime and temperature in an Indian context tend to severely handicap the implementation of administrative and governing policies due to lack of knowledge. Such policies can abate the crime sprees that tend to increase during heat waves.

This article comprehensively aims to describe and elucidate the pattern of mortalities and morbidities that occur during extreme heat waves and hopes to inspire further research into the same to better understand and combat the effects of such avoidable fatalities.

Keywords: Heat- related deaths, Heat wave effects, Patterns of heat wave effects.

Introduction

India is facing one of the hottest summers this year in comparison to the last few years According to the Indian Meteorological Department, in the plains, a heat wave is characterised by maximum temperatures reaching up to 40°C or more, while in coastal areas, it is when maximum temperatures reach 37°C or higher. In hilly regions, the threshold is set at 30°C or higher.

Deaths during these harsh conditions are worrisome as they are usually under reported or

Corresponding Author: Karen Harshitha, Assistant Professor, Department of Forensic Medicine and Toxicology, Vydehi Institute of Medical Sciences and Research Institute, Bangalore.

E-mail: dr.karenharshitha@gmail.com

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misdiagnosed. In 2022, total of 8,060 deaths in the country were reported due to causes attributable to forces of nature by the National Crime Records Bureau, India. 9.1% deaths were due to 'Heat/ Sun Stroke. They account for 730 deaths.[1] India registered 2,227 deaths due to the impact of extreme weather events in 2022 which was the fifth warmest year on record in the country since 1901 according to the 'Climate of India During 2022' report released by the Indian Meteorological Department. Thirty of those deaths were attributed to deaths due to heat wave.[2]A Swedish study conducted on the all-cause mortality and heat waves in 10 cities of India during 2018 -2019observed stronger associations between heatwaves and mortality with higher heatwave intensity. Further estimation was made by the researchers that around 1116 deaths annually (95 %CI, 861; 1361) were attributed to heatwaves.[3]

The discrepancies in reporting by these two Government agencies are shocking to say the least. How are the Government authorities determining these deaths? The deaths in India are registered in India under the rules of the Registration of Birth and death Act1969 which states that every birth and death must be reported. If a death has occurred at a medical institution, then the medical practitioner attending to the illness must issue a certificate or if the death has occurred anywhere else apart from a medical institution, then the medical practitioner who recently dealt with the illness must issue a medical certification of cause of death as per section 10.2 and 10.3 of the Act. These deaths as certified are statistical data that serve as information to the stakeholders concerned as to the public health issues prevalent at that period and place.

Ironically, many medical professionals do not attest to cause of death as a heat related death despite history furnished.

Discussion

Heat stroke is associated with high ambient temperatures and high humidity. Thermoregulatory mechanisms fail, sweating ceases and core body temperature rises. Rhythm abnormalities in the heart, disseminated intravascular coagulation, necrosis of the skeletal muscles and heart muscles may occur. [4] Hyperthermia or dysregulated temperature balance of the body is more often seen in the summer months in particularly hot environments, and is more common in those with less medical reserve such as the young, elderly, and those with severe medical conditions such as significant heart disease. In fact, a considerable number of heat-related deaths occurring during a heat wave will not be solely from hyperthermia but will result from heat stress fatally exacerbating underlying significant medical disease.[4]

Heatstroke is defined by a body temperature above 40.6 degrees Celsius, associated with mental abnormalities like delirium, convulsions, or coma, caused by overexposure to environmental heat, excessive ethanol intake[6-8], and is characterized pathophysiologically by a systemic inflammatory response determined by the heat, with subsequent multi organ failure. A less severe form of heatstroke is heat exhaustion, characterized by cardiovascular manifestations[9]. Heat-derived lung damage, such as pulmonary oedema, and acute respiratory distress syndrome, combined with the high rates of people with pre-existing respiratory conditions, and increased pulmonary stress due to heat-related hyperventilation and elevated air pollution during heatwaves, is accountable for the second highest source of mortality and morbidity during heatwaves, following cardiovascular disease. Exposure to extreme heat is also associated with acute kidney injury, adverse pregnancy outcomes, mental health impacts, and increase in non-accidental and injury-related deaths.[10]

Physio-pathologically heatstroke has four main types of effects: acute physiological changes, cytotoxic effects, generalized inflammatory response, and oxidative damage. In an elevated temperature environment circulatory flow is redirected towards the skeletal muscle and skin, to dissipate heat; if concomitant conditions affecting the cardiocirculatory system or insufficient hydration are present, acute cardiogenic shock may occur leading to complications in brain functions from structural damage resulting in stroke, arterial hypotension, multi organ ischemia. Etc, with subsequent increased levels of neurotransmitters in the body. [11-19].

Main cause of death in heatstroke is multi-organ dysfunction, with cerebropathy, acute respiratory

distress syndrome (ARDS), dissolution of skeletal muscle, acute renal failure, cardiac insufficiency, hepatic injury, or hematopenia, (especially thrombocytopenia- decrease in blood cells such as platelets) pancreatic damage, or haemorrhagic diseases [20]

In summary, the signs and symptoms associated with heat related morbidity such as fever, sweating, nausea, dizziness, cramps, excessive thirst, headache, general weakness, lack of energy, mental confusion, purposeless movements, restlessness, staggering gait, hypotension, arrythmia etc. tend to mimic other morbidity states such as cardiovascular diseases, cerebrovascular accidents or acute kidney injury which are, as already mentioned above, complications because of the heat stroke or hyperthermia. The medical professionals attending to those exhibiting these signs and symptoms rarely consider the diagnosis of hyperthermia or heat disorders owing to the lack of awareness or enough diagnostic evidence to come to the conclusion.

The role of extreme heat in causing a death is difficult to determine. While laboratory tests can detect organ damage resulting from heat stroke, and a combination of tests can assess the impact of hyperthermia (high body temperature) on the central nervous system, no single test can definitively identify extreme heat as the cause of death.

The suspected cases of heat related deaths which do undergo postmortem examination are again wrought by uncertainty in terms of diagnosis due to the non-specificity of the findings. The determination of pre-terminal or terminal body temperatures are challenging and at most times unavailable. The diagnosis of hyperthermia typically relies on investigating the scene, understanding the circumstances of death, and reasonably excluding alternative causes of death.

A document issued from the Ministry of Health and Family welfare in collaboration with the National centre for Disease control in 2021 lays down guidelines for identifying and categorizing heat-related deaths. The postmortem findings in heat related deaths based on this document mentionspetechiae or larger haemorrhages in the skin with slippage or petechial haemorrhages over the surface of the lungs, heart, and serosal surfaces. Right-sided cardiac dilatation, subendocardial haemorrhage of the left ventricle, visceral congestion (particularly in the lungs and the brain), and petechial haemorrhages in the thymus, the perifollicular area of the spleen, and lymph nodes are also noted.

The above findings are seen in victims who have survived heat stroke for less than 12 hours. Longer duration of survival i.e.,>12-24 hours exhibitpulmonary oedema of lung with diffuse alveolar damage (ARDS) with other signs of clotting abnormalities in the pulmonary blood vesels. The other finding of importanceis pale and oedematous skeletal muscles. Ancillary investigations such as histopathological examination are necessary in view of the nondescript gross appearance on postmortem.[21]

The specimens that are ideal for collection are skeletal muscles, bowel loops, kidneys, heart, brain and in certain cases liver, pancreas, and spleen. Some of the pathognomicmicroscopic findings are focal necrosis, variation in muscle fiber diameter of skeletal muscles, oedema with or without petechial haemorrhages in the gut, more prominent on the mucosal than on the serosa layer, and on the iliac and colic regions than on the stomach. Rhabdomyolysis resulting in acute tubular injury in the kidneys, focal necrosis of heart muscles and fibrin clot in vessels if there is onset of Disseminated intravascular coagulation (clotting abnormality) in the heart are also visualised. Brain oedema with progressive degeneration of nerve cells are seen in the brain. Significant findings in other organs are congestion and centrilobular necrosis in liver, acute pancreatitis, and microhaemorrhages in adrenal medulla.[21]

Lab diagnosis is also a crucial tool of exclusion to rule out heat related deaths. Increased vitreous sodium and chloride, increased postmortem serum and pericardial fluid creatinine, increased urine myoglobin are seen as a consequence of dehydration and skeletal muscle damage.[21]

It is unfortunate though that not many forensic pathologists or medical professionals in India are open to diagnosing death due to heat stroke or complications of heat disorders as a cause of death. International Classification of Diseases for Mortality

and Morbidity Statistics, 11th Revision, has even codified diseases and deaths that are heat related. Heat stroke (NF01.0), Heat syncope (NF01.1), Heat exhaustion due to fluid depletion (NF01.2), Heat fatigue, transient (NF01.3), Other specified effects of heat (NF01.Y), Effects of heat, unspecified (NF01.Z) are the descriptions and codes given officially to the effects of heat that can be utilised to certify heat-related deaths.[22]The lack of sensitization and misjudgement of the certifying doctors is hiding the true number of Indians dying due to extreme heat. It is extremely challenging for climate scientists, to investigate the connection between heat waves and heat stroke/mortality without access to the data that can emerge from proper reporting of deaths caused due to effects of heat.

Another aspect of fatalities during extreme temperatures is in terms of crime related deaths. During extreme heat, it is no surprise that one tends to feel more irritable and aggressive than in cold weather. The "heat hypothesis" states that hot temperatures increase aggressive motivation and (under some conditions) aggressive behaviour. [23] The expression of violent behaviour is shaped by both individual and societal characteristics, yet the impact of environmental factors remains less comprehended. A 14year old study conducted by the Division of Environmental Health Sciences, University of Minnesota School of Public Health, Minneapolis, USA on the association between temperature and violent behaviour across 436 U.S. countiesestimated that a 10 °C increase in daily temperature or daily departure from long-term normal temperatures were associated with 11.92% (95% PI: 11.57, 12.27) and 10.37% (95% PI: 10.05, 10.69) increase in the risk of violent crime, respectively.[24]

Jinming Hu et al, in a similar study on the corelation between crime and temperature exhaustively applied the box-plot method and linear regression to explore the correlation between temperature residuals and crime residuals. The results showed that more than half of the crime types have similar seasonal cycles (approximately 1 year) to that of temperature. Moreover, the daily residual analyses show that temperature residuals have a positive correlation with assault and robbery residuals in all cities, whose average slopes are more than 0.1.[25]It is overreaching to apply these study results on a global scale as they are limited to developed countries like the United States that are well equipped to deal with the severities of the temperature. Countries like India that are still developing, though acclimated to the tropical temperatures are incompetent to weather the vagaries of global warming and greenhouse effect. In the context of global warming, the world is likely to see an increase in crime in the years to come, if effective crime prevention measures and further developments in environmental governance are not implemented.

There is a dearth of Indian literature in terms of correlation between crime and temperature. However, this prompts for urgent future research in this area if the current trends and future predictions based on scientific models of the oncoming environmental temperature rises are to be believed.

Conclusion

The disastrous consequences of the human intervention into the natural order are very apparent in the famine of the natural resources we as a humanity are facing along with the human-caused natural disasters that are reported every other day. The rise in atmospheric temperatures resulting from global warming is one such manufactured disaster. The deaths ensuing as a result of this phenomenon is however, sadly ignored, under reported and poorly dealt with by the authorities especially in a developing country like India. The portentous effects of such ignorance can only mean poorly implemented environmental governance policies causing more damage and loss of life. "Take urgent action to combat climate change and its impacts" is the Sustainable Development Goal 13 set by the Department of Economic and Social Affairs of United Nations to combat climate change. India is a signatory to the Paris Agreement, which aims to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to limit it to 1.5 degrees Celsius. India ratified the agreement on October 2, 2016.As a signatory, India is obligated to take steps to reduce its greenhouse gas emissions and implement measures to adapt to the impacts of climate change. How can change be implemented if the effects of climate related extreme weather events such as heat related deaths are not adequately identified or reported?

Efforts to address heat-related deaths in India include early warning systems, public health campaigns, provision of cooling centers, and urban planning strategies aimed at reducing heat exposure in cities. However, there is a continued need for coordinated action at the local, national, and international levels to mitigate the impacts of extreme heat on public health in India. Indian Meteorological Department collaborates with governmental agencies, disaster management authorities, healthcare institutions, and other relevant stakeholders to develop strategies for heatwave preparedness, response, and management. Mandatory reporting of suspected heat wave deaths by the primary and tertiary health centres to the concerned public health authorities must by ensured.

Enhanced community engagement and the integration of long-term climate projections into Heat Action Plans (HAPs) are vital components of a comprehensive and adaptive approach to combat and alleviate the impacts of extreme heat. By fostering collaboration with stakeholders for decision making and embracing future climate insights, HAPs can enhance their responsiveness, effectiveness, and sustainability in safeguarding communities against the threats of heat waves in a changing climate landscape.

Adequate budget allocation is undoubtedly crucial for implementing measures such as establishing cooling centers, providing access to clean drinking water, improving urban planning to relieve urban heat island effects, and enhancing healthcare infrastructure to deal with heat-related illnesses. Policymakers must incorporate burdens associated with heat waves into their planning and decision-making processes to ensure effective prioritization of public health interventions addressing present and future health risks linked to heatwaves in India,.

The effectiveness of budgeting also depends on how efficiently the allocated funds are utilized and whether they are directed towards comprehensive heatwave management strategies. Transparency, accountability, and stakeholder collaboration are essential to ensure that budget allocations translate into tangible actions that effectively mitigate the impacts of heatwaves. Legal framework establishment to formulate clear legal guidelines foisting accountability and holding the stakeholders and authorities answerable for their roles in HAP execution is the need of the hour.

Furthermore, research by the Environmental protection agencies and the concerned authorities regarding all aspects of morbidity and mortalities due to extreme heat waves not excluding crime related deaths is the need for the hour. Researchers need to take stock of the vacuum of literature and studies related to this topic in the Indian context and strive to elicit the data that encourages further research and academic enquiry thus compelling the policy makers to enact enhanced lifesaving and environment-improving measures.

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Conflict of Interest: NIL

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Review Article

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Silver Diamine Fluoride: Overcoming the Traditional Drill and Fill Technique in Children

Nitika Naryal[1], Vinay Bhardwaj[2], Shailee Fotedar[3], Arun Singh Thakur[4], Shelja Vashisth[5],

[1]MDS 2nd YEAR, Post-graduate Student, [2]MDS, Professor& Head, [3]MDS, Professor (Designated), [4,5]Assistant Professor (Designated), Department of Public Health Dentistry, H.P. Government Dental College & Hospital, Shimla.

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Abstract

Dental caries is a chronic, bacterial, multi-factorial dynamic process and remains a significant public health problem in children. The treatment of dental caries can be very challenging for the dentist especially in young children. Silver Diamine Fluoride (SDF) offers a non-invasive alternative for managing dental caries in children, revolutionizing traditional drill and fill technique. Its unique properties, including antimicrobial activity, remineralization potential, and desensitizing effects, make it a versatile and effective agent for addressing carious lesions and improving oral health outcomes. Plenty of clinical evidence is available including many in-vivo and in-vitro studies that have demonstrated the successful use of SDF in preventive and curative aspects of clinical dentistry. While SDF offers significant benefits, dental professionals should carefully weigh the potential risks and benefits and adhere to recommended protocols to ensure safe and effective use. With the ongoing research and advancements in SDF, it continues to hold promise as a key component of preventive and restorative dentistry strategies aimed at improving oral health and reducing the burden of dental caries worldwide.

Keywords: Dental caries, Oral health, Minimally Intervention Dentistry, Silver Diamine Fluoride, SMART, Pediatric dentistry, Drill and fill technique, Non-invasive treatment.

Introduction

Dental caries is a chronic, bacterial, multi-factorial dynamic process. An individual is never free of caries as mineralization and re-mineralization is always occurring side by side. It is only when the net mineral loss is more than mineral gain, caries is evident clinically.[1] Dental caries remains a significant public health problem in children. By early 1990, a completely new approach of non-operative management of dental caries was introduced which led to the development of a new term "Minimal treatment" given by Mount which was later elaborated and published as "Minimal Intervention Dentistry" by Dawson and Makinson.

Corresponding Author: Nitika Naryal, PG Student, Dept. of Public Health Dentistry, H.P. Govt. Dental College & Hospital, Shimla.

E-mail: nikiesunvij01@gmail.com

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The Minimal Intervention Dentistry (MID) is a more acceptable alternative to the traditional drill and fill technique of dental caries management in children. MID focuses at maintenance of sound tooth structure using non-invasive techniques, that has replaced the conventional methods.[2]

The treatment of dental caries can be very challenging for the dentist especially in young children with limited adaptive ability, that will require highly developed skills of the dentist and high cost of instrumentation as well. Arresting Caries Treatment (ACT) which has been proposed in the recent years to manage the untreated dental caries in children.[3] Numerous innovative approaches and treatment modalities utilizing various silver-based products for managing dental caries in primary dentition have been introduced in dentistry, ranging from the traditional technique where the carious tissue is removed completely on the one hand and, on the other hand is a minimally invasive approach where the carious lesion is not removed at all or removed selectively.[4]

Silver Diamine Fluoride (SDF) though not new, has made its way to a wealthy list of fluoride-based caries-preventive agents, which basically aims at controlling the activity of microorganisms present in the biofilm on the tooth and lesion surface that remains the root cause for the progression of dental caries.[5] Silver diamine fluoride Modified Atraumatic Restorative Technique (SMART) is a special approach that combines the caries-arresting ability of the SDF and the ability of a well-placed and well-maintained high viscosity Glass Ionomer Cement (GIC) restoration to effectively seal the carious lesion, which ultimately leads to remineralization of the demineralized dentine (affected dentine). The limited co-operation of the children pertaining to their age, behaviour and disabilities makes this approach quite practical and beneficial to the dentist in arresting the advancement of an active carious lesion, which allows the dentist to buy time for more definitive treatment alternative until the child grows older. Ultimately helping the apprehensive child to cope with the dental treatment and at the same time instils a positive attitude in the child and as well as in his/her parents towards dentistry.[6] Such treatment methods can be implemented at community level regularly to halt the progression of dental caries to reduce its burden.

The present review is an evidence-based understanding of the use of SDF in Minimal Intervention Dentistry to manage dental caries in children and provides a comprehensive overview of its composition, mechanism of action, efficacy and safety, and its clinical significance based on the published literature.

Silver Diamine Fluoride

Silver diamine fluoride (SDF) has emerged as a promising topical agent in Minimal Intervention Dentistry due to its non-invasive nature, cost-effectiveness and unique properties in preventing and arresting caries.[6]

SDF was first developed by Yamaga et al. at Osaka University in Japan in the 1960s. It was primarily used as a cavity liner to protect the tooth's pulp and reduce tooth sensitivity. In the 1990s and early 2000s, researchers began conducting clinical trials to investigate the efficacy and safety of silver diamine fluoride for caries management and discovered promising results, demonstrating its ability to halt the progression of cavities, particularly in primary teeth.[7] In the United States, SDF received clearance from the U.S. Food and Drug Administration (FDA) in August 2014 for using it as a desensitizing agent. However, it was widely adopted by dentists during the 2020s and they began to use it off-label to arrest caries without the need for cavity preparation. This was particularly beneficial for young children, elderly patients, and individuals with dental anxiety. Its ease of application and cost-effectiveness further contributed to its widespread adoption. Over time, dental associations and organizations including the American Dental Association (ADA) began to recognize the potential of silver diamine fluoride in caries management. In 2021, the World Health Organization (WHO) recognized SDF as an "Essential Medicine" to treat caries. Guidelines were developed for its use in various settings, including pediatric dentistry, geriatric dentistry, and public health programs targeting underserved populations.[8]

SDF is a colorless alkaline solution that contains silver ions, fluoride ions, and ammonia, in a liquid base of water which works synergistically to inhibit

the progression of cavities by remineralizing tooth structure and reducing bacterial activity. The typical composition of commercially available silver diamine fluoride solutions is as follows: Silver Nitrate ($AgNO_3$) – It is highly soluble in water and dissociates into silver ions (Ag^+) and nitrate ions (NO_3^-) when dissolved. Silver ions are believed to play a significant role in the antimicrobial properties of silver diamine fluoride; Ammonium Fluoride (NH_4F) – Ammonium fluoride serves as the source of fluoride in SDF. Fluoride ions are well-known for their ability to remineralize tooth structure and inhibit the progression of dental caries by promoting the formation of fluorapatite, a more acid-resistant form of tooth enamel; Water (H_2O) – Water is the solvent used to dissolve silver nitrate and ammonium fluoride and form SDF solution. It serves as the carrier for the active ingredients and facilitates their application to the tooth surface. Additionally, some commercial preparations may contain other minor components or stabilizers to enhance shelf-life or improve application properties.[9]

A wide range of concentrations (w/v) of SDF are available that varies depending on the manufacturer and formulation including 10%, 12%, 30%, and 38%. [9] Out of these the best efficacy is obtained with 38% SDF.[11] Studies have found that post-application of 38% SDF, *Streptococcus mutans* levels reduced about 95% in 24 hours in saliva with highest reduction of about 99.95% was observed after 30 days.[12] A high variability regarding SDF application protocol was observed i.e. from annual to bi-annually or no second application at all.Yasmi and Richard in their study have mentioned that biannual application is more effective that annual application, though for children with poor oral hygiene, the frequency of application can be increased from annual to semiannually to reduce the caries rate.[13]In India, SDF is commonly available in 38% (w/v) concentration in a 5ml bottle under various brand names such as Caries Stop, Dengen caries arrest, Fagamin, and e-SDF.[9]

The mechanism of action of SDF involves several processes that contribute to its effectiveness in preventing and arresting dental caries. The primary mechanisms of action of SDF include: Antimicrobial Activity[13] – Silver ions (Ag^+) have potent antimicrobial properties as they disrupt the cell membrane of the bacteria, inhibit bacterial enzyme function, promote dextran induced agglutination and interfere with bacterial DNA replication, ultimately leading to the death or inhibition of cariogenic bacteria such as *Streptococcus mutans* that helps to control and prevent the progression of dental caries; Inhibition of Matrix Metalloproteinases[12]– 38% SDF has an inhibitory effect on MMP-2, MMP-8 and MMP-9 and helps in arresting caries progression; Remineralization[14] – Fluoride ions penetrates up to 50-100 microns in dentin, interact with hydroxyapatite crystals and forms calcium fluoride (reservoir for fluorapatite) and fluorhydroxyapatite that prevent decalcification of dentin and enhances its remineralization; Chemical Plugging of dentinal tubules[15] – Silver ions released from SDF can interact with the organic matrix of dentin and form insoluble silver salts, that obturates the dentinal tubules, preventing acid invasion and diffusion. The silver ions also effectively reduce *Streptococcus mutans* in tubules due to the oligomeric action; pH Modulation[16] – SDF can modulate the pH of the oral environment by neutralizing acids produced by cariogenic bacteria. By raising the pH and buffering acidic conditions, SDF helps to create a less favorable environment for bacterial growth and acid demineralization of tooth enamel. These properties make SDF a valuable tool for managing dental caries, particularly in population with limited accessibility to dental care or in cases where traditional restorative treatment may not be immediately feasible. Overall, the multifaceted mechanism of action of SDF makes it a versatile and effective agent for preventing, controlling, and treating dental caries in various clinical settings.[17]

SDF has specific indications and contraindications for its use in dental practice. SDF is primarily indicated for the prevention, arrest, or treatment of active carious lesion, particularly in cases of primary teeth, teeth with limited access to restorative treatment, anxiety-prone patients, elderly patients, individuals with a high risk of tooth decay such as those with poor oral hygiene, young children, individuals with special needs, individuals with limited access to dental care, or certain medical conditions; and to alleviate tooth hypersensitivity. The various contraindications

include individuals with a known allergy or sensitivity to silver metal; ulcerative gingivitis or stomatitis due to the potential for increased discomfort or irritation; pulp and peri-radicular diseases or deep carious lesions that require immediate conventional treatment; anterior teeth as SDF causes staining of the tooth surface and can compromise the esthetic appearance. Dental professionals need to conduct a thorough examination, including clinical and radiographic assessments, to evaluate the extent and severity of dental caries before deciding on SDF application. Additionally, patient education are essential aspect of the decision-making process and informed consent/assent should also be obtained before proceeding with the application.[16]

The SMART approach involves several steps to ensure effective and safe treatment (Figure 1). A general outline of the steps involved in the application of SDF as per the SMART approach is as follows: Firstly, isolate the tooth using cotton rolls, dental dams, or other isolation techniques and ensure moisture control. A barrier is also formed by applying petroleum jelly on the perioral area to prevent staining. Then clean the tooth surface using a toothbrush or cotton swab to remove debris, plaque, and biofilm followed by drying thoroughly with an air syringe or cotton pellet to ensure optimal adhesion of the SDF solution. Secondly, scrub the SDF solution gently and evenly onto the affected tooth surface using a microbrush or applicator tip so that all areas of the carious lesion are covered. After application, the SDF solution is allowed to remain in contact with the tooth surface for 1-3 minutes. Lastly, when a well arrested shiny dark lesion is visible, the tooth is restored with a high-viscosity Glass Ionomer cement restoration.[6]

The patient is provided with post-treatment instructions, including recommendations for oral hygiene, dietary habits, and avoiding eating or drinking for a specified period after treatment. If necessary, additional applications of SDF may be performed during follow-up visits to maintain the effectiveness of treatment and prevent the recurrence of dental caries. The frequency of application of SDF ranges from a single application or annual application or twice per year to three times per year.[6]

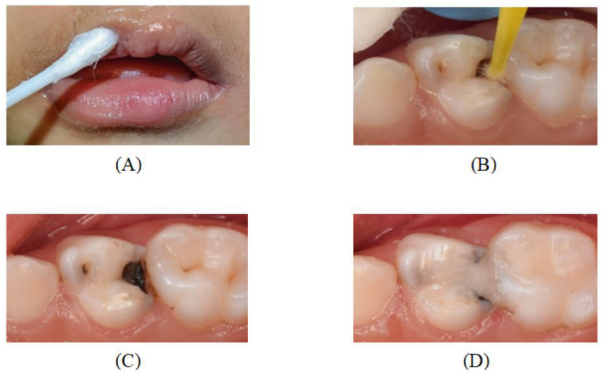


Figure 1: Illustrating the step by step application process of SDF. (A) Application of petroleum jelly to create a barrier. (B) Scrubbing SDF using a micro applicator tip on carious lesion. (C) Arrested shiny dark lesion. (D) Glass ionomer restoration post SDF application.

SDF is biocompatible with oral tissues, including enamel and dentin. Studies have demonstrated that SDF is well-tolerated when applied topically to teeth and does not typically cause significant adverse reactions or tissue damage when used appropriately. Despite its effectiveness in caries management and biocompatible nature, silver diamine fluoride can cause some adverse effects, particularly when applied inappropriately or in high concentrations. These may include dark staining of tooth surface or soft tissue such as gingiva, lips, or mucous membrane; mild irritation or discomfort if contact with soft tissues andallergic reactions to SDF that may present as itching, rash, or other signs of hypersensitivity.[18]

In addition to potential adverse effects, there are several safety considerations associated with the use of SDF that is, it is toxic if ingested in large quantities. Therefore, dentists should take precautions to minimize the risk of ingestion by instructing patients to avoid swallowing saliva during SDF application. Moreover, dental professionals should use appropriate personal protective equipment (PPE) when handling and applying SDF.[18]

Discussion

Various invasive and non-invasive techniques for the prevention and treatment of dental caries in children are available. Using fluoridated toothpaste is the most abundant and widespread of all and is available Over-the-counter (OTC). Other methods

include pit and fissure sealants, fluoride varnishes, hall crown technique, and conventional management of carious lesions that include elimination of caries surgically followed by replacement of tooth structure with a suitable restorative material. The interest of researchers and clinicians has emerged recently and has centered around SDF due to some of its unique features that include: ease and simplicity of use, affordability of material, minimal requirement of specialized training, less chair-side time and most importantly its minimally invasive approach.[19]

The impact of Silver Diamine Fluoride (SDF) has been well known for many years, but it is only now that its hypothesized role as a "Caries Bullet" due to its caries detecting, arresting, and preventing capability is investigated in detail for its effectiveness in managing dental caries in children majorly in primary dentition. This hypothesized role is said to be derived from the combined effect of silver salt that stimulates the sclerotic or calcified dentin formation, silver nitrate's germicidal potential and the ability of fluoride to reduce the decay.[20,21,22,23,24]

Many in-vivo and in-vitro studies that have demonstrated the successful use of SDF in preventive and curative aspects of clinical dentistry. Initial clinical reports of in-vitro studies and in-vivo studies suggested that SDF may be effective in controlling dental caries. [7,25,26,27] Results of clinical trials on suggested that SDF was substantially more effective than fluoride varnish or water in both arresting and preventing caries.[28] Another clinical trial indicated that for both primary teeth and permanent molars, SDF was beneficial.[29,30]

According to the available literature, SDF can be of great help in treatments such as arresting and preventing active carious lesions that can be implemented regularly at the community level to halt the progression of the carious lesion and reduce the public health burden of dental caries. Such promising results with SDF have made it to be a safe, effective, efficient, and equitable caries-preventive agent that can be used to fulfill the oral health goals in terms of the WHO Millennium Development Goals for Health.[8]

Conclusion

Silver Diamine Fluoride (SDF) represents a transformative approach in modern dentistry for arresting, preventing, and managing dental caries, especially in apprehensive or anxiety-prone pediatric patients, offering a valuable alternative to the traditional drill and fill technique. Through its minimally invasive nature, SDF has the potential to revolutionize pediatric dentistry by shrinking the need for traumatic and invasive procedures, reducing patient discomfort, and improving treatment outcomes. SDF addresses the underlying causes of dental decay while preserving tooth structure and function by effectively arresting carious lesions due to its antibacterial and remineralizing properties. Moreover, SDF's simplicity of application, cost-effectiveness, and wide availability make it a practical solution for addressing childhood caries in diverse clinical settings.[17] As dental professionals increasingly recognize the benefits of SDF, its integration into clinical practice can enhance patient experiences, increase access to care, and promote preventive dentistry strategies. While SDF offers significant benefits, dental professionals should carefully weigh the potential risks and benefits and adhere to recommended protocols which includes careful patient selection, proper application techniques, and thorough follow-up to ensure its safe use and effective treatment outcomes.[16] Additionally, research into SDF continues, focusing on optimizing its application techniques, exploring its long-term effects, and developing alternative formulations to minimize its staining effects on teeth. Also, efforts are underway to expand its availability and accessibility in regions with high rates of dental caries and limited access to dental care. With the ongoing research and advancements in SDF, it continues to hold promise as a key component of preventive and restorative dentistry strategies aimed at improving oral health and reducing the burden of dental caries worldwide.[18]

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Review Article

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Medley of Fungal Infections, and developing Antifungal Resistance: Post COVID

Sudeep Saha[1], Rima Moni Doley[2], Udayan Borborah[3], Juhi Bora[1], Swadamshree Boro[1]

[1]PGT Medicine, [2]Associate Professor, [3]Registrar, Department of Medicine, Assam Medical College & Hospital, Dibrugarh, Assam.

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Abstract

The Covid 19 pandemic has brought a paradigm shift in the incidence of fungal infection. S COV 2 is an RNA virus that causes a serious infection and is associated with many adverse effects involving different organs and systems during its pathogenic cycle in human. Immunocompromised status due to Covid infection especially in vulnerable groups like the elderly and patients with many Co morbidities; and also due to systemic steroid usage in the treatment of the Covid 19 infection has increased the incidence of invasive fungal infection. The most often encountered invasive fungal infection in Covid 19 infected patients and post Covid period are seen due to mucormycosis, aspergillosis, candidiasis. Other infection which are also in increasing trend are caused by pneumocystis Jiroveci, Histoplasma Sp., Cryptococcus Sp. etc. We have made a systematic review from more than 20 articles to know about the most commonly encountered opportunistic fungal infection Post Covid 19 period, the shift in the epidemiology of this fungal infection from the Pre Covid-era, Clinical features, diagnosis and treatment. Also, we stressed about the anti-fungal resistance encountered in the commonly used drugs belonging to the azole group and ecchinocandins etc.

Key Words: Covid 19, fungal infection, aspergillosis, mucormycosis, invasive candidiasis, Voriconazole, isuvaconasole, posaconazole, amohotericin B.

Introduction

Fungal infections, also known as mycoses, have historically been one of the most overlooked diseases in medical history. Despite their prevalence and potential to cause inflammation, irritation, and discomfort, these conditions were often neglected by the medical profession. Today, fungal infections remain a significant medical concern, impacting nearly 1,000,000 individuals worldwide.[1] The emergence of the COVID-19 pandemic has further exacerbated this situation, as the viral respiratory disease increases the susceptibility of patients to potentially life-threatening secondary fungal infections, especially in intensive care units (ICUs). In COVID-19 sufferers, invasive fungal infections like invasive mycosis, aspergillosis, cryptococcosis, and Candida are more

Corresponding Author: Sudeep Saha, PGT Medicine, Department of Medicine, Assam Medical College & Hospital, Dibrugarh.

E-mail: drsaha.sudeep23@yahoo.com

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common. The prolonged hospitalization periods, along with conditions such as lymphopenia, leucopenia, and a systemic hyper-inflammatory reaction, create an environment conducive to fungal growth in COVID-19 patients. Essential antifungal treatments are required to mitigate the associated comorbidities and mortality caused by these fungal infections. However, the susceptibility of fungal species to antifungal treatments has decreased and become less predictable.[1]

Epidemiology

Over 2900 papers were identified through literature searches, and a meticulous analysis focused on 434 papers containing incidence, prevalence, or proportion data. The findings suggest that approximately 4.1% of the Indian population, an estimated 57,251,328 out of 13,19,400 individuals, suffer from serious fungal diseases. Notable prevalence figures (in million) include recurrent vulvovaginal candidiasis at 24.3, allergic bronchopulmonary aspergillosis at 2.0, tinea capitis in school-age children at 25, severe asthma with fungal sensitization at 1.36, chronic pulmonary aspergillosis at 1.74, and chronic fungal rhinosinusitis at 1.5. Additionally, the annual incidence rates of pneumocystis pneumonia (58,400), invasive aspergillosis (2,50,900), mucormycosis (1,95,000), esophageal candidiasis in HIV (2,60,000), candidiasis (1,80,000), fungal keratitis (10,17,100), and cryptococcal meningitis (11,500) were determined.[2]

A prospective observational study conducted at AIIMS, New Delhi, spanning from April 2017 to December 2018, aimed to investigate invasive fungal infections (IFI). The study involved 3300 patients suspected of IFI, with 253 in the population proven to have fungal infections. In this mixed cohort, invasive aspergillosis emerged as the most common IFI at 40.7% (103/253), followed by mucormycosis at 24.5% (62/253). These findings align with studies in the hematological patient population, but they contrast with reports where invasive candidiasis is identified as the most common IFI. Diabetes mellitus (23.7%) and hematological malignancies (19.8%) were prevalent predisposing conditions, with chronic kidney disease (CKD) at 34.4% and pulmonary manifestations at 30.8% among other predisposing factors.[3]

Shift of trend of fungal infection during Covid.

Numerous studies have indicated that individuals with COVID-19 are more prone to co-infections or superinfections. In January 2020, just before the global spread of COVID-19, Chen et al. reported a fungal coinfection rate of 2%, with 2 out of 99 patients being infected with Candida albicans and Candida glabrata.4 Yang et al. reported a higher rate of 5.17%, with three out of 52 patients being infected with Aspergillus flavus, Aspergillus fumigatus, or Candida albicans.[5]

Subsequently, in February 2020, Zhu et al. found that co-infection was present in 94.2% of COVID-19 patients, of which 91.8% had bacterial coinfections, including Streptococcus pneumonia, Klebsiella pneumonia, and Haemophilus influenza. Additionally, 23.3% of patients experienced fungal co-infections. Notably, patients with more severe COVID-19 illness exhibited a higher incidence of fungal coinfections, with rates of 23.3% for aspergillosis, 2.5% for mucormycosis, 0.8% for candida, and 0.4% for cryptococcosis.[6]

COVID-19-associated Pulmonary Aspergillosis (CAPA) necessitates long-term treatment in the intensive care unit (ICU) due to its high mortality rate.7 In France, 33% of COVID-19 patients in the ICU were affected by CAPA, while in Germany, it impacted up to 26% of patients.8,9 However, Kula et al. reported a lower prevalence of invasive mold disease from CAPA, approximately 2%, based on a systematic review of post-mortem studies involving autopsies of COVID-19 patients, highlighting the possibility of overdiagnosis of CAPA.[10]

Before the COVID-19 pandemic, the estimated prevalence of mucormycosis in India ranged from as low as 0.02 to 9.5 cases per 100,000 population. However, the country witnessed a concerning surge in the number of mucormycosis cases during the COVID-19 pandemic.

Classification of mycoses

Based on site it is classified into superficial, Subcutaneous or systemic (deep) mycoses.

Epidemiological it is classified into endemic and oppurtunistic[11].

Morphological it is classified into yeast which includes Candda, Cryptococcus, Trichosporon; mold which include Aspergillus, Mucor, dinorphic fungi which include Histoplasma coccidioses, Blastomyces.[11]

Superficial and cutaneous mycoses

This classification encompasses various infections and their corresponding causative agents: Black Piedra (Piedra Hortae), manifested by small firm black nodules involving the hair shaft[11]; White Piedra (Trichosporon Beigelii) which Presents with soft, friable, beige nodules at the distal ends of the hair shaft[11]; Pityriasis Versicolor (Malassezia Furfur) which is the most prevalent superficial mycosis, characterized by hyperpigmentation or hypopigmentation of the skin on the neck, shoulders, chest, and back. It involves the superficial keratin layer[11]; Tinea Nigra (Horta Werneckii). It presents with brown to black patches on the palms of hands and the soles of feet.[11]

Cutaneous mycoses can be classified as either dermatophytes or dermatomycoses. Dermatophytes which is caused by agents belonging to the genera Epidermophyton, Microsporum and Trichophyton[11] and Dermatomycoses refers to cutaneous infections caused by other fungi, with Candida species being the most common among them.[11]

Subcutaneous mycoses

Subcutaneous mycoses can be broadly categorized into three types: Chromoblastomycosis, Mycetoma, and Sporotrichosis. These conditions typically arise from the traumatic inoculation of etiological fungi into the subcutaneous skin.[11]

Chromoblastomycosis, presents with verrucous skin lesions. Common causes of which include Fonsecaea pedrosoi, Fonsecaea compacta, Cladosporium carrionii, and Phialophora verrucosa.[11]

Mycetoma is characterised by suppurative granulomatous subcutaneous mycosis. It involves the destruction of contiguous bone, tendon, and muscle, often accompanied by the presence of draining sinus tracts.[11] It is classified into eumycetoma and actinomycetoma. Pseudallescheria boydii is the most common cause of eumycetoma, while Nocardia brasiliensis is the most common cause of actinomycetoma.[11]

Sporotrichosis is caused by Sporothrix schenckii. Involves the subcutaneous tissue at the point of traumatic inoculation.[11]

In these subcutaneous mycoses, the clinical presentation varies, and histological examinations often reveal distinctive features such as muriform cells or copper penny bodies.[11]

Deep mycosis

Caused by primary pathogen and opportunistic pathogen. Primary establishes infection in normal host whereas opportunistic infection requires a compromised host to establish infection(Cancer, AIDS etc.[11]

Primary deep mycosis

Primary deep mycoses are characterized by asymptomatic or clinically mild infections that occur in normal, immunocompetent individuals. However, exposure to a high inoculation of organisms can lead to life-threatening progression or the reactivation of latent infections.[11]

An example of a primary deep mycosis is Coccidioidomycosis immitis. In this infection, the inhaled fungal spores are transformed into spherules in the lungs[11]. While most cases of Coccidioidomycosis are occult or mild, some patients may experience progressive pulmonary infection that can disseminate to the brain, bones, and other sites. Coccidioidomycosis meningitis, a severe manifestation, requires lifelong treatment due to its potentially life-threatening nature[11].

Primary pulmonary coccidioidomycosis typically manifests with symptoms such as fever, cough, pleuritic chest pain, night sweats, fatigue, and a lack of improvement with antibiotic treatment[11]. This condition arises from the inhalation of spores of Coccidioides immitis, leading to respiratory symptoms and systemic involvement[11].

Coccidioidal meningitis is primarily observed in immunosuppressed patients and those in the second or third trimester of pregnancy. Symptoms of coccidioidal meningitis include persistent headache, lethargy, and confusion. Immunocompromised individuals are particularly susceptible to severe forms of the infection[11].

Histoplasmosis, caused by the inhalation of conidia of Histoplasma capsulatum, can lead to life-threatening complications. Dissemination to the hilum and mediastinal lymph nodes, spleen, bone, and brain can occur[11]. The pathogenesis involves the intracellular growth of the pathogen within macrophages, triggering a granulomatous reaction in tissues. This can lead to reactivation and the dissemination of the fungus to other organs[11].

There are different types of histoplasmosis are Acute Pulmonary Histoplasmosis which involves initial respiratory symptoms[11], Chronic Cavitary Pulmonary Histoplasmosis which is typically seen in smokers with structural lung disease. Presents with productive cough, dyspnea, low-grade fever, night sweats, and weight loss[11]. Progressive Disseminated Histoplasmosis. It occurs in immunocompromised individuals and presents with shock and coagulopathy[11]. Fibrosing Mediastinitis, a rare complication involving fibrous tissue formation in the mediastinum[11].

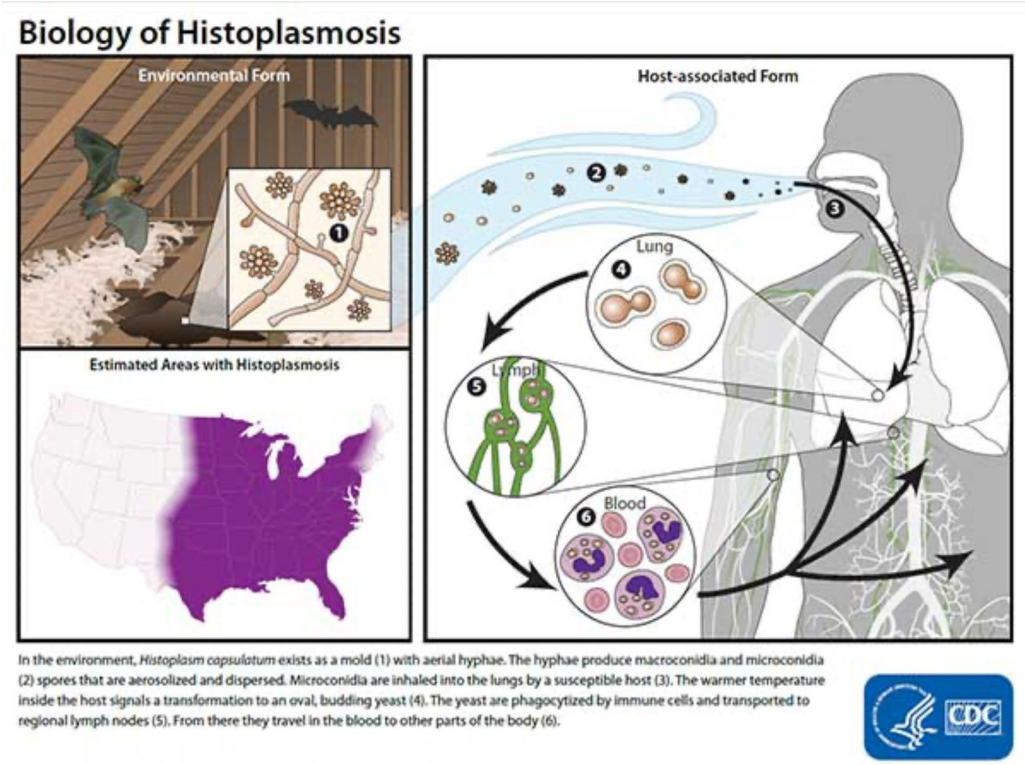


Fig 1: The epidemiology and pathogenesis of histoplasmosis[12]

Blastomycosis is a primary pulmonary infection caused by Blastomyces dermatitidis in the blastoconidial phase, leading to primary pulmonary infection[11]. The transmission occurs through the inhalation of conidia. Pulmonary blastomycosis can exhibit various clinical presentations, including asymptomatic cases or those presenting with flu-like symptoms, acute pneumonia, or chronic pneumonia.[11]

Notably, the severity of blastomycosis tends to increase in specific populations such as diabetics, immunosuppressed individuals, and those with multilobular pneumonia. Diabetics and immunocompromised individuals are particularly vulnerable to more severe manifestations of the infection, underscoring the importance of considering underlying health conditions when assessing the potential impact of blastomycosis[11].

Opportunistic fungal infection

Candida, with Candida albicans as the most common causative agent, is primarily recognized as the most prevalent opportunistic infection. The infection is classified into superficial and deep candidiasis.[11]

Superficial Candidiasis involves the epidermal and mucosal surfaces, affecting areas such as the oral cavity, pharynx, esophagus, intestine, urinary bladder, and vagina.[11]

Deep Candidiasis extends beyond superficial areas to involve internal organs like the kidneys, liver, heart, and others.[11]

Clinical manifestations of invasive candidiasis are often non-specific, with specific lesions observed in chronic disseminated candidiasis (CDC) and ocular candidiasis[11]. CDC is a form of invasive fungal infection that primarily affects the liver and spleen, typically manifesting as small, target-like abscesses referred to as "bull's-eyes"[11] These abscesses can be visualized through ultrasound, computed tomography, or magnetic resonance imaging. This condition is commonly observed in patients with acute leukemia undergoing chemotherapy[11].

Candida auris is an emerging pathogen causing nosocomial infections and is recognized as a significant global health concern. First identified as a novel Candida species in 2009, it has been isolated in 35 countries, excluding Antarctica. The clinical presentation of Candida auris infection resembles that of other Candida species[11]. It has been found in various body sites, leading to conditions such as bloodstream infections (fungemia), myocarditis, urinary tract infections, surgical wound infections, burn infections, skin abscesses (associated with catheter insertion), otitis, meningitis, and bone infections. The versatility of Candida auris in causing infections across diverse body sites underscores its clinical significance and challenges in treatment.[11]

Aspergillosis

Invasive aspergillosis is most commonly associated with the lungs and the paranasal sinuses. This fungal infection may extend beyond the lungs to disseminate into other organs such as the brain, kidneys, liver, heart, and bones. The types of aspergillosis include: Aspergilloma, Allergic Bronchopulmonary Aspergillosis (ABPA), Chronic Pulmonary Aspergillosis, Invasive Aspergillosis[11].

Zygomycosis

Zygomycosis, caused by fungi such as Rhizopus, Rhizomucor, Absidia, Mucor species, and other members of the zygomycete class, can result in invasive sinopulmonary infections. Mucormycosis, a particularly life-threatening form of zygomycosis, is associated with rhinocerebral syndrome.[11]

Major risk factors for mucormycosis include uncontrolled diabetes mellitus with or without ketoacidosis, as well as other forms of metabolic acidosis and immunocompromised conditions[11]. In cases of mucormycosis, the intracranial spread of the fungus is rapid and progressive. This spread can occur through direct extension across bone structures such as the cribriform plate/ethmoid or walls of the frontal and sphenoid sinuses. Additionally, angioinvasion of the walls of arteries and veins may occur, leading to microvascular thrombosis, occlusion, and infarction[11].



Fig 2: Clinical features of mucormycosis[13]

Mucormycosis affecting the bone marrow may facilitate fungal growth by damaging the endothelial lining of vessels, resulting in vascular insufficiency. This process can lead to bony necrosis and fungal osteomyelitis. The swift progression and potential complications of mucormycosis highlight the importance of early diagnosis and targeted intervention, especially in individuals with predisposing risk factors.[14]

Cryptococcosis

Cryptococcosis is indeed an opportunistic fungal infection that commonly affects individuals with compromised immune systems. The fungus responsible for cryptococcosis is Cryptococcus neoformans. While pneumonia and meningitis are two common manifestations, the infection can also affect other organs.[11]

Phaeohyphomycoses

Phaeohyphomycosis refers to infections caused by brown and black pigmented fungi, impacting the skin, superficial tissues, and even deeper organs like the brain. These infections are uncommon,

life-threatening, and typically occur in individuals with compromised immune systems. Early diagnosis and appropriate antifungal treatment, often involving surgery, are critical due to the severity of these infections.[15]

Hyalohyphomycosis

Hyalohyphomycosis is an infection caused by various saprophytic fungi characterized by hyaline hyphae elements. One example is Fusarium spp., known to infect immunocompromised patients, leading to conditions such as pneumonia, fungemia, and disseminated infection with associated cutaneous lesions. This type of infection is particularly prevalent in individuals with neutropenia, emphasizing the importance of understanding and managing these fungal infections, especially in immunocompromised populations.[15]

Pathogenesis

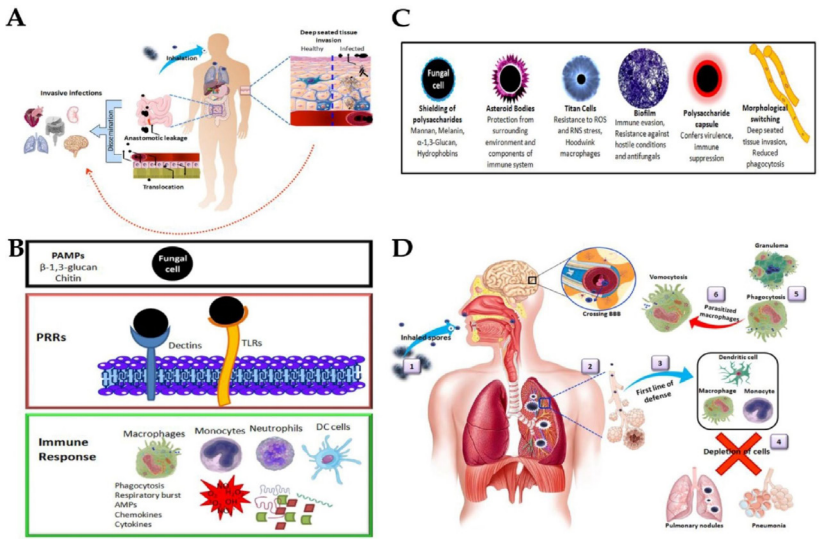


Fig 3: Pathogenesis of fungal infection[16]

A. Routes of invasion of fungal pathogens. B. Pathogen recognition and response in host immune system. C.Morphological modulation of fungal cells for immune evasion. D. Pulmonary transmission and pathogenesis of invasive fungal infections. 1. Inhalation of spores or conidia; 2. Entry into alveoli; 3. Eliciting first line of defense; 4. Depletion of phagocytic cells leads to disease progression as pulmonary nodules and pneumonia; 5. Macrophages phagocytise the fungal cells or encapsulate and form granuloma; 6. Fungal cells parasitize the macrophages that lead to vomocytosis of intact fungi and circulation into bloodstream and crossing blood brain barrier to cause systemic infections.[16]

Diagnosis

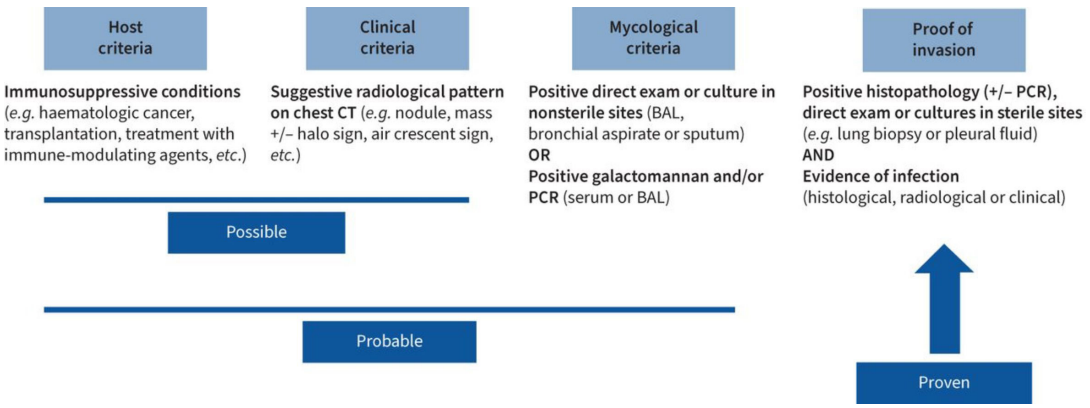


Fig. 4 Diagnosis of Invasive pulmonary aspergillosis[17]

Table 1: Characteristics of nonculture commercialised diagnostic tests for invasive pulmonary aspergillosis[17]

Target	Spectrum of detection	Type of sample
Galactomannan	All Aspergillus species (specific)#	Serum, BAL
(1→3)-β-d- Glucan	All Aspergillus species (not specific) +	Serum
***Aspergillus* DNA**	Most relevant Aspergillus species	BAL, other respiratory samples, serum
	Most relevant Aspergillus species,	
	Cyp 51 Amutations (L98H, TR34, T289A, Y121F)	
	Aspergillus fumigatus, Cyp51A mutations	
	(L98H, TR34)	
	Aspergillus species, Cyp51A (TR34, TR46)	

Treatment of Aspergillus infection

Three AF drug classes are currently licensed for the treatment of aspergillosis (table 3): the polyenes (amphotericin B formulations), the triazoles (voriconazole, posaconazole, isavuconazole, itraconazole) and the echinocandins (anidulafungin, caspofungin, micafungin)[17]

Therapeutic approaches

Invasive Pulmonary Aspergillosis *(IPA)*

AF therapy should be initiated promptly when IPA is suspected. When a bronchoscopy is planned, AF therapy should be started after the procedure whenever possible, but should not be delayed by more than 24 h. Triazoles (voriconazole, isavuconazole or posaconazole) should be privileged for proven or probable IPA and liposomal amphotericin B for possible IPA to ensure broad coverage including the Mucorales and azole-resistant *Aspergillus* species.[17]

Table 2: Treatment of invasive aspergillosis [18]

	Voriconazole	Isuvaconazole	Posaconasole	Liposomal amphotericin B	Caspofungin	Anidulafungin
Dosage	IV: 6mg/ kg Q12x 2, 4mg/kg Q12 starting Day 2 PO: 200mg Q12 h	IV: 200 mg Q8hrX 48hr 200mg daily starting day 3 PO: 200mg Q8 h for 48 hr, 200 mg daily starting Day 3	IV: 300mg Q12x 24 hr, 300mg daily starting Day 2 Delayed release: 300mg daily starting Day 2 Oral suspension: 200mg TID	IV: 3 mg/kg/ day	70mg daily on day1, 50 mg daily starting Day 2	200 mg daily on day 1, 100mg daiky on day 2

Chronic Pulmonary Aspergillosis

Oral triazoles are the cornerstone of CPA treatment. Itraconazole may be used as first-line therapy because of its low cost and good safety profile]. Voriconazole (or posaconazole) can be administered for more severe disease]. Isavuconazole can be used in case of toxicity or drug–drug interactions[17]. Patients with long-term triazole therapy should have regular dermatologic control (every 6 months) for the early detection of skin cancer. Echinocandin therapy may be considered in case of intolerance or resistance to triazoles]. Rezafungin (administered only once a week) or the novel oral beta-glucan synthase inhibitor ibrexafungerp may represent interesting alternative treatments.[17]

Candidiasis

Table 3: Tests approved for the diagnosis of invasive candidiasis.[19]

Test.	Diagnostic Time	Sensitivity Value		Specificity	Notes
Culture Testing	2-4 days	Positive	21-71%.	N/A	Allows susceptibility
T2Candida	3-5h	Positive	91%.	99%	Approved For detection of C. Albicans, C. Parasilopsis, C. Krusei, C. and C. glabrata
ß-D-glucan1h (Fungi tell).	≥80 ng/dl.	92%.	81%.		Can be positive other fungal Infection
ß-D-glucan + Procalcitonin	≥80ng/L 1h ng/mL.	<0.2	96%	98%	Can be positive in Other fungal Infection

Treatment of candidiasis[20]

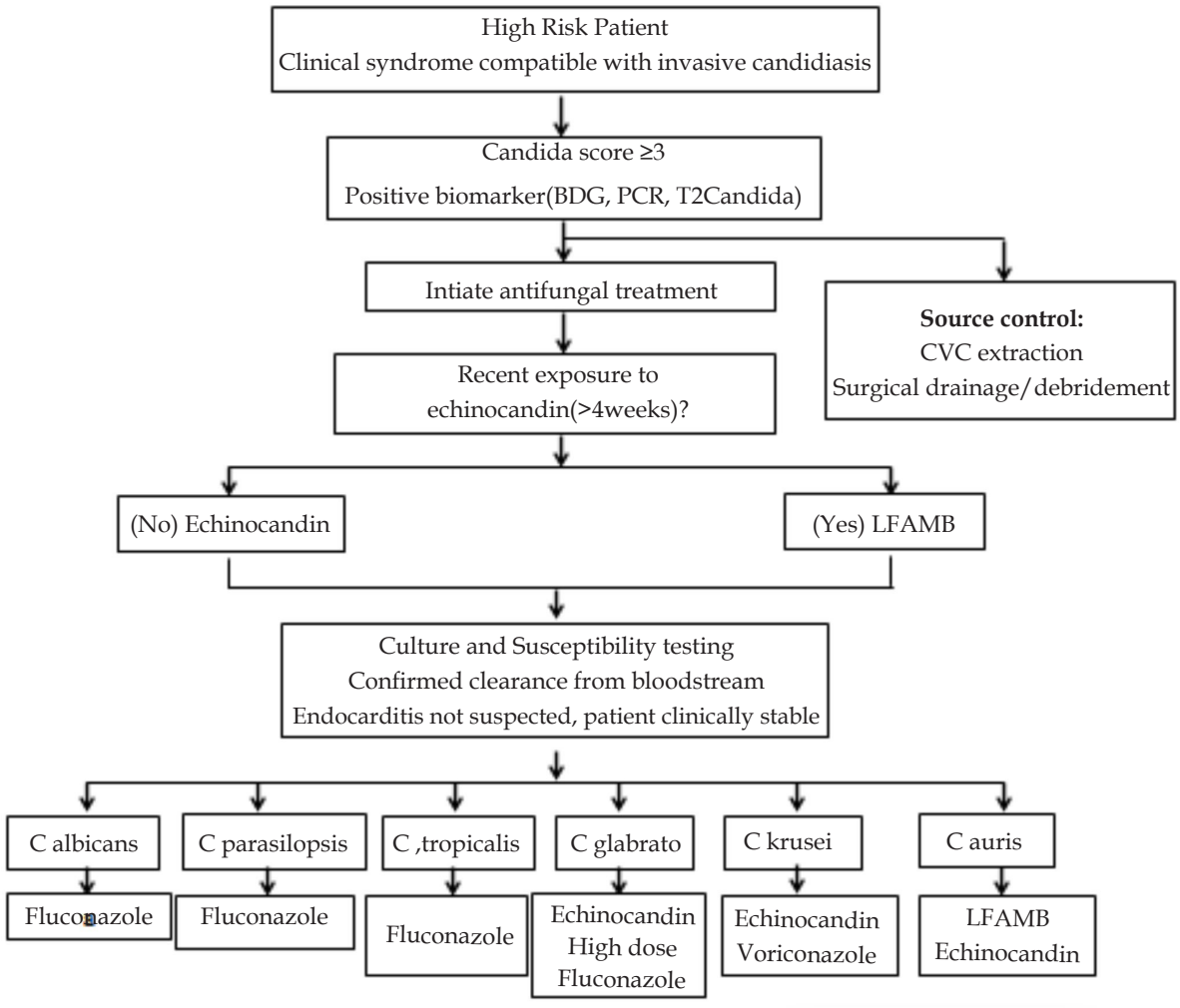


Table 4: Antifungal treatment and common adult dosage for Candidiasis.[21]

Treatment	Dosage
Fluconazole	Treating oral thrush is 50-100 mg once Daily for 7-14 days. The typical dose for Treating Vulvovaginal candidiasis is 150 Mg as a single dose.
Itraconazole	The typical dose for treating oral thrush is 200 mg once daily for 7-14 day. The typicalDose for treating Vulvovaginal candidiasis Is 100 mg twice daily for 7-14 Days.
Terbinafine	Treatment for Dermatophyte infections Caused by candida is 250 mg once daily.
Nystatin	Treatment for Dermatophyte infections 100,000 million units/g -1 million units/g Of cream or ointment applied to the Affected area noce or twice daily.

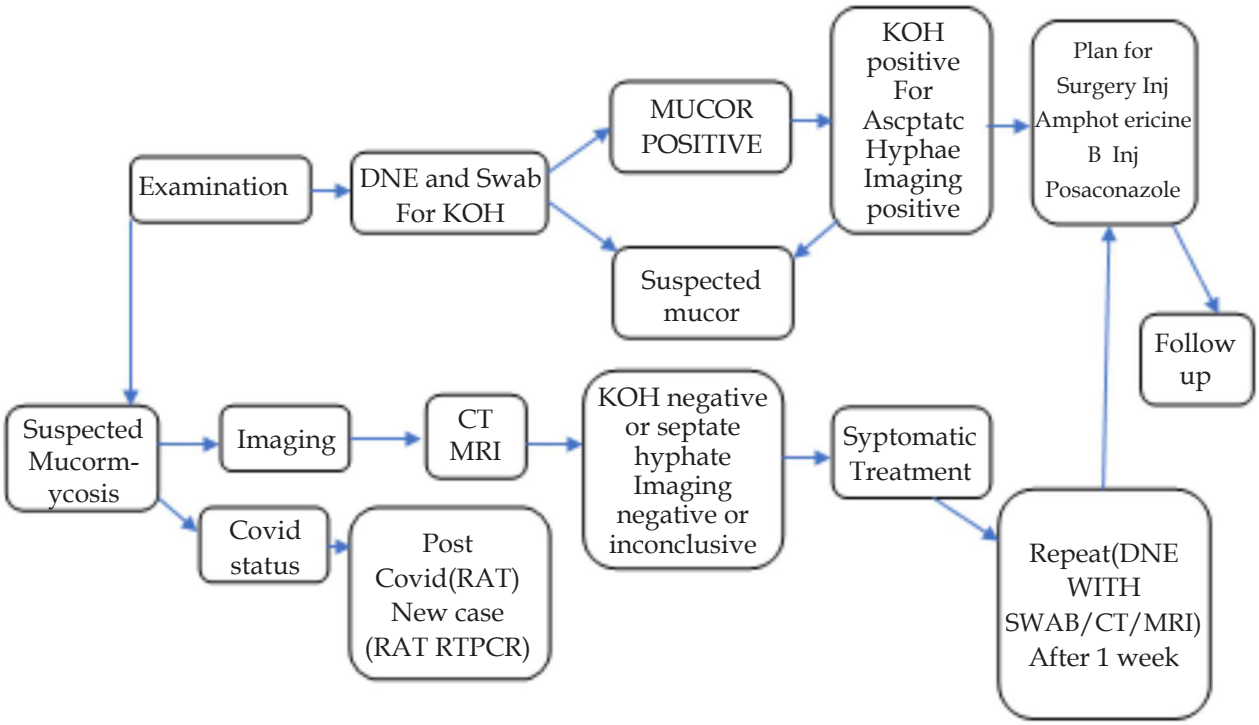
Table 5 : Therapeutic option for treatment of invasive candidiasis[22]

Therapy	Regimen	Comments
Primary Caspofungin	70mg as a loading dose, then 50mg/day	
Micafungin	100-150mg/day	No difference in clinical outcome between 100 and 150 mg/day
Anidulafungin	200mg as a loading dose f/b 100mg/day	
Liposomal amphotericin B	3mg/kg/day IV 400-800mg/day	Monitor renal function
Fluconazole		Increasing echinocandins are preferred for induction therapy
Voriconazole	6mg/kg Iv Q12hrx 2 doses followed by 4mg/kg IV Q12hr IV, oral therapy 200mg Q12hr	Therapeutic drug monitoring should be considered with dosage adjustment to keep trough concentration >1mg/l and 6mg/l

CoNsolodation therapy Fluconazole	400-800mg/day	Switch to fluconazole when patient is hemodynamically stable
Voriconazole	6mg/kg IV Q12 hr X2 doses, followed by 4 mg/kg Q12 IV; oral therapy 200mg Q12hr	Therapeutic drug monitoring should be considered with dosage adjustment to keep trough concentration >1mg/l and 6mg/l; Consider for patients with candida kruse I and candida glabrata

Mucormycosis

Diagnostic protocol[23]



The preliminary diagnostic tools used are DNE (diagnostic nasal endoscopy) with or without biopsy followed by nasal swab for KOH mount and the radiological investigations included CT scan and MRI.

MRI is the gold standard investigation for the diagnosis of Mucormycosis.

Table 6: Treatment of Mucormycosis[21]

Treatment	Dosage
Amphotericin B	1 mg/kg/day to 2 mg/kg/day. Amphotericin B can be given Intravenously (into a vein) or be given Formulation.
Isavuconazole	200 mg three times daily.
Posaconzole	The typical adult dose is 200 mg to 400 Mg once or twice daily.

Antifungal resistance

Currently, only a small number of antifungal drug types exist, so resistance can severely limit treatment options. Some types of fungi, like *Candida auris*, can become resistant to all the antifungal drugs normally used to treat these infections.[21]

Some species of fungi are naturally resistant to certain types of antifungal drugs. For example, the drug fluconazole does not work against infections caused by the fungus Aspergillus.[21]

Antifungal resistance is a complex process and depends on multiple host and microbial factors. Host immune status is a critical factor, as fungistatic drug must work synergistically to control and clear an infection. Patient with severe immune dysfunction are more likely to fail therapy, as the antifungal drug must combat the infection without the benefit of immune response. The presence of indwelling catheters, artificial heart valves, and other surgical devices may also contribute to refractory infections, as the infecting organisms attach to these objects and establish biofilms that resist drug action. [21]

Hülle cells, a thick-walled fungal spore formation seen in association with itraconazole resistance aspergillosis case as shown in Figure 3. The formation of Hülle cells in association with antifungal resistance needs to be investigated further to confirm the resistance character of the spores to corresponding antifungal.[21]

Improve treatment outcomes. Antifungal medications are often prescribed for extended periods of time, leading to the selection of resistant strains of fungi. Hülle cells, a thick-walled fungal spore formation seen in association with itraconazole resistance aspergillosis case as shown in Figure 3. The formation of Hülle cells in association with antifungal resistance needs to be investigated further to confirm the resistance character of the spores to corresponding antifungal.[21]

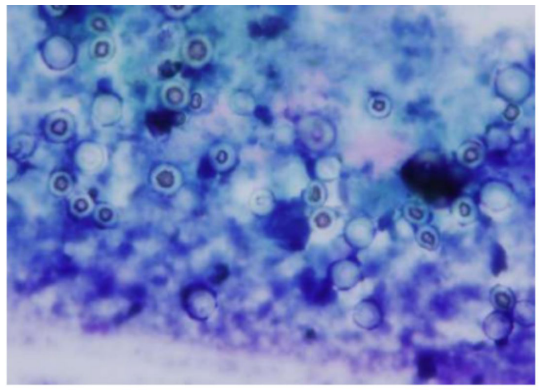


Fig. 5: Imprint cytology from Aspergilloma after the treatment with itraconazole showed numerous Hülle cells with thick protective wall formation.[21]

Voriconazole, isavuconazole, and Posaconazole are commonly used for the treatment of invasive fungal infections, including infections caused by Aspergillus species. Studies have shown that posaconazole, isavuconazole, and voriconazole have high potency against Aspergillus species and has demonstrated excellent in vitro activity against both itraconazole-sensitive and itraconazole-resistant strains. This suggests that posaconazole, isavuconazole, and voriconazole may be a better choice for the treatment of Aspergillus infections, especially in cases where itraconazole resistance is present. However, there have been reports of voriconazole resistance in some fungal species, including Aspergillus.[21]

Fluconazole is a widely used antifungal medication against Candidiasis, but like all antifungal agents, it can face resistance from certain strains of fungi. Fungal resistance to Fluconazole occurs when the fungal cells develop mechanisms to pump out the drug before it has a chance to act. This can result in reduced efficacy of fluconazole and a greater risk of fungal infections becoming more difficult to treat.[21]

Conclusion

The majority of the research referenced in the reference, along with additional epidemiological observations and case reports following the Covid-19 pandemic, demonstrate the significance

and burden of fungal infection that resulted from Covid-19 infection. Additionally, the likelihood of developing an opportunistic fungal infection was increased by a number of comorbidities, including diabetes, renal failure, increased use of corticosteroids and other medications, such as IL 6 inhibitors, cocktail therapy, and living in unhygienic conditions. Catheterization, mechanical ventilation, and other procedures can affect how various fungal infections present in COVID-19. Additionally, we have observed fungal invasion of the lung as well as fungal infection of the maxillofacial region as a result of mucormycosis, which presents with pain and a blackish discoloration, among other symptoms. It becomes crucial that patients see a health professional. Health care provider if he feels any pain in the maxillofacial area or any other symptoms listed in the study. It's also critical that health care providers recognize these symptoms and check for fungal infections in order to provide early intervention. For Post-Covid 19 patients, judicial use of different medications (drug stewardship) combined with rigorous adherence to personal and environmental hygiene can prevent fungal infection.

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Conflict of Interest: The authors declare no conflict of interest

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Original Article

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Prevalence of Vitamin D Deficiency in Northern Temperate Region of India

Abdul Ahad Wani[1], Abdul Baseer Qadri[2], Imran Rangraze[3], Aamir Shafi[4]

[1,4]Department of Internal Medicine, SKIMS Medical College, Bemina Jammu and Kashmir India, [2]Dr. Qadri's Hematology Center and Clinical Laboratory Srinagar Jammu and Kashmir India, [3]Department of Internal Medicine RAK medical and Health Sciences university UAE.

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Abstract

Background: Vitamin D plays an essential role in maintaining skeletal integrity and function among other health benefits. Vitamin D deficiency has a bearing not only on skeletal but also on extra-skeletal diseases. It plays a notable role in contributing to several leading causes of death including cardiovascular disease, cancers and diabetes. We sought the prevalence of vitamin D deficiency in Kashmir, a northern temperate region of India where it has been previously thought to be omnipresent.

Methods: This study was conducted across two tertiary care centers namely skims medical college hospital bemina Srinagar and Government medical college Srinagar wherein a total of 4895 patients were included among which 1936 were males and 2959 females. Samples were collected from April to November 2021.Vitamin D deficiency was defined as 25(OH) D concentration of <20 ng/ml. Vitamin D insufficiency was defined as 25(OH) D concentration of 20-30 ng/ml, sufficient Vitamin D level was defined as 25(OH) D concentration of 30 - 100 ng/ml and a risk of Vitamin D toxicity was defined as 25(OH) D concentration >100 ng/ml.

Results: Vitamin D deficiency was seen in 1635(33.4%) patients out of which 981(60%) were females and 654(40%) were males. A total of 543(11.09%) patients had severe Vitamin D deficiency out of which 370(68.1%) were females and 173(31.9%) were males. Insufficient Vitamin D levels were seen in 1364(27.86%) patients of which 797(58.4%) were females and 567(41.6%) were males.

Conclusion: Vitamin D deficiency is quiet prevalent in Kashmir valley and has been seen more commonly among the females. However it may not be as widely prevalent as has been previously observed in the region.

Keywords: Vitamin-D deficiency, calcium homeostasis, 25-hydroxy vitamin-D.

Introduction

Vitamin D plays an essential role in maintaining skeletal integrity, electrolyte reabsorption and immune system regulation among other health benefits. There are two types of physiologically important form vitamin D: cholecalciferol (D3) and

Corresponding Author: Aamir Shafi, Registrar Department of General medicine SKIMS MCH Srinagar Jammu and Kashmir India.

E-mail: amirshafi400@gmail.com

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ergocalciferol (D2). D3 is synthesized in the skin from 7-dehydrocholesterol in cell membranes upon exposure to UVB (290 – 320 nm) while D2 is plant and yeast derived exogenously by UV irradiation of ergosterol[1,2]. Vitamin D in the circulation is metabolized to 25-hydroxyvitamin D [25(OH)D] in the liver and further metabolized to the active metabolite 1,25-dihydroxyvitamin D [1,25(OH)2D] in the kidney. 25-hydroxyvitamin D [25(OH)D] is the major circulating metabolite of vitamin D. The concentration of 1,25(OH)2D is highly regulated by a variety of factors including serum parathyroid hormone and phosphorus levels [1,3].

The primary role of vitamin D has been considered to be the absorption of calcium from the intestine (i.e., calcium homeostasis in the body) and is necessary for skeletal health. Over the years it has become increasingly clear that vitamin D not only has a function in bones but it also significantly affects cell proliferation and differentiation[4]. Vitamin D deficiency has a bearing not only on skeletal but also on extra-skeletal diseases. Vitamin D deficiency has been linked with the increased risk of developing hypertension, diabetes, obesity and high triglyceride levels ultimately leading to increased cardiovascular mortality [5]. Some epidemiological evidence shows that vitamin D defieiency is associated with systemic lupus erythromatosus, rheumatoid arthritis and other autoimmune diseases [6-8]. Vitamin D deficiency plays a notable role in contributing to several leading causes of death including cardiovascular disease, cancers and diabetes.

Sun exposure alone is adequate for vitamin D sufficiency. However vitamin D deficiency is widely prevalent despite plentiful sunshine even in tropical countries like India. Low dietary vitamin D intake and poor exposure to sunlight are common causes of vitamin D deficiency in the general population. Skin pigmentation, clothing practices, latitude and season are some of the factors that influence the cutaneous photochemical synthesis of vitamin D in healthy individuals[9].

Prevalence rates of vitamin D deficiency defined as 25(OH)D <30 nmol/L (or 12 ng/ml) of 5.9% (US) [10], 7.4% (Canada) [11], and 13% (Europe) [12] have been reported. Estimates of the prevalence of 25(OH)D levels <50 nmol/L (or 20 ng/ml) have been reported as 24% (US), 37% (Canada), and 40% (Europe) [10-13]. Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent and other south Asian countries with the prevalence of 50-97% in the general population[14-18]. It has been observed in previous studies that vitamin D deficiency has a very high prevalence (83%) in apparently healthy adults in Kashmir[19].We conducted this cross sectional study in Kashmir valley, a temperate region situated in Northern India to assess the prevalence of vitamin D.

Methods

This study was conducted in a private diagnostic laboratory based in Kashmir located in the northern Indian union territory of Jammu and Kashmir. Because of its wide catchment area the laboratory receives patients from all over the valley. The study was conducted from April 2021 - November 2021. A total of 4895 patients were included among which were 1936 males and 2959 females. Patients included in the study were apparently healthy and residents of Kashmir valley and all patients had volunteered to be a part of the study. Vitamin D levels were assessed by electrochemilumine scence binding assay using cobas e immunoassay analyzer. Severe Vitamin D deficiency was defined as 25(OH) D concentration less than 12 ng/ml, Vitamin D deficiency was defined as 25(OH) D concentration of <20 ng/ml, suboptimal Vitamin D level was defined as 25(OH) D concentration of 20-30 ng/ml, sufficient Vitamin D level was defined as 25(OH) D concentration of 30 - 100 ng/ml and a risk of Vitamin D toxicity was defined as 25(OH) D concentration >100 ng/ml. The primary aim of our study was to determine the prevalence of vitamin D deficiency as per different age groups and gender in Kashmir North India.

Statistical methods

Statistical analysis was done by using SPSS software version 23. Chi square test was used to find the association between variables and correlation statistics was used. All values were discussed at 5% level of significance i.e. p value <0.05 was taken as significant.

Results

A total of 4895 patients who were residents of Kashmir valley participated in the study which

included 1936 males and 2959 females. Table 1 and figure 1 shows the distribution of patients by age and vitamin D levels respectively. 2496(51%) patients belonged to the age group 30-59 years, 769(15.7%) patients were in 0-14 age group, 725(14.8%) patients were in 15-29 years age group, 905(18.5%) were in 60 and above age group. Vitamin D deficiency was seen in 1635(33.4%) patients out of which 981(60%) were females and 654(40%) were males as shown in Table 2. 806(49.29%) out of 1635 patients having vitamin D deficiency were in the age group of 30-59 years. A total of 543(11.09%) patients had severe Vitamin D deficiency out of which 370(68.1%) were females and 173(31.9%) were males as shown in Table 2. 234(43.10%) patients in the age group 30-59 years had severe Vitamin D deficiency. Insufficient Vitamin D levels were seen in 1364(27.86%) patients out of which 797(58.4%) were females and 567(41.6%) were males. Sufficient Vitamin D levels were seen in 1834(37.46%) patients out of which 1147(62.5%) were females and 687(37.5%) were males. Vitamin D level >100 was seen in 62 patients out of which 34(54.8%) were females and 28(45.2%) were males. Table 3 shows gender distribution about Vitamin D levels. Table 4 shows correlation of vitamin D according to age with a significant p value.

Table 1: Distribution of Patients by Age and Vitamin D Levels.

Levels of Vitamin D		AGE				Total	χ2	p-value
		0-14	15-29	30-59	60+			
<12	N	104	144	234	61	543	170.15	0.001
	%	19.20%	26.50%	43.10%	11.20%	100.00%		
12—20	N	196	169	572	155	1092		
	%	17.90%	15.50%	52.40%	14.20%	100.00%		
21-30	N	211	192	733	228	1364		
	%	15.50%	14.10%	53.70%	16.70%	100.00%		
31-100	N	238	216	937	443	1834		
	%	13.00%	11.80%	51.10%	24.20%	100.00%		
>100	N	20	4	20	18	62		
	%	32.30%	6.50%	32.30%	29.00%	100.00%		
Total	N	769	725	2496	905	4895		
	%	15.70%	14.80%	51.00%	18.50%	100.00%		

Table 2: Distribution of Patients By Gender and Vitamin D Levels.

Levels of Vitamin D		Gender		Total	χ2	p-value
		Male	Female			
<12	n	173	370	543	29.16	0.001
	%	31.90%	68.10%	100.00%		
12—20	n	481	611	1092		
	%	44.00%	56.00%	100.00%		
21-30	n	567	797	1364		
	%	41.60%	58.40%	100.00%		
31-100	n	687	1147	1834		
	%	37.50%	62.50%	100.00%		
>100	n	28	34	62		
	%	45.20%	54.80%	100.00%		
Total	n	1936	2959	4895		
	%	39.60%	60.40%	100.00%		

Table 3: Distribution of Patients By Gender about Vitamin D.

Gender	N	Mean	Standard Deviation	Median	Minimum	Maximum
Female	2959	31	20	27	3	161
Male	1936	31	20	26	3	161
Total	4895	30.75	20.22	26	3	161

Table 4: Correlation of Vitamin D According to Age.

		Vitamin D
Age	ρ	.160**
	p	0.001
	n	4895

**** ρ: Spearman's rank correlation coefficient. n, total number of patients.**

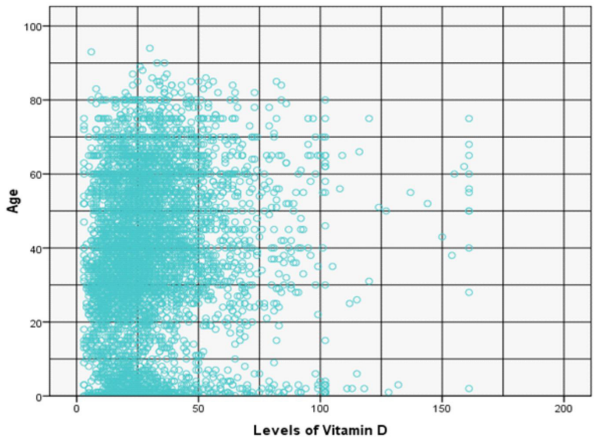


Fig. 1: Vitamin D Levels According to Age.

Discussion

Vitamin D is important for normal development and protection of bone. It has negative effects on calcium metabolism, osteoblastic activity, matrix ossification, bone remodeling and bone density [20]. Vitamin D deficiency is a common condition associated with many diseases including osteoporosis in the elderly, rickets in children, some cancers, cardiovascular diseases and diabetes mellitus [21, 22]. There is no consensus on the optimal serum 25(OH) D levels for bone health. The American Institute of Medicine (IOM) and American Geriatric Society recommend that serum 25(OH)D levels should be above 20 ng/mL and 30 ng/mL respectively to minimize the risk of falls and fractures [23-27].

It is estimated that approximately one billion people in the world suffer from vitamin D deficiency [28]. In the literature vitamin D status differs in several countries even in various regions of the same country. In America and Europe vitamin D deficiency was reported to be found in 40–100% of elderly men and women[28]. Prevalence rates of severe vitamin D deficiency defined as 25(OH)D <30 nmol/L (or 12 ng/ml), of 5.9% (US) [10], 7.4% (Canada) [11], and 13% (Europe) [12] have been reported. Prevalence of vitamin D deficiency is also much higher in Asia. A total of 30–50% of people in India, Lebanon, and Turkey [2] and also 45.2% of women in China were vitamin D deficient. Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent with the prevalence of 70-100% in the general population.

In our study Vitamin D deficiency was seen in 1635(33.4%) patients out of which 981(60%) were females and 654(40%) were males. 806(49.29%) out of 1635 patients having vitamin D deficiency were in the age group of 30-59 years. A total of 543(11.09%) patients had severe Vitamin D deficiency (Vitamin D <12 ng/ml) out of which 370(68.1%) were females and 173(31.9%) patients were males. Zargar et al[19] had previously in a hospital based study found a very high prevalence (83%) of vitamin D deficiency (defined as a serum 25 (OH) D concentration of <50 nmol/l) in apparently healthy adults from different walks of life. Our study included 4895 patients compared to their study which included 92 patients which may actually be the reason of the disparity in results between the two studies. Our study may actually represent the true prevalence of vitamin D deficiency in our population since it has much higher patient number.

In our study 654 (33.7%) out of total 1936 males and 981 (33.15%) out of total 2959 females had vitamin D deficiency which is again in contrast to that of the earlier study by Zargar et al. who found vitamin D deficiency in 76.6% males and 94.4% females. As prevalent as the deficiency of vitamin D may be the main source of vitamin D is sunlight to which our population is adequately exposed there may actually be no reason for a significant difference in vitamin d levels between the two genders.

In our study 33.4 % patients had vitamin D deficiency (<20 ng/ml) which included 60% females and 40% males. 11.09% of patients had severe vitamin D deficiency (<12 ng/ml) of which 68.1% were women and 31.9% were men. As for vitamin D insufficiency (20–30 ng/mL) it was found in 58.4% of women and 41.6% of men respectively.

Contrary to previous studies which have shown a predilection for vitamin D deficiency in elderly we found vitamin D deficiency more commonly in the adult age group (30-59 years) which may be due to the fact that there were a lesser number of patients enrolled in our study above the age of 60 years. Adding to it is the lack of exposure to sun in the predominantly indoor working class of subjects.

Conclusion

Vitamin D deficiency is quiet prevalent in our valley. However it may not be as widely prevalent as has been previously observed. Physician awareness is important and investigating patients before starting treatment is the ideal way forward.

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Conflicts of Interest: Authors declare no conflicts of interest exist.

Ethical Clearance: Date: 10/03/2021 Number: 78/SKIMSMCH/21

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Original Article

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Prevalence of Oral Cancer and OPMDs(Oral Potentially Malignant Disorders) in Patients Visiting a Tertiary Care Centre in West Bengal: A Cross-Sectional Study

Abhishek Ghosh[1], Rudra Prasad Chatterjee[2], Santanu Sen Roy[3], Sanjeet Kumar Das[4]

[1]MDS 3rd Year Post Graduate student in the Department of Oral & Maxillofacial Pathology, Guru Nanak Institute of Dental Sciences & Research, Kolkata, WB, [2]Reader, Department of Oral & Maxillofacial Pathology, Guru Nanak Institute of Dental Sciences & Research, Kolkata, WB, [3]Professor, Department of Public Health Dentistry, Guru Nanak Institute of Dental Sciences & Research, Kolkata, WB, [4]Reader, Department of Oral & Maxillofacial Pathology, Guru Nanak Institute of Dental Sciences & Research, Kolkata, WB.

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Abstract

Background: Oral Cancer is the 6th most common cancer in the world. Most of these oral cancers develop from pre-existing Oral potentially malignant disorders (OPMDs), previously known as pre-malignant lesions and conditions. The aim of this study was to investigate the prevalence & clinico-epidemiological parameters in patients with Oral Cancer and OPMDs visiting a tertiary care hospital.

Materials and Methods: This is a hospital based cross sectional study. The patients attending the outpatient department of this tertiary care hospital were selected after thorough clinical screening with a view to detect the presence OPMDs and OSCC. After obtaining written informed consent, all the details including habit history were recorded in a specially prepared clinical record sheet through active interrogation and proper clinical examination. This data were tabulated in the excel sheet to facilitate further statistical analysis.

Results: Fourth and fifth decades are the most prevalent age groups for development of Oral Cancer & OPMDs when considered together. OSMF was more prevalent in relatively younger age group of 20 to 29 years, with an increasing prevalence among women. All three forms of oral habits i.e. tobacco chewing, smoking and alcohol drinking are prevalent among males; whereas females have prevalent habit of smokeless tobacco. Cheek and tongue were the prevalent sites for development of lesions.

Conclusion: The study shows the association between OPMDs & oral cancer with various epidemiological and habit parameters along with relative prevalence; which may help the policy makers to identify the target population and frame appropriate preventive policies.

Key-words: Oral cancer, OPMDs, Precancer, Tobacco habits.

Corresponding Author: Abhishek Ghosh, MDS 3rd Year Post Graduate student in the Department of Oral & Maxillofacial Pathology, Guru Nanak Institute of Dental Sciences & Research, Kolkata, WB.

E-mail: abhishek09ghosh@gmail.com

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Introduction

WHO International Classification of Diseases defines *oral cancer* as a neoplasm arising in the lips, oral cavity, oropharynx, nasopharynx or hypopharynx. It is the 6th most common cancer in the world.[1,2] 90% of all oral malignancies are Oral squamous cell carcinomas (OSCC), with incidence rates of 12.8 and 7.5 per 1 lakh population in men and women respectively.[3,4]

Most of these oral cancers develop from pre-existing Oral potentially malignant disorders (OPMDs), previously known as pre-malignant lesions and conditions. WHO (2007) defined it as " the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date". Multiple disease processes fall under OPMDs of which Oral Leukoplakia(OLKP), Erythroplakia, Oral Sub-mucous Fibrosis (OSMF), Oral Lichen Planus (OLP) are important.[5,6]

Cross sectional studies are important in estimating the prevalence of a disease in the population and identifying high risk populations. The association between OPMDs & oral cancer with various epidemiological and habit parameters along with relative prevalence had been studied in various other states in India; but very few studies had been conducted in the state of West Bengal. Hence the objectives of this study was to record the clinico - epidemiological profile of the patients with OPMDs and OSCC visiting this tertiary care hospital and to evaluate the risk factors including the oral habits with respect to occurrence of the disease processes.

Methods

Study design: A hospital based cross-sectional study

Setting: The study was conducted in the Department of Oral and Maxillofacial Pathology of a tertiary care centre and Dental teaching institute during the period of January 2021 to May 2022. The entire study was accorded ethical clearance from the institute.

Selection of Study Subjects:

All the patients attending the outpatient department were screened clinically with a view to detect the presence OPMDs and OSCC on the basis of clinical guidelines laid down by Neville et al, [7]. Out of total number of 33,085 patients screened, one hundred and sixty six (166) patients either having OPMDs or OSCC were selected for the study. Informed consents were taken from the study subjects for participation. Due precautions and sterilization protocols were followed during the clinical examination of the patients to prevent any such contamination. The following inclusion and exclusion criteria were laid down.

Inclusion Criteria:

1. Patients above 12 years of age .
2. Patients having clinical signs of OPMDs or OSCC.

Exclusion Criteria:

1. Mentally retarded patients .
2. Individuals not willing to give consents to participate in the study.

Recording of Clinical Data:

After obtaining written informed consent, all the details were recorded in a specially prepared clinical record sheet through active interrogation and proper clinical examination. The demographic details, habit history of patients and clinical presentations were recorded, after prior calibration. This data were tabulated in the excel sheet to facilitate further statistical analysis to be performed.

Statistical Analysis:

The data was entered using MS Excel 2016. The data was analysed using IBM SPSS Statistics (Version 25). As the comparison was done between two groups and the distribution of data followed normalcy, parametric tests of significance (one way anova) was used.

Results

In the present study, analysis of a total number of 166 subjects with OSCC and OPMDs were performed after screening the patients attending the Out-Patient Department (OPD) during the period from January, 2021 to May, 2022. The sample population frame included 33,085 participants, among which 166 study subjects matched the eligibility criteria and were recruited for the study. The prevalence of the cases was calculated to be 0.5%.

Distribution of the Study Subjects According to Different Patho-physiological Conditions:

After careful clinical examination of 166 diseased subjects with OPMDs and Oral cancer, forty (24.1%) patients were provisionally diagnosed with

Leukoplakia, six (3.6%) with Erythroplakia, while forty four (26.5%) of them with Oral sub-mucous fibrosis, twenty eight (16.9%) with Oral Lichen Planus and forty eight (28.9%) with Oral cancer. Their presence in the study population was found to be significant. [Figure 1]

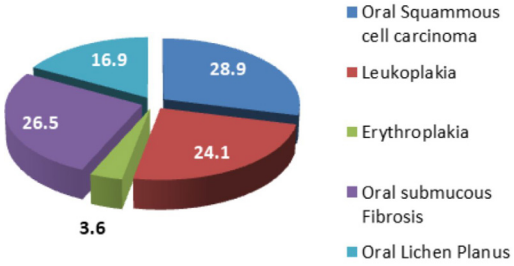


Fig 1: Pie chart representation showing distribution of study subjects according to different patho-physiological conditions

Distribution of Study Subjects According to Age:

While analyzing the clinico-epidemiological demographic parameters, all the study subjects were divided into SIX age groups. Group I: 20 to 29 years, Group II: >29 to 39 years, Group III: >39 to 49 years, Group IV: >49 to 59 years, Group V: >59 to 69 years and Group VI: >69 years. A considerable number of patients (28.3 %) were in the age group III (>39 to 49 years); followed by 22.3% in the age group II; 18.1 % in each group IV and V; 9% in age group I and lastly, 4.2% in age group VI. [Figure 2]

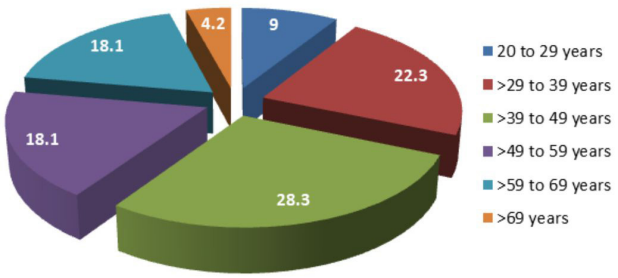


Fig 2: Pie chart representation of distribution of study subjects according to age

Distribution of Study Subjects According to Sex:

While analyzing the sex distribution among the study subjects, significant number of them were male (68.1 %) and 31.9% % were female. [Figure 3]

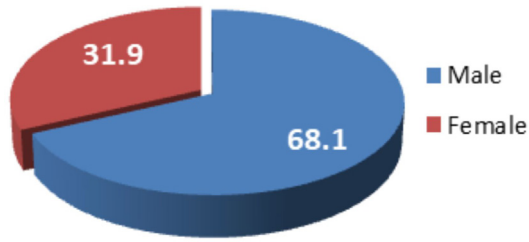


Fig 3: Pie chart representation of distribution of study subjects according to sex

Distribution of Study Subjects According to Place of Residence:

Places of residences of the study subjects revealed that significant number of 84.3% were urban population residing at Municipal areas and 15.7% were rural population from Panchayet areas.

Distribution of Study Subjects According to Religion:

Out of 166 number of study subjects, significant numbers were Hindus (91%) and only 9% were Muslims.

Distribution of Study Subjects According to Education:

Out of 166 number of study subjects, significant number of subjects were having secondary education (34.3%), graduates (24.7%), HS qualified (24.1%), followed by primary education (11.4%), illiteracy (4.8%) and Post-graduates (0.6%). [Table 1]

Table 1: Distribution of Study Subjects According to Education:

	Frequency	Percent	Chi Square	P Value
Illiterate	8	4.8	85.422	<0.0001*
Primary	19	11.4		
Secondary	57	34.3		
Higher secondary	40	24.1		
Graduate	41	24.7		
PG	1	0.6		
Total	166	100.0		

Distribution of Study Subjects According to Occupation:

Out of 166 number of study subjects, significant numbers were businessmen (42.8%), while others included housewives (24.1%), service holders (16.9%), followed by retired persons (7.8%), labourers (3.6%), students (1.8%) agriculture (1.2%), health workers (1.2%) and unemployed persons (0.6%). [Table 2]

Table 2: Distribution of Study Subjects According to Occupation:

	Frequency	Percent	Chi Square	P Value
Agriculture	2	1.2	248.651	<0.0001*
Business	71	42.8		
Health Worker	2	1.2		
Housewife	40	24.1		
Labourer	6	3.6		
Retired	13	7.8		
Service	28	16.9		
Student	3	1.8		
Unemployed	1	.6		
Total	166	100.0		

Distribution of Study Subjects According to Average Monthly Income:

On the basis of average monthly income, all the study subjects were divided into FIVE groups. Group I: Upto 5 thousand, Group II: 5-10 thousand, Group III: 11- 25 thousand, Group IV: above 25 thousand, and Group V: Nil. A considerable number of 27.9% were in income group III : 11-25 thousand; 24.2% had nil income; 23.6% were in income Group II: 5-10 thousand; followed by 18.2% from income Group I: Upto 5 thousand and only 9% from income Group IV: above 25 thousand [Table 3]

Table 3: Distribution of Study Subjects According to Average Monthly Income:

Average Monthly Income:	Study Subjects (N=166)
Group I: Upto 5 thousand	31 (18.2%)
Group II: 5-10 thousand	39 (23.6%)
Group III: 11- 25 thousand	46 (27.9%)
Group IV: above 25 thousand	10 (6%)
Group V: Nil	40 (24.2%)

Prevalence of Oral Habits Among Study Subjects:

While analyzing the oral habits among 113 male subjects, significant number of them (65.5%) had tobacco-chewing habit, considerable number of 52.2% had habit of tobacco smoking while 35.4% had habit of alcohol consumption. On the other hand, 66% of 53 female subjects had only tobacco chewing habit. None of the female subjects had habit of smoking and alcohol consumption. [Table 4]

Table 4: Prevalence of Oral Habits among Study Subjects

Habits	Male	Female
Smoking Tobacco	52.2%	--
Smokeless Tobacco	65.5%	66%
Alcohol consumption	35.4%	--

Prevalence of the Oral Cancer and OPMDs Based on Gender:

Oral Squamous Cell Carcinoma was more prevalent among men (31%) than women (24.5%). The same was evident for Leukoplakia men (31.9%) & women (7.5%), whereas Erythroplakia was noted more in women (5.7%) than men (2.7%). More or less equally prevalence of OSMF was noted among men (24.8%) and women (30.2%). OLP is more prevalent in women (32.1%) than in men (9.7%).[Table 5]

Table 5: Prevalence of the Oral Cancer and Opmds Based on Gender:

	Male		Female		Chi Square	P Value
	Frequency	Percent	Frequency	Percent		
Oral Squammous cell carcinoma	35	31.0	13	24.5	12.783	<0.0001*
Leukoplakia	36	31.9	4	7.5		
Erythroplakia	3	2.7	3	5.7		
Oral submucous Fibrosis	28	24.8	16	30.2		
Oral Lichen Planus	11	9.7	17	32.1		
Total	113	100.0	53	100.0		

Prevalence of the Oral Cancer and OPMDs Based on Age:

Oral Squamous Cell Carcinoma was mostly prevalent in the age group >59 to 69 years (53.3%) followed by age group >49 to 59 years (30%). More so, Erythroplakia was more prevalent in the same age group as OSCC (6.7%). In contrast, Leukoplakia mostly occurred in the much lower age group age group >29 to 39 years (32.4%) and >39 to 49 years (29.8%). OSMF too was prevalent in younger age group 20 to 29 years (66.7%) followed by >29 to 39 years (29.8%). Nearly equal distribution of OLP patients was noted in the age group >69 years (28.6%) and >49 to 59 years (26.7%). [Table 6]

Table 6: Prevalence of the Oral Cancer and OPMDs Based on Age:

	20-29 years		>29-39 years		>39-49 years		>49-59 years		>59-69 years		>69 years	
Lesions	N	%	N	%	N	%	N	%	N	%	N	%
Oral Squammous cell carcinoma	2	13.3	7	18.9	12	25.5	9	30.0	16	53.3	2	28.6
Leukoplakia	0	0	12	32.4	14	29.8	7	23.3	5	16.7	2	28.6
Erythroplakia	1	6.7	0	0	1	2.1	2	6.7	2	6.7	0	0
Oral submucous Fibrosis	10	66.7	13	35.1	13	27.7	4	13.3	3	10.0	1	14.3
Oral Lichen Planus	2	13.3	5	13.5	7	14.9	8	26.7	4	13.3	2	28.6
Total	15	100.0	37	100.0	47	100.0	30	100.0	30	100.0	7	100.0
Chi Square	2.27											
P Value	0.05*											

Prevalence of Oral Cancer and OPMDs Based on The Sites:

OSCC was most prevalent on the cheeks (79.2%) and tongue (31.3%) followed by retro-molar region (12.5%), gingiva (10.4%), palate (8.3%), lips (4.2%), floor of mouth (4.2%) and pharynx(2.1%). Leukoplakia predominantly affected cheeks (87.5%), tongue (10%), palate (10%) and lips (7.5%)., whereas Erythroplakic lesions were prevalent on cheeks and gingiva (16.7%). In case of OSMF, cheeks (86.4%), soft palate (15.9%), retro-molar area (4.5%) and pharyngeal wall (2.3%) were the prevalent sites of involvement. OLP was prevalent on cheeks (46.4%) & tongue (46.4%), followed by gingiva (17.9%), lips

(10.7%) and retro-molar areas (3.6%). Thus significant number of patients had involvement of cheek and tongue in Oral cancer and various OPMDs. (<0.0001) [Table 7]

Table 7: Prevalence of Oral Cancer and Opmds Based on the Sites:

Site	Lip		Cheek		Gingiva		Tongue		RMT		FOM		Palate		Pharynx	
Lesions	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Oral Squammous cell carcinoma	2	4.2	38	79.2	5	10.4	15	31.3	6	12.5	2	4.2	4	8.3	1	2.1
Leukoplakia	3	7.5	35	87.5	3	7.5	4	10.0	2	5.0	0	0	4	10.0	0	0
Erythroplakia			6	100.0	1	16.7			0	0	0	0	1	16.7	0	0
Oral submucous Fibrosis	3	6.8	38	86.4			6	13.6	2	4.5	0	0	7	15.9	1	2.3
Oral Lichen Planus	3	10.7	13	46.4	5	17.9	13	46.4	1	3.6	0	0	1	3.6	0	0
Chi Square	0.417		10.246		2.062		5.009		0.995		1.244		.830		.400	
P Value	0.796		<0.0001*		0.088		0.001*		0.412		.294		.508		.808	

*Statistically significant

Discussion

In this prospective study, after careful clinical examination of 166 study subjects, prevalent age distribution was found to be in the group of >39 to 49 years (28.3%) and >29 to 39 years (22.3%), followed by >59 to 69 years group (18.1%) and >69 years(18.1%) age group. Singh et al (2021) also reported that maximum disorders were seen in age group of 31–40 years, followed by 41–50 years, 21–30 years, 51–60 years, >60 years, 11–20 years and 0–10 years .[8] Thus, it can be put forward that fourth and fifth decades are the most prevalent age groups for development of Oral Cancer &OPMDs when considered together.

While considering the prevalence of oral cancer with respect to age, the present study recorded that OSCC was more prevalent in the age group >59 to 69 years (53.3%) followed by age group >49 to 59 years (30%). S P Khandekar et al (2006), in a study among 117 OSCC patients , reported the peak incidence to be in 5th & 6th decades of life.[9] Thus OSCC is more prevalent in the higher age range.

Leukoplakia was more prevalent in the age group >29 to 39 years (32.4%) and>39 to 49 years (29.8%) in this study. Bánóczy revealed the prevalence of leukoplakia in the age-group of 51-60 years. [10] While comparing with the earlier reports, this study clearly states that there is a tendency of decrease in age prevalence of Leukoplakia. This may be attributed to the increasing trend of tobacco habits from very tender age, specially among the school and college goers, due to peer pressure or other social factors.

This study revealed that OSMF was more prevalent in relatively younger age group 20 to 29 years (66.7%) followed by >29 to 39 years (29.8%). Study by Nigam et al (2013) reported that the maximum number of OSMF cases were seen in the age group of 3640 years.[11] Thus it can be put forward that those in the 20-40 years age group are more susceptible for development of OSMF.

While analyzing cases of Oral Lichen Planus, Regezi et al reported that most of the OLP patients were between 40 and 70 years of age; it is a disease of adulthood and children are rarely affected.[12] When compared with earlier reports, the present study indicates little higher age prevalence of OLP patients.

Considering the gender in all the age groups, men are more affected than women. In India, men are two to four times more affected than women due to the changes in the behavioral and lifestyle patterns. [3] The present study revealed that Oral Squamous Cell Carcinoma (OSCC) was more prevalent among men (31%) than women (24.5%). The same was evident for Leukoplakia, which was more prevalent in men (31.9%) than women (7.5%), whereas Erythroplakia was slightly more prevalent in women (5.7%) than men (2.7%). OSMF was more or less equally prevalent among

men (24.8%) and women (30.2%), with increasing trend among women. On the contrary, OLP is more prevalent in women (32.1%) than in men (9.7%).

M P Singh et al (2015) also reported prevalence of oral cancer amongst males (75.9%) than in females (24.1%).[13] While considering gender prevalence of OSMF, Sinor et al found male predominance in OSMF cases in India .[14] Nigam et al also reported Male- female ratio, in their study to be 6.9:1. [11] The increasing trend of OSMF among women, as evident in the present study, can be attributed to the tobacco chewing habits specially among housewives, in this part of the state.

The present study reported that 84.3% of the study subjects were urban and 15.7% were from rural areas. This may be due to the fact that the place of study is located in urban area and the main patient base was from the adjoining municipal areas. Apart from that, lack of awareness or negligence to seek medical attention by the rural population may also be considered.

While analyzing the distribution as per religion, 91% were Hindus and 9% were Muslims in the present study. P N Wahi, in a study in Agra district, noted no significant difference by religion except that the rate for Jains was found significantly higher than the average.[15] Location of this hospital in Hindu predominated area may be attributed to the prevalence of Hindus in this study.

Significant variation in the distribution of study population on the basis of educational status was noted in the present study. Out of total study subjects (166), significant number of them passed secondary exam (34.3%), graduation (24.7%) and HS (24.1%), followed by primary (11.4%), illiterates (4.8%) and Post-graduates (0.6%).

These findings were corroborated to earlier reports of Kaveri H et al (2018), who reported higher prevalence of OPMDs among Secondary passed study subjects (28.43%), followed by College (24.81%), illiterates (20.33%), primary (8.19%) and middle school (16.01%), lastly post-graduates (2.24%). [16] This may be attributed to the chance or probability of acquiring tobacco habits among the school goers from their peer groups.

Distribution of diseased study subjects (OSCC and OPMDs), on the basis of occupation was found to be significant. Considerable number of them were businessmen (42.8%), while other included housewives (24.1%), service holders (16.9%), retired persons (7.8%), labourers (3.6%), students (1.8%) agriculture (1.2%), health workers (1.2%) and unemployed persons (0.6%).

Kaveri H et al , in a recent study (2018) had reported higher prevalence of tobacco use among drivers, tailors, tea seller, cleaner and maid; followed by labourers, shopkeepers, homemakers, teachers and unemployed, with resultant increase in habit related lesions. [16]

Thus it may be put forward that individuals pursuing occupations with greater uncertainty and risks get easily indulged in tobacco habits, ultimately leading to increased prevalence of oral lesions. However the higher prevalence among housewives in the present study may be attributed to their frank admissions that they had acquired such habits from peer groups and often used when alone in their leisure times.

Distribution of study subjects as a whole showed a great variation on average monthly income. A considerable number(27.9%) were in income group of 11-25 thousands, i.e. middle class; 24.2% had no income i.e. mainly homemakers; 23.6% were in income group 5-10 thousands; followed by 18.2% from income group upto 5 thousands, i.e, lower economic class and only 9% from income group above 25 thousands.

These findings were in accordance with earlier reports of S P Khandekar et al (2006),who divided his study subjects into lower, middle and upper socio-economic status and found most cases belonging to lower middle and lower socio economic scales. Low socio-economic status may be a risk factor for poor oral hygiene, further increasing the risk of oral cancer in tobacco chewers.[9]

The present study critically analyzed the prevalence of oral habits based on different demographic parameters. It revealed that all three forms of oral habits i.e. tobacco chewing, smoking and alcohol drinking are prevalent among males; whereas females have prevalent habit of smokeless

tobacco. M P Singh et al (2016) had reported that OSSC was most prevalent in individuals having habit of smokeless tobacco (45%) followed by persons having habit of both smokeless and smoking tobacco (41.8%), together accounting for 86.8% prevalence. Conversely, in females, the frequency of OSCC was highest in smokeless tobacco users, accounting for 72.8% prevalence. [13] Kaveri et al (2018) also reported 92.8% prevalence of smokeless tobacco habits among males & only 7.2% among females. [16]

In south-east Asian countries, the OSCC location varies due to different forms of tobacco usage as reported by Prabhu et al. [17] Among European and US populations, tongue is the most common site accounting to nearly half of all oral cancers reported. But in Asian countries like India, buccal mucosa is the most common site of oral cancer as reported in Maharashtra, India, by Neha Gupta et al.(2016) [18]

While considering the OPMDs, Nevil et al & Axéll et al (1996) found that Leukoplakia was commonly present in buccal mucosa (76%), alveolar sulcus (19%), and tongue (5%) [19] Nigam et al had reported that the common sites involved in OSMF are buccal mucosa, labial mucosa, retro-molar pads, soft palate and floor of the mouth.[11] Thus it can be put forward that cheek and tongue are the prevalent sites for development of disease processes in OSCC and OPMDs when considered together.

The main limitation of this study is the possibility of information bias , mainly under-reporting of oral habits by female participants owing to associated social taboo. Moreover it appears that further in depth studies with more number of samples are required for proper association of clinico-epidemiological factors to the development of lesions.

Conclusion

This study showed the distribution of Oral cancer and OPMDs on different clinic-epidemiological parameters. It revealed that there was an increasing trend of Gutkha use among both sexes; along with increasing incidences of OSMF among women. Distribution on the basis of educational background warrant the probability of acquiring tobacco habits among the school goers from their peer groups. The appropriate authorities may be approached to include book chapters on tobacco ill effects, as well as organize seminars regarding it. Ban on sale of tobacco products should be imposed strictly in the vicinity of the schools. Due to changing patterns in the prevalence of oral habits and mucosal lesions, it is necessary to conduct further surveys to understand the psycho-social aspects and devise effective control and prevention strategies.

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Original Article

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D-dimer a Clue for Severe Dengue / Dengue Shock Syndrome, An Observational Study

Aniket Khaladkar[1], Suvarna Patil[2], Amey Paranjape[3], Pravin Jagtap[1], Balaji Asole[1], Bishav Singh[1], Ajit Nandoskar[4]

[1]Post Graduate Student, Department of Medicine, BKL Walawalkar Hospital and Rural Medical College, Sawarde, Taluka-Chiplun, District-Ratnagiri, Maharashtra, India, [2]Professor, Department of Medicine, BKL Walawalkar Hospital and Rural Medical College, Sawarde, Taluka-Chiplun, District-Ratnagiri, Maharashtra, India, [3]Associate Professor, Department of Respiratory Medicine, BKL Walawalkar Hospital and Rural Medical College, Sawarde, Taluka-Chiplun, District-Ratnagiri, Maharashtra, India, [4]Biochemist, Regional Centre for Adolescent Health and Nutrition, BKL Walawalkar Hospital and Rural Medical College, Sawarde, Taluka-Chiplun, District-Ratnagiri, Maharashtra, India.

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Abstract

Background: Dengue fever, a mosquito-borne viral infection, poses a significant public health threat, particularly in tropical and subtropical regions. Caused by five serotypes of the dengue virus (DENV-1 to DENV-5), it affects an estimated 400 million people annually, leading to severe illness in around 96 million [1]. Dengue's clinical spectrum ranges from asymptomatic infection to mild febrile illness with flu-like symptoms, to severe dengue (SD) and dengue shock syndrome (DSS), characterized by plasma leakage, thrombocytopenia, and organ dysfunction [2].

Objective: To evaluate the correlation and diagnostic accuracy of D-dimer in differentiating severe dengue and dengue shock syndrome (SD/DSS) from mild dengue.

Method: This is an observational study carried in BKL Walawalkar medical college for a period of 6 months. 125 patients were enrolled in the study which were diagnosed as Dengue positive(NS1, IG-G, IG-M) after taking their informed consent. Dimer, platelet creatinine, SGOT SGPT levels were monitored.

Conclusion: The present study provides strong evidence for a link between D-dimer levels and the severity of dengue infection and it also address the correlation of low platelet count and high Ddimer levels. This suggests that D-dimer could be a valuable marker for assessing dengue severity.

Keywords: D-dimer, dengue haemorrhagic fever, platelet.

Corresponding Author: Suvarna Patil, Department of Medicine, BKL Walawalkar Hospital and Rural Medical College, Sawarde, Taluka-Chiplun, District-Ratnagiri, Maharashtra 415606, India.

E-mail: dr.suvarnanpatil@gmail.com

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Introduction

Dengue fever, a mosquito-borne viral infection, poses a significant public health threat, particularly in tropical and subtropical regions. It affects an estimated 400 million people annually, leading to severe illness in around 96 million[1]. Dengue's clinical spectrum ranges from asymptomatic infection to mild febrile illness with flu-like symptoms, to severe dengue (SD) and dengue shock syndrome (DSS) [2].The primary vector for Dengue transmission is the Aedes mosquito, specifically Aedesaegypti and Aedesalbopictus[3]. These mosquitoes breed in stagnant water, making urban environments particularly susceptible to outbreaks, further exacerbated by factors like poverty, inadequate sanitation, and climate change [2].

Symptoms of dengue typically appear 4-10 days after infection, with the most common being high fever, severe headache, muscle and joint pain, nausea, and vomiting [2]. A characteristic skin rash may also develop. While most cases resolve within 1-2 weeks, SD and DSS can be life-threatening, requiring prompt medical attention and supportive care [4].

However, clinical diagnosis can be challenging, especially in the early stages, due to overlapping symptoms with other febrile illnesses. Hence, exploring reliable biomarkers for severe dengue and DSS diagnosis is paramount.[3]

D-dimer, a fibrin degradation product generated during clot breakdown, has emerged as a potential candidate. Studies suggest elevated D-dimer levels in patients with severe dengue compared to uncomplicated cases, potentially reflecting increased vascular leakage and coagulation abnormalities [5]. Furthermore, research indicates an association between D-dimer and the severity of organ dysfunction in DSS, highlighting its possible role in predicting clinical outcomes [6].

Researching D-dimer's potential as a diagnostic tool for severe dengue (SD) and dengue shock syndrome (DSS) holds significant importance due to the challenges in early and accurate diagnosis. While dengue fever is widespread, differentiating SD/DSS from mild dengue can be difficult, potentially delaying critical interventions. D-dimer, a marker of vascular dysfunction and coagulation abnormalities in SD/DSS, offers a promising avenue for more specific and timely diagnosis. Exploring its efficacy could lead to improved clinical outcomes, reduced healthcare costs, and better patient management, particularly in resource-limited settings. This research could contribute significantly to advancing dengue diagnostics and potentially saving lives

Methodology

Study Design:

It was anobservational study conducted at B.K.L. Walawalkar Rural Medical College from 1/8/2023 to 1/2/2024

Inclusion Criteria:

Patients presenting with clinical symptoms or Confirmed dengue positive by RT-PCR or NS1/IgG/IgM antigen test.

Exclusion Criteria:

a) Lack of confirmed dengue infection by RT-PCR or NS1/IgG/IgM / antigen test.

b) Incomplete clinical data or laboratory results.

Data Collection and Analysis:

Confirmation of dengue infection by RT-PCR or NS1/IgG/Ig Mantigen test. A standardized and validated assay to measure D-dimer levels(ACL ELITE turbidimetric immunoassay) was used. Complete blood count (CBC) to assess platelets, haematocrit, and other blood cell parameters were monitored till the discharge and was performed on HORIBA H 500 photometry. Serum chemistry to evaluate liver and kidney function was performed on fully automated analyser. Clinical monitoring of daily progress based on disease severity, recording for Vital signs like Temperature, pulse, respiratory rate, blood pressure. Look for signs of plasma leakage, bleeding, organ dysfunction.

Patients were classified as a) **Dengue Fever (DF)** which includes flu-like symptoms including fever, nausea, myalgia, headache, normal platelet count. b) **DF with warning signs (DFWS)** which include hepatomegaly, abdominal pain, vomiting, mucosal bleeding, and increasing haematocrit concurrent with rapidly declining platelets. c) Severe dengue/Dengue Shock syndrome(DSS). This phase is characterised by

shock, bleeding and organ involvement also called as dengue haemorrhagic fever [1].

Data was analysed using SPSS V25.0. Data was shown as Mean±SD for continuous variable and n (%) for categorical variables. ANOVA was used to compare continuous variables and Chi-square test was used for categorical variables.

Results

Total 125 patients admitted from 1/12/2022 to 1/2/2024were recruited for study. There were 86 (68.8%) males with mean age was 40±9 years and 39 (31.2%) females with mean age 40±12 years. We classified the patients in DF (n=40), DF with warning signs (n=73) and Severe dengue (n=12). We have compared the age and haematological parameters within the groups of severity of dengue(Table 1). Severity of dengue increases with age ($p<0.05$). We found that male patients were more affected than females but the association was not significant. Hb, RBC and PCV were significantly lower in DF group than the group of DF with warning signs ($p<0.05$). Mean D-DIMER levels were 174.4 ng/dl, 621.5 ng/dl and 7566 ng/dl in DF, DF with warning signs and Severe dengue respectively ($p<0.001$). We also found that SGOT levels were high than SGPT levels.

Table 1: Age, gender, hematological parameters and dengue classification.

Dengue Severity	**Dengue classification**				**p**
	All	**DF (n=40)**	**DFWS (n=73)**	**Severe Dengue (n=12)**	
Age (years)	40.26±10.41	38.90±10.22	39.75±10.06	47.83±10.85	0.026*
Male	86 (68.8%)	22 (55.0%)	56 (76.7%)	8 (66.7%)	0.058
Female	39 (31.2%)	18 (45.0%)	17 (23.3%)	4 (33.3%)	
Hb (g/dL)	13.39±2.73	12.15±2.63	14.11±2.52	13.04±3.04	0.001*
RBC Count	**4.69±0.93**	4.36±1.01	4.89±0.80	4.48±1.12	0.010*
PCV (%)	**40.16±8.95**	36.43±8.05	42.46±8.63	38.63±9.88	0.002*
M.C.V **(µm^3)**	**84.89±10.60**	84.15±9.52	85.02±11.13	86.50±11.24	0.790
M.C.H (pg)	**28.56±4.53**	27.83±4.89	28.82±4.44	29.34±3.81	0.454
M.C.H.C (g/dL)	**33.65±2.33**	33.57±2.33	33.65±2.44	33.95±1.77	0.887
Total WBC count	**4784.79±2787.02**	5347.95±3037.84	4417.53±2489.92	5188.71±3492.43	0.212
Neutrophils	**58.13±14.79**	62.02±15.79	55.33±13.99	62.56±13.27	0.040*
Lymphocyte	**32.05±14.31**	28.18±14.68	34.84±13.47	27.60±15.16	0.032*
Monocytes	**5.58±3.84**	5.17±2.32	6.05±4.56	4.01±2.36	0.170
Eosinophils	**1.24±2.56**	1.37±3.15	1.25±2.39	0.77±1.09	0.776
Basophils	**0.20±0.51**	0.21±0.41	0.21±0.59	0.13±0.27	0.869
Platelet Count	**82192.40±72084.47**	171876.25±58244.66	38835.62±21257.03	47000.00±22703.62	0.000*
Platelet Count **<1 Lakh**	85 (68.0%)	0 (0.0%)	100 (100.0%)	100 (100.0%)	0.000*
DDIMER (ng/ml)	1145.11±3725.43	174.40±27.84	621.52±488.43	7566.00±10230.66	0.000*
DDIMER **>250ng/dl**	76 (60.8%)	0 (0.0%)	64 (87.7%)	12 (100.0%)	0.000*
SGOT (mg/dl)	196.11±279.78	83.37±132.64	230.96±315.35	282.05±280.78	0.035*
SGPT (mg/dl)	127.83±184.85	96.99±233.56	138.88±171.33	149.12±149.73	0.567

*Mean±Standard deviation; *statistically significant.*

Table 2: Clinical profile of 12 patients with severe dengue.

No	1	2	3	4	5	6	7	8	9	10	11	12
Age (years)	53	60	48	40	29	63	59	16	53	24	48	34
Sex	Male	Female	Male	Male	Male	Female	Male	Female	Male	male	male	female
Fever (days)	3	8	5	3	6	5	7	1	6	8	4	3
Dengue status IgG/IgM/ NS1	NS1, IgM+	IgG +	NS1+	NS1+	NS1 and IgM+	IgM+	NS1, IgG, IgM+	Ns1,IgG	NS1	Ns1	Ns1	Ns1 IgM
DM	+	-	-	-	-	-	-	-	-	-	+	+
HTN/IHD	+	-	+	-	-	+	+	-	-	-	+	-
D dimer ng/ dl	3629	13255	2140	3793	1118	2800	2689	2000	22000	4886	2342	5250
Platelets	75000	70000	44000	37000	32000	59000	10000	65000	70000	25000	20000	74000
Complication	Hepatitis Pancreatitis	Hepatitis	Hepatitis	Hepatitis	Leucopenia	ARDS	Severe Thrombocytopenia	ARDS	Hem peritoneum	DIC	Hepatitis	DIC
Status at discharge dead/ recover/ referred	Recovered	Recovered	Recovered	Recovered	Recovered	Recovered	Recovered	DAMA	DAMA	Death	Recovered	death
Total hospital stay in days	10	11	8	7	6	10	8	5	7	4	11	3

Table 2 shows the Biochemical and clinical characteristics of severe dengue. Out of 12 patients 2 patients who were critically ill took discharge against medical advice but, 8 patient showed improvement despite suffering from complications like ARDS, hepatitis, bleeding and required intensive critical care monitoring. Two patients died due to DIC(disseminated intravascular coagulation). The average hospital stay of all patients was 7 days.

Discussion

Ours is the first observational study on d dimer as a marker for severe dengue in patients from Konkan region, BKL Walawalkar rural medical college and hospital is a multispecialty tertiary care hospital in Konkan region of western Maharashtra catering to rural population. It is equipped with Intensive care units with blood component backup so most of the patients from Konkan region with dengue fever are referred to the hospital with majority patient being of dengue fever with warning signs. Patients with dengue fever having normal platelet levels showed fast recovery with short term hospital stay while it was observed that DF with warning signs showed low platelet count and long term hospital stay. Warning signs prominently seen in these patients were abdominal pain, nausea, declining platelet count, elevated HCT. Along with fluid therapy platelet transfusion were also required in these patients. Symptoms like hepatitis, acute respiratory distress syndrome (ARDS), leukopenia, Disseminated intravascular coagulation (DIC) were observed in few patients with severe dengue in such cases ICU admission was needed along with ventilator support. In these patients we observed very high levels of D-dimer (>7000 ng/dl) with low platelet count (<1 lakh) at the time of admission. So, d-dimer could be an early predictor for diagnosing the severity of dengue and it could help to decide further course of treatment for clinicians. The presence of the D-dimer (DD) indicated activation of the coagulation system resulting from the destruction of cross-linked fibrin and reflects clot formation and lysis[7,8] thus D-dimer assay, a specific marker for cross-linked fibrin, is

often used as a marker for disseminated intravascular coagulation[9].Studies support a connection between D-dimer and dengue severity. For instance, research by Yusof et al. [10] found significantly increased D-dimer levels in Dengue Haemorrhagic Fever (DHF) patients compared to Dengue Fever (DF).

In our study it was observed that severity of dengue increases with age which resonates with findings from the study by Annan on Direct and indirect effects of age on dengue severity. The association between increasing age and dengue severity among individuals with dengue infection has been established.[11] In dengue, accurate and reproducible PCV measurement would be important for making decisions about fluid management, in our study we observed that PCV values were significantly higher in patients with DFWS as compared to DF($p<0.05$) similar results was observed in a study done by Sahassananda D [12].

Lower platelet count increases the risk of bleeding tendency. Patients with DFWS showed significantly low platelet counts as compared to patients with DF($p<0.001$).

The previously discussed studies [13, 14] focused on D-dimer as a risk stratification tool for severe dengue however ours is the first study from Konkan region. Overall, the table provides evidence that D-dimer levels can be a potential marker for dengue severity. Patients with higher D-dimer levels are more prone to have dengue haemorrhagic fever and even to land up in dengue shock syndrome which is a life threatening complication.

In patients with Dengue fever with warning signs at initial stage may cause thrombocytopenia due to increased vascular permeability and plasma leakage and later because of disseminated intravascular coagulation (DIC). To identify the severity of dengue D-dimer can be used as a specific and sensitive marker of DIC[15].

The SGOT levels were elevated than SGPT levels in DFWS and severe dengue, almost all DFWS and SD had abnormal SGOT profile. (Table-1) SGOT raised more than SGPT in dengue may be due to involvement of myocytes. Very high levels of SGOT and SGPT indicate severity of the disease along with morbidity and mortality and similar results were shown in study done by Mamtakumari et.al. in children of age group of 1-12years[16].In the study done by Kittiya Setrkraising, Chansuda Bongsebandhu-phubhakdi et al. showed significantly higher D-dimer levels in DHF patient compared with DF patient with the sensitivity of D-dimer in predicting DHF of 90% [7]. Study done in Thailand shows similar correlation where D-dimer levels were monitored in children[15], but in our study adult population was involved. By implementing these recommendations, healthcare professionals can gain a deeper understanding of D-dimer's role in dengue severity assessment and potentially develop more effective strategies for managing this challenging illness.

Conclusion

The present study provides strong evidence for a link between D-dimer levels and the severity of dengue infection. Patients with high D-dimer levels (>250 ng/dL) were significantly more likely to have severe dengue compared to those with lower levels. This suggests that D-dimer could be a valuable marker for assessing dengue severity. While the present study does not only directly address D-dimer but it also highlights the importance of platelet levels, PCV, SGOT and SGPT levels in dengue severity. It may help clinicians in predicting dengue severity before the patient progress into toxic stage so that close monitoring and proper management can be arranged. To investigate how both D-dimer and platelet levels change over the course of the illness in these patients. A longitudinal analysis would provide a more dynamic picture.

Limitations

The study presents a single time point, and ideally D-dimer levels should be tracked throughout the illness. Additionally, D-dimer is not specific to dengue and can be elevated in other conditions. Therefore, D-dimer levels should be interpreted by a doctor in conjunction with other clinical findings and tests for a comprehensive diagnosis.

Conflict of Interest: None of the authors have any conflict of interest to declare.

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Ethics: The Study was approved by the Institute Ethics committee of BKL Walawalkar Rural Medical College and Hospital (Reference no.264). Our institute ethics committee is registered with the Government of India. Registration code is EC/755/INST/MH/2015/RR-18.

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Original Article

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Knowledge and Implementation Practices of Standard Intensive Care Services: Underlying Characteristics of Bangladeshi Healthcare Providers Context

Most. Farida Begum[1], Bilkis Banu[2], Nasrin Akter[2], SujanaHaque Chowdhury[2], Nusrat Hossain Sheba[2], Shahnaz Begam[3]

[1]Sher-e-Bangla Medical College Hospital, Barisal, Bangladesh, [2]Department of Public Health, Northern University Bangladesh, Dhaka, Bangladesh, [3]SAIC College of Medical Science & Technology, Dhaka, Bangladesh.

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Abstract

The concept of intensive care is emerging in Bangladesh, but it needs more attention.The aim of this study is to determine the knowledge and implementation practices of standard intensive care services among healthcare providers in Bangladesh. From February to May 2023, a cross-sectional research of doctors and nurses running the intensive care unit (ICU) in Bangladesh's Barisal district was carried out. Participants filled out confidential, self-administered knowledge and practice questionnaires. There were 80 respondents, including 86.3% of young people (aged less than 40) and 73.8% of female respondents. It was found that physicians (AOR/p=13.16/0.02; 95% CI: 1.41-122.92) who had less ICU work experience (5 years) (AOR/p=13.98/0.01; 95% CI: 2.35-83.26) were found to have significantly poor knowledge. It was found that doctors with less than five years of experience working in an intensive care unit (AOR/p=6.07/0.03; 95% CI: 1.16-31.64) and no ICU training (AOR/p=5.82/0.04; 95% CI: 1.09-30.81) performed poorly when providing ICU services.Standard intensive care education to gain better knowledge should be strengthened.

Keywords: Knowledge, Implementation Practices, Standard Intensive Care Services, Healthcare Providers.

Introduction

It is imperative to make the most efficient use of intensive-care units (ICUs).[1] Hospitals have dramatically varying morbidity and mortality rates in ICUs. This discrepancy is most likely caused by variations in ICU setup and healthcare practices.[2] The recovery of critically ill patients is facilitated by combination of expert knowledge, experience, and high-quality critical care, high-tech equipment, strong clinical competence staff, and a great ability to work with group decision-making are responsible.[3,4] Emergency care knowledge gaps in junior doctors transitioning from undergraduate to postgraduate training are particularly prevalent in critical care.[5]

Corresponding Author: Nusrat Hossain Sheba, Department of Public Health, Northern University Bangladesh, Dhaka, Bangladesh.

E-mail: nusrat.shebar3@gmail.com

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In developed countries, physical assessment skills are easily included by nurses in the USA, and more recently, in Canada and Australia, as a part of health assessment, which is dependent on clinical decision-making that can have the most significant impact on the quality of care in ICU.[3] Nurses are likely to be exposed to germs throughout their regular practice; consequently, nurses must demonstrate the ability to effectively apply infection control principles.[6] Furthermore, standard precautions are intended to protect healthcare staff and patients by utilizing the basic concepts of infection prevention.[6] Data from Hunan Province, China, participants revealed that half of them were familiar with every standard backup procedure.[7] Additionally, the findings from Korea's study showed that the intensive care unit's and nurses' compliance with standard safeguards was high.[7]

In Bangladesh, the national Intensive Care Unit (ICU) Quality Improvement (QI) Framework, 2019, stated that the ICU facilities and rooms allocated for patients are frequently insufficient.[8] The high death rate among ICU patients generally may be decreased by providing better quality critical care that incorporates best practices in structure, organization, and care delivery.[9] The close unit model[10] and nurse-to-patient ratio[9] including architectural design to support infection control[9] have also been linked to better patient outcomes.It is necessary to conduct additional research with a more practical focus onintensive care nurses' technological and human knowledge.[11,12] We are barely aware of any studies that have explored physicians' opinions toward the use of quality indicators in the intensive care setting. Research isneededto know the level of knowledge and compliance with the standard intensive care services in the intensive care unit among Bangladeshi healthcare providers. Hence, the purpose of this paper is to study knowledge and implementation practices of standard intensive care services among Bangladeshi healthcare providers.

Methods

Study design

A quantitative cross-sectional study was carried out from February to May 2023. Semi-structured data were collected in this study to obtain information on socio-demographic characteristics, professional indicators, and knowledge of implementation practices on standard implementation care services among healthcare providersof Barisal district of Bangladesh.

Study participants, sample size, and sampling

This study considered 80 healthcare professionals, namely physicians and nurses, responsible for managing the Intensive Care Unit (ICU) of Barisal district in Bangladesh.

Healthcare professionals of eight divisions (Dhaka, Chittagong, Rajshahi, Khulna, Rangpur, My mensingh, Sylhet, and Barisal) of Bangladesh were considered as the study population. Barisal division was selected through multi-stage random sampling as a study place. Barisal district was considered for this study under the division concerning as divisional district. Initially, a potential standard sample size was assumed as 384 calculated by using the formula "n= 'Z^2pq/d^2" where Z (standard normal deviate) was considered as 1.96; p (as no prevalence found regarding this issue, so 50% was considered) as 0.50 and margin of error was considered as 0.05. Finally, all healthcare providers serving for ICU in the Barisal district, i.e., 80 participants, were considered for this study.

Quantitative information for this study was collected from the respondents' who were signified physicians and nurses managing ICUs in Barisal district and provided their consent to participate in this study.

Data collection

Data was collected from the study participants using a pre-tested and semi-structured questionnaire through the interviewer-administered method. Respondents were interviewed according to their convenience on March 2023 and onwards. The survey took only 10 to 15 minutes for the interviewer to complete. All authors had access to the collection and preserving participants' information during or after data collection. The survey was administered in Bengali with the utmost support from the hospital authority.

Ethical considerations

This study was approved by the Ethical Review Committee of the Department of Public Health of Northern University Bangladesh (NUB/DPH/

EC/2022/21-a) and conformed to the Declaration of Helsinki. The respondentsparticipation was anonymous and voluntary. Written informed consent was taken from the respondents at the beginning of the survey. Participants could withdraw from the survey at any time, and their autonomy has been ensured.

Questionnaire design

Two independent reviewers pre-validated the questionnaire and pre-tested among 5% of the study participants. The quality of the questionnaire addressed the responses of the pre-test. The dependent variables of the questionnaire were considered from the standard guidelines for ICU of Bangladesh 'National Manual on Basic ICU Skills'.[13] The pivotal components of the questionnaire were: (i) Socio-demographic information: age, gender, marital status, religion, education, income, number of children, family type, and family size (ii) Professional information: work experience, profession, ICU training, ICU work experience (iii) Knowledge and implementation practices of standard intensive care services: Initial assessment and management on critically ill patient, Airway oxygenation, Oxygen therapy, Ventilation, Infection prevention control in ICU, Sterility maintenance in ICU, Patient monitoring, Care of the patient on ventilation, Endotracheal/ Tracheostomy tube suction, Cardio-pulmonary resuscitation (CPR), Nutrition in critical care, Bedsore management in ICU.

Data analysis

Collected data was checked and analyzed employing the Statistical Package for the Social Sciences (SPSS) software. Study characteristics were subjected to descriptive statistics (frequency and proportions) to summarize the obtained data.

Relevant continuous data were categorized followingmid values of the percentage scores cut points.[14] A multinomial logistic regression analysis was performed followed by a modelling procedure considering a backward elimination process, including pre-specified confounders, i.e., age, gender, marital status, religion, education, income, number of children, family type, family size work experience, profession, ICU training, ICU work experience. Odds Ratios with 95% confidence intervals concerning knowledge and implementation practices of standard intensive care services (poor and good) were calculated for the specified exposures.

Results

Participant's characteristics

A total of 80 respondents were selected as a sample to conduct this study wherethe majority (73.8%) of the respondents were female and 86.3% were young adults (<40 years). More than half of the respondents (65%, n = 52/80) had graduation as their education and had >35000 BDT as their monthly family income (52.5%, n=42/80). In addition, most of the study subjects (63.8%, n = 51/80) were nurses, while 68.8% had training in standard intensive care services. Moreover, the study revealed that most of the study subjects (88.8%, n=71/80) had <5 years of experience in the Intensive Care Unit (ICU). (Table-1)

Level of knowledge and implementation practice of standard intensive care services among the respondents

The study revealed that most of the respondents (80%) had poor knowledge of standard intensive care services. In addition, the study also delineates that the majority (76.20%) of the study subjects had poor implementation practices due to having poor knowledge.

Furthermore, the study revealed a significant association between the level of knowledge and the implementation practiceof standard intensive care services among the respondents (χ^2/p= 56.59/0.01 at 95% CI). (Figure 1)

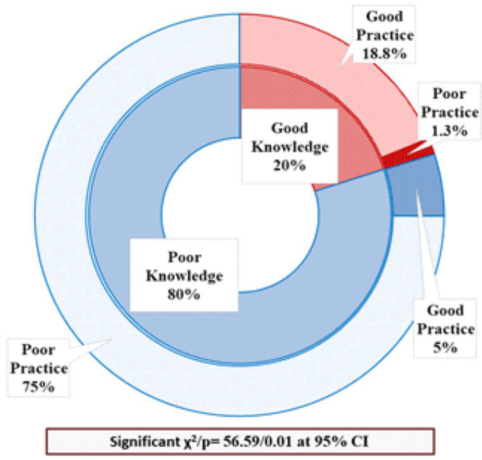


Fig 1: Status of knowledge and implementation practice of standard intensive care services among the respondents (n=80)

The level of knowledge and implementation practice was assessed by considering 12 components of standard intensive care services among the respondents.

Initial assessment and management of critically ill patient, Airway oxygenation, Oxygen therapy, Ventilation, Infection prevention control in ICU, Sterility maintenance in ICU, Patient Monitoring, Care of the patient on ventilation, Endotracheal/ Tracheostomy tube suction, Cardio-pulmonary resuscitation (CPR), Nutrition in critical care, Bedsore management in ICU

Respondent's characteristics associated with their knowledge and practice of standard intensive care services

Results of bivariate (cross table) analysis revealed that respondents' gender (p=0.04), monthly income (p=0.01), profession (p=0.01), ICU training (p=0.01), and ICU work experience (p=0.01) are significantly associated with their level of knowledge on standard intensive care services. In other words, it is observed that the poor level of knowledge of the study subjects was significant among the males who had BDT 35000 or more monthly income, did not have ICU training, and had less (<5 years) ICU work experience compared to their counters.

In addition, poor implementation practice of standard intensive care services was predominantly found among the younger male professionals who had educatonup to graduation and had BDT 35000 or more monthly income. Furthermore, respondents, who showed significant poor practice in the ICU services were mostly physicians who did not have ICU training and had less (<5 years) ICU work experience. This scenario represents the poor ICU services provided in the hospitals in such areas of Bangladesh. (Table-1)

Table 1: Characteristics of the respondents according to the level of knowledge and implementation practices of standard intensive care services (n=80)

Characteristics	Knowledge				Practice		
	Number of participants, n (%)	Good, n (%)	Poor, n (%)	χ^2/p-value (≤0.05)	Good, n (%)	Poor, n (%)	χ^2/p-value (≤0.05)
Socio-demographic information							
Age (In Years)							
<40	69 (86.3)	13 (16.3)	56 (70.0)	0.42/0.52	14 (17.5)	55 (68.8)	3.32/0.06
>40	11 (13.8)	3 (3.8)	8 (10.0)		5 (6.3)	6 (7.5)	
Gender							
Male	21 (26.3)	1 (1.3)	20 (25.0)	4.13/0.04*	2 (2.5)	19 (23.8)	3.18/0.07
Female	59 (73.8)	15 (18.8)	44 (55.0)		17 (21.3)	42 (52.5)	
Education							
Up to graduation	52 (65.0)	12 (15.0)	40 (50.0)	0.88/0.35	16 (20.0)	36 (45.0)	4.02/0.04*
Post-graduation	28 (35.0)	4 (5.0)	24 (30.0)		3 (3.8)	25 (31.3)	
Monthly income (In USD)							
<330	38 (47.5)	12 (15.0)	26 (32.5)	6.07/<0.01*	13 (16.3)	25 (31.3)	4.37/0.04*
>330	42 (52.5)	4 (5.0)	36 (47.5)		6 (7.5)	36 (45.0)	
Profession related information							
Profession							
Physician	29 (36.3)	1 (1.3)	28 (35.0)	7.79/<0.01*	2 (2.5)	27 (33.8)	7.14/0.01*
Nurse	51 (63.8)	15 (18.8)	36 (45.0)		17 (21.3)	34 (42.5)	
ICU training							
Yes	55 (68.8)	16 (20.0)	39 (48.8)	9.09/<0.01*	18 (22.5)	37 (46.3)	7.83/0.01*
No	25 (31.3)	0 (0)	25 (31.3)		1 (1.3)	24 (30.0)	
ICU work experience (In Years)							
<5	71 (88.8)	10 (12.5)	61 (76.3)	13.80/<0.01*	13 (16.3)	58 (72.5)	10.31/0.01*
>5	9 (11.3)	6 (7.5)	3 (3.8)		6 (7.5)	3 (3.8)	

Data are presented as frequency (n), percentage (%);

**Statistical significance at p-value ≤0.05.*

A chi-square test was used to observe the association.

Identified predictors for the knowledge and practice of standard intensive care services

The regression analysis revealed some significant predictors associated with poor knowledge status among the respondents. The outcome is illustrated in Figure 2. In the initial screening of regression analysis, male physicians (male: COR/p=6.82/0.05; 95% CI: 0.84-55.24, physician: COR/p=11.67/0.02; 95% CI: 1.45-93.73) with higher monthly income (BDT>35000: COR/p=4.39/0.02; 95% CI: 1.27-15.10) and less ICU work experience (<5 years: COR/p=12.20/0.01; 95% CI: 2.62-56.84) showed higher odds of poor knowledge compared to their reference group. The study revealed the final predictors associated with the poor knowledge of intensive care services after adjustment of regression modeling with the significant variables of crude odds and elimination of the confounders in a backward manner. After all, it was identified that physicians (AOR/p=13.16/0.02; 95% CI: 1.41-122.92) who had less ICU work experience (<5 years) (AOR/p=13.98/0.01; 95% CI: 2.35-83.26) were found to have significantly poor knowledge, which made them vulnerable for the poor practice during providing the ICU services in their hospital. (Figure 2)

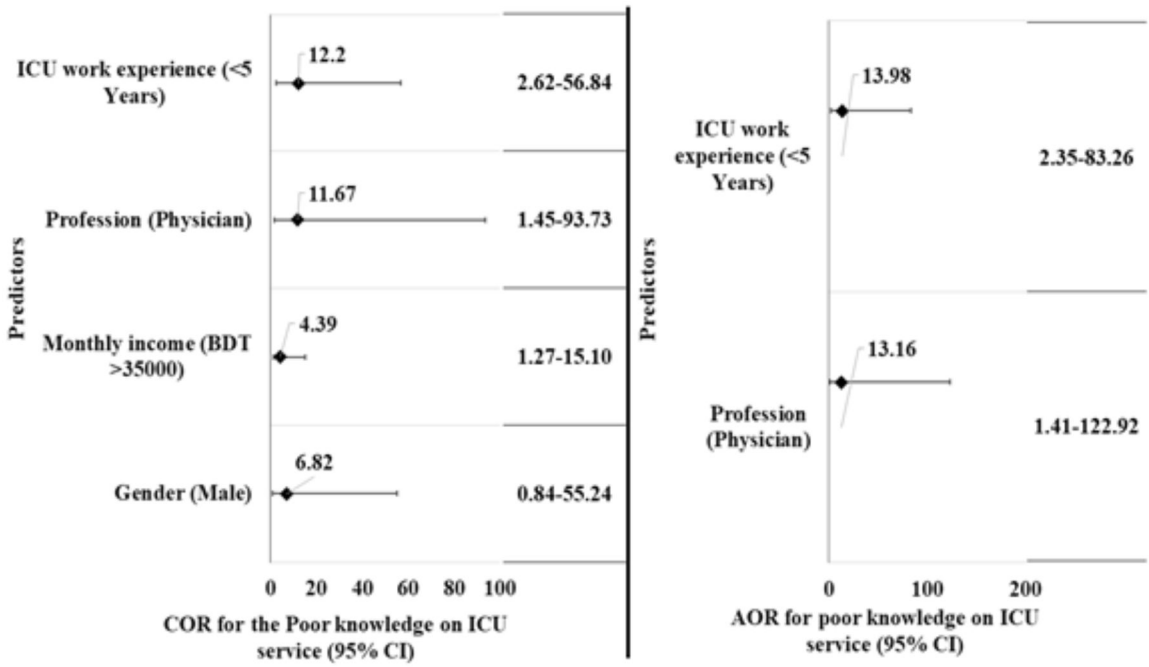


Fig 2: Predictors associated with the level of knowledge on ICU service among the respondents (n=80)

Fig 2 Footnote: Statistically significant predictor is considered at p ≤0.05. The reference category for Gender is female, for monthly family income is <35000 BDT, for profession is nurses, and for ICU work experience is >5 years. (Regression Analysis)

Similarly, this study also revealed some significant predictors for poor practice of intensive care services through the regression analysis. The initial crude outcome revealed that post-graduate physicians (physicians: COR/p=6.75/0.02; 95% CI: 1.43-31.79, post-graduate: COR/p=3.70/0.05; 95% CI: 0.98-14.07) with higher monthly income (BDT>35000: COR/p=3.12/0.04; 95% CI: 1.05-9.31) did not have ICU training (COR/p=11.68/0.02; 95% CI: 1.46-93.92) and less ICU work experience (<5 years: COR/p=8.92/0.01; 95% CI: 1.97-40.42) showed higher odds of poor implementation practice compared to their reference group. After adjustment of regression modeling with the significant variables of crude odds and elimination of the confounders in a backward manner, the study revealed the final predictors for poor practice of intensive care services. As final determinants, it was identified that physicians (AOR/p=5.82/0.04; 95% CI: 1.09-30.81) who did not have ICU training (AOR/p=6.87/0.05; 95% CI: 0.81-58.16) and had less ICU work experience (<5 years) (AOR/p=6.07/0.03; 95% CI: 1.16-31.64) had significant poor practice of ICU services. (Figure 3)

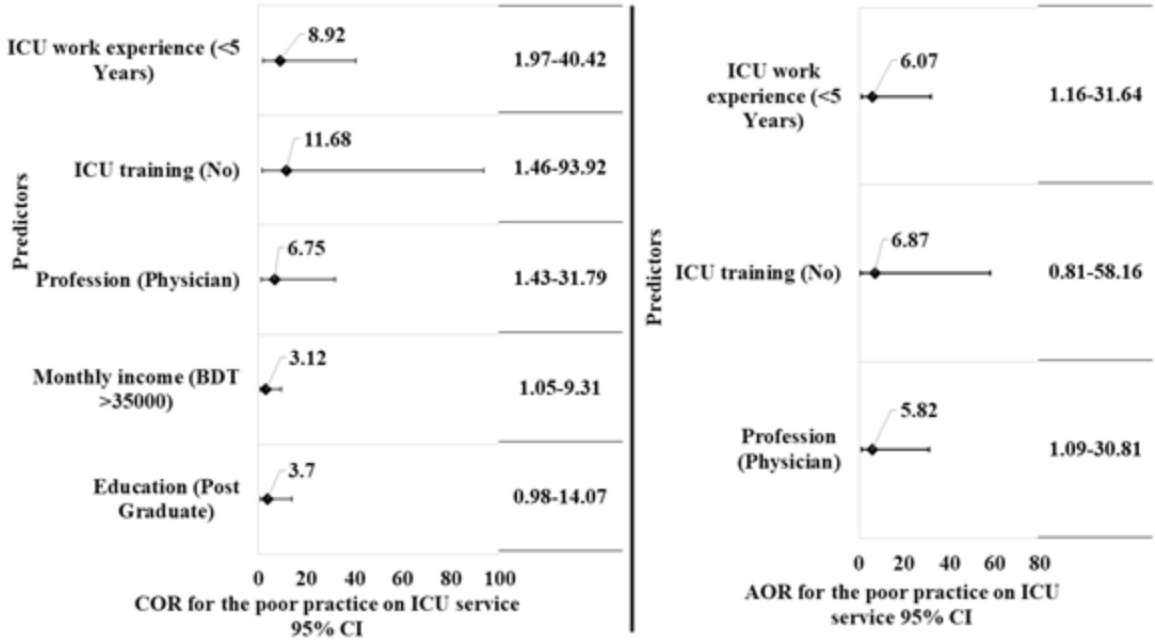


Fig 3: Predictors associated with the implementation practice on ICU service among the respondents (n=80)

Fig 3 Footnote: Statistically significant predictor is considered at p ≤0.05. The reference category for education is graduation, monthly family income is <35000 BDT, for profession is nurses, for ICU training years, and for ICU work experience is >5 years.

Discussions

Health professionals need to have a clear concept of standard intensive care services for cost-effective quality care delivery to ICU patients with a team effort, especially in acountry with scarce resourceslike Bangladesh. That is why the current study was conducted to understand the underlying factors associated with the knowledge and practice level of standard intensive care services among Bangladeshi health professionals. As revealed from the current study, more than two-thirds of the study subjects were females, young professionals, and nurses. This feature is concurrent with many other studies[6,7] emphasizing young nurses and their knowledge and implementation practice on standard intensive care services in ICUs. The results of our study majority had a previous course on standard intensive care services.

Assessment of health professionals' knowledge and implementation of standard-level intensive care revealed that a greater part of the studied had unsatisfactory knowledge (80%) and practice (75%) levels. On the same line, this significant finding was revealed by some other studies from Asia; China, and Pakistan mentioning a lack of knowledge level about infection control and ventilation among ICU experts.[6,15] However, contradicting findings were revealed by Ibrahim, Said & Hamdy,[16] who found the majority of their studied group aware of what infection is and how it is transmitted.

Concerning specific characteristics, it was found that Bangladeshi male doctors with a monthly income of more than 330 USD and by profession with ICU working experience of less than 5 years were significantly associated with unsatisfactory knowledge level. On the counterpart, ICU-experienced female nurses with a lower monthly income (<330USD) had satisfactory knowledge of standard intensive care indicating a positive scenario. In addition, it was disappointing to explore that health professionals with ICU training experience revealed poor knowledge of standard intensive care services. This unique finding does not coincide with any other study finding. To explore the practice level, it was clear to mention that someone's education, knowledge, and qualification do not always influence their practice level. ICU-experienced doctors with post-graduation degrees with a good monthly

income were significantly associated with poor implementation of standard care for ICU patients.

Finally, the outcome of logistic regression analysis showed all the strong characteristics that influence both knowledge and practice of standard intensive care services among health care providers in Bangladesh. Lack of knowledge was found among doctors (OR/p= 13.16/0.05) who had less ICU work experience (<5 years) (OR/p= 13.98/0.05) regarding standard ICU care, which makes them more susceptible to poor practice. No exceptions were observed about the practice level. Again, doctors who had less ICU work (<5 years) experience with no previous ICU training were identified as final predictors for poor practice. Also, the time frame was very short & this is not the overall scenario of the country. Finally, to explain the strength, this study sorted out a large number of predictors which will help the policymakers in rethinking new dimensions to improve ICU support policies. Our study may also be helpful for introducing a different pattern of intervention on a large scale for reducing the burden of health system in Bangladesh.

Conclusions & Recommendations

The study revealed that physicians having less ICU work experience (<5 years) were significantly responsible for poor knowledge of standard intensive care. Moreover, it was identified that physicians with less work experience and did not have ICU training, did significantly poor practice of standard ICU services. Furthermore, younger male professionals with greater monthly incomes tended to implement standard intensive care services poorly. This incidence serves as an example of the inadequate ICU services offered in hospitals in Bangladesh. Therefore, we advise including critical care education in the curriculum of medical schools in the form of in-service educational programs and practical clinical training. Besides, the Ministry of Health Education, as well as the subsidiary institutions, shouldgive standard intensive care education to gain better knowledge. Future studies are also required to replicate thestudy using a significant number of respondents.

Ethical Clearance: This study was approved by the Ethical Review Committee of the Department of Public Health of Northern University Bangladesh (NUB/DPH/EC/2022/21-a)

Source of funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest: None declared.

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Original Article

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Library Resources and Services Usage by Undergraduate and Post Graduate Medical Students of a Medical College in Maharashtra: A Cross-Sectional Study

Ankit Bonde[1], Surendra Kulkarni[2], Sanjeev Chincholikar[3]

[1]Undergraduate Medical student, MIMER Medical College, Talegaon Dabhade, Pune, [2]Associate Professor, Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Pune, [3]Professor and HOD Department of Community Medicine, MIMER Medical College, Talegaon Dabhade.

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Abstract

Background: As medical science is a continuously advancing discipline, use of the medical library by students is very important for updating their knowledge and competence. **Objectives:** To study the pattern of library usage by undergraduate and postgraduate medical students and to compare library utilization across academic years.

Materials and Methods: A cross-sectional study was carried out among undergraduate and post graduate students in a medical college. A structured questionnaire was used for data collection.

Results: Total 250 students (231 undergraduate and 19 post graduate students) participated in the study. 34% of undergraduate and 21% post graduate students were found visiting library daily. Increasing trend was observed in daily visits of the students as academic years progress. Students spent significantly more time during examination days in the library as compared to usual days. The primary reason for visiting the library was to prepare for the examination. 73.20% students reported that recent editions of books and journals were available in library. Most of the students were satisfied about the library services.

Conclusion: Students are utilizing library facilities and services to a great extent but still there is a need to sensitize students to use library for activities such as research, reading recent journals, preparation of seminar.

Key words: Library usage, medical students, academic years, recent books, satisfaction

Introduction

In medical education one has to be a good learner to maintain their knowledge and develop their skills to give the best medical care to patients as well as to achieve best academic position as student [1]. As medical science is a continuously advancing discipline, the use of the medical library by students is very important

Corresponding Author: Surendra Kulkarni, Associate Professor, Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Dist. Pune.

E-mail: dr.sjkulkarni@gmail.com

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for updating their knowledge and competence. One of the major goals of medical education is to encourage students to maintain their knowledge of medical science by becoming life-long learners[2].

Libraries are reservoirs of knowledge forever.[3] An academic library is an inexhaustible store house of knowledge, where one can go at will, unrestricted to help himself to the whole field of knowledge and practical life of the past, present and prognostications for the future. If a library is well stocked and the students know they can find more information than what they are taught, they will use the library maximally.[4]

Medical library as a center of information helps to enhance the knowledge by providing the collection of books, journals, place to study and new modern library provides internet and computer[1].

Though an institution may have the best stocked libraries, the utilization of the libraries by the students need not simply depend on the number of books and journals in the library. Many factors like personal preferences, the general environment in the library, inconveniences of the working hours, distance from the place of residence may influence the use of the libraries by the medical students[5].

With this back-ground, the present study was an attempt to study the utilization of library resources and level of satisfaction among the undergraduate and postgraduate medical students of a Medical College in Maharashtra.

Aims and Objectives:

The present study aims at studying library usage pattern among undergraduate and post graduate medical students. The specific aims and objectives of the study include:

1. To study the pattern of library usage by undergraduate and postgraduate medical students.
2. To observe the library utilization by the students across the academic years.
3. To identify the level of satisfaction of the students about library services.

Materials and Methods

A cross-sectional study was carried out among undergraduate and postgraduate medical students of a Medical College in Maharashtra to observe the pattern of library utilization by them. The study was approved by Institutional Ethical Committee. The approval letter from Institutional Ethical Committee has reference number and date as follows: IEC/ MIMER/2020/695 dated 09/03/2020. The study population consisted of undergraduate and post graduate students studying in a Medical College.

Sample Size: A previous study reported that 42% of the medical students were using library services daily.[6] Considering this data with 95% of confidence limit and 15% of allowable error (i.e., 15% of 42%), the estimated sample size was 236 and it was rounded up to 250.

Study Tool: A structured questionnaire was used as a study tool for data collection. The questionnaire was in two parts. The first part covered the data regarding demographic characters of the students such as name, age, gender, academic year etc. The second part of the questionnaire included questions regarding the pattern of library usage by the students. The questions were related to frequency of visits to library, time spent in library, purpose of visit to library and level of satisfaction of the students.

Sampling Type: All undergraduate and postgraduate students who gave the consent for the study, were incorporated in the study till the required sample size was fulfilled.

Data Collection: The purpose of the study was explained to the students. The questionnaire was offered to the students by personal contacts. The data was analyzed using appropriate statistical methods like averages and Chi square test. Further, Yate's correction was applied whenever required.

Results

A cross-sectional study was carried out to study the library usage pattern among undergraduate and postgraduate medical students in a medical college.

Total 250 undergraduate and post graduate students participated in the study. Among total 231 undergraduate students. Almost equal proportion of students was observed across all academic years of MBBS. There were 19 post graduate students. Proportion of male and female students was almost equal.

Table 1: Students' visit to library across academic years

Academic Year	Daily	Once or twicea week	Occasionally	Total
First Year MBBS	12 (16%)	24 (32%)	39 (52%)	75 (33%)
Second Year MBBS	29 (37%)	23(29%)	27(34%)	79 (34%)
Third Year MBBS	38 (49%)	19 (25%)	20 (26%)	77 (33%)
Total	79 (34%)	66 (29%)	86 (37%)	231

Table 1 shows an increasing trend of daily visits to library as academic years progress from First year MBBS to Third year MBBS. The difference was tested by applying Chi Square Test and it was found significant.

($\chi 2 = 20.52$, $p < 0.05$)

It was also observed that very few (21%) post graduate students were found to visit library daily.

Table 2: Time spent by the undergraduate students in the library

Variable	Academic Year	Time spent in library by the students in hours			Total
		1 to 2 Hours	2 to 4 Hours	> 4 Hours	
Time spent in library by the students	First Year MBBS	35(47%)	36(48%)	4(5%)	75 (33%)
	Second Year MBBS	32(41%)	37(47%)	10(12%)	79 (34%)
	Third Year MBBS	17(22%)	29(38%)	31(40%)	77 (33%)
	Total	84 (36%)	102 (44%)	45 (20%)	231

Table 2 shows that students spent more time (more than four hours) in library as the academic year progresses. After applying Chi square test, the difference was found to be statistically significant.

($\chi 2 = 31.53$, $p < 0.05$).

Almost half of the post graduate students were also found to spend 1 to 2 hours in the library.

Table 3: Time spent in library by students on usual days and examination days

Variable	Time spent in library in hours by both students			Total
	1 to 2 Hours	2 to 4 Hours	> 4 Hours	
On usual days	95(38%)	107(43%)	48(19%)	250
During examination days	66(26%)	33(13%)	151(61%)	250

Table 3 shows the time spent in library by both undergraduates and post graduate students on usual days and during examination period. It was observed that there was sharp increase in time spent in library during examination days. The observation was found statistically significant after performing Chi square test. ($\chi 2 = 97.65$, $P < 0.05$).

Table 4: Purpose of visits to library by the students

Purpose of the visit	Frequency	Percentage
To borrow/return/renew books	85	34%
To read text books	162	65%
To read reference books	91	36%
To complete class assignments or class work	73	29%
To prepare for examination	198	79%

It is evident from the above Table 4 that the students utilized library facilities more to prepare for the examination. Other purposes were reading text books, to borrow/return/renew books, to complete the class assignments.

Table 5 Availability of recent editions of books and journals and response of the students.

Academic Year	Positive Response
First Year MBBS	64(85%)
Second Year MBBS	52(66%)
Third Year MBBS	53(69%)
Post Graduate Students	14 (74%)
Total	183(73%)

Table 5 shows about two third of the students from all academic years reported that recent editions of text books, reference books and journals are available in library. However, availability of books was maximum for the first year, as reported by the students.

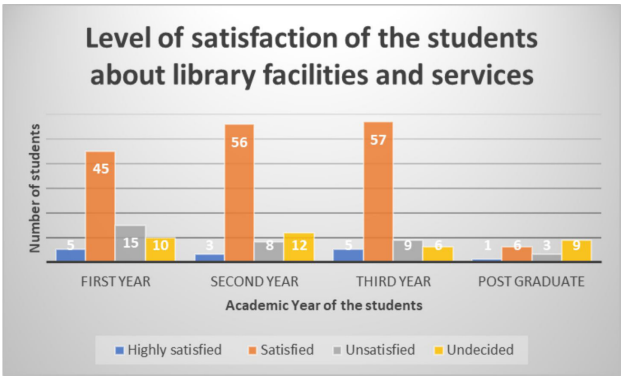


Fig 1 Level of satisfaction of the students about library facilities and services

Fig 1 shows that most of the students were satisfied about library facilities and services. However, proportion of satisfaction was more among second year and third year students. Level of satisfaction was very low among postgraduate students.

Discussion

The present study was a cross-sectional study conducted in a medical college to study the pattern of library usage among undergraduate and postgraduate medical students. Total 250 students participated in the study. Among which 231 were undergraduate and 19 were postgraduate students.

In our study, percentage of undergraduate students visiting library daily was found 34%. Similar findings were reported in a study conducted by Parande M. et all[7]. The study conducted by Goel N.K. et all[5] reported little lower percentages. This difference may be attributed to different purpose of visit like borrowing/reading books. Slightly higher percentage i.e. almost 41% was reported in the study conducted by Ayan Pal et all [2] for students visiting library daily.

Percentage of Post graduate students visiting library daily was found 21% while study conducted by Parande et all [7] reported it at much higher level (64%).

It was also observed that percentage of daily visits showed increasing trend as academic year progresses among undergraduate students. This means that usage of library services is more as academic year progresses. Almost similar findings were reported in the study conducted by Sahak M.et all.[8] and by Abdulgani PM. et all[9].

It was observed that students spent more time (more than 4 hours) in library as the academic years progress from first year to third year. The association was found to be significant. This means that usage of library services is more as academic year progresses. Almost similar findings are reported in the study conducted by Sahak M.et all.[8] and Abdulgani PM. et all.[9]

It was found that students spent more in library during examination days and it was found statistically significant. It is expected that time spent by the student in the library will be more during examination period and this finding was confirmed in our study. Similar results were reported in a study conducted by Parande M. et all.[7]

It was observed that students used library facility primarily to prepare for examinations. Similar reasons were reported by Kalita H. et all [10]. In another study conducted by Basu M. et all [11] and Chatterjee C. et all [12], the main purpose to visit library was to read the text books.

Almost two third of the students in our study reported that recent editions of books and journals were available in the library. Similar findings were observed in a study by Srinivasalu P. et all[13]. However, in the study conducted Parande M. et all.[7] very few students reported positively.

Majority of the students in our study were found satisfied about facilities and services in library. Similar findings were reported in studies conducted by Rathnakara UP [14] and by Basu M. et all.[10]

Conclusion

It was found that most of the undergraduate and postgraduate students are utilizing library services. It was observed that students visited library for preparation of exams. It was evident that students use library facility daily as academic year progresses. Students spent more time in library, during examination periods than on usual days. Almost two third of the students opined positively for availability of recent editions of books and journals. Most of the students were satisfied with library services.

Recommendations:

Based on above findings it can be recommended that there is a need to sensitize students to use library for activities such as research, reading recent journals, preparation of seminar. Students should be encouraged to use library facilities regularly. Availability of recent editions of the books and journals should be increased in library for all academic years. Though most of the students are found satisfied with the library facilities.

Limitations of the study: This study was conducted in only one private medical college. Such studies may be carried out in other Government Medical colleges to confirm our findings.

Ethical Clearance: The study was approved by Institutional Ethical Committee. The approval letter from Institutional Ethical Committee has reference number and date as follows: IEC/ MIMER/2020/695 dated 09/03/2020

Conflict of Interest: There is no interest of conflict.

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Original Article

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Prevalence and Patterns of Non-Doctor Prescription Practices in Urban Field Practice Area of Dharwad

Arpitha V S[1], Pushpa S patil[2]

[1]Lady Medical Officer, Department of Community Medicine, Belagavi institute of medical sciences, Belagavi, [2]Professor and Head, Department of Community Medicine, Shri Dharmastala Manjunatheshwara college of medical sciences and hospital, Dharwad.

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Abstract

Background: The dearth of quality of care in many tribal and remote rural areas of the country has led to non-doctor prescription practices. Non-qualified personnel prescribing can result in drug resistance and wrong use of drugs. Our objective is to estimate the prevalence and patterns of non-doctor prescription practices in urban field practice area of SDMCMSH, Dharwad

Methods: A cross sectional study was conducted among adults of urban field practice area, SDMCMSH, Dharwad. An estimated sample size of 335 was selected using systematic random sampling. All eligible subjects were interviewed through pre-tested questionnaire.

Conclusion: The prevalence of non-doctor prescription practices was 42 (12.5%). Herbal practitioners 16 (38.09%) and nurses 12 (28.57%) were major non-doctors prescribing in community. Faith 13 (30.95%) and easy accessibility 7 (16.66%) were the reasons for consulting non-doctor. Around one in ten adults seek non-doctor for consultation. Herbal remedies were also prescribed along with allopathic medicine. Non-accessibility and non-availability of qualified doctors can increase this practice in near future.

Keywords: Non-doctor prescription, Prevalence, Systematic random sampling

Introduction or back ground

The term non-doctor prescription originated from UK. It was defined as" prescribing by specially trained nurses, optometrists, pharmacists, physiotherapists, podiatrists, and radiographers, working within their clinical competence as either independent or supplementary prescribers". However, the historical base is from USA in 1970's. In the 2003, supplementary prescribing was introduced in UK. Supplementary prescribing was defined as "a voluntary partnership between an independent prescriber (a doctor or dentist) and a supplementary prescriber (e.g., nurse, optometrist, pharmacist, physiotherapist, chiropodist/podiatrist,

Corresponding Author: Arpitha V S, Lady Medical Officer, Department of Community Medicine, Belagavi institute of medical sciences, Belagavi.

E-mail: arpithavs86@gmail.com

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or radiographer) to implement an agreed patient-specific clinical management plan with the patient's agreement". Independent prescribing was started in the year 2006.[1,2]

A Doctor in this context is described as any person who is qualified to prescribe an allopathic medicine.[10,11] The prescription which is not prescribed by a above defined person is considered as non-doctor prescription. Non-doctors are compounders, community health volunteers, certified health assistants, Complementary and Alternate medicine practitioners, traditional healers, Accredited Social Health Activist, pharmacists and nurses.[3,4]

The doctor-population ratio in India is of 1:1456. The standards mentioned by WHO is 1: 1000. Along with this there is a wide gap in distribution of doctors in urban and rural settings. It is estimated that the ratio of doctors distributed in urban to rural is 3.8: 1. There is a dearth on quality of care in many tribal and remote rural areas of the country. This has landed up in growth of quacks. It is told that 57.3% of personnel practicing allopathic medicines have no medical qualification. The Ayushman Bharat initiative announced by GoI demands 1,50,000 mid-level providers within the next 3-5 years to provide comprehensive primary and preventive care. The health and wellness centers proposed under this scheme is placed with trained mid-level providers.[5]In India, in order to curb the shortage of doctor's government has made an amendment in National Medical Council (NMC) bill to allow nurse practitioners to allow prescription of drugs.[6] There are few instances in India where the CHP were introduced to meet the disparity between number of patients and health practitioners. Hence, the present study was conducted to estimate the prevalence and patterns of non-doctor prescription practices in Urban field practice area of Dharwad.

Material and Methods

A Community based cross-sectional study was conducted among adults aged between 18-60 years residing at Jannat Nagar, Urban field practice area, SDMCMS&H, Dharwad. The study was carried out between November 2018 to October 2019. We included the adults aged between 18-60 years of age who are permanent residents and those who gave consent to participate. Those people who were seriously ill, mentally challenged and incapable of hearing and speaking at the time of data collection were excluded from the study.

The sample size was estimated using following formula. $n = z^2pq/ d^2$. Based on the previous studies the prevalence of non-doctor prescription practices was found to be 70%.[3] Alpha error of 5% and absolute error of 5% the estimated sample size was 335. We used systematic random sampling technique. The study area consisted of 1300 households with 5099 adult population. Sampling interval was estimated by dividing number of houses in the area with that of sample size which was calculated as 4. One random number from 1 to 4 was selected by lottery method. The subsequent house was selected by adding 4 to the random number. If the selected house was locked or non-availability of study participants at the time of visit, frequent and subsequent visits were made to collect the data. Even after 3 subsequent visits, if the participants are unavailable then the next random house was selected. Only one member from the household was selected by lottery technique.

Institutional ethical committee approval was taken before conducting the study.

A questionnaire was self-developed for this study. It was pilot tested and the necessary changes were incorporated. The questionnaire consisted of two parts. The first part included data on socio-demographic variables- age, gender, education, occupation, income, medical history and health insurance. The second part had details on patterns of non-doctor prescription practices.

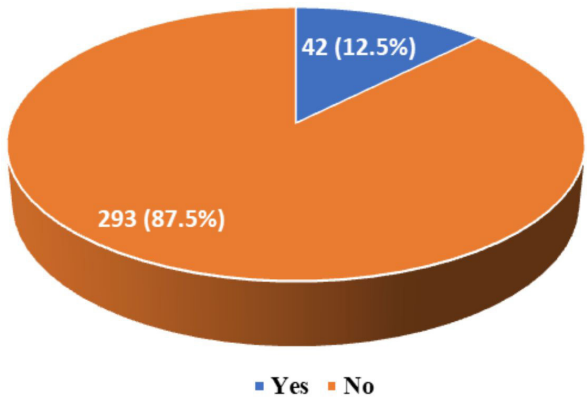


Figure 1: Prevalence of per non-doctor prescription practices (n=335).

Table 1: Non-doctors prescribing medications in the community. (n=42)

Non-doctor	Frequency	Percentage
Herbal practitioner	16	38.09
Anganwadi worker	3	7.14
Nurse	12	28.57
Traditional healer	4	9.52
Pharmacist	2	4.76
School teacher	2	4.76
Compounder	1	2.38
Relative	1	2.38
Trained dai	1	2.38

Table 2: Reasons for consulting non-doctor (n=42).

Reasons	Frequency	Percentage
Approachable	7	16.66
Emergency	2	4.76
Faith	13	30.95
Suggested by a friend	8	19.04
Accessible	7	16.66
Not relieved from other forms of therapy	5	11.90

Table 3: Diseases/symptoms for which non-doctor was consulted (n=42).

Diseases	Frequency	Percentage
Cough/cold	13	30.95
Allergy	1	2.38
Body ache	16	38.09
Acidity	1	2.38
DM/HTN	3	7.14
Fever	4	9.52
Fungal infection	1	2.38
Hemorrhoids	2	4.76
Paralysis	1	2.38

Results and Discussion

A total of 335 adults residing in Jannathnagar, field practice area of SDMCMS&H, Dharwad participated in the study. Majority of the participants were females 267 (79.7%), 99 (29.6%) of them belonged to 30-39 years of age, 190 (56.7%) were unemployed, 94 (27.5%) were illiterate, 180 (53.7%) were from nuclear family, 280 (83.6%) of them married and 155 (46.3%) belonged to class IV socio-economic status. The prevalence of non-doctor prescription practices in the community was 42 (12.5%) (Figure 1). Majority 16 (38.09%) of them took medications from herbal practitioners, 12 (28.57%) consulted nurse and few others contacted compounders, dai, pharmacist and school teacher (table 1). Table 2 shows the reasons given by study participants for consulting non-doctor. Of 42 (12.5%) study subjects who practiced non-doctor prescription, 13 (30.95%) of them said that faith was the reason behind consulting a non-doctor. Other reasons given by study participants were 7 (16.66%) easy accessibility, 7 (16.66%) approachable and 2 (4.76%) emergency situations. Table 3 shows the diseases for which non-doctor prescription was used. Of all the disease/ symptom, backache was the symptom for which 16 (38.09%) majority of the study participants approached non-doctor. 13 (30.95%) of them used Tulasi and other herbal drops to alleviate cold and cough and also to boost their immunity.

Remaining 5 (11.09%) participants said that they were not relieved of symptoms after taking medications from doctor and hence tried non-doctor prescription. Majority 30 (71.42%) of them consulted less than 3 times in last 6 months. Only 3 (7.14%) study participants consulted non-doctor more than 10 times. When study participants were enquired about the adverse events following the in take of the drugs prescribed by non-doctor, 2 (4.8%) out of 42 participants experienced adverse events like rashes and giddiness. And, 29 (69%) of the study participants told they were relieved of symptoms and will recommend the non-doctor prescription to others.

Discussion

A community based cross-sectional study was conducted among adults aged between 18-60 years in urban field practice area attached to Department of Community Medicine, Shri Dharmastala Manjunatheshwara College of Medical Sciences and Hospital, Dharwad to estimate the prevalence and to describe the patterns of non-doctor prescription practices. A total of 335 adults were included in our study. The prevalence of non-doctor prescription practices was 12.5%. Prescriptions practices were 12.5%. A community based cross-sectional study done in hilly terrain in Pokhara village in Nepal showed that the prevalence of non-doctor prescription was

70%.[3] A systematic review which included 46 studies, non-doctor prescription was undertaken by nurses in 26 studies and by pharmacists in 20 countries. The prevalence of nurse prescription in a study done at UK is 43%.[7] The relatively less prevalence in our study can be attributed to the study area, as it is a urban locality the health facilities and over the counter drugs are easily accessible. It has 3 pharmacies within 5km radius and nearest health facility is 2 km away.

Majority 16 (38.09%) and 12 (28.57%) of our participants consulted herbal practitioners and nurse respectively. A study done in Nepal in 2002 showed that majority of the non-doctor prescriptions were from compounders (51%) and certified health assistants (42%).[3] In a article named "working with non-medical prescribers" done in UK in 2011 figured out more than 50,000 non-medical prescribers. Which includes 30,000 community practitioners, 19,000 nurses, 2000 pharmacists and remaining were allied health professionals (optometrists, radiographers and physiotherapist).[8] Many countries like USA and Canada have now introduced certain reforms to authorize nurse for prescribing medicines to address physician shortage and increase in non-communicable/ chronic diseases.[9] As India is facing disproportion in doctor patient ratio, government had approved limited prescription rights to nurses, pharmacists and mid-level medical practitioners.[10]

Present study showed 13 (30.95%) of them said that faith was the reason behind consulting a non-doctor. Majority of them approached non doctor for body ache 16 (38.09%) and cough/ cold 13 (30.95%). The reasons given by the participants in a study conducted in Nepal were inaccessibility of the doctors, minor ailments (23%) and cost-effectiveness (11%).[3]It is said that faith heals more than a medicine. Our study participants had faith in those non-doctors whom they were consulting and also as many were using it for minor ailments, they preferred going to a non-doctor to avoid loss of daily wages and doctor fee. Few participants tried it as a last option as the symptoms/ disease were not cured by other mode of treatment.

Conclusion

The prevalence of non-doctor prescription practice was 42 (12.5%). The major source of non-doctors in the community were herbal practitioners 16 (38.09%) and nurses 12 (28.57%). The common reason for consulting non-doctor was faith 13 (3.65%) and easy approachability 7 (16.66%). The symptom for which non-doctor consulted was for bodyache. Further studies on factors influencing non-doctor prescription practices are required to address the issue.

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Ethical Clearance/Statement of Ethics: Institutional ethical committee, Ref number: SDMIEC/PG/0191/2018 date: 12-11-2018

Conflicts of interest statement: Nil

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Original Article

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A Study to Assess the Satisfaction Level among the Beneficiaries of Janani Shishu Suraksha Karyakram in Rural Areas of Jabalpur District, India

Ashish Jain[1], Neeraj Rai[2], Aditya Thakur[3]

[1]P.G. Resident, Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur (M.P.), ORICD ID: https://orcid.org/0009_0003_8600_7931 [2,3]Associate Professor, Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur, [2]ORICD ID: https://orcid.org/0009-0000-2575-7550, [3]ORICD ID: https://orcid.org/0000_0003_0137_287X

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Abstract

Introduction: The satisfaction derived from utilizing JSSK services underscores its pivotal role in transforming the healthcare landscape for millions of women and children in India. At its core, the program embodies the fundamental principle that every individual has the right to access quality healthcare without facing financial hardship.

Objective: To find out the Satisfaction level among the beneficiaries of JSSK in Jabalpur district.

Methods: It was a descriptive Cross-sectional study done in the rural areas of Jabalpur district. A sample of 385 was acquired using the formula z^2pq/l^2. Multistage random sampling was used for selection of study participants. House to house visit was conducted to collect data using predesigned, pretested semi-structured questionnaire regarding satisfaction on using services of JSSK and Behaviour among the support staff.

Results: The present study observed that out of total more than half of the study participants were satisfied with utilization of various JSSK entitlements whereas about one third of them expressed dissatisfaction with the services. About half of the study participants were satisfied regarding supporting services and behaviour of hospital staff.

Conclusion: A robust monitoring and feedback mechanisms should be enabled in order to track the continuous improvement and responsiveness to the evolving needs and preferences of beneficiaries, which will further enhance the satisfaction levels.

Keywords: JSSK, Beneficiaries, Utilization, Benefits, Satisfaction.

Introduction

In the vast tapestry of India's public health initiatives, the Janani Shishu Suraksha Karyakram (JSSK) shines as a beacon of hope, ensuring that expectant mothers and newborns receive the care they deserve, regardless of their socioeconomic

Corresponding Author: Aditya Thakur, Associate Professor, Department of Community Medicine, NSCB Medical College, Jabalpur.

E-mail: Adityathakur701@gmail.com

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status.[1]Launched by the Government of India in June 2011, the JSSK program is designed to provide a comprehensive range of free and cashless maternal and child healthcare services in public health facilities across the country. [1-2]

The satisfaction derived from utilizing JSSK services underscores its pivotal role in transforming the healthcare landscape for millions of women and children in India. At its core, the program embodies the fundamental principle that every individual has the right to access quality healthcare without facing financial hardship.[1,3,4] By offering a gamut of services encompassing antenatal care, institutional delivery, postnatal care, and treatment for sick newborns, the JSSK program endeavors to address the multifaceted needs of expectant mothers and their infants, ensuring their well-being throughout the perinatal period.[2,5]

The satisfaction derived from utilizing JSSK services extends beyond mere medical interventions to encompass broader socio-economic implications. Families are relieved of the stress of exorbitant healthcare expenses, enabling them to focus on nurturing their newborns' health and well-being, thereby fostering a sense of gratitude and contentment with the support provided by the government. [6] Moreover, the success of the JSSK program in garnering satisfaction among beneficiaries can be attributed to its patient-centric approach and effective implementation strategies. Keeping this in view, the present study has been done with an aim to find out the Satisfaction level among the beneficiaries of JSSK in Jabalpur district.

Material and methods

Study design

It was a descriptive Cross-sectional study done in the rural areas of Jabalpur district.

Study duration

Study was conducted from March 2019 to Feb 2020.

Sample size

A sample of 385 was acquired using the formula z^2pq/l^2. Where p was the prevalence of institutional delivery in rural area of Jabalpur District that was 79%.[6]5 % was considered as allowable error. A total of 400 sample was taken to avoid the drop outs.

Study participants

The women who were permanent resident, had delivered live child in public health facility in the past 1 year or who had registered in Anganwadi centre as well as sub health centres of that area. were included in the study. Women who did not found at home or house was found locked on two repeated visits were excluded from the study.

Study setting

Multistage random sampling was used for selection of study participants. Out of the 7 blocks in Jabalpur district 2 blocks were purposively selected based on the past year performance, in terms of Institutional deliveries in public health facilities to total deliveries. One was best performing block- Sihora and other was low performing block – Panagar. Then from each block 2 sub health centre was selected, from each sub health centre 2 village were selected randomly. After the selection of village 20 eligible participants were selected using lottery method after getting the list from Anganwadi worker of the village.

Data Collection

House to house visit was conducted to collect data using predesigned, pretested semi-structured questionnaire regarding satisfaction on using services of JSSK and Behaviour among the support staff. Relevant records whichever available were reviewed during data collection. Data obtained was coded and entered using Microsoft office excel 2016. Collected data was checked for its completeness and correctness before analysis.

Statistical analysis

Data obtained was coded and entered using Microsoft office excel 2016. Collected data was checked for its completeness and correctness before analysis. Data was finally tabulated, analysed and interpreted by using IBM Statistical software for social sciences (SPSS 20). Chi-square test was applied to find out the association between different variables.

Ethical Permission

Ethical Permission was taken from the ethical committee of Institution on Aug 2018 with reference no. IEC/ 343/2018. Purpose of the study was clearly explained to the study participants before commencing interview and Informed Verbal Consent was obtained from study participants.

Results

A total of 400 participants were enrolled in the study based on the inclusion and exclusion criteria. Table.no.1. shows satisfaction level of study participants for various entitlements utilized during delivery out of which regarding transport 47% were highly satisfied while for diagnostic services 42% were highly satisfied. Regarding drugs and consumables 57% of study participants were satisfied. About 1/4th of the study participants was highly dissatisfied with their out-of-pocket expenditure incurred during delivery. Figure.1. depicts that 54% of the study participants were either satisfied and highly satisfied with utilization of various entitlements of JSSK during delivery. About 31% of the study participants were dissatisfied and highly dissatisfied with utilization of various entitlements of JSSK during delivery.

Table. no. 2. shows that 41% of the study participants were satisfied with immediate attention given after admission of which 22% were highly satisfied. Satisfaction level was low (15%) about behaviour of labour room staff and 49% were dissatisfied with their behaviour. Similarly for nursing staff behaviour only 20% were highly satisfied while 50% were dissatisfied. Figure.2. depicts that equal proportion of study participants were satisfied (43%) and dissatisfied (39%) with behaviour of hospital staff and supporting services utilized during hospitalization while 20% were undecided about it.

As shown in table.no.3. study participants who were highly satisfied and satisfied with various entitlements utilized during delivery were >25 years of age (59%), educated up to middle school (60%) , unskilled worker (58%), belonged to ST category (84%), living in joint family (55%), in Lower class (61%) and had BPL card(59%). Association with education of the study participants was statistically significant (<0.05) and association with caste and socioeconomic status was statistically highly significant (<0.001). In table.no.4. it was observed that 59% study participants who underwent normal delivery were found to be either satisfied or highly satisfied with various JSSK entitlements. 71% of study participants who delivered in Civil hospital (SDH) were found to be satisfied and highly satisfied as compared to who delivered at tertiary centres and rural health centres. Association of satisfaction level for various entitlements of JSSK utilized with type and place of delivery was found to be statistically highly significant (<0.001).

Table 1: Distribution of study participants according to satisfaction level regarding various entitlements of JSSK.

S. No.	Entitlements under JSSK	Highly satisfied Frequency (%)	Satisfied Frequency (%)	Undecided Frequency (%)	Dissatisfied Frequency (%)	Highly Dissatisfied Frequency (%)
1.	Free diagnostic services	166 (42)	98 (24.5)	46(11.5)	29(7)	61(15)
2.	Free drugs and consumables	102(25.5)	128(32)	47(12)	77(19)	46(11.5)
3.	Free diet in the hospital	86(21.5)	114(28.5)	54(13.5)	78(19.5)	68(17)
4.	Availability of free transportation from home to hospital	189(47)	71(18)	41(10)	54(14)	45(11)
5.	Free transport facilities available at the time of discharge from hospital to home	154(39)	74(19)	45(11)	60(15)	67(17)
6.	Out of pocket Expenditure during hospitalization	46(12)	78(20)	112(28)	68(17)	96(24)

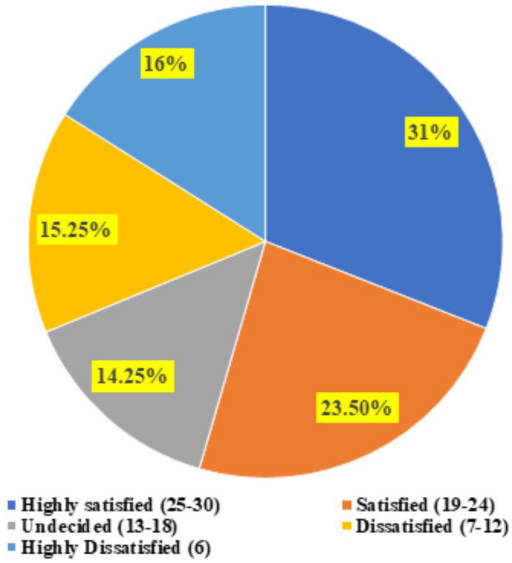


Figure 1: Proportion of study participants according to satisfaction level (score) for various entitlements of JSSK utilized during delivery.

Table 2: Distribution of study participants according to satisfaction level regarding hospital staff behaviour and Supportive service.

S. No.	Regarding hospital staff behaviour	Highly satisfied Frequency (%)	Satisfied Frequency (%)	Undecided Frequency (%)	Dissatisfied Frequency (%)	Highly Dissatisfied Frequency (%)
1.	Immediate attention given after admission by doctor and staff	89(22)	74(19)	93(23)	38(10)	106(26)
2.	Behaviour of Labor room Staff During Child birth	60(15)	115 (29)	29 (7)	122 (30)	74(19)
3.	Behaviour of nursing staff during stay in hospital	78(20)	96 (24)	24 (6)	89 (22)	113(28)
S. No.	**Supporting services**	**Highly satisfied Frequency (%)**	**Satisfied Frequency (%)**	**Undecided Frequency (%)**	**Dissatisfied Frequency (%)**	**Highly Dissatisfied Frequency (%)**
1.	Availability of stretcher /wheel chair during shifting to ward	47(12)	57 (14)	98 (25)	117 (29)	81(20)
2.	Signboards/Locating departments were available	64(16)	43(11)	178 (44)	54 (14)	61 (15)
3.	Provided bed, mattress, pillow, blankets and linen during stay	112(28)	148 (37)	81 (20)	32 (8)	27 (7)
4.	Frequent communication / counselling by Staff about patient condition and timing of discharge	96(24)	48 (12)	36 (9)	94 (24)	126 (31)
5.	Counselling about diet, care, medicine, immunization & follow-up at the time of discharge	112(28)	146 (37)	76 (19)	32 (8)	34 (8)

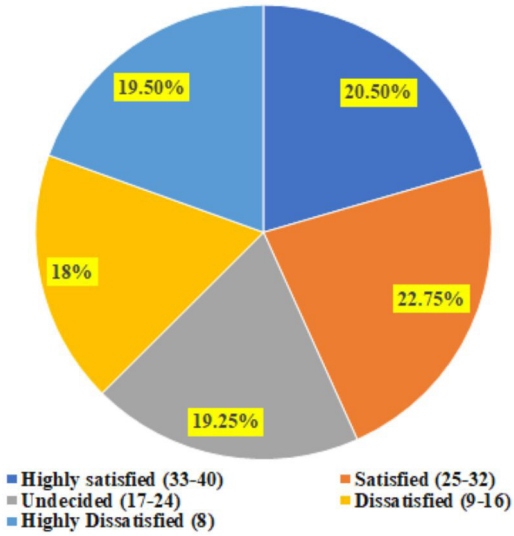


Figure 2: Proportion of study participant according to satisfaction level (score) regarding the behaviour of hospital staff and supporting services utilized during hospitalization

Table. No. 3. Association Between Socio-demographic Variables and satisfaction level for various entitlements utilized during delivery.

	Satisfaction status			Total N=400(%)
Socio demographic variables	**Highly satisfied and satisfied N = 228 (%)**	**Neither satisfied and dissatisfied N=57 (%)**	**Dissatisfied and highly dissatisfied N=125 (%)**	
Age (in years)	Frequency	Frequency	Frequency	
18-25	152 (53)	40 (14)	96(33)	288 (100)
>25	66 (59)	17(15)	29(26)	112 (100)
χ2=2.08, df =2, P =0.354				
Education of Study participant				
Upto Primary school	85 (52)	33 (20)	45 (28)	163 (100)
Middle school	97 (60)	15 (9)	50 (31)	162 (100)
High school and above	36 (48)	9 (12)	30 (40)	75 (100)
χ2=11.36, df = 4, P = 0.023				
Occupation				
Housewife	183 (54)	50 (15)	107 (31)	340 (100)
Unskilled worker	35 (58)	7 (12)	18 (30)	60 (100)
χ2=0.56, df = 2, P =0.758				
Caste				
General and Other backward class	79 (37)	46 (21)	91 (42)	216 (100)
Scheduled caste	58 (67)	7 (8)	22 (25)	87 (100)
Scheduled tribe	81 (84)	4 (4)	12 (12)	97 (100)
χ2=67.16, df = 4, P*=<0.001				
Type of family				
Nuclear	104 (53)	25 (13)	66 (34)	195 (100)
Joint	114 (55)	32 (16)	59 (29)	205 (100)

Continue.....

χ2=1.46, df =2 , P =0.482				
Socioeconomic status				
Upper middle Class (II) & Middle Class (III)	29 (36)	13 (16)	39 (48)	81 (100)
Lower middle Class (IV)	110 (58)	17 (9)	62 (33)	189 (100)
Lower Class (V)	79 (61)	27 (21)	24 (18)	130 (100)
χ2=28.68, df =4, P*= < 0.001				
BPL card				
Yes	125 (59)	27 (13)	61 (28)	213(100)
No	93 (50)	30 (16)	64 (34)	187 (100)
χ2=3.25, df =2, P =0.196				

* Statistically significant

Table No. 4: Association between type and place of delivery with satisfaction level for various entitlements of JSSK utilized.

	Satisfaction status			**Total N=400 (%)**
	Highly satisfied and satisfied N =228 (%)	**Neither satisfied and dissatisfied N=57 (%)**	**Dissatisfied and highly dissatisfied N=125 (%)**	
Type of delivery	**Frequency**	**Frequency**	**Frequency**	**Frequency**
Normal	204 (59)	51 (15)	92 (26)	347 (100)
LSCS	14 (26)	6 (11)	33 (63)	53 (100)
χ2=28, df =2, P*= < 0.001				
Place of delivery				
SHC, PHC & CHC	62 (56)	20 (18)	29 (26)	111 (100)
SDH (Civil hospital)	98 (71)	15 (11)	26 (18)	139 (100)
DH & Medical college hospital	58 (39)	22 (15)	70 (46)	150 (100)
χ2=35.10, df =4, P*= <0.001				

* Statistically significant

Discussion

54.5 % of the Study participant were surely Satisfied with the various entitlements of JSSK utilized during delivery. Dissatisfaction Proportion regarding the entitlements of JSSK was around 30%. More satisfaction was found in Free diagnostic and transport services available under JSSK. Similar finding was reported by Gupta M et al [7] that among pregnant mothers, all the respondents were satisfied with the availability of drugs and consumables. Similarly, 49 (98%) respondents were satisfied with the available investigation 24×7 (including laboratory services, ultra-sonography and electrocardiogram etc). Among pregnant mothers, 44 (88%) respondents were satisfied with the transport service to and fro and referral services and 5 respondents were highly satisfied. 47 (94%) respondents were satisfied with the available free diet in the hospital. All the respondents i.e., 50 (100%) were happy and satisfied with the availability of free transport at the time of discharge. Another study done by Chauhan et al [8] observed that out of 64 beneficiaries who delivered at hospital, most 52 (81%) of them were satisfied and only 12 (18.75%) were found to be dissatisfied with the services received at place of delivery. A study carried out by Sharma P et. al. 67% of the women were satisfied with the benefits that they were getting through this program and about 33% participants in the study were not satisfied.[9]

A total of 43% of Participants in the present study were satisfied with behaviour of hospital staff and supporting services utilized during hospitalization. A study done by Gupta M et al [7] observed that among 50 pregnant mothers, 46 (92%) respondents were satisfied with the attention provided by them in indoor immediately. As far as nursing care and immediate attention, 46 (92%) and 48 (96%) respondents were satisfied respectively; only two to three respondents were highly satisfied with the nursing care and attention provided by the staff after admission respectively.

In present study Satisfaction level for supporting services was low out of which lowest for availability of stretcher /wheel chair during shifting toward (26%) and for signboards and locating departments (27%). Most of the study participants were satisfied with availability of bed, mattress, pillow, blankets and linen during stay (65%). Satisfaction level regarding counseling about diet, care, medicine, immunization & follow-up at the time of discharge was 65%.

Gupta M et al [7] found that majority of the respondent 's i.e. 45 (90%) had frequent communication about patient condition and about the discharge and were satisfied. At the time of discharge, a large majority of the respondents i.e. 47 (94%) were satisfied in relation to guidance about diet, medicine, care of the patients at home, immunization and further follow-up in the hospital. This difference in satisfaction level for various component in present study and study done by Gupta M et al may be due to different health facilities were involved in present study while Gupta M et al did his study in one tertiary care hospital. In tertiary care hospital there is better provision of care than rural health care delivery system. Association might be due to a study participant who belonged to General and OBC caste were more aware and knowledgeable about JSSK entitlement but because of underutilization of entitlements they were highly dissatisfied.

Similarly, association of socioeconomic status with satisfaction level for various entitlements utilized during delivery might be due to as socioeconomic status of the participants increases, they became more aware and knowledgeable about JSSK entitlement and because of underutilization of entitlements they were highly dissatisfied. Similarly in present study the Association between type and place of delivery with satisfaction level was due to the reason that normal deliveries' study participants had low OOPE compared to LSCS and which in turn giving rise to more satisfaction among them.

Conclusion

The present study observed that out of total more than half of the study participants were satisfied with utilization of various JSSK entitlements whereas about one third of them expressed dissatisfaction with the services however most of the study participants (about 2/3rd) were satisfied regarding diagnostic services as well as with free transportation facility from home to hospital while highest dissatisfaction was observed for out-of-pocket expenditure incurred during hospitalization. About half of the study participants were satisfied regarding supporting services and behaviour of hospital staff. The association was found statistically significant between satisfaction level for utilization of various JSSK entitlements and education, caste, socioeconomic status of the study participants as well as for type and place of delivery. A robust monitoring and feedback mechanisms should be enabled in order to track the continuous improvement and responsiveness to the evolving needs and preferences of beneficiaries, which will further enhance the satisfaction levels.

Conflict of Interest: None

Source of Funding: Self

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Original Article

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Drug Utilization Pattern in Dermatology: A Comprehensive Analysis of Prescription Trends and Patient Management in Dermatological Outpatient Department (OPD)

Ashraf A. M [1], Subramanian R[2], Rajkumar R[3], L.Manju[4]

[1]Assistant Professor, Department of pharmacology, Sree Uthradom Thirunal Academy of Medical sciences, Vattapara, Thiruvananthapuram, [2]Associate Professor, Department of Dermatology, Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram, [3]Assistant Professor, Department of Pharmacology , Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram, [4]Statistician, Department of Community Medicine, Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram.

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Abstract

Background: Drug utilization Understanding the patterns of drug utilization is essential for optimizing patient management in Dermatology Outpatient Departments (OPD). This study presents a comprehensive analysis of prescription trends and patient management practices in Dermatology OPD, with a specific focus on drug utilization patterns.

Methods: A cross-sectional study was conducted in the Dermatology OPD of a tertiary care center in 322 patients. Data were collected through observations and the review of health records. The study investigates prescription trends, drug utilization patterns, and drug formulations used, considering various dermatological conditions.

Results and conclusions: Prescription trends are examined in terms of medication classes, dosage regimens, and treatment durations. This study sheds light on the patterns of drug utilization patterns in Dermatology OPD, offering a foundation for evidence-based decision-making in patient care. Males (59.93%) outnumbered females in health seeking behavior ,tinea (10.9%) was the most commonly reported condition and antihistaminincs (17.57%) were the most prescribed drugs followed by antifungal drugs (8.5%). Total number of drugs prescribed were 1070.Average number of drugs per prescription is 3.32, percentage of prescriptions with antibiotics and injections were 21.1% and 1.55% respectively. These findings are significant in optimizing prescription practices, enhancing patient outcomes, and guiding future research in dermatological therapeutics.

Keywords: Dermatology, Drug Utilization, Prescription Pattern, Patient Management, Cross-sectional Study, Skin Disorders, Medication Patterns.

Corresponding Author: Asida Mohamed Ashraf, Assistant Professor, Department of pharmacology, Sree Uthradom Thirunal Academy of Medical sciences, Vattapara, Thiruvananthapuram.

E-mail: drasidaraj@gmail.com

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Introduction

Dermatological conditions represent a wide spectrum of disorders that significantly impact the quality of life of affected individuals. Since dermatology is a broad specialty with increasing OPD attendance by patients, understanding the utilization patterns of dermatological drugs is paramount for optimizing patient care and advancing the field. Drug utilization studies are part of a broad specialty known as Pharmacoepidemiology, a science that encompasses pharmacology and epidemiology under its wing for the study of drug use and its effects in large group of populations. In other words this field is concerned about postmarketing surveillance and they can influence clinical decision and policy making.[1] This study embarks on a comprehensive investigation into the drug utilization patterns in Dermatology OPD, with a focus on prescription trends and patient management strategies. By delving into the intricacies of drug prescriptions and patient care, this research seeks to contribute valuable insights that can inform evidence-based practices, refine treatment protocols, and ultimately enhance the effectiveness of dermatological interventions.

A review of existing literature underscores the importance of studying drug utilization patterns in dermatology to improve patient outcomes and healthcare efficiency. Previous research has emphasized the dynamic nature of dermatological drug prescriptions, with considerations for diverse patient populations, varying skin conditions, and evolving therapeutic modalities.[2]

Several studies have investigated prescription trends in dermatology, shedding light on the prevalence of specific drug classes, dosage regimens, and the impact of factors such as age, gender, and geographic location on prescription patterns. These investigations have contributed to a growing body of knowledge, revealing trends in the utilization of topical and systemic agents for conditions ranging from common dermatoses to more complex autoimmune disorders.

Despite these valuable contributions, there remains a need for studies that specifically delve into drug utilization patterns within the dynamic setting of Dermatology OPD, considering the nuances of outpatient care. This study addresses this gap by conducting a comprehensive analysis, incorporating a substantial sample size of 322 patients, and providing an in-depth exploration of prescription trends and patient management strategies.

In conclusion, this study builds upon the foundation laid by previous research and extends the current understanding of drug utilization patterns in Dermatology OPD. By doing so, it aspires to contribute meaningful insights that can inform clinical practices, guide future research endeavors, and ultimately improve the delivery of dermatological care.

Materials and Methods

A prospective evaluation of 322 prescriptions of patients attending Dermatology OPD of Sree Uthradom Thirunal Academy of Medical sciences were done and the data were entered into Microsoft Excel. Data analysis were done in SPSS 28. Patients who fulfilled the inclusion criteria were included in the study after taking informed consent. The study was conducted after getting Instituitional Ethical Committee clearance (NO: 41/IEC/SUTMS/2023) dated 04/05/2023

Inclusion criteria

Patients attending dermatology OPD irrespective of age who gave consent.

Exclusion criteria

Patients who did not consent to the study

The relevant data was collected from OPD prescriptions details were filled into the predesigned proforma.

Prescriptions were analyzed for following information:

1. Data pertaining diagnosis: Dermatological conditions for which treatment were sought.
2. Data pertaining to drug therapy: Drugs prescribed groups to which the drugs belong, dosage forms, route, frequency and duration of administration.
3. Prescribing indicators

Statistical analysis

SPSS 28 was used for statistical analysis. Results were expressed in terms of percentage.

Results

A total of 322 prescriptions were analysed for patient demographic details, prescribing details and disease incidence.

Table 1: Age distribution among study patients

Sl No	Age category	Frequency	Percentage (%)
1.	<10	43	13.4
2.	10-19	41	12.8
3	20-29	75	23.3
4	30-39	42	13
5	40-49	51	15.8
6	50-59	28	8.7
7	>60	42	13
	Total	322	100

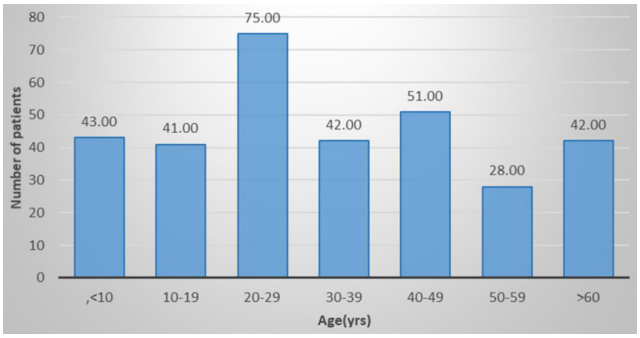


Figure 1: Age distribution among study patients

Table 2: Gender distribution among study patients

Gender	Frequency	Percentage
Female	129	40.06
Male	193	59.93
Total	322	100

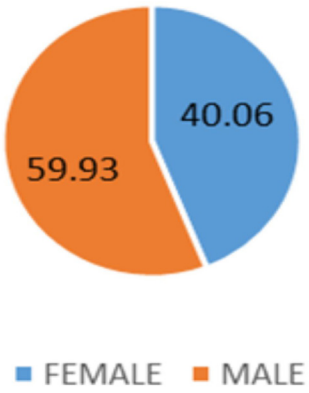


Figure 2: Gender distribution of study patients

The most common conditions observed were Tinea 39 (10.9%) >acne vulgaris 31 (8.6%)>Eczema 27 (7.5%) > psoriasis 15(4.2%). The various patterns of skin conditions observed are given in Table No.3

Table 3: Frequency of various dematological conditions among patients attending Dermatology OPD

Diagnosis	Frequency	Percentage
Tinea	39	12.11
Acne vulgaris	32	9.94
Eczema	27	8.39
Pityriasis versicolor	22	6.83
Psoriasis	15	4.66
Candidiasis	16	4.97
PMLE[#]	11	3.42
Urticaria	11	3.42
Seborrheic dermatitis	11	3.42
Miliaria	9	2.80
Pyoderma	8	2.48
Insect bite reaction	7	2.17
Alopecia	7	2.17
Melanosis	6	1.86
Pityriasis alba	6	1.86
Contact dermatitis	6	1.86
Lichen planus	5	1.55
Photodermatitis	4	1.24
Warts	4	1.24
Scabies	4	1.24
Atopy	4	1.24
Herpes simplex	4	1.24
Dermatitis Papulosa Nigra	4	1.24
Keloid	3	0.93
Hypertrophic scar	3	0.93
Vitiligo	3	0.93
Xerosis	3	0.93
Melasma	3	0.93
Acanthosis nigricans	3	0.93
Angioedema	3	0.93
Amyloidosis	2	0.62
Furunculosis	2	0.62
Impetigo	2	0.62
Onycholysis	2	0.62

Continue.....

Lichen simplex chronicus	1	0.31
Onychomycosis	1	0.31
Pediculosis	1	0.31
Pemphigus vulgaris	1	0.31
Pompholyx	1	0.31
Varicella	1	0.31
Others	25	7.77
Total	322	100

PMLE- Polymorphous Light Eruption.

The commonly prescribed drug classes were H1 antihistaminics 54% (175) followed by antifungal agents 28%(91) as shown in the table . Steroids were prescribed in 4.3% prescriptions. 95.03% prescriptions had topical treatments along with oral drugs ,only 4.96% prescriptions were without topical drugs prescription.

Table 4: Drug classes prescribed and their frequencies.

Drug Groups	No of Drugs Prescribed	% of Total Drugs Prescribed
Antihistaminincs	188	17.57
Steroids	14	1.30
Antifungals	91	8.5
Antihelminthics	41	3.83
Antiviral drugs	4	0.37
H2 blockers and PPI	50	4.67
Vitamins	51	4.76
Probiotics	22	2.05
Immunomodulators	5	0.02

Of the 322 prescriptions the different topic formulations commonly prescribed were as shown in the Table 5.

Table 5: Formulations prescribed and their frequencies.

Formulation	Frequency	Percentage
Lotion	79	24
Ointment	34	10.5
Gel	55	17.08
Cream	223	69.2
Soap	29	9

Continue.....

Shampoo	36	11.18
Sunscreen	20	6.21
Facewash	6	1.86
Nail Lacquer	5	1.55
Powder	2	62.11

Total number of drugs prescribed were 1070 and the average number of drugs per prescription is 3.32. Generic drugs were seen in 3.32% (12) of prescriptions 1.12% of total number of drugs prescribed. Antibiotics were prescribed in 21.11% (68) prescriptions and topical steroids were seen in 45.65% (147) prescriptions. Percentage of prescriptions with injections prescribed are 1.55% and that with drugs prescribed from EDL are 3.72%.

Discussion

The present study provides a comprehensive analysis of prescribing patterns, patient demographics, and prevalent skin conditions in the dermatological outpatient setting. Our findings shed light on several key aspects of dermatological practice, including patient age and gender distribution, common diagnoses, prescription trends, and usage of different topical formulations, the trend of oral and parenteral drug usage.

Patient Demographics:

Analysis of patient demographics revealed a varied distribution across different age groups and genders. The majority of patients fell within the age range of 20-29 years, comprising 23.29% of the total sample, followed by those aged 40-49 years and 30-39 years. This distribution reflects the diverse age spectrum of individuals seeking dermatological care. Furthermore, a higher proportion of male patients (59.7%) compared to female patients (40.3%) attended the OPD, suggesting a gender related variation in treatment seeking behaviour in dermatology practice. This is in line with the study by Farah Asif et al [3] where the percentage of males were 54.16%.

Prevalent Skin Conditions:

Tinea emerged as the most common dermatological condition, accounting for 10.9% of diagnoses, followed by acne vulgaris (8.6%), eczema (7.5%), and psoriasis (4.2%). This is in contrast

to study by Anuj Kumar et al [4] where the most common diagnosis was acne (17.95%) The prevalence of these conditions aligns with global trends reported in dermatological literature. Additionally, a wide array of less common conditions were identified like pompholyx, keloid, warts, varicella etc, emphasizing the broad spectrum of dermatological diseases encountered in clinical practice.

Prescription Patterns:

H1 antihistamines constituted the most frequently prescribed drug class (54%), indicating their significance in managing allergic and inflammatory skin conditions. Antifungal agents were also prominently prescribed (28%), reflecting the high prevalence of fungal infections such as tinea. This is in line with similar findings by Anuj Kumar et al[4] where antihistaminics and antifungals formed the majority of drugs prescribed. Steroid usage, while relatively lower (4.3%), underscores their role in managing inflammatory skin conditions cautiously due to associated adverse effects. Notably, the overwhelming majority of prescriptions (95.03%) included topical treatments alongside oral medications, highlighting the importance of multimodal therapy in dermatological management which was in contrast to other studies by Marie et al[5] and Pathak et al [4]where oral formulations were majorly prescribed than topical formulations.

Topical Formulations:

Creams were the most commonly prescribed topical formulation (69.2%), followed by lotions (24%) and gels (17.08%) which is similar to a study by Shankpal[6] et al This preference for creams may be attributed to their ease of application and versatility in addressing various dermatological conditions. Other formulations such as ointments, shampoos, and sunscreens were also prescribed, albeit less frequently, reflecting the diverse therapeutic needs of dermatological patients.

Prescription Characteristics:

The average number of drugs per prescription was 3.32 which was similar to findings by Krishna J et al[7] indicating the multidrug approach often employed in dermatological management. Other studies showed average number of drugs to be 1.48 [5] which is in accordance with WHO guidelines (<2). However, the utilization of generic drugs was relatively low (3.32% of prescriptions), suggesting potential opportunities for cost-saving measures and increased access to medications. This was in contrast to a study by R Maini et al[8] where the generics were 6.98%. Antibiotics were prescribed in approximately one-fifth of cases (21.11%), underscoring their role in managing infectious dermatological conditions. Furthermore, a substantial proportion of prescriptions included topical steroids (45.65%), emphasizing their widespread use in treating inflammatory skin disorders. Percentage of prescriptions done based on EDL were only 3.72% owing to factors like perceived differences in quality and therapeutic effect. other studies demonstrated high number prescriptions based on EDL such as 92.6% by Sumana et al [9] and 48.84% by Suhaina et al .[10]

Limitations and Future Directions:

This study has several limitations, including its retrospective nature and single-center design, which may limit the generalizability of findings. Though the sample is drawn from a single OPD, several factors support its broader representativeness which are as follows:

1. Diverse patient demographics: The hospital caters to a large and diverse population drawing patients from different socioeconomic groups, culture and age groups. This diversity helps in capturing a wide range of patient characteristics making it more generalizable.
2. High patient volume : which gives a picture of medication use patterns and health issues
3. Consistency with broader trends: our findings were compared with other national and international multicenter studies and an observtions were made on similar health trends and medicatiion usage patterns.
4. We focused on generalizable outcomes rather than outcomes which are unique to our hospital's characteristics.

Additionally, the study did not explore factors influencing prescribing decisions or patient outcomes. Further studies are needed in this area to determine factors determining such prescription trends and their modulation in patient care to bring about maximal therapeutic benefits.

Conclusion

In conclusion, this study offers valuable insights into the demographic profile, prevalent skin conditions, and prescription patterns in a dermatological outpatient setting. It mainly focused on prescribing indicators and adherence to WHO guidelines. The generic prescription, prescription from EDL were low and average number of drugs were high emphasizing the need for rationality in prescription and reducing therapeutic costs. The findings underscore the need for personalised therapeutic approaches, emphasizing the importance of evidence-based practice and holistic patient care in dermatology. Further research is needed to address gaps in knowledge and optimize dermatological management strategies. While it is true

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Original Article

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Awareness about Menstrual Cups and Hygiene amongst Undergraduate Medical Students of Government Medical College of Central India

Ayushi Shrivastava[1], Satish Saroshe[2], Vijay Khare[3], Shivam Dixit[4]

[1]PG Resident, Department of Community Medicine, M.G.M Medical College and M.Y. Hospital, Indore, [2]Associate Professor, Department of Community Medicine, M.G.M Medical College and M.Y. Hospital, Indore, [3]PG Resident, Department of Community Medicine, M.G.M Medical College and M.Y. Hospital, Indore, [4]Assistant Professor(Statistics and Demography)Department of Community Medicine, M.G.M Medical College and M.Y. Hospital, Indore.

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Abstract

Background: Menstrual hygiene management is a critical component of women's health, and it is imperative that medical students, future healthcare providers, possess a comprehensive understanding of menstrual cups. They have emerged as a sustainable and cost-effective alternative to traditional menstrual hygiene products. This study aims to assess the awareness and knowledge about menstrual cups and menstrual hygiene among medical students.

Material & Methods: A pre and post intervention study was conducted among female undergraduate medical students to assess their baseline knowledge and awareness of menstrual cups and menstrual hygiene. Subsequently, a targeted educational intervention, consisting of educational session and post-intervention assessment was conducted to assess changes in awareness.

Results: Majority were from 1st professional year and between age group 18-25 years**.** The impact of educational intervention can be assessed by the knowledge about menstrual cups being readily available at pharmacies which has also improved from 29.7% pre-intervention to 89.8% post-intervention, showing a significant improvement in knowledge($p<0.05$). The knowledge about menstrual cups being easy to use and acceptable had also increased from 32% to 86.7% post-intervention, showing a significant improvement in knowledge ($p<0.05$).

Conclusion: This study emphasises the significance of empowering the medical students to be advocates for improved menstrual hygiene practices. These findings contribute to the ongoing efforts to promote menstrual health and hygiene in India and underscore the need for further research and interventions in this crucial area of public health.

Keywords: Menstrual Cup, Menstrual Hygiene, Education Intervention

Corresponding Author: Vijay Khare, PG Resident, Department of Community Medicine, M.G.M Medical College and M.Y. Hospital, Indore.

E-mail: vjkhare24@gmail.com

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Introduction

For decades, MHM (Menstrual Hygiene Management) has been overlooked while the population health community understandably has focused its attention on issues related to adolescent girls' sexual and reproductive health, such as risks from HIV and other sexually transmitted infections, family planning, and contraceptive use. A growing focus on MHM from nongovernmental organizations, UNICEF, and other international agencies now highlights the profound impact of this problem on school-aged girls and provides the basis for a much-needed research, programming, and policy agenda.[1] The sensitive nature of the topic (menstruation) can pose challenges to utilizing particular research methods, emphasizing the importance of local collaborations and the incorporation of a range of research methods to assure the most valid set of data is acquired.[2] Menstrual cups have been available for decades, but their use in India is limited because of lack of awareness and popularity of sanitary pads. Since they are reusable, they reduce solid waste and are environment friendly.[3] MCs are reusable sanitary cups which are made of medical grade silicon, latex, or a thermoplastic isomer. These cups were first patented in the USA and presently almost 100 brands are available and marketed globally.[4] Made of high-grade medical grade silicone (biodegradable) have the advantage of reuse, and can potentially last up to 10 years.[5] It collects more blood than the standard sanitary pads and is environmentally friendly with few known side effects. The knowledge about menstrual cup will motivate the women to start using them as it is an ecofriendly, cost effective and sustainable method and will thereby promote menstrual hygiene[6]. Menstrual cup is one of the menstrual management products that is available throughout the world and can be effective in improving women's quality of life by empowering women in menstrual management.[10] The present study tries to assess the impact of educational intervention on knowledge about menstrual cups in the female undergraduate students at MGM Medical College, Indore (M.P.).

Aims and Objectives

The present study aims to explore the impact of an educational intervention on the awareness and knowledge of menstrual cups and menstrual hygiene among undergraduate medical students at MGM Medical College, Indore (M.P.). By focussing on this specific demographic, we seek to not only improve their understanding of menstrual health but also equip them with the knowledge and skills to educate and counsel their future patients effectively.

Furthermore, this research also shed light on the importance of addressing menstrual hygiene from a public health perspective and demonstrates how medical undergraduates can play a vital role in changing societal attitudes towards menstrual hygiene practices.

Material and Methods

- Study Design

We employed a descriptive longitudinal study design.

- Study Participants

By using convenience sampling, undergraduate medical students from various academic years were recruited for the study. Inclusion criteria included students currently enrolled at MGM Medical College, Indore and their willingness to participate in the educational intervention. The study was carried out from December 2022 to February 2023.

- Sample Size Calculation

The sample size was determined using the Cochran's formula:

$$n = Z^2 pq/d^2$$

Where:

n = required sample size

Z = Z-score (confidence level) at 95% confidence interval (1.96)

p = estimated proportion of undergraduate medical students with awareness about menstrual cups (taken as 82)[8-9]

d = margin of error (0.07)

After calculation, the minimum required sample size was determined to be approximately 130 participants.

- Educational Intervention

The educational intervention was based on review of existing literature on menstrual cups, menstrual hygiene and educational programs.

o A power-point presentation on menstrual cup usage and benefits.

o A discussion on menstrual hygiene practices.

o Q & A sessions

The educational intervention was conducted in a classroom setting over a two-hour session. It was designed to be an interactive session with open discussions.

- Data Collection

Pre-intervention Assessment

The participants completed a pre-intervention questionnaire which included the socio-demographic data and questions regarding the knowledge about the menstrual cups.

Post-intervention Assessment

Following the educational intervention, the same participants completed a post-intervention questionnaire that was identical to the pre-intervention assessment. This allows for a comparison of changes in knowledge and attitudes.

- Data analysis

Data collected through the questionnaires were coded, entered into a database and analysed using a statistical software SPSS version 25. Descriptive statistics such as frequencies and percentages were used to summarize the participant's socio-demographic characteristics, awareness levels and menstrual hygiene practices. Mcnemar test was used to compare pre and post intervention responses. A p-value of <0.05 was statistically significant.

Results

The results show that there were total of 128 students out of which 72 were from 1st prof, 26 from 2nd prof and 4 & 26 from 3rd and 4th prof respectively.

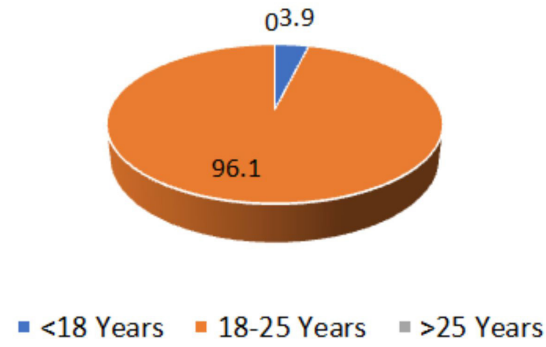


Fig 1: Agewise Distribution of Study Participants

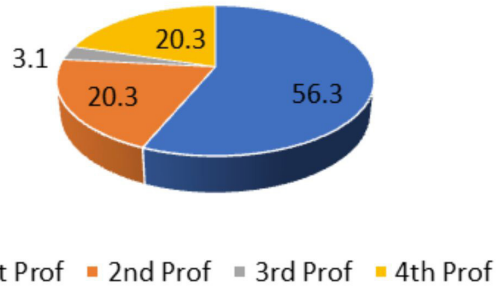


Fig 2: Batchwise Distribution of Study Participants

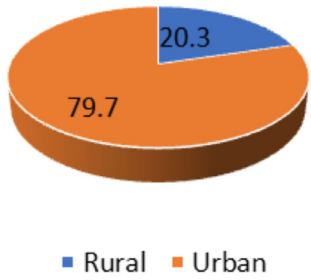


Fig 3: Urban/Rural distribution of participants

The results show that most of the female medical students had heard about menstrual cups (96.1%) prior. After educational intervention, this percentage increased to 98.4%. Majority of females got to know about menstrual cups from social media (72.66%) while some from friends (46.1%) and some (23.44%) from various advertisements. The impact of educational intervention can be assessed by the knowledge about menstrual cups being readily available at pharmacies which has also improved from 29.7% pre-intervention to 89.8% post-intervention, showing a significant improvement in knowledge($p<0.05$). The knowledge about menstrual cups being easy to use and acceptable had also increased from 32% pre-intervention to 86.7% post-intervention, showing a significant improvement in knowledge ($p<0.05$). Similarly, the knowledge

about menstrual cups being reusable and sustainable had also improved from 77.3% prior to educational intervention to 93.8% post-intervention.

The knowledge about self-administration of menstrual cups (self-insertion and removal of menstrual cups) has also shown a positive shift from 46.1% in pre-test to 92.2% in post-test result, showing a statistically significant improvement in knowledge($p<0.05$).

The results had shown that only 21.1% of female medical students had knowledge about side-effects of menstrual cups in the pre-test questionnaire which was increased to 88.3% in the post-test questionnaire, showing a statistically significant improvement in knowledge ($p<0.05$). In the post-test, 84.4% of individuals stated they could use the menstrual cups for up to 12 hours depending on the amount of flow in every cycle, compared to 21.2% in the pre-test and 57.8% of females had no knowledge about the duration for which the menstrual cup can be used in the pre-test. This shows a significant improvement in participants awareness about the duration for which the menstrual cups can be used.

The knowledge about the usage of menstrual cups while IUCD is inserted has shown a positive shift by 85.9% in post -test results from 25% in pre-test.

The awareness of how to properly clean menstrual cups has also improved, with 68% of participants agreeing that they should use soap and water after the intervention, compared to 56.3% who were unaware of this prior to the intervention. Also, the awareness about use of menstrual while doing physical exercise/playing sports has improved by 91.4% post-intervention from 33.6% in pre-test. The awareness regarding menstrual cups not stretching the vagina has also shown a statistically significant improvement from 26.6% in pre-test to 90.6% in the post-test (p-value <0.0001).

Table-1 Knowledge related questions on menstrual cup

1.1 Knowledge about menstrual cups					
	Post intervention			**Total**	**p-value**
Pre intervention	**Yes**	**No**	**Don't Know**		
Yes	121(94.5%)	1(0.8%)	1(0.8%)	123(96.1%)	0.407
No	4(3.1%)	0(0.0%)	0(0.0%)	4(3.1%)	
Don't Know	1(0.8%)	0(0.0%)	0(0.0%)	1(0.8%)	
Total	126(98.4%)	1(0.8%)	1(0.8%)	128(100.0%)	

1.2 Available at pharmacies					
Pre intervention	**Post intervention**			**Total**	**p-value**
	Yes	**No**	**Don't know**		
Yes	38(29.7%)	0(0.0%)	0(0.0%)	38(29.7%)	<0.0001
No	19(14.8%)	4(3.1%)	0(0.0%)	23(18.0%)	
Don't know	58(45.3%)	6(4.7%)	3(2.3%)	67(52.3%)	
Total	115(89.8%)	10(7.8%)	3(2.3%)	128(100.0%)	

1.3 Reusable					
Pre intervention	**Post intervention**			**Total**	**p-value**
	Yes	**No**	**Don't Know**		
Yes	95(74.2%)	4(3.1%)	0(0.0%)	99(77.3%)	<0.0001
No	7(5.5%)	2(1.6%)	0(0.0%)	9(7.0%)	
Don't Know	18(14.1%)	1(0.8%)	1(0.8%)	20(15.6%)	
Total	120 (93.8%)	7(5.5%)	1(0.8%)	128 (100.0%)	

1.4 Self-insertion and removal of menstrual cup					
Pre intervention	**Post intervention**			**Total**	**p-value**
	Yes	**No**	**Don't know**		
Yes	56(43.8%)	3(2.3%)	0(0.0%)	59(46.1%)	<0.0001
No	2(1.6%)	1(0.8%)	0(0.0%)	3(2.3%)	
Don't know	60(46.9%)	4(3.1%)	2(1.6%)	66(51.6%)	
Total	118(92.2%)	8(6.3%)	2(1.6%)	128 (100.0%)	

1.5 Time duration to wear menstrual cup at one stretch						
Pre intervention	**Post intervention**				**Total**	**p-value**
	4-6 hours	**Up to 12 hours**	**Up to 24 hours**	**Don't know**		
4-6 hours	5(3.9%)	14(10.9%)	3(2.3%)	0(0.0%)	22(17.2%)	<0.0001
Up to 12 hours	1(0.8%)	26(20.3%)	0(0.0%)	0(0.0%)	27(21.1%)	
Up to24 hours	0(0.0%)	5(3.9%)	0(0.0%)	0(0.0%)	5(3.9%)	
Don't know	7(5.5%)	63(49.2%)	2(1.6%)	2(1.6%)	74(57.8%)	
Total	13(10.2%)	108(84.4%)	5(3.9%)	2(1.6%)	128(100.0%)	

1.6 Ways of proper cleaning of menstrual cup						
Pre intervention	**Post intervention**				**Total**	**p-value**
	Cleaning it by microwaving	**Cleaning it in boiling water**	**Cleaning it with soap and water**	**Don't know**		
Cleaning it by microwaving	1(0.8%)	1(0.8%)	3(2.3%)	0(0.0%)	5(3.9%)	<0.0001
Cleaning it in boiling water	1(0.8%)	10(7.8%)	18(14.1%)	3(2.3%)	32(25.0%)	
Cleaning it with soap and water	0(0.0%)	3(2.3%)	15(11.7%)	1(0.8%)	19(14.8%)	
Don't know	1(0.8%)	16(12.5%)	51(39.8%)	4(3.1%)	72(56.3%)	
Total	3(2.3%)	30(23.4%)	87(68.0%)	8(6.3%)	128(100.0%)	

1.7 Use of menstrual cup while doing heavy physical exercise/playing sports					
Pre intervention	**Post intervention**			**Total**	**p-value**
	Yes	**No**	**Don't Know**		
Yes	38(29.7%)	2(1.6%)	3(2.3%)	43(33.6%)	<0.0001
No	3(2.3%)	0(0.0%)	0(0.0%)	3(2.3%)	
Don't Know	76(59.4%)	4(3.1%)	2(1.6%)	82(64.1%)	
Total	117(91.4%)	6(4.7%)	5(3.9%)	128(100.0%)	

1.8 Side-effects					
Pre intervention	**Post intervention**			**Total**	**p-value**
	Yes	**No**	**Don't know**		
Yes	24(18.8%)	2(1.6%)	1(0.8%)	27(21.1%)	<0.0001
No	72(56.3%)	8(6.3%)	1(0.8%)	81(63.3%)	
Don't know	17(13.3%)	1(0.8%)	2(1.6%)	20(15.6%)	
Total	113(88.3%)	11(8.6%)	4(3.1%)	128 (100.0%)	

Continue.....

1.9 Cost effective					
Pre intervention	Post intervention			Total	p-value
	Yes	No	Don't Know		
Yes	69(53.9%)	4(3.1%)	0(0.0%)	73(57.0%)	<0.0001
No	8(6.3%)	0(0.0%)	0(0.0%)	8 (6.3%)	
Don't Know	43(33.6%)	1(0.8%)	3(2.3%)	47(36.7%)	
Total	120(93.8%)	5(3.9%)	3(2.3%)	128(100.0%)	

Table 2: Attitude towards use of menstrual cups

2.1 Do you think menstrual cups are easy to use and acceptable					
Pre intervention	Post intervention			Total	p-value
	Yes	No	Don't know		
Yes	32(25.0%)	8(6.3%)	1(0.8%)	41(32.0%)	<0.0001
No	20(15.6%)	2(1.6%)	0 (0.0%)	22(17.2%)	
Don't know	59(46.1%)	5(3.9%)	1(0.8%)	65(50.8%)	
Total	111(86.7%)	15(11.7%)	2(1.6%)	128 (100.0%)	
2.2 Will you try menstrual cups over conventional methods					
Pre intervention	Post intervention			Total	p-value
	Yes	No	Don't Know		
Yes	49(38.3%)	2(1.6%)	0(0.0%)	51(39.8%)	<0.0001
No	35(27.3%)	0(0.0%)	0(0.0%)	35(27.3%)	
Don't Know	35(27.3%)	3(2.3%)	4(3.1%)	42(32.8%)	
Total	119(93.0%)	5(3.9%)	4(3.1%)	128(100.0%)	

2.3 Level of stigma or taboo associated with the use of menstrual cups					
Pre intervention	Post intervention			Total	p-value
	Yes	No	Don't Know		
Yes	75(58.6%)	17(13.3%)	0(0.0%)	92(71.9%)	.016
No	14(10.9%)	9(7.0%)	0(0.0%)	23(18.0%)	
Don't Know	7(5.5%)	3(2.3%)	3(2.3%)	13(10.2%)	
Total	96(75.0%)	29(22.7%)	3(2.3%)	128(100.0%)	

2.4 Do you think menstrual cup stretches out the vagina					
Pre intervention	Post intervention			Total	p-value
	Yes	No	Don't Know		
Yes	4(3.1%)	19(14.8%)	0(0.0%)	23(18.0%)	<0.0001
No	2(1.6%)	32(25.0%)	0(0.0%)	34(26.6%)	
Don't Know	4(3.1%)	65(50.8%)	2(1.6%)	71(55.5%)	
Total	10(7.8%)	116(90.6%)	2(1.6%)	128(100.0%)	

Table 3: Likert scale depicting agreement of study participants regarding preference, usage, side-effects, positive effects and willingness to use menstrual cup.

Response as per Likert scale Parameters	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Are you going to frequently prefer using menstrual cups?	61(47.7%)	50(39.0%)	10(7.8%)	5(3.9%)	2(1.6%)	128(100%)
Do you think using menstrual cups has an effect on your daily activity?	6(5.9%)	6(5.9%)	13(10.2%)	55(43.0%)	48(37.5%)	128(100%)
Do you think using menstrual cups is associated with side effects?	3(2.3%)	8(6.3%)	19(14.8%)	46(35.9%)	52(40.6%)	128(100%)
Do you think using menstrual cups has positive effect on environment?	58(45.3%)	60(46.9%)	7(9.9%)	3(2.3%)	0(0.0%)	128(100%)
Will your family members be willing to use menstrual cups if they were told about it?	45(35.2%)	56(43.8%)	21(16.4%)	5(3.9%)	1(0.8%)	128(100%)

Discussion

In the present study, there were total of 128 students out of which 72 were from 1st prof, 26 from 2nd prof and 4 & 26 from 3rd and 4th prof respectively. In another study, 400 undergraduate medical students belonging to second, third and final year MBBS of Raja Rajeswari Medical College and Hospital were included in the study population Out of 400 medical students who took part in the study, 28 (7%) of them discontinued with the questionnaire stating that they were not aware of what a menstrual cup was, Rest 372 (93%) students completed the questionnaire[3]

In the present study 96.1% of students belonged to age group 18-25 years while in another study, majority of the responders were aged between 18 and 25 (38.15%), followed by 26–35 years (34.76%). Majority of the responders belongs to urban area (41.23%) The source of information about the menstrual cup for the responders was friends (68.92%), followed by family (23.07%), media (4.30%), and medical personal (3.69%)[4]

In the present study most of the female medical students had heard about menstrual cups (96.1%) prior. In another study, Among the study population, 246 (82%) heard about menstrual cup and 54 (18%) did not heard about menstrual cup[5], In another study, 88.09% of subjects had poor knowledge, 11.9% of them had average knowledge and none of them acquired good knowledge regarding menstrual cup and only 40% of the women were aware of the usage of menstrual cup[6].In this study total of 120 participants were included. Among them, 80% of the study participants were aware of the menstrual cup[7]

In the present study, the knowledge about menstrual cups being easy to use and acceptable had also increased from 32% pre-intervention to 86.7% post-intervention, showing a significant improvement in knowledge ($p<0.05$). In our study, Knowledge about Whether the use of menstrual cups is cost effective was 57% pre-intervention which increased to 93.8% post intervention. In another study, the participants found using the menstrual cup easy and convenient. The participants described economic and environmental advantages of using the menstrual cup. Buying sanitary pads used to be an economic burden to the participants[8]

The results had shown that only 21.1% of female medical students had knowledge about side-effects of menstrual cups in the pre-test questionnaire which was increased to 88.3% in the post-test questionnaire, showing a statistically significant improvement in knowledge ($p<0.05$). In few other studies, coming to menstrual cup usage and toxic shock syndrome (TSS), 144 (38.70%) of them were of the belief that there

could be risk of getting infected with the cup usage. While 162 (43.5%) of them found no association[3]

Discomforts mentioned by the participants were: pain when inserting the menstrual cup, feeling the menstrual cup sticking out of the vagina, feeling a constant urge to urinate and leakage. Concerns were related to the size, shape and texture of the menstrual cup, and that it may "get stuck" in the vagina, while relatives were said to be concerned about the use of the menstrual cup leading to reduced fertility or losing virginity.[8] The majority (67%) of females mentioned that after usage of menstrual cups they experienced no side effects, 10% of participants had irritation and leakage, and 13% of participants had an unpleasant odor.[9]

In another study, Satisfaction was significantly higher [t(168.99) = 3.724, P = 0.001] in women who did not have pain during removal [t(168.99) = 3.724, P = 0.001], subjective vaginal pain [t(513) = 2.845, P = 0.005], pelvic pain [t(86.931)= 2.942, P = 0.004)], and allergies and rashes [t(32.693)= 2.256, P = 0.031][10]

In the present study, Knowledge about Level of stigma or taboo associated with the use of menstrual cups increased from 71.9% to 75%. In other study, Restrictions during menstruation are common. The most frequent were restrictions in visiting places of worship, and touching religious items or praying (PP 77%, 71% to 83%, range 7–100, I2 99%, n=67), with no difference by setting (table 4) or over time (figure 4)[11]

In the present study, 58 students (45.3%) Strongly agree and 60 students (46.9%) agree that using menstrual cups has positive effect on environment. In one other study, 93% think that menstrual cups are more environment friendly than sanitary pads[12]

Conclusion

It is quite significant in our educational interventional study that knowledge and awareness about menstrual cups in the medical students have improved significantly. Our study demonstrates that menstruation cups are a better option to existing menstrual hygiene practices since they are long-lasting, eco-friendly, pleasant, safe, do not require frequent changes throughout the day, and have no disposal difficulties. Adaptability develops gradually with good counselling, peer support, practice, and consistency.

Strength and Limitations

Major strength of our study was the educational interventional approach. We tried to compare the knowledge of study participants before and after the intervention which made the participants to take part in our study more actively and enthusiastically. The limitations of our study were that more participants must be added so that results of the study can be generalised. The study may have been subjected to selection bias as participation was voluntary. Lastly, the short duration of the study limited the assessment of long-term changes in knowledge and practices.

Recommendations

As the future health professionals of our country, they can help in spreading awareness about the safe and hygienic menstrual practices by using other new methods rather than traditional ones. They can also help in reducing stigma about discussing the issues related with menstruation. More such studies, on a large scale, must be conducted so this issue of safe menstrual hygiene practices can be addressed in a better manner. Governmental, Non-governmental, Private and Community participation is needed to resolve the issues related with Menstrual hygiene and safety.

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Original Article

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Implementation of Surgical Site Infection Prevention Bundle in Gynaecological Surgeries: A Quality Control Initiative

Bhanu Priya[1], Upasana Verma[2], Shalini Rajaram[3], Dhiraj Kumar Jha[4]

[1]Professor, [2]Associate Professor, Department of Obstetrics and Gynaecology, UCMS and GTB hospital, New Delhi, India, [3]HOD & Director Professor, Department of Gynae Oncology, AIIMS, Rishikesh, [4]Resident, Department of Microbiology, UPUMS, Saifai Medical College, Etawah UP, India.

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Abstract

Background: Surgical site infection (SSI) is the most common post operative morbidity after gynaecological surgeries. There can be multiple risk associated that may or may not be modifiable. Therefore, perioperative bundled approach is designed to reduce surgical site infections.

Aim/Objective: To determine whether surgical site infection (SSI) prevention bundle reduces the risk of SSI by 30 days postoperatively compared with the standard hospital protocol.

Methods: A randomized control trial was conducted on women who underwent elective gynaecologic surgery from January 2019 to May 2020. The subjects were divided into intervention and control group. The primary outcome was the rate of SSI by 30 days postoperatively.

Results: Total 192 women were randomized. the intervention group included 94 and 98 were assigned to the control group. The SSI rate at 30 days after surgery was 8 /85 (9.5%) in intervention group and 22/85 (25.8%) in control group (p value=0.005; RR=0.36;95% confidence interval [CI], 0.17-0.77). The relative risk reduction of SSI was 64% (p value=0.005) after the bundle was implemented. In subgroup analysis, the primary outcomes were affected by the subgroups like age, co morbidities and operative characteristics.

Conclusion: SSI prevention bundle intervention led to significant decrease in overall SSI rate in electively planned gynecological surgeries.

Keywords: Antibiotic prophylaxis, Chlorhexidine, Closing pan, Quality control initiative, Gynaecological surgeries, Surgical site infection(SSI)

Introduction

Surgical site infection (SSI) is the most common post operative morbidity after gynaecological surgeries. Surgical site infection is defined as infection at or near the surgical incision within 30 days of operative procedure. According to the Center for Disease Control and prevention (CDC) Surgical

Corresponding Author: Dhiraj Kumar Jha, Resident, Department of Microbiology,UPUMS, Saifai Medical College, Etawah UP, India.

E-mail: drjhadhiraj@gmail.com

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Site Infections (SSIs) are classified as being either incisional or organ space. Incisional SSIs involves only skin and subcutaneous tissue (superficial incision SSI) and those involving the deeper soft tissue of the incision (deep incisional SSI). Organ/ space SSIs involve any part of the anatomy (e.g. organ/space) other than incisional body wall layers that was opened or manipulated during an operation.[1,2]

SSIs have now emerged as the most common and most costly cause of health care associated infections.[3] A prevalence survey undertaken in 2017 in India estimated approximately 10% SSI rate in the women who underwent gynecological surgeries.[4] A recent study of 2023 also observed similar incidence of 9.2% SSI, with risk factors of high BMI and blood sugar levels implicating towards SSI.[5] The international epidemiology data on SSI shows even lesser prevalence of SSI worldwide of just 2.5% which necessitates the need of surgical site infection prevention bundle implementation at a routine level.[6]

SSIs are associated with considerable morbidity ranging from a relatively trivial wound discharge to a life-threatening condition. Other clinical outcomes of SSIs include poor scars (hypertrophic/keloid scar) that are cosmetically unacceptable, persistent pain and itching and a significant impact on emotional wellbeing.[7]

Several patient related factors (old age, nutritional status, pre-existing infection, co-morbid illness) and procedure related factors (emergency/ elective, poor surgical technique, prolonged duration of surgery, pre-operative part preparation and inadequate sterilization of surgical instruments) can influence the risk of SSIs significantly.[4,8]With the feedback of validated outcomes data provided by the American College of surgeons National Surgical Quality Improvement Program, the Centers for Medicaid and Medicare Services initiated the Surgical Care Improvement Project (SCIP) to reduce surgical complications.[9]Despite high compliance to guidelines related to perioperative antibiotic administration, hair removal, normothermia, and blood glucose control, these interventions alone have not been proven to lower surgical site infection rates,which suggests additional interventions are needed. [9,2,10]

There are evidences that the bundle of interventions during the preoperative, intraoperative and post operative period might cause significant reduction in SSI rate rather than single intervention during any of the phase. The bundled intervention has gained special interest in complicated surgery where risks of infection are already more. Surgical site infection risk can be complex with many risk factors that may or may not be modifiable, and there may not be adequate time to address modifiable risk factors. Therefore, perioperative bundles of evidence-based practices performed collectively and designed to reduce surgical site infections have been introduced. [11-15]

The effect of bundled interventions has been reported in the past, but no such randomized control trial is available in the literature for gynecological surgeries. This study was planned to implement and identify the effect of bundled intervention on the rate of SSI.

Material and Methods

This single center, two arm, parallel randomized control trial was conducted from May 2019 to May 2020 in the Department of Obstetrics & Gynecology, UCMS and GTB Hospital, New Delhi, India.

The sample size was calculated considering the baseline infection rate of 24% which was analyzed retrospectively during 2017-18. Assuming the power of the study to be 80%, taking two sided confidence interval to be 95% and intervention to control ratio to be 1:1, the sample size of 85 was calculated for each group. The sample size was further inflated to allow 10% follow up loss. We therefore aimed for a sample size at least 94 in each case and control arm.

All women undergoing elective gynecologic surgeries through abdominal route for any indication were included in the study. Participants were randomly assigned in a ratio of 1:1 to the intervention and control group after allocating the randomization number by computer generated randomization table. Women who were not operated in GTB hospital or coming with surgical site infection after 30 days of getting discharge from the hospital were excluded. A written and informed consent was taken from all the women. Demographic and clinical details (medical

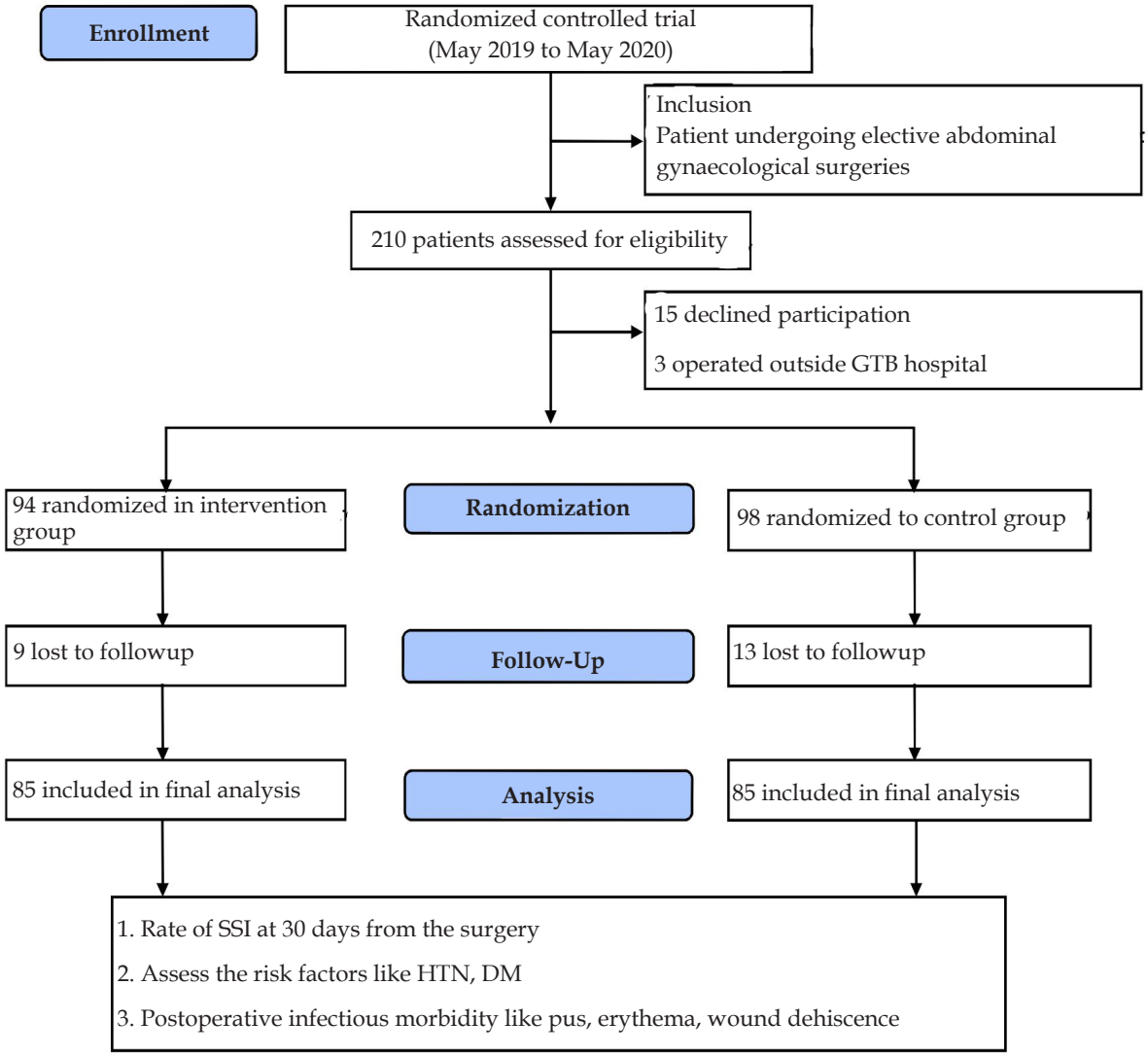


Figure 1: Randomization and follow up of study participants

disorder, operative characteristics of procedure, blood transfusion) of the women were recorded as per the pre designed Performa.

Intervention group

The pre operative interventions include, shower with soap on morning of surgery, hair removal on pubic area was only done if required, by depilate or creams. Routine antibiotic (Injection Cefazolin 2 gm IV) was given at least 30 minutes before the surgery after the test dose. Women who were allergic to cefazolin received Clindamycin or vancomycin. The timing and the dose of the antibiotics were in the consensus of antimicrobial prophylaxis guidelines by American Society of Health-System Pharmacists (ASHP) 2013. Skin was prepped with 2% Chlorhexidine-gluconate (CHG) solution followed by 70% isopropyl alcohol and dried 3-5 minutes. Pre operative vaginal preparation was done with CHG solution.

The intra operative interventions include re-dosing of antibiotics after 4 hours, maintaining normothermia and normoglycemia and closing pan. At the end of procedure, the closing pan was used which included the fresh sterile abdominal sheet, sterile instruments, fresh electrocautery, fresh pair of gloves for fascial and skin closure and changing surgical gown, if vaginal or perineal contamination.

Control group

The control group had the perioperative protocols as per the hospital policy. This included

the preoperative shower with soap, hair removal by shaving, prophylactic antibiotic 30 minutes before the surgical incision, prepping the skin by 5% betadine and wound closure.

On postoperative day 3 in both intervention and control group, dressing of surgical site was done with spirit and 5% betadine and wound was examined for any discharge, erythema and induration. Patients were discharged as per the primary clinician's discretion. For Pfannenstiel incision stitches were removed on postoperative day 8 and midline incisions stitch removal were done on postoperative day 10. Temperature was recorded twice a day during hospital stay. Wound cultures for aerobes and anaerobes were sent in case of wound infections and appropriate antibiotics were given. Patients who underwent re-suturing or conservative management of wound (as per hospital protocols) were recorded on Performa. Any readmission within 30 days of discharge was recorded.

The primary outcome was the rate of SSI (superficial, deep and organ space infectionas per CDC guidelines)by 30 days after discharge from hospital. Secondary outcomes included the risk factors for SSI, post operative infectious morbidity like fever, erythema, wound dehiscence, etc, resuturing, blood transfusion and duration of hospital stay. In addition, patients were contacted at 2-3 weeks from hospital discharge to ascertain any SSI or any related complications. The study was compiled as per CONSORT guidelines for reporting randomized control trials and the checklist was used to ensure compliance (Fig 1).

Statistical analysis

Participant characteristics and surgical characteristics were compared in the intervention and control groups using the two-sample t test for the continuous variables and chi square or fisher exact test for the categorical variables. Relative risk and corresponding 95% confidence interval were estimated using logistic regression models for the case and control group. All calculated P values were two-sided and that < .05 was considered statistically significant.

Results

Figure 1 depicts the enrollment, randomization, follow up and patients finally kept for analysis. The baseline characteristics of case and control group are depicted in Table 1. There was no significant difference in two groups except co- morbidities. The co- morbidities like diabetes (11.76% vs. 3.5%, p value=0.043) and hypertension (30.5% vs. 16.4%, p value=0.030) were significantly more in intervention group. The preoperative, intraoperative characteristics of both the groups are depicted in Table 2.

Table 1: Clinical characteristics in intervention and control groups

Parameters	Intervention group n=85 (%)	Control group n=85 (%)	p value
Mean Age (in years)	42.88±13.76	44.95±12.57	0.479
Parity >2	78(91.7)	79(92.9)	0.773
Nullipara	7 (8.3)	6(7.1)	
Body Mass Index(BMI) (kg/m2)	25.44±5.116	25.06±3.806	0.194
Co-morbidities present	40(47.05)	22(25.8)	0.004
Diabetes	10(11.76)	3(3.5)	0.043
Hypertension	26(30.5)	14(16.4)	0.030
Obesity (BMI>30 Kg/ m2)	4(4.7)	5(5.8)	0.731

Table 2: Surgical characteristics of intervention and control groups

Parameters	Intervention group n=85 (%)	Control group n=85 (%)	p value
Preoperative hemoglobin (mean gm%)	10.99±1.18	10.55±1.296	0.083
Pre operative blood transfusion	7(8.2)	13(15.3)	0.153
Indication for surgery			
Benign	41	51	
Malignancy	44	34	0.124
Ca ovary	6	11	
Ca endometrium	18	9	
Ca cervix	18	16	
Type of incision			
Midline vertical incision	52(61.1)	41(48.23)	0.164
Transverse incision	33(38.8)	44(51.8)	
Mean duration of surgery(minutes)	198.49±89.5	181.41±90.7	0.826
Operating time>180 minutes	48(56.47)	36(42.35)	0.065
Post-operative blood transfusion	30(35.2)	34(40)	0.527
Post operative fever	27(31.7)	39(45.8)	0.059
Mean duration of stay(days)	8.72±3.824	10.1±8.48	0.58

The SSI rate at 30 days after surgery was 8/85 (9.5%) in intervention group and 22/85 (25.8%) in control group which was significantly lower than the control group (p value=0.005) (Table 3). The relative risk of having SSI in intervention group was much lower than control group (RR=0.36;95% confidence interval [CI], 0.17-0.77). After implementation of SSI bundle, the relative risk reduction of SSI was 64% (p value=0.005). The frequency of superficial, deep and organ space SSI are shown in Table 3**.** Only one woman required wound resuturing in case group whereas five women needed resuturing for deep SSI. One woman had organ space infection in control group and was managed by antibiotics. The wound healed by secondary intention over due course of time. The secondary outcome at 30 days like, wound discharge, induration, post operative fever, wound culture status and women requiring resuturing for wound deep SSI is depicted in Table 3.

Table 3: Outcomes at 30 days after abdominal Gynecological surgery

	Intervention group (n=85)	Control group (n=85)	Relative risk(95%CI)	p value
Primary outcome				
Total SSI(%)	8(9.4)	22(25.8)	0.36(0.17-0.77)	0.005
Superficial SSI (%)	7(87.5)	16(72.7)	0.43(0.18-1.00)	0.043
Deep SSI (%)	1(12.5)	5(22.7)	0.2(0.02-1.67)	0.096
Organ space SSI (%)	0(0)	1(4.5)	-	-
Secondary outcomes				
Wound discharge	8(9.4)	21(24.7)	0.38(0.17-0.81)	0.049
Wound induration	6(7.05)	13(15.2)	0.46(0.184-1.15)	0.088
Post operative fever	27(31.7)	39(45.8)	0.69(0.47-1.02)	0.059

Continue.....

Wound culture report			-	
No growth	7(8.2)	13(15.2)	0.53(0.22-1.2)	0.153
E.coli	1(1.1)	4(4.7)	0.25(0.02-2.19)	0.173
Acinetobacter	0(0)	3(3.5)	-	-
Kleibsella	0(0)	2(2.3)	-	-
Resuturing	1(1.1)	5(5.8)	0.2(0.02-1.67)	0.094

In subgroup analysis, the primary outcomes were affected by the co- morbidity of diabetes and hospital stay >10 days (Table 4).

Table 4: Subgroup analysis of the primary outcome.

Risk factors	**Intervention group SSI/Total no (%)**	**Control group SSI/Total no (%)**	**Relative risk (95%CI)**
Age >60			
Yes	3/18 (16.6)	6/15 (40)	0.5(0.14-1.74)
No	5/67 (7.4)	16/70 (22.8)	0.37(0.14-0.96)
BMI >30KG/m2			
Yes	2/4 (50)	5/5 (100)	0.66(0.18-2.42)
No	6/71 (8.4)	17/80 (21.2)	0.44(0.18-1.07)
Diabetes			
Yes	6/10 (60)	1/3 (33.3)	1.5(0.24-9.17)
No	2/75 (2.6)	21/82 (25.6)	0.12(0.03-0.52)
Hypertension			
Yes	7/26 (26.9)	4/14 (28.5)	0.95(0.32-2.8)
No	1/59 (1.6)	18/71 (25.3)	0.08(0.01-0.6)
Pre operative Blood transfusion			
Yes	2/7 (28.5)	6/13 (46.1)	0.70(0.17-2.8)
No	6/78 (7.6)	16/72 (22.2)	0.39(0.16-0.95)
Malignancy surgery			
Yes	7/44 (15.9)	15/34 (44.1)	0.44(0.2-1.0)
No	1/41 (2.4)	7/51 (13.7)	0.19(0.02-1.5)
Midline vertical incision			
Yes	7/52 (13.4)	17/41 (41.4)	0.40(0.18-0.90)
No	1/33 (30.3)	5/44 (11.3)	0.28(0.03-2.3)
Operating time >180 minutes			
Yes	5/48 (10.4)	15/36 (41.6)	0.32(0.12-0.81)
No	3/37 (8.1)	7/49 (14.2)	0.6(0.16-2.18)

Post operative blood transfusion			
Yes	6/30 (20)	16/34 (47.0)	0.52(0.226-1.2)
No	2/55 (3.6)	6/51 (11.7)	0.33(0.07-1.58)
Duration of hospital stay>10 days			
Yes	7/31 (22.5)	21/31 (67.7)	0.45(0.21-0.96)
No	1/54 (1.8)	1/54 (1.8)	1(0.06-15.57)

Discussion

SSI rate is a key indicator of quality care offered by healthcare institution. This study has shown the positive impact of implementation of SSI prevention bundle on the women who underwent open gynaecological surgeries at our center. After one year of implementation of SSI prevention bundle, the SSI rate was 9.4%, representing approximately 3- fold decrease in SSI, as compared to control group. Though the fall in SSI was not as much as observed in the western studies, but no Indian study has ever practiced SSI prevention bundle as per the best of our knowledge.[16]Most of the previously published studies on SSI prevention bundle in gynaecological surgeries which included both benign and oncology surgeries, have been able to demonstrate successful reduction in SSI in different patient population. Guo et al reported a decrease in SSI rate from 2.7% to 0.4% (odds ratio, 7.41; 95% confidence interval, 1.67–32.75) including the sterile closing pan and gloves change before skin and fascial closure.[16]Andimanetal also reported a decline in SSI rate from 4.51% to 1.87% (aOR=0.46, p=0.01) after implementation of SSI prevention bundle in gynaecologic surgeries. It included multidisciplinary team designed bundled intervention with additional intervention of chlorohexidine impregnated preoperative wipes.[17]

Our findings added to existing surgical site infection prevention bundle data and apply current knowledge to the gynaecological surgeries. However, the higher baseline infection rate is probably due to combination of factors. Importantly, due to non-uniformity of the surgical site infection prevention policy in the study institution. In addition, this study included all the gynaecologic surgeries at the study institution. Thus, all the morbid and complex cases expected to have higher SSI were included in the present analysis.[16,18] The relative risk of develpoing SSI in control group was three times higher than case group, which suggest clear benefits of implementation of bundled intervention in the prevention of SSI. Therefore, results were consistent with the other studies.[18,4]

As expected, theco morbidities like diabetes and hypertension in our study had significant impact on SSI rate. The odds of having SSI were more in women with having age>60 years, co-morbidities like BMI >30 kg/m2, diabetes and hypertension. The increasing age is correlated with greater likelihood of certain chronic conditions, malnutrition and a fall in the body's immunological efficiency, causing more extensive SSI. Similarly, the chronic conditions like diabetes and hypertension also contributes to SSI in similar fashion. High BMI and obesity results in decrease in blood circulation in fat tissues is associated with increase in infection rate.[19]The diabetes as co morbidity and duration of hospital days>10 days were associated with higher relative risk of SSI in case as well as control group, when subgroup analysis of risk factors for the primary outcome was done. Similar results were obtained in the study done by Bharatnur etal.[20]

Overall, the current quality control initiative for reducing and preventing SSI was successful in reducing the rate of SSI in gynaecological open surgeries in our hospital. It also added to the current gynaecologic data in demonstrating that bundles are effective in reducing infection rates in benign as well as malignant surgeries. Further sustained implementation of bundle in all type of gynaecological surgeries will ensure reduced SSI rate, even in long term.

Conclusion

Wound infection is the major cause of post operative morbidity in gynaecoogical surgeries. Complete elimination of SSI is nearly impossible but reduction in rate of SSI can be operationalized by implementation of SSI prevention bundle. The bundled intervention should include all the aspect of women including pre, intra and post operative period.

Ethical Clearance: Ethical clearance was taken from the institutional ethical committee with reference number GTBHEC 2018/P-108 dated 05/02/2019.The trial was registered with clinical registry trial of India with trial number CTRI/2019/05/019083.

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Conflicts of interest: None

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Original Article

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Effect of *Trataka Kriya* on Selected Psychological Parameters in School Teachers During the COVID- 19 Pandemic Situation: A Randomized Controlled Trial

Bhogal Ranjeet Singh[1], Pathak Satish Dattatraya[2], Rajbhoj Pratibha Hemant[3]

[1]PhD Kaivalyadhama SMYM Samiti (Kaivalyadhama Yoga Institute) Swami Kuvalayananda Marg, Valvan, Lonavla, Maharashtra, [2]M.S., F.C .P.S., M.N.A.M.S, Kaivalyadhama SMYM Samiti (Kaivalyadhama Yoga Institute) Swami Kuvalayananda Marg, Valvan, Lonavla, Maharashtra, [3]MPhil, Kaivalyadharna SMYM Samiti (Kaivalyadhama Yoga Institute), Swami Kuvalayananda Marg,Valvan, Lonavla, Maharashtra.

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Abstract

Objectives: The present study focused on investigating the impact of Trataka on stress-related ailments associated with online teaching and lockdown conditions among school teachers. The main objective of the study is to assess the effect of regular Trataka Kriya practice on Perceived Stress, Anxiety, Self-Perception, Parental Stress, Mental Well Being and Occupational Stress in School Teachers during the COVID- 19 Pandemic.

Methods: The present study is a two-arm, randomized controlled trial. Both male and female teachers of age ranging from 35- 50 Yrs., having no health complications, as well as, those not practicing *Trataka Kriya* routinely, were enrolled in the study. The study volunteers matched in respect of age and gender, were then divided into an experimental (n= 52) and a wait-listed control group (n= 52) with the help of Block Randomization method. Of the 104 teachers selected for the study, 68 completed the entire protocol. Data were collected at two time points at pre-testing (T_0) and post-testing (T_1).

Results: Results showed a significant reduction in the perceived stress (p= 0.003), generalized anxiety (p = 0.006), parental stress (p<0.0001), and occupational stress index (p<0.0001) in the experimental group. The experimental group results also showed significant improvement in the self-perception (p<0.0001), Mental well-being (p<0.0001) and sleep quality (p = 0.054).

Conclusion: Trataka Kriya practice has shown to significantly improve mental well-being, self-perception, and reduce anxiety and stress levels among school teachers.

Keywords: Stress, anxiety, depression, *Trataka Kriya*, mental well-being, sleep quality

Corresponding Author: Rajbhoj Pratibha Hemant, MPhil, Kaivalyadhama SMYM Samiti (Kaivalyadhama Yoga Institute) Swami Kuvalayananda Marg,Valvan, Lonavla, Maharashtra.

E-mail: pratibha@kdham.com

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Introduction

Trataka is one of the six cleansing processes in *Hatha Yoga* that cures eye diseases and wards off sloth according to *Hatha Pradipika* (II:35)[7]. There are clinical observations, based on about 100 experiments, conducted at Kaivalyadhama, Lonavla (1975)[4], as well as, clinical observations, done at Bihar School of Yoga Munger, Bihar[24], that suggest that *Trataka* helps in psychological cleansing through *Mental Catharsis* (*Non-reactive witnessing* of the repressed thoughts, emotions, memories getting surfaced and getting cleansed away), and also through detecting the precipitating factors behind the manifestation of stress, anxiety and emotional disorders. *Trataka* unburdens one from many a complex, embedded deep at the unconscious level, thus facilitating *sensory feedback* within the body. As it enhances lachrymal fluid secretion, which has phagocytic action against microorganisms or any other foreign particles, it protects eyes from eye diseases. *Gheranda Samhita* says, *Trataka* helps the practitioner to achieve the *Shambhavi Mudra*, facilitating *Dhyana* i.e. meditation[8] in the process.

Research proved that if one manages stress, and know art of relaxation can improve the quality of life, affecting positivity to life expectancy.[6,18,13] Yogic relaxation techniques helped in relieving stress, anxiety and enhancing emotional balance in individuals[25,12,3,17] and thus helped to improve immune status.[13,18] A significant reduction, in impulsiveness, emotional stability, oppositional and Attention Deficit Hyperactivity Disorder (ADHD) index, were observed when *Trataka,* along with other *yogic practices* was given as an intervention.[15] *Trataka* helped to get relief from eye diseases.[2,10] Many research findings have shown that *Trataka* was not just helpful in managing and curing the diseases of eyes, but it also helped in psychological cleansing, when it cleansed the mental burden and thus helped to maintain a sound Mental Health.[12]*Trataka* helped the patients of anxiety to recover from psychological disorders.[12,23] There are some studies in which *Trataka,* in combination with other yogic practices, was found helpful in improving mental stability, developing a strong will power, reducing agitation, improves psychomotor functions and in reducing anxiety.[1,15,10,2,16] If Mental Health of a person is good then he can handle the extreme stress with more ease and can't feel anxious in any difficult situations. *Trataka* was found to improve cognitive ability,[1,9] concentration[9] and attention[1,9] of a practitioner to help him to take a better decision in their life and can tackle any situation easily. *Trataka,* being a relaxation inducing practice, can help in personal well-being, self-adjustment and social adjustment. Thus, a regular practice of *Trataka* can help maintain physical and mental health of a practitioner.

During Corona VIrus Disease(COVID) pandemic situation the emotional health of the teachers were badly affected as they had to cope up with the online teaching and COVID together. Teachers faced lots of psychological problems like depression, tensions and disturbances in their personal and professional life during the Corona Virus Disease 2019 (COVID-19).[28] Teachers' Mental Health were studied during the Covid-19 pandemic in Poland for having an insight about treating it.[14]*Trataka* has been found to have ameliorating effect on insomnia severity and quality of sleep in people with insomnia.[26]

The present study, on school teachers, during the COVID pandemic was undertaken, using the parameters having a strong correlation with stress borne maladies, so as to investigate the effect of *Trataka* in teachers who were genuinely under stress while preparing their study lessons online, as well as, other problems associated with the lockdown condition.

Methods

Study design:

The present study is a two-arm randomized controlled trial (Fig 1). The study was approved by the Independent Ethics Committee (IEC) of the implementing Institute (IEC Reg No.: Kdham/SRD/IEC-07/2020/01). An experiment procedure aligns with the ethical standards of the responsible committee on human experimentation and comply with the Helsinki Declaration of 1964, as revised in 2013. Participants' written informed consent was obtained followed by orientation lectures and information sheets.

Data was collected at two time points at pre-testing (T_0) and post-testing (T_1). Self-report questionnaires were administered using one-to-one mode by the experienced psychologists at T_0 and T_1. After pre-testing the subjects of the Experimental Group (EG) were exposed to three months, three days a week, 8 min a day, of *Trataka Kriya* practice, whereas, the control group was waitlisted for the said period. Except for the *Trataka Kriya* intervention to the Experimental group, there was no difference in the routines between the two groups. Upon completion of the training to the Experimental group, subjects of both the groups underwent a post-test assessment on the selected parameters at T_1. After completion of the study, the Wait-listed Control Group (WCG) participants were given the same training.

Participants:

All the study participants were teachers, from a local School, institution's secondary School and a School of Pune, aged 35 to 50, having no health complications like migraines, vertigo, etc., as well as, those not practicing *Trataka Kriya* routinely, were enrolled in the study. Patients with acute pathological conditions of eye disorders, as well as, those suffering from asthma, diabetes and hypertension were excluded from the study.

A total of 148 teachers were assessed for the eligibility, of those 104 teachers found suitable for the study. The study volunteers matched in respect of age and gender, were then divided into Experimental (n= 52) and WCG (n= 52) with the help of Block Randomization method. Of the 104 teachers selected for the study, 70 completed the entire protocol.

Intervention:

For the Experimental Group, traditional *Trataka Kriya* practices with sesame oil *diya* were used. The distance, between wick of a flame and eyes, was one meter, at the level of eyes, parallel to the ground. The actual *Trataka Kriya* practice period was of 8 minutes followed by a rest in supine position for 10 minutes**.** An experienced yoga teacher conducted all *Trataka Kriya* practice sessions.

Outcome variables:

The following tests, corresponding to selected parameters were administered

Self-report questionnaires:

Perceived Stress Scale (PSS): It measures the perception of stress. The reliability coefficient (Cronbach's α) for the Perceived Stress Scale is 0.715.[21]

Generalized Anxiety Disorder (GAD) 7- It is seven item scale and the reliability coefficient (Cronbach's α) for the GAD-7 scale is 0.895[5].

Kaivalyadhama Self-perception Rating Scale (KSRS)- A custom-made test developed, based on Osgood's Semantic Differential Method, at Kaivalyadhama.

Warwick-Edinburgh Mental Well-being Scale (WEMWBS)- WEMWBS is a 14-item scale, the reliability coefficient (Cronbach's α) for WEMWBS is 0.89 in student sample and 0.91 in population sample.[29]

Parental Stress Scale (PSS)* - PSS is a parent-report measure used to assess stress related to parenting. The reliability coefficient (Cronbach's α) for PSS* is 0.74.[22]

Pittsburgh Sleep Quality Index (PSQI): PSQI assesses sleep quality and disturbances over a 1-month time interval. The reliability coefficient (Cronbach's α) for PSQI is 0.736[20].

Occupational Stress Index (OSI)- It measures Occupational/Job Stress (Hindi version).[27]The reliability coefficient (Cronbach's α) for OSI is 0.72- 0.91.

Statistical Analysis:

Data was analysed, with the help of R-software version 4.1.2, using descriptive statistics, Within Group and Between Group results were compared with the help of paired t-test and independent samples t-test respectively.

Results

The results above show the efficacy of the traditional mode of *Trataka* with a remarkably enhanced statistical significance. in case of the parameters of Perceived Stress, Generalized Anxiety, Self-Perception, Mental Well-Being, Parental Stress, Sleep Quality and Occupational Stress in School Teachers. Both Within (Table 1, Fig 2 & 3) and Between Group (Table 2, Fig 4 & 5) comparison,

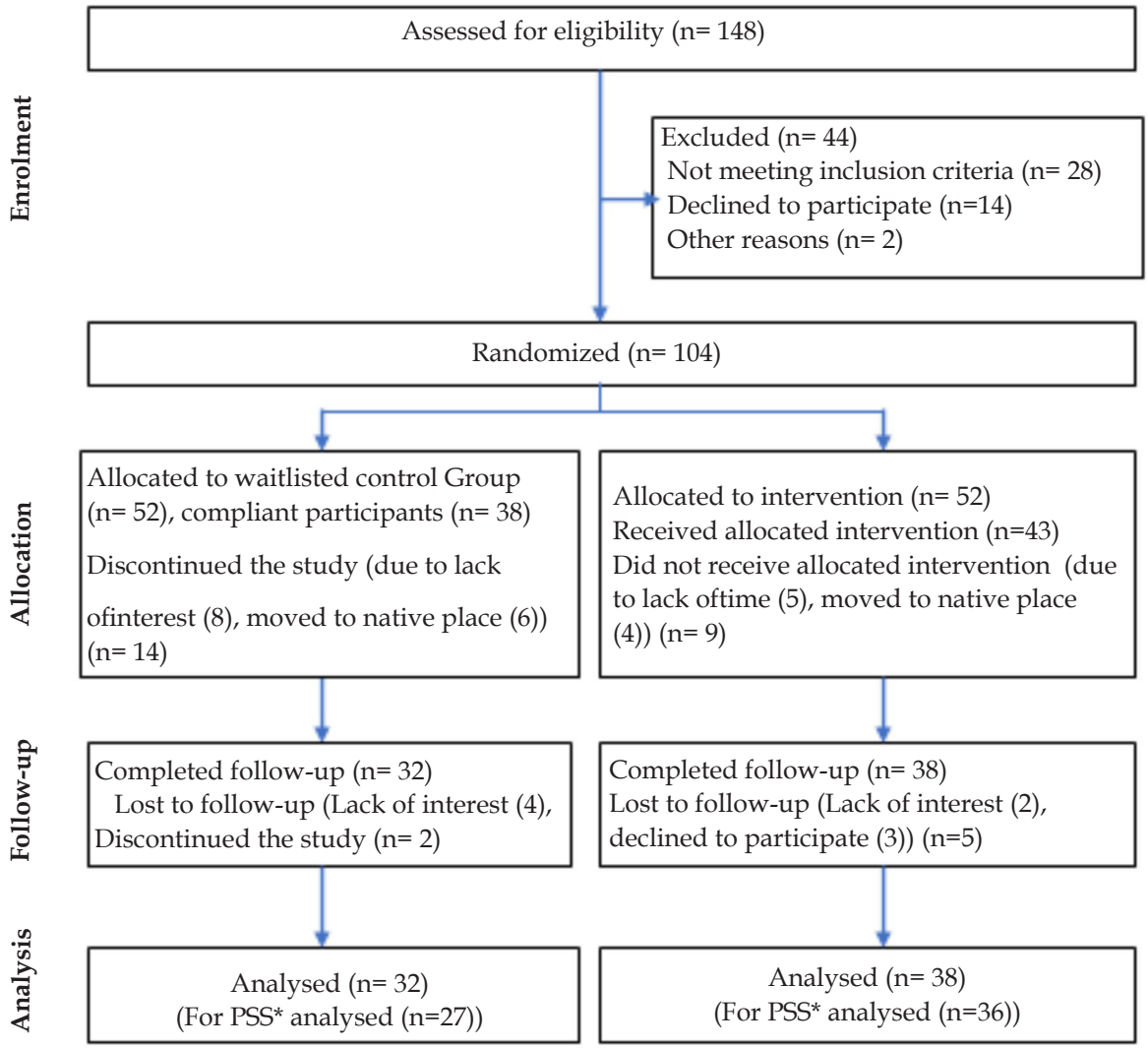


Figure 1: Consort Statement

showing statistical significance, following the intervention of *Trataka*, speak volume of the efficacy of *Trataka* in countering the stress responses of school teachers, who were often seen engaged in overwork and extremely busy schedules at schools.

Table 1: Within Group Comparison

Parameters	WCG (n= 32)			EG (n = 38)		
	T_0	T_1	p- value	T_0	T_1	p- value
PSS	19.22±5.43	19.38±5.08	0.819	20.21±7.64	16.47±5.14	0.003
GAD-7	6.34±4.27	7.69±5.86	0.086	7.45±5.61	5.16±4.28	0.006
KSRS	24.60±7.22	23.10±7.37	-0.045	21.87±8.33	26.47±6.64	<0.0001
WEMWBS	53.97±8.73	50.33±12.05	-0.055	51.92±7.39	57.42±6.77	<0.0001
PSS*	37.33±9.72	40.19±6.75	0.100	40.42±8.17	35.58±8.37	<0.0001
PSQI	5.28±2.73	5.22±2.88	0.867	6.08±2.80	6.92±3.43	0.054
TOTAL OSI	121.35±16.23	125.26±17.75	0.160	127.26±17.50	113.39±14.81	<0.0001

[**PSS=** Perceived Stress scale, **GAD-7=** Generalized Anxiety Disorder- 7, **KSRS=** Kaivalyadhama Self-Perception Rating Scale, **WEMWBS=** Warwick-Edinburgh Mental well-being scale, **PSS*=** Parental Stress Scale, **PSQI=** The Pittsburgh Sleep Quality Index, **OSI=** Occupational Stress Index]

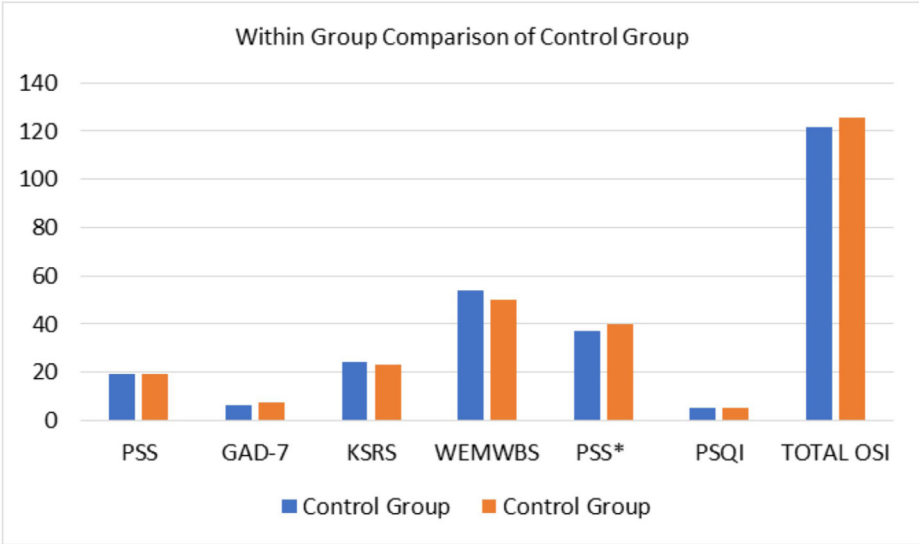


Figure 2: Within Group Comparison of Control Group

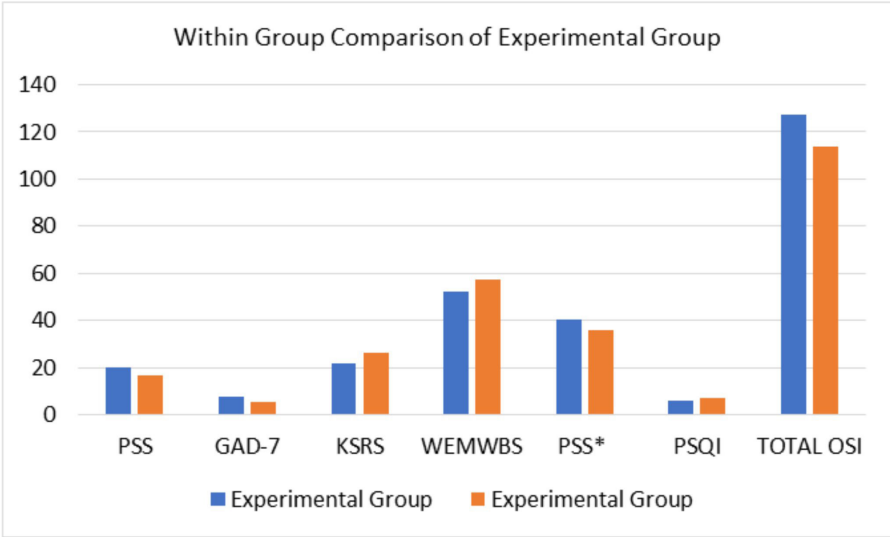


Figure 3: Within Group Comparison of Control Group

Table 2: Between Group Comparison

Parameters	T_0			T_1		
	WCG	EG	p-value	WCG	EG	p-value
PSS	19.22±5.43	20.28±8.09	0.545	19.38±5.08	16.34±5.12	0.004
GAD 7	6.34±4.27	7.66±5.98	0.340	7.69±5.86	5.47±4.46	0.085
KSRS	24.60±7.22	23.63±7.89	0.630	23.10±7.37	27.10±6.02	0.021
WEMWBS	53.97±8.73	52.70±7.48	0.461	50.33±12.05	58.20±6.43	0.003
PSS*	37.33±9.72	40.96±6.86	0.145	40.19±6.75	36.93±7.99	0.169
PSQI	5.28±2.73	6.44±2.84	0.155	5.22±2.88	7.06±3.41	0.019
TOTAL OSI	121.35±16.23	126.81±18.47	0.236	125.26±17.75	113.29±14.95	0.004

[**PSS=** Perceived Stress scale, **GAD-7=**Generalized Anxiety Disorder- 7, **KSRS=** Kaivalyadhama Self-Perception Rating Scale, **WEMWBS=** Warwick-Edinburgh Mental well-being scale, **PSS*=** Parental Stress Scale, **PSQI=** The Pittsburgh Sleep Quality Index, **OSI=** Occupational Stress Index]

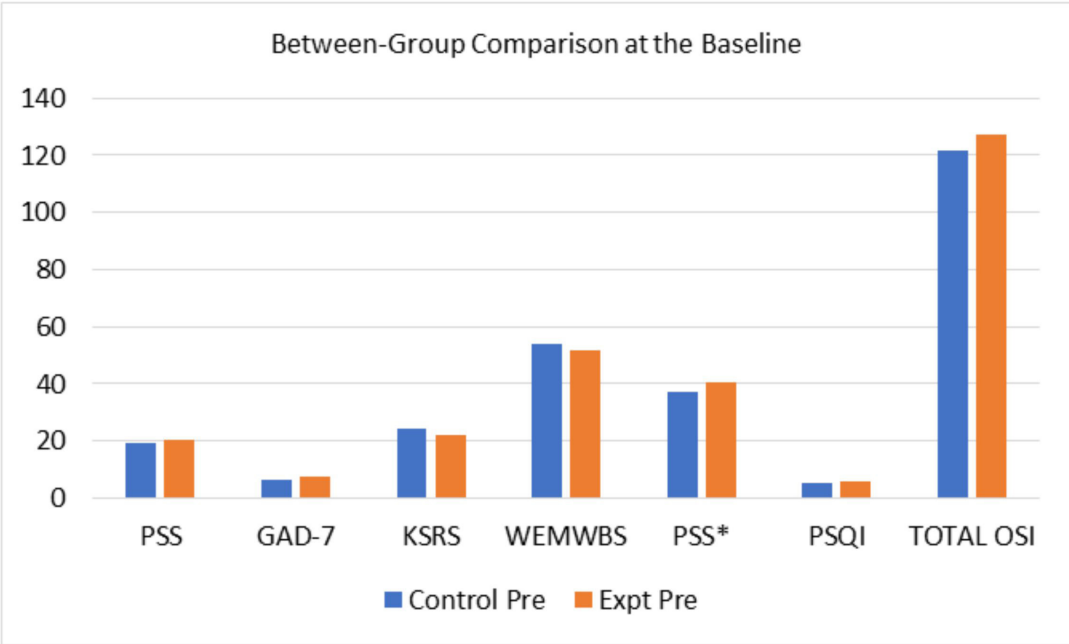


Figure 4: Between Group Comparison at the Baseline

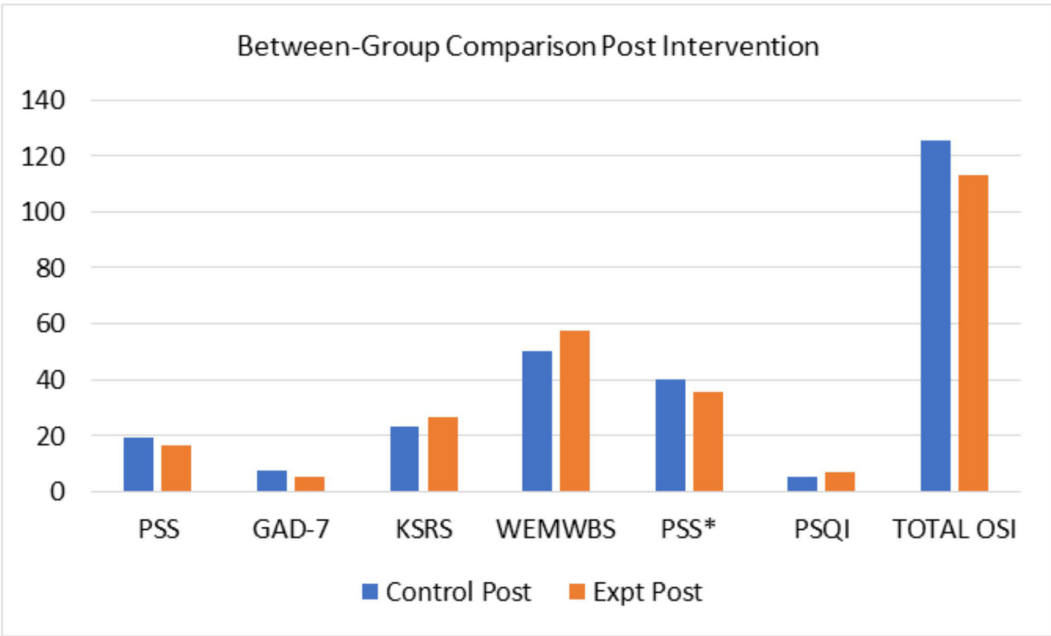


Figure 5: Between Group Comparison Post Intervention

Discussion

As *Trataka,*being mentioned as one of the six cleansing processes in yoga, cleanses *nadis,* and thus facilitates an ideal flow of *prana.* As *Udana Prana* is associated with oculomotor functions the eye disorders are managed properly, as mentioned in *Hatha Yoga* texts. As *Udana Prana* is also associated with higher psychological processes, *Trataka* is expected to correct psychological functions as well.[19] Preliminary findings of the experiments conducted at Kaivalyadhama and Bihar School of Yoga, as mentioned earlier, have corroborated this line of reasoning.[3,17] At Kaivalyadhama, about 100 experiments made it explicit that *Trataka* carries out cleansing at the psychological level when

many repressed and suppressed wishes, feelings, emotions and memories come to the surface of the mind before finding their way out, giving an unburdening effect, through phylo-analysis,[11] in case of *Trataka* practitioners. *Hatha Pradipika* speaks of the interdependence of *Citta* and *Prana*.[7] Therefore, with *Citta* calming down, due to the cathartic effect of *Trataka,* the *Prana* follows suit and becomes calm, facilitating psychophysiological functions of the *Trataka* practitioner. *Trataka* thus relaxes the psycho-physiological functions because of its cathartic effects, resulting into witnessing awareness in detecting deep rooted mental complexes and thus enhances further the mental relaxation in the process. As a result, practitioners' general awareness might have been enhanced influencing their Self Perception and Perceived Stress favorably. The enhanced awareness might have also proved to be instrumental in reducing Parental Stress, Generalized Anxiety and Occupational Stress, as well as, in enhancing Mental Well-Being and Sleep Quality, in School Teachers in this study.

Three months, three days a week, 8 min a day of *Trataka* practice, showing statistically significant changes in all parameters, in both Within Group and Between Group comparisons, is indicative of a clear efficacy of *Trataka* for effectively tackling stress responses of the school teachers and also endowing them with an enhanced mental well-being. Both Within Group and Between Group analyses amply correlate, in respect of statistical significance with respect to the favorable effect of *Trataka* in the selected parameters. Control Group, on the other hand, not showing significant changes in any of the parameters in case of both Within Group and Between Group analyses, amply lends support to the favorable changes observed in the experimental group. The results are fairly consistent in showing the efficacy of *Trataka Kriya* on the measures of Stress, Anxiety, Mental Well Being, Sleep Quality and occupational stress in the School Teachers during the COVID- 19 Pandemic condition[28]

Trataka Kriya is often a neglected cleansing process (*Shuddhi Kriya)*. The yogic literature also does not speak explicitly about its efficacy for mental imbalances except mentioning its utility in treating the oculomotor diseases and in removal of sloth. Thanks to the initial work done by Kaivalyadhama and Bihar School of Yoga that these researchers started taking interest in this hitherto often neglected *Shuddhi Kriya,* as a part of yoga research. Since *Trataka* is one of the chief cleansing processes mentioned in yogic texts *Hathapradipika*[7] and *Gheranda Samhita*,[8] the researchers had a logical line of reasoning that *Trataka* must be contributing to cleansing of *nadis* and consequently contributing to corrections in the *pranic* (energy) flow within its practitioners and thus affecting favorably all psycho-physiological functions. Since the area of *Udana Prana* encompasses the neuronal processes, the *Trataka* practice, in all probabilities, have an influence on the same in a pronounced way, helping all psychological processes favorably.

Generalized Anxiety Disorder (GAD) was reduced significantly in case of Within Group Comparison in Experimental Group ($p<0.006$)as against Control Group showing only an approaching statistical change ($p>0.086$) following the three months *Trataka* intervention period. Between Group Comparison amply corroborates the results seen in Within Group Comparison with an approaching significance ($p<0.085$). Perceived Stress found reduced significantly ($p<0.003$) while Control Group showed no significant change ($p>0.819$) as regards Within Group Comparison. These results were further corroborated by Between Group Comparison when Experimental Group showed significant reduction in Perceived Stress ($p<0.004$). Sleep Quality Index Global Score was enhanced significantly ($p<0.054$) in the Experimental Group while Control Group registered non-significant change ($p>0.867$) in case of Within Group Comparison. Between Group Comparison amply supported these results when Experimental Group showed statistically significant change ($p<0.019$). Total Occupational Stress was found significantly reduced in Experimental Group ($p<0.0001$) as against the Control Group showing non-significant change ($p>0.16$) as regards Within Group Comparison. Between Group Comparison lends support to these results with Experimental Group showing significant reduction in Total Occupational Stress ($p<0.004$). Scores on Self Perception Rating Scale showed a significant ($p<0.0001$) enhancement in Experimental Group, indicating positive approach to life and living, as seen in Within Group Comparison

as against the Control Group showing significant decline (P<0.045), indicating its unfavorable approach to life & living. Between Group Comparison further lends support to these findings with Experimental Group showing a significant enhancement in Self Perception (p<0.021). Mental Well-being scores were found to be enhanced significantly (p<0.0001) in Experimental Group, while in Control Group, these scores were found reduced with an approaching significance (p<0.055). Between Group Comparison amply corroborates these findings with Experimental Group showing a statistically significant (p<0.003) change in the scores of Mental Well-being. As well, Total Occupational Stress Index showed a statistically significant reduction (P<0.004) in Experimental Group, in case of Within Group comparison, Control Group. On the other hand, Control Group showed an increase in Total Occupational Stress in Within Group Comparison (P<0.216), though statistically not significant.

Conclusion

Trataka Kriya of 8min duration has been found to be clearly instrumental in enhancing Mental Well-being and positive Self-perception significantly, as well as, in reducing Generalized Anxiety, Perceived Stress, Parental Stress and Occupational Stress significantly and thus underlying the importance of *Trataka* in preserving and promoting Mental Health of school teachers during the pandemic situation.

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1. Kaivalyadham Yoga institute, Lonavla
2. Central Council for Research in Yoga and Naturopathy

Ethical Clearance: Name of the IEC: Independent Ethics Committee for Kaivalyadham Yoga Institute Date: 20.7.2020 Reg. No.: Kdham/SRD/IEC-07/2020/01

Conflicts of interest statement: None to declare

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Original Article

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A Retrospective Study on Indications of Caesarean Section in a Tertiary Care Urban Setup

Biswajyoti Guha[1], Aparna Mondal[2]

[1]Consultant, Gynaecology and Obstetrics, AMRI Hospital Mukundapur, [2]Research Associate, Academics and Clinical Research, AMRI Hospital Mukundapur.

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Abstract

Background: A Caesarean Section (CS) is a life saving procedure. It has a beneficial effect on maternal and child health as an alternative to difficult vaginal delivery. Adverse outcomes are postpartum hemorrhage (PPH), surgical site infection, puerperal sepsis, and maternal mortality, and fetal complications like neonatal sepsis, neonatal death, stillbirth, neonatal respiratory distress, a low Apgar score, and preterm birth. In past few decades a remarkable increase has been observed in delivery by caesarean section. This study aimed to find the indications of caesareansection in a private hospital.

Method: A retrospective study was carried out for a period of six months at AMRI Hospital, Mukundapur, Kolkata. This includes 359 pregnant women, who underwent caesarean sections, both elective and emergency.

Conclusion: Out of 359 pregnant women, 91% (328) were elective caesareans and 9% (31) were emergency caesarean sections. Previous caesarean section 16.15% (58) was found to be the most common indication of caesarean sections. A reduction of primary CS should be given priority. Following labor care guidelines, use of cardiotocography, partography, and patient education will contribute to the reduction of caesarean sections and related complications.

Key words: Caesarean section, indications, tertiary care

Introduction

There is a noticeable increase in caesarean sections in both developed and developing countries. The reported increase in developed countries in the past decades from about 5% in the early 1970s to more than 40% in some regions of the world till 2018s [1-2].

The reasons for this alarming increase are not completely understood.Some probable reasons are late pregnancy, malpresentation, malposition, especially breech, diminished normal or assisted vaginal delivery, fear of birth trauma to newborn and decreased vaginal birth after Caesarean section.

Corresponding Author: Aparna Mondal, Research Associate, Academics and clinical research, AMRI Hospital Mukundapur.

E-mail: clinicalresearch.mhmka@manipalhospitals.com

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In India, rate of C-section deliveries doubled from 7.1% in 2006 to 17.2% in 2016 and increased to 21.5% in 2021[3, 4,5]. The World Health Organization (WHO) experts opined on the desirable rate of Caesarean section should be between 10 and 15%[6].

It is a life-saving obstetric intervention with a goal to minimize adverse maternal and fetal outcomes, and maximize favorable effects. It can be achieved by reducing the risk of maternal PPH, surgical site infection, postpartum fever, puerperal sepsis, and maternal mortality, psychological trauma and controlling stillbirth, preterm birth, neonatal sepsis, early neonatal death, neonatal respiratory distress, and a low Apgar score of the neonates[7, 8].

Caesarean delivery also carries long-term risks to mothers, and to her future pregnancies. A scar on the uterus may result in subsequent delivery by CS. The risk of placenta accreta is 0.3% in a woman delivered by CS, and it increases to 6.74% with five or more Caesarean deliveries[9].

Caesarean delivery on maternal request (CDMR) refers to a primary Caesarean Section performed on maternal requests in the absence of definite medical or obstetric indications of CS. Possible reasons are anxiety and fear of the labor pain, trauma to the pelvic floor, poor labor experience from previous deliveries; wrong belief about fetal trauma or death from vaginal deliveries; convenience of scheduled birth; short delivery time without labor pain[10, 11, 12, 13].There were globally 6.2 million reported cases of unnecessary Caesarean sections performed annually[14]. Researchers explored in their studies that the CS rate was about 19% in some countries, and it's association with a high maternal and neonatal mortality rate[15, 16].

This study aimed to identify the factors associated with Caesarean section and its indications in the present day.

Materials and Methods

It is a retrospective study conducted with pregnant women who were admitted for delivery at inpatient department of gynecology and obstetrics of this hospital from September 2023 to February 2024.

Pregnant women who underwent Caesarean sections, both elective and emergency included in this study and who delivered by other mode such as normal delivery, or instrumental vaginal delivery were excluded.

The patient files of all women CS delivery in this study period were identified from the hospital medical record department. Collected data were entered in pre-structured proforma. An elective Caesarean section is a planned intervention performed to avoid risky vaginal deliveries and the decision was made before the onset of labor. Emergency Caesareans were defined as those performed for maternal or fetal complications arising before or during labor.

Demographic characteristics such as age, gravidity, and parity were collected from patient files. Obstetric characteristics were also recorded, such as the period of gestation during delivery, history of assisted reproduction, fetal number, previous history of fetal loss, and indication for undergoing a Caesarean section.

Outcome data was collected on newborns transferred to a nursery or neonatal intensive care unit (NICU), history of postpartum hemorrhage, and readmission following CS.

This study was approved by the institutional ethics committee of this hospital on 24 January 2024(Reference no- AMRI-MKP/EC/AP 10/23-24).

Results and Discussion

A total of 359 women with Caesarean sections were enrolled in the study. Out of them, 91% were elective cesareans and 9% were emergency Caesarean sections. The maternal age for underwent Caesarean section ranges from 22 years to 50 years with an average of 32 years. Figure 1 shows 76% of women belong to the age group 30 to 39 and, 26% are age between 20 to 29, and 3% are age between 40 to 49, and one patient in the age group 50 and above.93% (Table 1) of mothers have singleton pregnancy and 7% delivered twin baby.

Figure 1, Age distribution, n=359

Primigravida (Table 1), was 56%, second gravida 28%, and the remaining were between 3rd and 6th gravida. Table 1 shows that the majority of women who underwent Caesarean sections electively were primigravida 57% whereas a greater number

of multigravida 61% had undergone emergency Caesarean sections. Quin et al. found a higher incidence of cesarean section among primigravida because of presence of risk factors [17]. Haidar et al. and Shams had et al. observed that the rate of emergency CS is higher in multigravida [18, 19].

Table 1: Distribution of patients according to different parameters

	Variables	n=	Percentage
Type of Caesarean sections			
1	Elective	328	91%
2	Emergency	31	9%
Gravidity			
1	Primi	202	56%
2	Second	101	28%
3	Third	39	11%
4	4-6	17	5%
CS & Gravidity- Elective			
1	Primi	188	57%
2	Multi	140	43%
CS &Gravidity- Emergency			
1	Primigravida	11	39%
2	Multigravida	17	61%
Fetal Number			
1	Singleton	333	93%
2	Twin	26	7%
Period of gestation			
1	Preterm	164	46%
2	Term	195	54%
Assisted reproduction			
1	IVF	44	12%
2	Normal pregnancy	315	88%
Admission to NICU			
1	Admitted to NICU	36	10%
2	Transfer to nursery	323	90%

Reasons for emergency Caesarean delivery classified as premature rupture of membranes (PROM) 32.2%, pre-eclampsia 32.2%, fetal distress 25.8%, early labor 6.45%. One case of acute pancreatitis in pregnancy was delivered at 35 weeks by emergency CS.

Figure 2, Emergency CS, n=31

Figure 3 shows the various indications for Caesarean sections. The most frequent indications of Caesarean delivery were previous Caesarean section 16.15% maternal disorder related to pregnancy 12.00% hypertensive disorder of pregnancy 11.70% prolonged and obstructed labor 10.86% uterine factor 10.60% and general disease complicating pregnancy 9.75% The next common causes are malposition 5.84% PROM 5.29% intrauterine growth retardation (IUGR) 5.01% and fetal distress 3.9% . Information on indications of CS was missing in 15 cases. There were 6 cases of oligohydramnios, 4 cases of antipartum hemorrhage, and 3 cases with previous history of fetal loss.

Figure 3, Indications of CS, n= 359

Fibroid uterus, adenoma uterus, unfavorable cervix, unicornuate or bicornuate uterus, women with bad obstetric history, and bilateral tubal clipping were grouped under the uterine factor. Prolonged or obstructed labor includes high floating head, failed induction, cephalopelvic disproportion, and large for a date baby. Maternal disorders consisted of Rh –ve pregnancy, obstetric cholestasis, gestational diabetes mellitus (GDM), and gestational thrombocytopenia. Pregnant women with type 2 diabetes mellitus (T2DM), systemic HTN, beta thalassemia trait, Glanzmann thrombasthenia, hypothyroidism, and bronchial asthma are categorized under general diseases complicating pregnancy. Women recovered from leptospirosis and scrub typhus, delivered by elective CS, came under the same title. Hypertensive disorders of pregnancy cover gestational hypertension, preeclampsia, and eclampsia.

Studies have reported an upward curve in CS deliveries globally and in India [20, 21]. As shown in this study, Mishra et al and Mascarello et al reported increased incidences of CS among women previously underwent Caesarean delivery [22, 23].

National Institute for Health and Clinical Excellence [24] and the American College of Obstetricians and Gynecologists [24] have stated that previous CS should not be considered as an indication in the absence of maternal and fetal emergencies. There is reported success rate of (80%) in vaginal birth after Caesarean section (VBAC) and lower morbidity rate

than those who delivered previously by CS [23, 25]. So, focus on reducing post CS deliveries can be achieved by reducing the rate of primary CS.

FIGO recommends-[26]

- Counseling by healthcare providers at each antenatal visit
- Uniform classification for CS (Robson/WHO classification)
- Equal fees for vaginal delivery and CS
- Publishing annual CS data by hospitals

We observed that maternal disorders related to pregnancy, which include gestational diabetes mellitus (GDM) and intrahepatic cholestasis during pregnancy, are next common causes of caesarean delivery. Other researchers have similar findings in their study[27].

Prolonged or obstructed labor (10.86%) was one of the first five common causes in this study. Penn Z and Robert CL et al concluded that it also contributed to the rising trend of CS in other population-based studies, with a high prevalence of 30%[23, 28]. Walker R and Heffner L et al in their studies showed active management of the second stage of labor by augmentation was effective in managing prolonged labor[25, 29] without causing severe birth asphyxia[30, 31].Monitoring labor by using partograph resulted in reduction of CS rate by around 31%, as documented by studies conducted in the United States, the United Kingdom, and South Africa[30]. Some Indian studies drew mixed results on use of partograph for monitoring labor[32-34].

Table 1 shows that 54% of the women delivered at gestation period>37 weeks and 45% of the women with gestation period <37 weeks had delivered by Caesarean section. It was observed that 12.25% of total Caesarean section cases had a history of assisted reproductive technology (ART), out of which 95.45% were delivered by elective CS. Fear of women and obstetricians about the safe outcome of an IVF pregnancy[35, 36] may be the probable reason.

All women delivered by CS at this hospital have an uneventful postpartum period, except two cases of PPH. One death documented and two received blood transfusions.

In this study, there were two cases of caesarean delivery on maternal request (CDMR) where both primigravida had undergone elective CS, which may be due to fear of vaginal delivery. This can be overcome by patient counseling reduces fear of labor pain.

As shown in Table 1 babies of 36 mothers were transferred to NICU for O2 support and care 15/11 and one neonatal death of a preterm baby was recorded. Several researchers[37-39] concluded that babies born through CS experienced a higher risk of adverse neonatal outcomes like low birth weight, delayed initiation of respiration.

Conclusions

In this study previous CS is the commonest indication for caesarean section, reduction of primary CS should be given priority. The consideration of a caesarean section as an easier option than vaginal delivery needs to be changed now. Following updated labor care guidelines, rational use of cardiotocography, partography and patient counseling at antenatal visits will contribute to the reduction of Caesarean deliveries and complications.

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Original Article

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Participation for Development of Health Massage Establishments Under COVID-19 Outbreak: A Case Study of Phetchabun Province

Boadsaporn Anusornpanichakul[1], Pannawit Khampangngam[2], Kiattisak Saeio[3]

[1,2]Department of Consumer Protection and Public Health Pharmacy, Phetchabun Provincial Public Health Office, Mueang Phetchabun, Thailand, [3]Sirindhorn College of Public Health Phitsanulok, Faculty of Public Health and Allied Health Sciences, Praboromarajchanok Institute, Wangthong Phitsanulok, Thailand.

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Abstract

This study purposed to study participation to develop entrepreneurs of health massage establishments in Phetchabun Province, using the model by Cohen and Uphoff (1980) and to investigate their knowledge, attitude, and practice (KAP). 74 entrepreneurs were recruited by purposive selection. Descriptive statistics and independent sample t-test were used in analysis results. Firstly, input were relevant regulations and government announcements. Secondly, participation procedures were implemented included decision-making, implementation, benefits, and evaluation. Thirdly, output were most of the entrepreneurs completely achieved and were approved to reopen. Lastly, outcomes were they became knowledgeable and developed skills, their establishments were standardized with hygienic services. These findings found that mean of knowledge, attitude, practice, and site assessment were significantly increased (p-value <0.01). To summarize, a community development program can be succeeded through active and voluntary involvement of members in all stages. Also, carrying out a development projects using participation developed knowledge, attitude, and practice of the entrepreneurs. Community members could be promoted to raise awareness and encouraged to attend activities while regional agencies contributed intensive assistances.

Keywords: knowledge, attitude, practice, participation model, health massage establishment

Introduction

Under loosening COVID-19 restrictions in Thailand, Department of Health Service Support (DOHSS), Ministry of Public Health specified a number of practices that establishment entrepreneurs were required to absolutely implement for disease protection. Before reopen during the situation, the establishments were inspected and approved by public health officers. In addition, participation was considered as a strategy in health engagement with

Corresponding Author: Boadsaporn Anusornpanichakul, Department of Consumer Protection and Public Health Pharmacy, Phetchabun Provincial Public Health Office, Mueang Phetchabun, Thailand.

E-mail: boadsaporn@gmail.com

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involvement of stakeholders when formulated a 20-year strategic plan[1].

Community participation refers to involvement of community members in a particular area to take responsibly part in an activity, at various stages of projects[2]. The community participation also facilitated increasing knowledge and skills to apply mutual efforts in order to improve well-being[3]. While it promotes use of local knowledge, it fosters a sense of ownership and preserve the members towards community development[2].

According to Cohen and Uphoff's conceptual participation[4], there was proposed four forms of people's engagements:

Decision-making – this level people can identify needs and problems of local community. Then priority and arrangement were determined.

Implementation – This is the operation including coordination and elaboration. People voluntarily take part by thought contribution, resource supports and managements.

Benefits – This is a follow-up to the implementation involved positive benefits and obtaining negative consequence.

Evaluation – It is a success assessment concerns advantages and disadvantages that can be given input for making further improvements.

In addition, it was significantly noted that community development basically aimed to improve life quality of members and to involve them in the process[5]. While it enhances empowerment among individuals, it fosters social cohesion, by bringing people from different backgrounds and creating opportunities for interaction[6]. In order to achieve effective development, it is crucial to ensure people's participation and active contribution as a whole in design of the projects and concerned organizations[7].

However, Kiattisak and Boadsaporn's findings interestingly reported that clients were provided services with knowledgeable practitioners/providers in improved establishments while government officials contributed useful practices as well as reinforcement[8]. This study; therefore, purposed to investigate participation to develop entrepreneurs of health massage establishments in Phetchabun Province, using the model by Cohen and Uphoff (1980)[4] and to examine their knowledge, attitude, and practice when participation implementation.

Materials and Methods

Design and setting

This action study was carried out on entrepreneurs of health massage establishments in Phetchabun, a province in North-Central of Thailand and was performed during October, 2021 – September, 2022. Ethical approval was obtained from the Ethics Committee of Human Research, Phetchabun Provincial Public Office, Project Number: 2/64-14-25/06/64.

Initially, the entrepreneurs logged-in http://spa.hss.moph.go.th/Self/ and did a "Self-Assessment for Health Establishments to Prevent and Control Coronavirus Disease 2019 (COVID-19)". Before public health officers at provincial level had an assessment, they used data acquired form the self-assessment.

Research tools

This study was used the "Self-Assessment" designed and issued by DOHSS including 2 parts: demographic data and checklist questions with five categories.

A questionnaire was developed based on "Guidelines to Prevent and Control Coronavirus Disease 2019 (COVID-19) for Spa, Health, and Beauty Massage Establishments by DOHSS" to measure knowledge, attitude, and practice (KAP) of the entrepreneurs. The 60-item questionnaire was divided into three categories. Results from piloting were shown 0.741, 0.844, 0.720 reliability calculated through Alpha Coefficient.

Participants

74 entrepreneurs of health massage establishments in Phetchabun, having a license and required reopening while the situation in 2021, were recruited by purposive selection.

Statistical Analysis

Descriptive statistics were carried out to describe demographic characteristics; in the meantime,

independent sample t-test was used to examine differences before and after implementation. All statistical analysis was performed using statistical package program.

Results

As demonstrated in Table 1, the participants included 66 females (89.19%) and 8 males (10.81%).

The majority (47.30%) was married and 29.73% was single. There was a higher number of high school / vocational certificate (36.49%), followed by bachelor degree or above (27.03%). Most of them were in age group of 45-59 years (63.51%) and had 1500-4000 ฿ monthly income (40.54%). Among them, 32.43%, 21.62%, 9.46% of the establishments were located in districts of Mueang Phetchabun, LomSak, and NongPhai with the same number of Bueng Sam Phan respectively.

Table 1: Demographic characteristics of health massage establishment entrepreneurs

Demographic characteristics		**N**	%
Gender	Female	66	89.19
	Male	8	10.81
Marital status	Single	22	29.73
	Married	35	47.30
	Divorced	7	9.46
	Widowed	10	13.51
Education	upper elementary school	5	6.76
	middle school	7	9.46
	high school / vocational certificate	27	36.49
	diploma / higher vocational certificate	15	20.27
	bachelor degree or above	20	27.03
Age	25-44 years	21	28.38
	45-59 years	47	63.51
	> 60 years	6	8.11
Monthly income (฿)	1500-4000 ฿	30	40.54
	4001-6500 ฿	28	37.84
	6501-9000 ฿	16	21.62
Establishment location	Mueang Phetchabun	24	32.43
	LomSak	16	21.62
	Khao Kho	3	4.05
	Chon Daen	3	4.05
	Lom Kao	3	4.05
	NongPhai	7	9.46
	Wong Pong	3	4.05
	Bueng Sam Phan	7	9.46
	WichianButi	4	5.41
	Si Thep	4	5.41
Total		74	100.00

To begin with, announcements were managed to encourage the establishment entrepreneurs (EEs) who were interested towards participation activities for development. Meeting invitation was verbally and nonverbally done then the EEs were introduced objectives, activities, advantages, schedules and relevant information. Next, a questionnaire was primarily conducted to investigate KAP of the EEs. Later, a participation process was undertaken.

Input

Firstly, a number of official letters attached regulations, and government announcements were mailed to all EEs. In the meantime a chat group through LINE application was created, provincial officials (POs), who mainly have regulated health massage establishments in all 11 districts and district officials (DOs), who have supervised them in a district area, became members in the group. When the EEs were invited to attend, they joined willingly. Next, the POs informally summarized the mailed documents using language easy understand. After that, most EEs took photos and posted to declare their receiving. In some cases, the EEs directly called the POs to make sure they exactly understood after reading. Furthermore, the POs and the DOs advised the EEs stay informed through various reliable channels such as DOHSS website, publications of public announcements.

Participation Process

1. Decision making – The POs initiated a meeting to have a discussion with the EEs, but gathering into a group during COVID-19 outbreak was prohibited. As a result, a meeting originally was arranged through video conference using Zoom Application. However, there was found some barriers, especially the EEs section. For example, Internet connection was frequently failed. They were not knowledgeable and unskilled using the Application. Therefore, chatting in a group via LINE Application and making a call were applicable ways for convenient communication. While open discussion was carried out, the EEs voluntarily expressed their needs and obstacles. The POs listened with attention and gathered data. After that, facility requirements, functions, and performances were specified. While the POs collected and examined the self-assessment data, a site inspection schedule was identified. The EEs were allowed to know relevant information as well as next operations.
2. Implementation – Before a site examination, the EEs actively arranged their establishments with assistance of practitioners. In some cases, they were asked to present their improved establishment photos with brief descriptions while having arrangement. The POs also facilitated various essential items for COVID-19 protection such as hand sanitizers, face shields, and signs and notices with friendly environment. Besides, useful suggestions and practical actions were introduced. Especially, the EEs were given chances to consult with empathy when the POs managed supportive contribution. In addition, positive encouragement and compliments were kindly provided. After the inspection, certifications were electronically approved to whom achieved the assessment by the POs. Then the DOs assisted printing out and taking them to the establishments in their responsible area to obviously display. Moreover, the EEs were continually informed progresses through the group.
3. Benefits – The health massage establishments where were completely achieved the inspection were standardized with COVID-19 protection. The EEs also gained more essential knowledge and practices. Therefore, clients were provided hygienic services in sanitized establishments. Particularly, the EEs were enhanced pride and self-confidence; hence, they were not embarrassed to express their opinions. Community connection was also risen, so they easily exchanged constructive experiences and ideas as well as asked for assistance or collaboration. Furthermore, performances of both the POs and the Dos were fulfilled. They increasingly understood different situations so that additional and practical activities were appropriately managed. Besides, these relevant participants participated in After Action Review (AAR) activity after the performance for further development. The POs gradually reported the operations via the group.
4. Evaluation – When finishing the first inspection, the POs summarized the performances and notified without display

establishment names and locations. In addition, several establishments absolutely achieved were illustrated desirables practices. However, they were asked a permission before being displayed. While the unachieved EEs were given 2 months for improvement, they were asked to present their progress so that the POs provided advices and suggestions. Moreover, the DOs were assigned to monitor unachieved ones were always emphasized to create pleasant atmosphere and promoted sympathy encouragement. Especially, some entrepreneurs who seemed frustrated or discouraged were visited to enhance motivation. Later, another site examination was undertaken with the same procedures. In case of urgent matters, both provincial and districts officials suddenly cooperated to contribute resources and facilities. Next, performance reports were conducted every quarter of a year and at the end of fiscal year. In addition, the POs suggested them to stay arranged their establishments and relevant objects for practical services while the EEs gave some negative and positive feedbacks concerning the implementation. The EEs were also provided space to explain all the results.

Output

After the performance, 67 out of 74 establishments (90.54%) absolutely achieved and were approved reopening during the loosening situation.

Outcome

The EEs become intensive knowledge with developed skills and their health massage establishments were standardized with disease protection as well as hygienic massage services. Furthermore, both provincial and districts performances were officially fulfilled.

Table 2: KAP scores and site examination and comparison of participation implementation

Categories	Before Implementation				After Implementation				t	p-value
	Max.	Min.	Mean	SD	Max.	Min.	Mean	SD		
1. Knowledge	7.00	12.00	9.77	1.30	12.00	19.00	15.43	1.47	30.15	0.001*
2. Attitude	2.50	4.45	3.43	0.39	3.20	4.25	3.73	0.24	8.57	0.001*
3. Practice	6.00	17.00	11.45	2.70	9.00	16.00	12.93	2.02	6.46	0.001*
4. Site Examination	15.00	28.00	22.05	3.24	18.00	37.00	35.45	4.90	21.50	0.001*

* Statistically significant at level 0.01

As shown in Table 2, it was found that knowledge mean was 9.77, but it was obviously increased to 15.43 after participation was implemented. Moreover, mean of attitude was 3.43 then it was slightly different at 3.73. Besides, mean of practice was 11.45, it was moderately risen at 12.93 then. Also, mean of site examination was 22.05, it was evidently grew up at 35.45.

When considering the participation, it was found that mean of knowledge, attitude, practice, and site assessment were significantly increased (p-value<0.01).

Discussion

The study investigated participation process following Cohen & Uphoff approach. The present process of community participation was parallel Promrit, 2022[9] and Wahyudi, 2023[10].

To start the procedures, the public health officers at provincial level introduced goals, activities, advantages, functions, and schedules. Generally, people participate when they were informed about the programs and potential benefits affected their welfare[11]. Hermawan & Hutagalung, 2019 also asserted their interests would be a determinant of people's attitude and behavior in deciding to participate[12].

Decision making – the findings revealed a reachable space was provided for discussion through the chat group which relevant parties including public health officers at both levels and the EEs voluntarily joined the group created. This was given a chance the EEs to freely convey their demands and interests. It could be also assumed the members are more aware of needs and problems for community development. Accordingly, Rasoolimanesh & Jaafar, 2016 stated

that local members will actively participate in when government willingly listens to community ideas and allow to be involved in decision making stage[13]. Moreover, a sense of ownership can emerge when activities were designed with mutual agreements[14].

Implementation – It was found when the EEs engaged in various activities such as establishment arrangement, deliberation, and socialization, they were empowered in enthusiastically to prepare required items and sites for accomplishment. Their confidence and ability were strengthened to independently solve problems[14]. While working together, trust between the EEs and the officers was developed through a creation of friendly atmosphere. Furthermore, the EEs were completely provided chances for kind consultation. Correspondingly, active and voluntary community involvement as well as growth of participation in development process require trust and opportunities given by government[15].

Benefit – It was appeared that the EEs were promoted their confidence; as a result, they proudly and confidently explicit opinions which Bappi et al., 2018 mentioned that fear of participants towards development programs will be removed for effective participation[7]. Furthermore, while a community connection was built, a social cohesion was arisen. This was supposed to lead boosting relationship between the officers and the EEs. Moreover, authorized performances were executed which their visibility and efficiency of public health officers at both level were encouraged, particularly when being in charge of overcoming community troubles[16].

Evaluation – While the EEs prepared and refined their establishments, collaboration of the POs and the DOs contributed supportive materials, useful advices and positive encouragements. These findings affirmed that local government supports were crucial to achieve sustainable development through community participation[17]. The EEs were provided available space to explain all the performance and give feedbacks on their different experiences. It was implied that the voices of community members were heard and their insights were considered when designing future programs, leading to increased transparency[18].

Additionally, the study examined KAP of the establishment entrepreneurs. It was figured out KAP scores and site assessment when participation implemented were certainly higher which were line with[19,20]. Correspondingly, Edward & Ofili, 2023 revealed that community participation was utilized as a method to improve knowledge, attitude, and practice of household heads[21]. Likewise, when people take part in making new decision and solving problems, learning is produced which it assisted to change in attitude, behavior, confidence, and leadership[22]. During the implementation, the POs educated in utilization of available resource as well as motivated to increase their awareness; meantime, the EEs were promoted to use local wisdom to improve establishment. This was consistent with Li et al., 2015 that suggested people could receive appropriate knowledge to generate correct beliefs, adopt positive attitudes, and form healthy behaviors[23].

Conclusion

A productive community development program can be succeeded through active and voluntary involvement of members in all stages from decision-making, implementation, benefit receiving, and evaluation. Besides, collaboration between residents and government organizations to perform meaningful activities was enhanced to response ongoing problems by utilizing available local resources. Also, carrying out effective development projects using participation developed knowledge, attitude, and practice of the entrepreneurs then they became more knowledgeable and skillful; as a result, they arranged and improved their establishment for achievement as well as sanitized health massage services.

Recomendation

Members in a particular area could be provided a variety of communication channels especially social media so that people could reach correct and useful information to raise awareness towards community development. To develop people's participation, the members could be encouraged to regularly attend feasible activities, training programs, and group membership. Regional government agencies could be required to enlighten constructive knowledge and provide intensive assistances.

Ethical Clearance: Ethical approval was obtained from the Ethics Committee of Human Research, Phetchabun Provincial Public Office, Project Number: 2/64-14-25/06/64.

Conflict of interest: The authors declare no conflict interest, financial or otherwise.

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Original Article

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Gaps and Challenges in Implementing National Tuberculosis Elimination Programme (NTEP) at Field Level in Tribal Areas Through Geographic Information System (GIS) Technology

C. Rajyalakshmi[1], V.B. Srividya[2], Chaitanya Gujjarlapudi[3], Kuppli Sai Sushma[4], Likhita Alajangi[5], Midhulasri Kukkapalli[6]

[1]Associate Professor; Department of Community Medicine, GITAM Institute of Medical Sciences & Research, [2]Professor; Department of Community Medicine, GITAM Institute of Medical Sciences & Research, [3] Professor &HoD; Department of Community Medicine, GITAM Institute of Medical Sciences & Research, [4]Assistant Professor, Department of Community Medicine, Andhra Medical College, [5]House Surgeon; GITAM Institute of Medical Sciences & Research, [6]House Surgeon GITAM Institute of Medical Sciences & Research.

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Abstract

Objective: Tribal population, because of their limited access to quality TB services and increased risk of TB due to biological and behavioural factors, are categorized as "key population groups" for TB. There are many established gaps in NTEP delivery in tribal areas. Using GIS mapping will help understand and address most of these challenges. Hence, the present study aims to find out the gaps in NTEP implementation among tribal populations using GIS technology.

Methodology: This is a Community-based cross-sectional study conducted in Paderu area, Alluri Sita Rama Raju (ASR) District, a tribal area near Visakhapatnam District, Andhra Pradesh state. Under Paderu TU, there are three PHCs: G madugula, Minimuluru, and Gemmili. All the patients registered for Tuberculosis during the second (April-June) and third (July-September) quarters of 2022 in the study area were included in the present study.

Results: Out of 61 cases, the follow-up visits were hindering among 70% of patients. Nearly half of the cases were located beyond 5kms radius from the health facility, hindering the access and utilisation of health services. 91.5% of the patients did not receive voice messages or calls regarding health education for compliance with drugs. All patients did not receive DBT for 1year. 20% of the patients expressed concerns related to cultural factors like forbidding them from some food items and associated stigma by restricting them from attending school.

Conclusion: The identified gaps were interconnected and require comprehensive solutions. Factors such as stigma and cultural beliefs, will require more time to overcome.

Key words: GIS technology, Kobo tool box, NTEP, Tribal area, Tuberculosis

Corresponding Author: Kuppli Sai Sushma, Assistant Professor, Community Medicine, Andhra Medical College, Visakhapatnam.

E-mail: saisushma.ravipalli@gmail.com

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What is already known on this topic: We already know that there are many established gaps in NTEP delivery in tribal areas which include lack of awareness of healthcare facilities, location of sub-centre, high chances of transmission, and Long distance covered to reach DMC in providing sputum samples.

What this study adds: The present study, through the use of GIS mapping, adds to the knowledge about the epidemiological factors of underserved populations who live in hard-to-reach areas. Using GIS mapping will help to understand and address most of the challenges faced in tribal areas.

How this study might affect research: GIS technology enables any stakeholder to view the geographical challenges faced at ground level, especially in hard to reach areas like tribal areas directly at the central level.

Introduction

India, with 8.6% of the tribal population, is finding it difficult to bridge the gap between tribal and non-tribal populations about healthcare.[1] They account for over a quarter of the country's poorest people. Because of their limited access to quality Tuberculosis (TB) services and increased risk of TB due to biological and behavioural factors, Tribal people are categorized as "key population groups" for TB according to WHO's Global plan to end TB.[2] In 1997, the Government of India launched the Revised National TB Control Programme (RNTCP) to mitigate the high TB burden in the country. The RNTCP introduced targeted pro-poor approaches for TB control, implementing specific tribal action plans. The National Sample Survey for Tuberculosis carried out between 1955 and 1958, did not include tribal groups; therefore, no nationwide TB burden estimates are available for the tribal population. There are many established gaps in National Tuberculosis Elimination Programme (NTEP) delivery in tribal areas, including lack of awareness of healthcare facilities, location of sub-centre, high chances of transmission, and Long distance covered to reach Designated Microscopic Centre (DMC) in providing sputum samples.[3] Using Geographic Information system (GIS) mapping will help understand and address most of these challenges.

Geographical Information System (GIS) is a new approach to analysing spatial inequities through gathering, managing, and analysing data. GIS integrates multiple data like the location of cases, the distance from health centres, the nearest health facility for every case, clustering of cases, etc. It adds to the knowledge about the Epidemiological factors of underserved populations who live in hard-to-reach areas. In Tuberculosis, the potential use of GIS technology has been established in the surveillance of Tuberculosis for detecting the actual clusters of disease (health geographics) and application of these methods in places where contact tracing is routinely practised. Using GIS for demographic analysis to estimate the demand for various types of services can benefit administrators managing health programmes at the national level for resource allocation and re-distribution.[4] Hence, the present study has been taken up to find out the gaps in the implementation of NTEP among tribal populations using GIS technology.

Materials and Methods

Study design and study population: Community-based cross-sectional study among all the patients registered for Tuberculosis during the second (April-June) and third (July-September) quarters of 2022 in Paderu TU (Tuberculosis Unit), along with all the three PHCs under it, were included in the present study.

Study setting: The present study was conducted in Paderu TU, Alluri Sita Rama Raju (ASR) District, a tribal area near Visakhapatnam District, Andhra Pradesh state. Under Paderu TU, there are three PHCs: G madugula, Minimuluru, and Gemmili. These areas consists of Tribal communities kondadora, gadaba, chenchu, porja etc.[5]

Sample size and sampling technique: Out of 7 TUs of ASR district, Paderu TU was selected by simple Random sampling method. In Paderu, TU, during the second and third quarters of 2022, a total of 61 patients were registered for Tuberculosis. The data was collected from all 61 patients.

Study duration: The data from the study subjects were collected over a period of 2 months, i.e. October and November 2022, by trained house surgeons

along with the principal investigator on a pre-tested semi-structured interview schedule.

Data variables: The interview schedule comprised of socio-demographic information of the patient, disease-related information, personal details like tobacco usage, alcohol usage, associated comorbidities and any other problems faced by the patient after diagnosis of TB. The geopoints of the health facilities and patients' households were collected using the KoBo toolbox. It is a suite of tools for field data collection for use in challenging environments. The software is free and open source. It allows collection of the data in offline mode and allows to upload the data with an internet connection. It allows the export of the data into Excel files.[6] As the present study was conducted in a tribal area, where securing internet access is challenging, the Kobo toolbox was used for data collection. As a part of the study, details about the health infrastructure of the study area were obtained from District Tuberculosis Control Officer (DTCO), ASR district.

Data analysis: The obtained data was compiled and analysed in MS Excel. Descriptive statistics for categorical variables were represented in percentages and proportions, and continuous variables by mean and standard deviation. The geopoints obtained from the Kobo toolbox were retrieved into MS Excel, and spatial analysis was done using QGIS version 3.16.

Ethical statement: The present study was conducted after obtaining permission from the Institutional Ethics Committee (Ref. No: No.GIMSR/ Admn./Ethics/approval/IEC-10/2021; Date: 13-08-2021), District Medical and Health Officer (DMHO) and DTCO of the ASR district.

Patient Involvement: After obtaining necessary permissions for the study, information regarding the patients registered for Tuberculosis during second and third quarters of 2022 was obtained from DTCO office, Paderu area. Data was collected by Principal Investigator along with trained Interns from the patients on a pre-tested semi-structured interview schedule via house to house visit in the tribal area. Geo-tagging of household of the patient was done using Kobo tool box at the time of house to house visit.

Results

Among the seven TUs, Paderu TU was selected randomly. There were 61 cases of TB reported in the 2nd and 3rd quarter of 2022 from Paderu TU, of which 58 were drug-susceptible and 3 were drug-resistant TB cases. Of the 58 drug-susceptible cases, four were on retreatment for TB. All the cases were included in the study. Of these 61 cases, 13 were directly reported in Paderu TU, and the other 48 were reported from Gemmili, Minumuluru, and G.madugula PHCs, which work as Designated Microscopic Centres (DMCs) under Paderu TU. The age of the cases ranged from 4yrs-65yrs. The mean age of the cases was 32±13.3yrs.

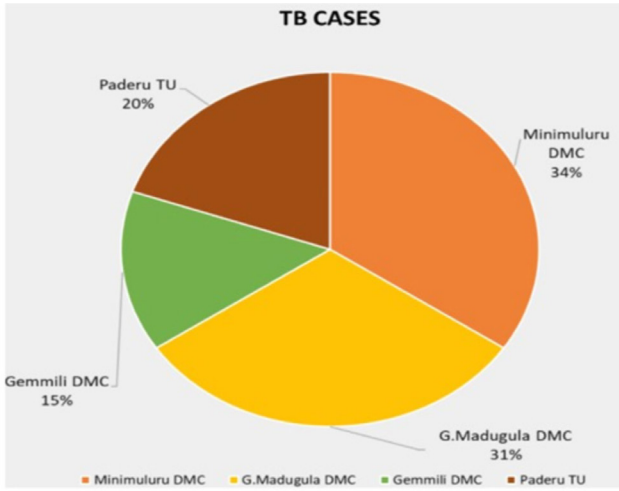


Fig 1: Distribution of cases with respect to health facilities

Table 1: Distribution of the cases based on socio-clinical variables

Variable	N (%)
Gender	
Male	41(67)
Female	20(33)
Total	61(100)
Occupation	
Agriculture	48(79)
Students	13(21)
Total	61(100)
Health facility	
Paderu TU	13(20)
Minumuluru DMC	20(34)

Continue.....

Gemmili DMC	9(15)
G.Madugula DMC	19(31)
Total	61(100)
Site of TB	
Pulmonary	55(90)
Extra Pulmonary	6(10)
Total	61(100)
Type of TB	
Drug Susceptible	58(95)
Drug resistant	3(5)
Total	61(100)
Contact history	
Present	51(84)
Absent	10(16)
Total	61(100)
Treatment Adherence	
Yes	55(90)
No	6(10)
Total	61(100)
Follow up Visit	
yes	19(30)
no	42(70)
Total	61(100)
Distance from health centres	
Within 5kms	27(44.3)
Outside 5kms	34(55.7)
Total	61(100)
Counselling received	
Yes	44(72.5)
No	17(27.5)
Total	61(100)
Voice messages/calls received	
Yes	5(8.5)
No	56(91.5)
Total	61(100)
DBT received	
Yes	0(0)
No	61(100)
Total	61(100)

Gaps identified at field level-

Geographic factors and their influence on treatment:

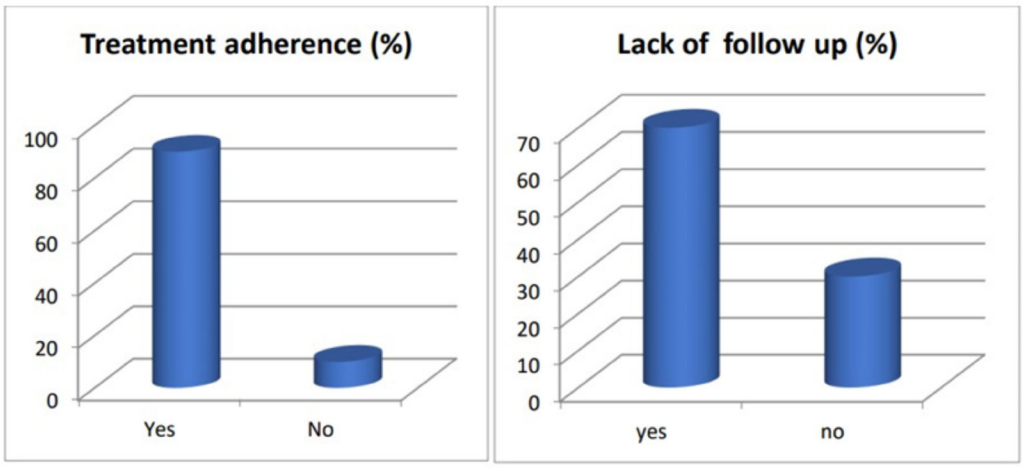


Fig 2 & 3: Distribution of cases based of treatment adherence and lack of follow up

Fig 2& 3: Even though 90% of the patients adhered to medication, follow-up visits for sputum sample collection at the initiation of the continuation phase, declaring outcome, or addressing complications during treatment were hindering among 70% of patients because of lack of transport facilities.

Figure 4 represents age wise distribution of cases in Paderu mandal. A circle marking is shown in the fig 4 represents a 5 km radius around the DMC. Nearly half of the cases were located beyond this circle, indicating that the distance between the health facility and the residence of cases is more than

5 km, hindering the access and utilisation of health services.[7] The maximum distance between the health facility and the patient's residence was observed to be 35 km in the present study. For 34 patients (55.7%), the health facility was at a distance of >5kms from their residence. Some villages, especially in Gemmili PHC, were in hilly areas. Visiting that village on a walk was strenuous and time-consuming for a health worker. This is also represented in Fig 2, where none of the cases were within 5kms range from the health facility for Gemmili PHC.

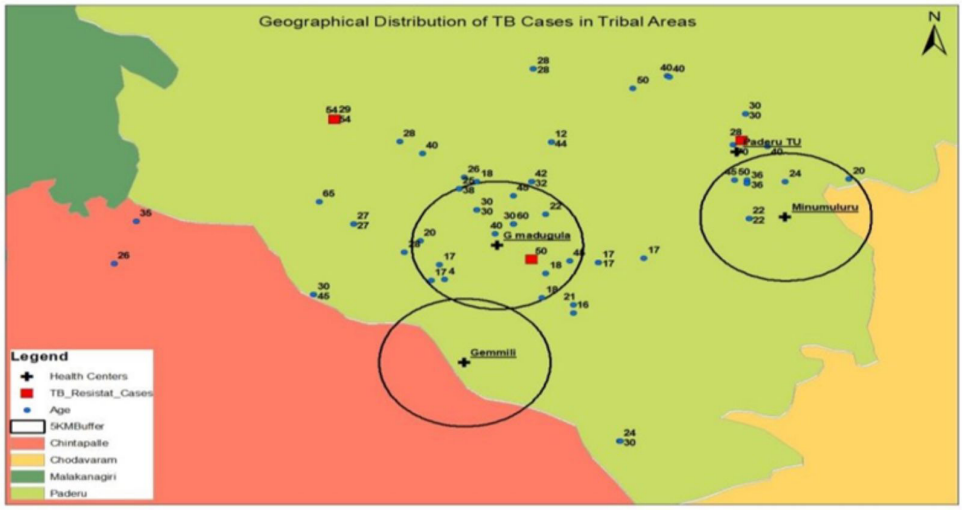


Fig 4: GIS Map representing the geographical distribution of cases and health facilities

Health system factors:

Most of the patients (72.5%) were counselled for compliance with drugs at the time of initiation of drugs by a health worker/pharmacist/ASHA worker. 91.5% of the patients did not receive voice messages or calls regarding health education for compliance with drugs.

Identified challenges in programme implementation:

All patients did not receive Direct Benefit Transfer (DBT) for 1year. TB Preventive Therapy (TPT) was not provided for all eligible candidates. For drug-susceptible cases, TB treatment was initiated within three days. However, for all the three-drug resistance cases present in the current study, there was a 15-20 day lag for diagnosis and initiation of treatment.

In Paderu, TU, all the TB Health Visitor (TBHV) posts were vacant. The cases reported in the Paderu area were from the Area hospital and PHCs. The CBNAAT machine at Paderu TU was not functional, and testing for TB was done using the TruNAAT machine by Senior Tuberculosis Laboratory Supervisor (STLS) of Paderu TU. Because of this, there was a pooling up of samples to be tested. To add up to the already existing burden, samples from Hukumpeta TU were also being sent to Paderu TU because of the lack of a CBNAAT/TruNAAT machine and vacant STLS post in that TU, as it is the neighbouring area. A pharmacist from a nearby PHC initiated the TB treatment, but there was no follow-up of these cases for declaring treatment outcomes.

Socio-cultural factors:

Few patients (20%) expressed concerns related to cultural factors like forbidding them from some food items like dal and eggs due to fear of the increase in the disease and associated stigma by restricting them from attending school due to fear of the spread of disease for both pulmonary and extra-pulmonary cases even after completion of the intensive phase of treatment.



Fig 5: Lymphadenitis in 8 year old, school going girl

Discussion

The primary objective of the present study was to identify gaps in implementing of the National Tuberculosis Elimination Program (NTEP) among the tribal population using QGIS technology. The study found that over 50% of the patients lived more than 5 km from healthcare centres. This distance made it difficult for health workers to make regular visits to monitor the patient's condition and address any side effects that may arise from the treatment. Furthermore, the lack of transport facilities compounded this problem, making it even more challenging to provide regular care to patients.[8] In the TIE-TB project, mobile TB diagnostic vans were demonstrated as successful tools for addressing geographical challenges. Mobile TB diagnostic vans would help reach rugged terrains and thus improve the notification rates.[9] These gaps in access to healthcare services highlight the need for targeted interventions to improve healthcare access and service delivery in remote and underserved areas.[10,11]

The present study revealed that among 70% of the patients, no sputum sample was collected either at the end of the intensive phase or at the end of the treatment course to confirm sputum conversion or treatment outcome, respectively. The patients collect their monthly TB kits from the respective PHCs, but there is no follow-up on these cases to declare the treatment outcomes. Furthermore, the lack of staff, particularly in hard-to-reach areas, has compounded the challenges faced by health workers in the tribal areas. This lack of follow-up can lead to low reporting of complications, an increased risk of MDR TB, and higher rates of non-adherence to TB treatment.

To address these challenges, it is imperative to fill the vacant healthcare staff positions in a timely manner and provide regular training to existing staff on the importance of follow-up visits. Additionally, an intensive health education campaign should target the general public to emphasise the importance of completing TB treatment. During counselling of TB patients, more emphasis should be given to the importance of complete treatment, reporting of any complications and complaints that need to be immediately brought to the attention of health staff.[12]

It should be noted that as the ASR district is newly formed, there may be administrative issues hindering the implementation of Direct Benefit Transfer (DBT) for TB patients. Addressing these issues will ensure the program's success in the region.

It was also observed that a school-going child with extra-pulmonary Tuberculosis faced discrimination in school and was restricted from attending due to fear of the disease spreading. This situation arose due to a lack of awareness among the general population regarding the disease's mode of transmission. The present study found that 20% of the population reported experiencing stigma even after completing the intensive phase of treatment. Similarly, Bhattacharya et al[6].(6) reported stigma, and a study conducted in Ethiopia found that 42.4% of patients perceived stigma related to Tuberculosis.[13]

Stigma related to Tuberculosis can lead to non-adherence to treatment, thereby increasing the risk of developing drug-resistant Tuberculosis. To address this issue, widespread Information, Education, and Communication (IEC) activities need to be conducted to increase awareness among the general population about the disease's mode of transmission. Healthcare workers should also focus on counselling patients to counter existing stigma. The involvement of local leaders in addressing the stigma associated with the disease can also be beneficial. However, screening may become more challenging when stigma is prevalent in a community. Therefore, additional efforts are needed to tackle the stigma associated with Tuberculosis.

Furthermore, several barriers to healthcare access in tribal areas were identified, including socio-demographic factors such as lack of education, long distances from patient residences to primary healthcare centres, and inadequate transport facilities. These factors are likely to influence the health-seeking behaviour of the community.[14-17] The backbone of healthcare in tribal areas is accessible healthcare, which is the primary responsibility of the public healthcare system. [18]

However, the existing healthcare system in tribal areas faces several challenges, including a lack of field TB health visitors (HVs), lab technicians LTs, and Senior Treatment Supervisors (STS). This

deficiency could hinder the quality of healthcare in these areas. Furthermore, there is a significant shortage of allopathic doctors at primary healthcare centres (33%) and specialists at community health centres (84%), highlighting the need for a solution to address this shortage.[16]

Another challenge identified in the study is the increase in pre-treatment loss to follow-up cases. Patients who did not receive voice messages or calls regarding health education for compliance with drugs were unable to give missed calls, which increased the number of lost follow-up cases. This issue was proven in a randomised control trial conducted in 2021 by Majella MG et al.[19] Similarly, the CARE-call system was used in Thailand to increase adherence to TB drugs.[20] Therefore, it is necessary to explore innovative solutions to improve healthcare access and quality in tribal areas.

Conclusion & Recommendations

The identified gaps in the healthcare system are interconnected and require comprehensive solutions. Many of these gaps, such as recruitment of manpower and improving communication and accessibility, can be addressed with the commitment of administrators. However, other factors, such as stigma and cultural beliefs, will require more time to overcome. They will depend on overall social development, including improvements in education, the economy, and transport accessibility.

The present study's findings have been shared and discussed with health officials in the ASR district, and steps have been taken to address the identified gaps. For instance, direct benefit transfers (DBT) have been released to registered patients, and efforts have been made to fill vacant posts in the healthcare system. These steps demonstrate a proactive approach to addressing the identified gaps and improving healthcare access and quality in the region.

Ethical Clearance: Institutional Ethics Committee (Ref. No: No.GIMSR/Admn./Ethics/approval/IEC-10/2021; Date: 13-08-2021), District Medical and Health Officer (DMHO) and DTCO of the ASR district.

Conflicts of Interest Statement: Nil

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Original Article

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A Cross-Sectional Study on the Prevalence and Attitudes towards Tobacco Use among Healthcare Professionals in Mizoram

C. Lalramdini[1], H.T.Lalremsanga[2], Lukima Saikia[3], H.T.Lalthanthuami[4], Likhita Alajangi[5], Midhulasri Kukkapalli[6]

[1]M.Sc. Nursing, Ph.D. Student at Mizoram University, Dept. of Zoology, Aizawl, Mizoram, India, [2]Dept. Of Zoology, Mizoram University, Tanhril, Mizoram, India, [3]Ph.D. in Nursing, Lecturer, Regional Nursing College, Guwahati, Assam, India, [4]M.Sc. Nursing, Ph.D. Student (CSIR Senior Research Fellow), College of Nursing, JIPMER, Puducherry, India.

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Abstract

Background: The average lifespan of smokers is often ten years shorter than that of non-smokers. Accelerated adoption of anti-tobacco and tobacco use cessation initiatives is necessary since health professionals are viewed as role models for health promotion, despite their higher tobacco use rates.

Methods: An online cross-sectional descriptive survey was completed by 426 healthcare professionals from Mizoram, including nurses, doctors, dentists, pharmacists, and multipurpose health workers, using a self-administering questionnaire adapted from the Global Tobacco Surveillance System. The tool's scale-content validity indices showed Cronbach's alpha values of 0.894 and 0.985 following psychometric testing. A significance level of 5% was used for statistical analysis.

Results: 47.2%of the participants used tobacco. 41.9%of the nurses' participants used tobacco, compared to 64.7%, of dentists who did not. More than half of the physicians 53.3%, multipurpose health workers 58%, and pharmacists 52.2% were tobacco users. Among the tobacco users, 9.2% solely smoked, 34%only used smokeless tobacco, and 4%, both smoked and used smokeless tobacco. Individuals' attributes such as gender, eating habits, and length of service are significantly correlated with their attitudes regarding tobacco usage.

Conclusion: The rate of tobacco use among healthcare professionals is alarming and requires appropriate interventions.

Keywords: Attitude; Healthcare professionals; Smoking; Smokeless Tobacco Use; Tobacco; Tobacco Use Cessation;

Corresponding Author: C. Lalramdini, Assistant Professor, College of Nursing, RIPANS, Aizawl, Mizoram, India.

E-mail: didinijose@gmail.com

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Introduction

Background: With the tobacco pandemic claiming the lives of around 8 million people year worldwide, it is one of the largest hazards to public health. Among these deaths, tobacco usage is directly responsible for about 7 million deaths, while second hand smoke exposure causes 1.2 million deaths in nonsmokers. Over 80% of the world's 1.3 billion tobacco users live in low- and middle-income countries, where tobacco use is a leading cause of illness and death. Spending by households on necessities like food and housing was substituted for tobacco costs, which resulted in poverty.[1] There will be a startling disparity in the enduring prevalence of tobacco smoking amongst nations by 2025. The goals set forth for tobacco control will be unattainable for many countries.[2]

Even though many tobacco control policies have been put in place globally, tobacco use still has a significant detrimental influence on public health and causes significant financial losses for society.[3]

Despite the tobacco control legislation, India's tobacco consumption is still rising. Stronger and more visible anti-tobacco campaigns are needed, as well as increased public awareness of the harmful effects of tobacco use and active involvement from health professionals in programs aimed at helping people quit using cigarettes.[4] In comparison to the general population, healthcare workers likewise had a higher rate of tobacco use.[5]Those in the medical field who are seen as role models and advocates for public health but who also use tobacco heavily are a reflection of discomfiting circumstances. This demonstrates a concerning situation and necessitates that health professionals, who also serve as public health advocates and role models, take immediate action to combat tobacco use and quit smoking.[6]

The three North East Indian states of Manipur, Mizoram, and Tripura have a 50% or higher incidence of tobacco usage among men and women. More than half of women (52.4%), most males (64.9%), and a very high percentage (58.7%) of all adults—especially in Mizoram—smoke tobacco or use smokeless tobacco.[7]

Material and Methods

A cross-sectional descriptive survey was carried out among 426 healthcare professionals comprising nurses, doctors, dentists, pharmacists, and multipurpose health workers in Mizoram presently working in private/government/mission hospitals.

Data was collected in a hybrid method, using a self-administered questionnaire from 3rd January 2023 to 9th May 2023. 426 responses were received and processed for analysis.

Development of tool:

A modified version of the Global Health Professions Student Survey (GPHSS) was used as the data-gathering method[8] and created based on a thorough literature analysis conducted by subject matter experts utilizing the Delphi technique. The content validity of the tool was obtained from 10 experts (faculty from concerned departments) with an average proportion relevance of 0.98. The scale content validity index was appropriate: S-CVI/Ave of 0.985 and S-CVI/UA of 0.852, since S-CVI of >0.8 is considered an acceptable cut-off score. In terms of internal consistency and reliability, the questionnaire's Cronbach's alpha (α-0.894) was deemed adequate.[9]

Ethical considerations:

The Human Ethics Committee of Mizoram University granted ethical permission by letter No. MZU/HEC/2022/002 dated March 8, 2022. The protocols adhered to were compliant with the institution's ethical guidelines and the 2013 revision of the Declaration of Helsinki. Before enrollment, each subject willingly provided their informed consent. Additionally, the participants' data confidentiality and anonymity were guaranteed.

Statistical analyses:

The statistical package for the social sciences (IBM SPSS Statistics for Windows, Version 25, IBM Corporation, Armonk, NY, USA) was used to analyze the data. For categorical variables, descriptive statistics were given as frequency, percentage, and 95% confidence intervals. Continuous variables were presented as mean with standard deviation or median with interquartile range based on the normality assumption determined by Kolmogorov-Smirnov and Shapiro Wilk test. The relationship between healthcare professionals' attitude toward tobacco use and their socio-demographic characteristics, was assessed using an independent student t-test.

Spearman rank correlation was used for the relationship between attitude and previous training score. All the statistical analyses were carried out at a 5% significance level.

Results and Discussion

A large proportion of the participants 69 % belong to the 18-39 age group. The gender-wise response is significantly dominated by females at 82.4% to males at 17.6%. A majority 60.1% belong to the nuclear family and 46.2% are married while 50.2% are single. Table-1

Out of all participants, 47.2% were tobacco users. There is a 95% probability that the true percentage of tobacco users lies between 42.4% and 52.0%. More participants did not use any form of tobacco among the dentists 64.7%; while 41.9% of the nurses were tobacco users. More than half of the doctors 53.3%, multipurpose health workers58 %, and pharmacists 52.2% were tobacco users among the participants. Among the tobacco users, 9.2% of participants practiced only smoking, 34% of participants used smokeless tobacco, and 4% practiced both smoking and smokeless tobacco use. 71.6% of the participants have tried cigarette smoking at least once. A larger proportion of the participants 27.2% tried their first cigarette between 20 and 29 years of age. Nearly two-thirds 62.4% of the participants have tried smokeless tobacco such as paan masala, zarda, gutkha, khaini, paan, or tuibur (tobacco brew). Table-2

The findings far exceed the conclusion drawn in the meta-analysis by Nilan et al 2019 where the combined prevalence of tobacco usage was 21% for men and 17% for women.[10] The outcome is a clear indication of how concerning and disturbing the tobacco use rate among healthcare professionals is. It would be helpful to support healthcare professionals in quitting smoking if further research focuses on understanding the cause of the high prevalence of tobacco use among them. The outcome is a clear indication of how concerning and disturbing the tobacco use rate among healthcare professionals is.

A statistically significant association was noted between the type of profession and different forms of tobacco used (P<0.001). Smokers are found to be more among multipurpose health workers (19.3%), whereas, 36.9% of the nurses were using smokeless tobacco. The proportion of participants using both smoking and smokeless tobacco is the highest among pharmacists (10%), while none of the dentists were using both forms of tobacco.Table-3. This contradicts the findings of Mizher et al 2018, where no statistically significant difference (p=0.156) was observed in the prevalence of tobacco use among physicians and other healthcare professionals.[11]

53.7% of smokers (current and previous), and 53.7% of participants who received help regarding smoking cessation have abstained from smoking. Whereas, 58% of participants who did not receive help have stopped smoking. No statistically significant association was found between help received for smoking cessation and abstinence from smoking (P-0.610). Table -4.To promote individualized cessation programs and strategies, there is a need to increase the capacity for locally relevant research and implementation science.[12]

Table-5 shows that participants' attitudes towards tobacco use have a significant relationship with participants' characteristics like gender, food habits, and duration of work experience. Females have a higher attitude score towards tobacco use (111.06 vs. 108.96) as compared to men (P-0.045). Participants who followed a non-vegetarian diet had better attitude scores than vegetarians and vegan participants. (P-0.048). A lower mean attitude score towards tobacco use was also noted among divorced participants (P-0.065) and participants belonging to extended family (P-0.132), as compared to other categories. Dentists have a comparably higher attitude score on tobacco use (115.18±5.71) as compared to other healthcare professionals, which was however not statistically significant (P-0.093). Years of experience are found to be significant (P -0.031). Those with experience of 10 years or less have a better attitude (111.34±7.78) and their attitude gets better again after 21 years or more experience (110.84±8.71). There is no significant relationship between tobacco use and attitude towards tobacco use among the participants. A negligible positive correlation was also found between attitude score and previous training score (ρ of 0.221).

With regards to the attitude toward tobacco use, the study identified that the mean score was higher

among overall non-tobacco users (110.73 vs. 106.14) and non-smokeless tobacco users (110.56 vs.106.10), which are both statistically significant at P-0.047 and P-0.049 respectively, non-smokers are better inclined to give counseling to the patient than present smokers. Mizher et al.2018 also drew a similar conclusion that in comparison to present smokers, patient counseling was provided by non-smokers much more often.[11]

A minute correlation is detected between the attitude score and the previous training score (ρ of -0.041). The majority of the participants received previous training regarding tobacco use (>90%). However, fewer participants stated that they received training on tobacco cessation approaches (89.2%) and the use of antidepressants (21.5%). Training on tobacco cessation approaches for healthcare professionals was found to be relatively low. Chan et al. 2007 stated that most of their study participants did not receive training.[13] Lack of experience, expertise, time, and resources are thought to be the most obstacles to providing adherence assistance. Healthcare professionals thought that increasing counseling and keeping an eye on adherence could raise adherence rates.[14] The primary barriers noted include a lack of expertise, insufficient treatment duration, and a lack of awareness of referral channels, and recommendations for quitting smoking. More training on smoking cessation techniques is required, according to the evidence, which highlights one of the possible obstacles. Future studies in this area are also suggested to support the use of smoking cessation counseling in dentistry settings.[13]

Participants who do not use any kind of tobacco have the highest mean attitude score (110.73±6.97), whereas, participants who practiced both smoking and smokeless tobacco use have the lowest mean attitude towards tobacco use (104.67±8.55). A lower mean attitude score towards tobacco use was also noted among widowed participants (P-0.413) and participants belonging to extended family (P-0.101), as compared to other categories. This finding supports Chan et al 2023 who stated that Healthcare professionals whom themselves use tobacco were substantially less likely to think their tobacco cessation advice would be helpful. Additionally, they felt noticeably less equipped to help people give up tobacco use.[13]

Table 1: Socio-demographic characteristics of participants **N=426**

Participants' characteristics		**Frequency**	**Percentage (%)**
Age	18-29	151	35.4
	30-39	143	33.6
	40-49	80	18.8
	50-59	52	12.2
Gender	Female	351	82.4
	Male	75	17.6
Religion	Christian	420	98.6
	Hindu	2	0.5
	Others	4	0.9
Marital status	Single	214	50.2
	Married	197	46.2
	Divorced	10	2.3
	Widowed	5	1.2
Family type	Extended	18	4.2
	Joint	152	35.7
	Nuclear	256	60.1
Food habits	Non-vegetarian	396	93.0
	Vegetarian	22	5.2
	Vegan	8	1.9

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Profession	Dentist	17	4.0
	Doctor	45	10.6
	MHW	88	20.7
	Nurse	236	55.4
	Pharmacist	40	9.4
Organization	Government	251	58.9
	Mission	86	20.2
	Private	89	20.9
Work experience	≤10 years	251	58.9
	11-20 years	86	20.2
	≥21 years	89	20.9

Table 2: Prevalence of tobacco use among healthcare professionals

Questions	**All**		**Dentists**	**Doctors**	**MHW**	**Nurses**	**Pharmacists**
	n	**% (95% CI)**	**n=17**	**n=45**	**n=88**	**n=236**	**n=40**
Current use of tobacco							
Yes	201	47.2 (42.4-52.0)	6 (35.3)	24 (53.3)	51 (58.0)	99 (41.9)	21 (52.5)
No	225	52.8 (48.0-57.6)	11 (64.7)	21 (46.7)	37 (42.0)	137 (58.1)	19 (47.5)
What form of tobacco do you currently use?							
Smoking	39	9.2 (6.6-12.3)	3 (17.6)	8 (17.8)	17 (19.3)	5 (2.1)	6 (15.0)
Smokeless	145	34.0 (29.5-38.8)	3 (17.6)	14 (31.1)	30 (34.1)	87 (36.9)	11 (27.5)
Both smoking and smokeless	17	4.0 (2.3-6.3)	0	2 (4.4)	4 (4.5)	7 (3.0)	4 (10.0)
Have you ever tried or experimented with cigarette smoking even one or two puffs?							
Yes	305	71.6 (67.1-75.8)	16 (94.1)	37 (82.2)	53 (60.2)	167 (70.8)	32 (80.0)
No	121	28.4 (24.2-32.9)	1 (5.9)	8 (17.8)	35 (39.8)	69 (29.2)	8 (20.0)
How old were you when you first tried a cigarette? (N=305)							
10 years or younger	24	7.9 (5.1-11.5)	2 (12.5)	2 (5.4)	2 (3.8)	17 (10.2)	1 (3.1)
11-15 years	72	23.6 (19.0-28.8)	4 (25.0)	9 (24.3)	14 (26.4)	40 (24.0)	5 (15.6)
16-17 years	42	13.8 (10.1-18.2)	4 (25.0)	8 (21.6)	6 (11.3)	12 (10.2)	7 (21.9)
18-19 years	61	20.0 (15.7-24.9)	1 (6.3)	6 (16.2)	12 (22.6)	30 (18.0)	12 (37.5)
20-29 years	83	27.2 (22.3-32.6)	4 (25.0)	7 (18.9)	16 (30.2)	51 (30.5)	5 (15.6)
30 years or older	23	7.5 (4.8-11.1)	1 (6.3)	5 (13.5)	3 (5.7)	12 (7.2)	2 (6.3)
Have you ever used smokeless tobacco such as paan masala, zarda, gutkha, khaini, paan or tuibur (tobacco brew)?							
Yes	266	62.4 (57.7-67.1)	10 (58.8)	29 (64.4)	59 (67.0)	139 (58.9)	29 (72.5)
No	160	37.6 (32.9-42.3)	7 (41.2)	16 (35.6)	29 (33.0)	97 (41.1)	11 (27.5)

N=426

n-number of participants; %-percentage CI-Confidence interval

Table 3: Comparison of tobacco use among healthcare professionals **N=426**

Profession	Tobacco use n(%)				P-value
	None	Smoking	Smokeless tobacco	Both	
Dentists	11 (64.7)	3 (17.6)	3 (17.6)	0	<0.001
Doctors	21 (46.7)	8 (17.8)	14 (31.1)	2 (4.4)	
MHW	37 (42.0)	17 (19.3)	30 (34.1)	4 (4.5)	
Nurses	137 (58.1)	5 (2.1)	87 (36.9)	7 (3.0)	
Pharmacists	19 (47.5)	6 (15.0)	11 (27.5)	4 (10.0)	

*n-number of participants; %-percentage; *Chi-square test; P<0.05*

Table 4: Help received for smoking cessation among previous and current smokers N=130

		Stopped smoking		P-value*
		Yes n (%)	No n (%)	
Help/advice received for smoking cessation	Yes	22 (53.7)	19 (46.3)	0.610
	No	52 (58.4)	37 (41.6)	

*n-number of participants; %-percentage; *Chi-square test;P≤0.05*

Table 5: Relationship between healthcare professionals' attitude on tobacco use and their socio-demographic characteristics **N=426**

Participants' characteristics		Attitude score on tobacco use (Mean±SD)	P-value
Age[1]	18-29	111.26±7.56	0.679
	30-39	110.69±8.17	
	40-49	110.05±9.19	
	50-59	110.04±8.99	
Gender[2]	Female	111.06±8.12	0.045
	Male	108.96±8.73	
Religion[1]	Christian	110.72±8.28	0.790
	Hindu	109.50±10.61	
	Other	108.00±5.72	
Marital status[1]	Single	111.08±7.787	0.065
	Married	110.66±8.57	
	Divorced	104.20±9.11	
	Widowed	108.00±10.22	
Family type[1]	Extended	108.67±8.87	0.132
	Joint	109.88±8.58	
	Nuclear	111.32±7.98	
Food habits[1]	Non-vegetarian	110.93±8.14	0.048
	Vegetarian	108.50±9.16	
	Vegan	104.75±9.16	

Profession[1]	Dentists	115.18±5.71	0.093
	Doctors	109.93±8.18	
	MHW	109.58±9.18	
	Nurses	111.08±7.77	
	Pharmacists	109.83±9.400	
Organization[1]	Government	110.73±8.34	0.692
	Mission	111.49±8.32	
	Private	110.24±8.05	
Years of work experience[1]	≤10 years	111.34±7.78	0.031
	11-20 years	108.64±8.86	
	≥21 years	110.84±8.71	
Tobacco use form[1]	None	111.20±8.06	0.329
	Smoking	109.72±8.02	
	Smokeless tobacco	109.94±8.57	
	Both smoking and smokeless tobacco	112.53±8.51	
Previous training score[3]		0.221 (0.127, 0.314)	<0.001

SD-standard deviation; [1]One-way Analysis of Variance; [2]Independent student t-test;

[3]Spearman's rank correlation coefficient(ρ) with 95% Confidence interval; P≤0.05

Conclusion

It is disturbing to learn that a significant percentage of healthcare personnel use tobacco in various forms. The study revealed that tobacco use has a significant relationship with participants' characteristics like gender, food habits, and duration of work experience. Contrary to tobacco users, non-users have a better attitude and are more likely to provide a good example of healthy behavior. The study revealed a negligible positive correlation between attitude score and previous training score. Healthcare workers themselves must stop using tobacco to be able to support programs to assist people in quitting tobacco use. Helping healthcare professionals give up tobacco usage should therefore be a priority.

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Conflict of Interest: None

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Original Article

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Knowledge Attitude and Practices about Family Planning Methods among Postpartum Mothers and Challenges Faced by the Service Providers at a Tertiary Care Hospital: A Mixed Method Study

Chinta Archana[1], Kuppli Sai Sushma[2], Krishnaveni Avvaru[3]

[1]Postgraduate, [2]Assistant Professor, [3]Professor and HOD, Department of Community Medicine, Andhra Medical College,Visakhapatnam.

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Abstract

Background: According to the fifth National Family Health Survey (NFHS-5), only 66.7% of married women were using family planning methods. In addition, there are numerous obstacles faced by the family planning unit service providers in making beneficiaries utilize these services.

Objectives: To assess the Knowledge, Attitude, and Practices about family planning methods among postpartum mothers. To explore the challenges faced by the service providers of family planning unit.

Methodology: Study design: Facility-based mixed method study

Quantitative part: A cross-sectional study was conducted in the postpartum ward of KGH, Visakhapatnam among 156 mothers by convenient sampling technique using a pre-tested semi-structured interview schedule.

Qualitative part: The service providers of family planning unit of KGH, Visakhapatnam were interviewed using an in-depth interview guide.

Results: The Knowledge and Practices regarding family planning methods among postpartum mothers is 81.4% & 48.7% respectively, the most common reason for non-usage being want for children. Service providers faced challenges related tocounselling, service, and infrastructure in the health care facility.

Conclusion: This study emphasizes that knowledge regarding family planning methods need not necessarily result in their usage.

Keywords: challenges, family planning methods, postpartum mothers.

Introduction

Family planning is a way of thinking and living that is adopted voluntarily, upon the basis of knowledge, attitudes, and responsible decisions by individuals and couples, to promote the health and welfare of the family group and thus contribute

Corresponding Author: Chinta Archana, Postgraduate, Department of Community Medicine, Andhra Medical College, Visakhapatnam.

E-mail: charchana96@gmail.com

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effectively to the social development of a country.[1] In 1952, India became the first nation in the world to introduce a National Programme for Family Planning. The plan is now being realigned to meet population stabilisation targets as well as to enhance reproductive health and reduce maternal, neonatal, and child mortality and morbidity. Over the years, the plan has changed in terms of policy and actual programme execution.[2] The service providers of the family planning unit consider the pregnancy and postpartum periods to be excellent for counselling women on the adoption of family planning methods due to the woman's frequent interaction with the health system over a reasonably lengthy period.[3]

The informed choice and utilization of various family planning methods by postpartum mothers is important. Despite the availability of a variety of family planning methods during the postpartum period, female sterilization remains the most common method used by married women.[4,5] Globally the usage of modern contraceptives among women rose from 35% in 1990 to 45% in 2021, with Eastern and Southeast Asian regions witnessing the highest percentage of usage.[6] According to the Fifth National Family Health Survey (NFHS-5), 66.7% of married women use any type of family planning method with 56.5% using modern methods.[7]

However, the landscape of family planning services is not without its challenges where the healthcare service providers are at the forefront of delivering accurate information and counseling to postpartum mothers. These challenges encompass a range of issues, from limited resources and high patient volumes to the need for specialized expertise and evolving societal norms. Understanding and addressing these challenges is paramount to ensure that individuals and families have access to the quality family planning care they deserve within the complex healthcare ecosystem of a tertiary care hospital. By shedding light on these issues, we hope to contribute to the ongoing efforts to improve family planning services within tertiary care hospitals, ultimately enhancing the overall quality of reproductive healthcare for the communities they serve.

Objectives:

1. To assess the Knowledge, Attitude, and Practice about family planning methods among postpartum mothers.
2. To explore the challenges faced by the family planning unit service providers.

Materials and Methods

A facility-based mixed-method study was conducted from August to September 2023 in a government tertiary care hospital in Visakhapatnam.

A cross-sectional study was conducted among postpartum mothers in the postpartum ward of King George Hospital (KGH), Visakhapatnam. According to a previous study, 89%[8] of the participants practised family planning. By using the formula $4pq/l^2$ [l(absolute error)= 5%] the sample size was calculated as 156. All the mothers who gave consent were included and women who had abortions were excluded. A convenient sampling technique was used to select the mothers. The mothers were interviewed using a pre-tested semi-structured interview schedule, that consisted of information related to sociodemographic characteristics, obstetric history, and questions related to their knowledge, attitudes, and practice about family planning methods. The updated BG Prasad scale for 2023 was used for socioeconomic status. Data was entered into an MS Excel spreadsheet and analysed using IBM SPSS version 25. Frequencies and percentages were done. To study the association of various sociodemographic variables with knowledge and practice Chi-Square test was done. A P-value of <0.05 was considered to be significant.

For the qualitative part, the service providers of the family planning unit of KGH, Visakhapatnam were interviewed. Service providers, involved in health care and counselling services were included whereas technical staff were excluded. After informing the participants about the study's objective and obtaining their consent, interviews were performed using an interview guide[9]. Each interview lasted between 15 and 20 minutes. Every interview was conducted in Telugu or English language, depending on the participant's preference, and was audio recorded using a recorder. A total of eight key informant interviews were donetill data saturation

was reached. The interviews were done directly by the principal investigator, who had training in conducting interviews. A manual thematic analysis was done. Data obtained was first transcribed into Telugu and English language and then translated into English from which codes were identified. Following that categories and themes were derived.

Written informed consent was taken from all the study participants. Ethical clearance was obtained from the Institutional Ethics Committee, Andhra Medical College, Visakhapatnam. (Serial no:196/IEC AMC/AUG 2023).

Results

A total of 156 postpartum mothers have participated in the study. The mean age of the study population is 23.81±2.89 years. Majority (52.6%) of the women were married after the age of 20 years and 84 (53.8%) mothers were primi.

Table 1: Sociodemographic characteristics of the study participants (n=156)

Variables	n (%)
Age (Years)	
≤20	29 (34.5)
≥21	127(65.5)
Religion	
Hindu	123 (78.8)
Christian/ Muslim	33 (21.2)
Education	
Educated	143 (91.7)
Uneducated	13 (8.3)
Occupation	
Employed	39 (25)
Unemployed	117 (75)
Place of residence	
Rural	67 (42.9)
Urban	79 (50.6)
Tribal	10 (6.5)
Type of family	
Nuclear	62 (39.7)
Three generation/Joint	94 (60.3)
Socio economic status	
Upper	21 (13.5)
Upper middle	33 (21.1)
Middle	76 (48.8)
Lower middle	16 (10.2)
Lower	10 (6.4)

Knowledge regarding family planning methods:

Out of 156 study participants 127 have heard about family planning methods. The source of information for 84.3% among study participants was family/friends followed by 81.9% from healthcare workers, 77.2% from doctors, and 22.8% from social media.

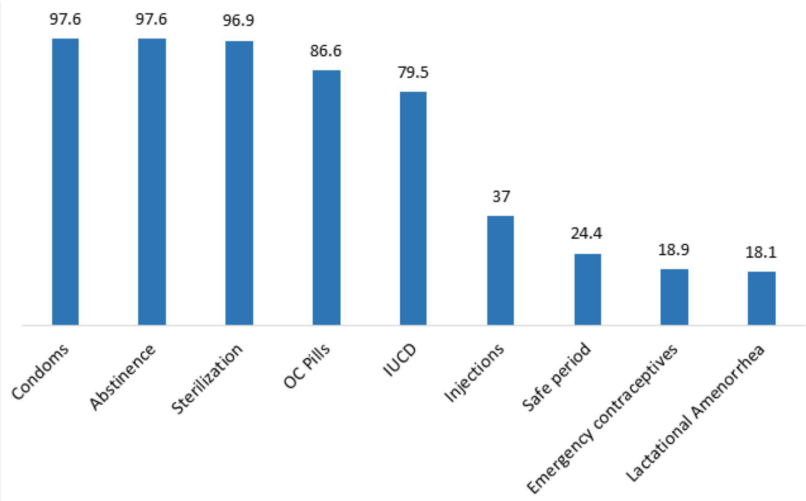


Fig 1: Knowledge regarding various family planning methods [(n=127)%] (multiple response answers)

The majority of the study participants knew (98.4%) they could access these services from tertiary care hospitals, followed by private hospitals (97.6%), subcentres/PHCs (88.2%), CHCs (72.4) and medical shops (29.1%).

Attitudes regarding family planning methods:

In this study, 88% of women agreed that contraceptives should be used to limit the number of children while 3.8% of women agreed it is a sin to use family planning. 37.9% of women disagreed when asked if they would encourage their friends to use family planning methods. 58.9% of the study participants agreed that usage of contraceptives causes infertility in the future which is in line with the reason for not using family planning methods as side effects.

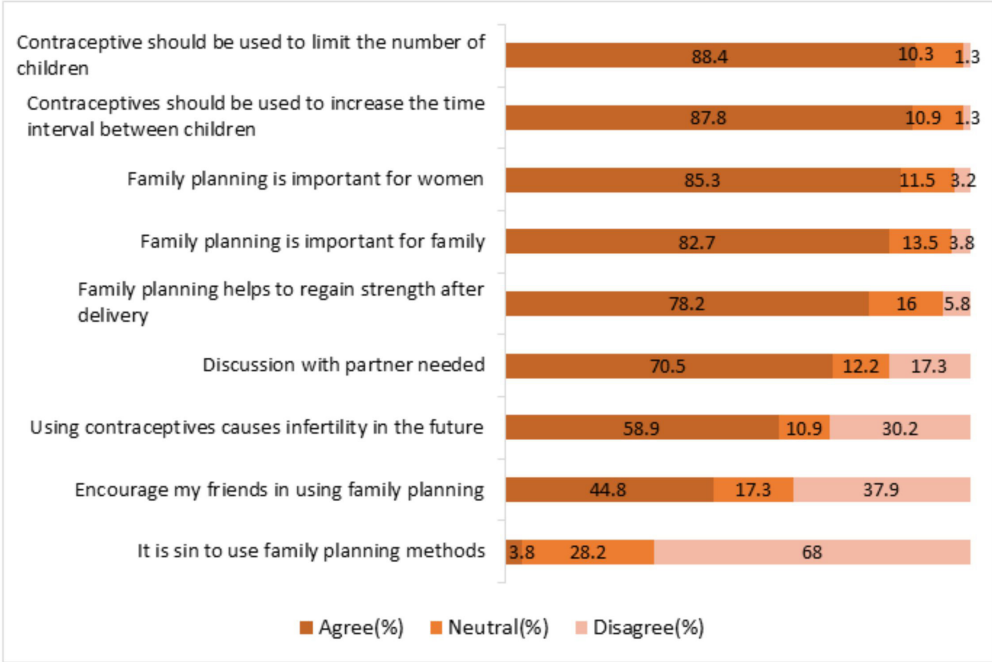


Fig 2: Attitudes regarding Family planning methods among postpartum mothers (n=156)

Practice of family planning methods:
Among 156 study participants, only 76 (48.7%) had used family planning methods. The most common method practiced by the study participants was abstinence (76.3%), followed by IUCD (44.7%), condoms (18.4%), and oral contraceptive pills (1.3%). In this study, 80 (51.3%) study participants have not practiced any family planning method. The reasons for not using family planning methods (Fig 3).

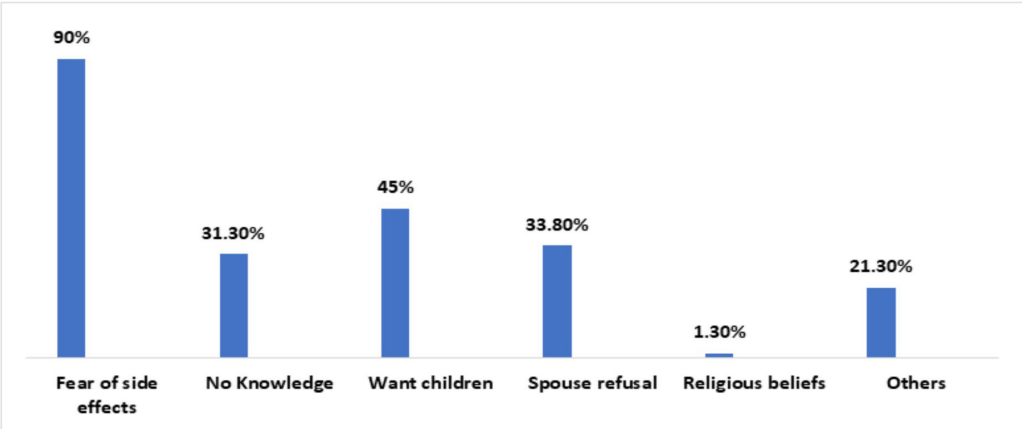


Fig 3: Reasons for not using family planning methods: (n=80) (multiple response answers)

For 77.6% of the study participants the reason for using contraceptives was advice from heath care workers followed by child spacing (73.7%) and to improve the health of the mother and child (43.4 %).

Table 2: Socio-demographic characteristics and their association with knowledge and practices of various family planning methods among the study population (n=156)

Characteristics (n=156)	Knowledge			Practice		
	Present (%)	Absent (%)	P-value	Used (%)	Not used (%)	P-value
Age (Years)						
≤20	13 (44.8)	16(55.2)	0.001*	2 (6.9)	27(93.1)	0.001*
≥21	114(89.7)	13(10.3)		74(58.2)	53(41.8)	
Religion						
Hindu	99(80.4)	24(19.6)	0.567	62(50.4)	61(49.6)	0.415
Christian/ Muslim	28(84.8)	5(15.2)		14(42.4)	19(57.6)	
Education						
Educated	117(81.8)	26(18.2)	0.710	65 (45.4)	78(54.6)	0.008*
Uneducated	10 (76.9)	3(23.1)		11 (84.6)	2(15.4)	
Occupation						
Employed	34(87.1)	5(12.9)	0.285	23(58.9)	16(41.1)	0.139
Unemployed	93(79.4)	24(20.6)		53(45.2)	64(54.8)	
Place of residence						
Rural	54(80.5)	13(19.5)	0.160	32(47.7)	35(52.3)	0.377
Urban	67(84.8)	12(15.2)		37(46.8)	42(53.2)	
Tribal	6(60)	4(40)		7(70)	3(30)	
Type of family						
Nuclear	50(80.6)	12(19.4)	0.842	28(45.1)	34(54.9)	0.470
Three generation/Joint	77(81.9)	17(18.1)		48(51.1)	46(48.9)	
Socio economic status						
Upper	16(76.1)	5(23.9)	0.842	11(52.3)	10(47.7)	0.885
Upper middle	27(81.8)	6(18.2)		14(42.4)	19(57.6)	
Middle	63(82.8)	13(17.2)		37(48.6)	39(51.4)	
Lower middle	12(75)	4(25)		8(50)	8(50)	
Lower	9(90)	1(10)		6(60)	4(40)	

It was observed that mothers aged above 21 years had higher knowledge regarding family planning methods when compared to those below 20-years mothers. Age (≥ 21 years) and education of the study participants were significantly associated with the usage of family planning methods.

Qualitative part:

Challenges faced by the service providers

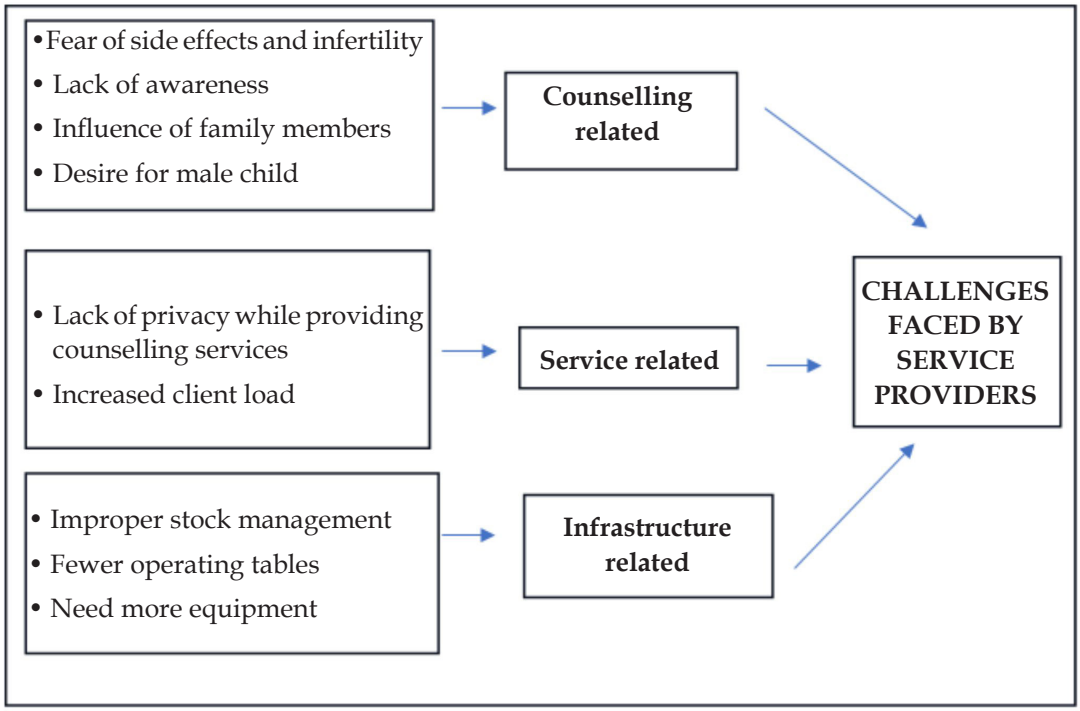


Fig 4: Challenges faced by family planning unit service providers

Service Providers described various challenges related to counselling, services, and infrastructure (Fig 4). Lack of awareness about family planning methods among the mothers was one of the service-related challenges as described in Fig 4. This finding is in line with the knowledge of the mothers about various family planning methods (18.6%) in the present study. Fear of side effects is another challenge. This study shows that, among the 81.1% of mothers who had never used any family planning method in the past, 90% of them cited fear of side effects as their main reason. In a statement given by one of the service providers, it was said that:

"They have fears. They say that IUCD will go somewhere in the body, it will reach the heart. They have also the fear of not getting pregnant after the stoppage of these methods."

Discussion

The mean age of the postpartum mothers in the present study was 23.81 ± 2.89 years. In a study conducted by Singh et al.,[10] the mean age was 30.5 years.

In our study, 81.4% of the study participants have knowledge regarding family planning methods. The study conducted by Sah et al. in Nepal showed that it was 83.5%[11] in Qazi M et al. it is 94%[12] and 98% in a study conducted by Prachi et al.[13] This low level of knowledge in comparison to other studies could be attributed to cultural barriers, and inadequate education during the antenatal period. The hesitancy of the mothers to talk about family planning methods could also be one of the reasons. Educating mothers from initial stages of their antenatal period about the significance of usage of family planning methods can help achieve a better understanding and acceptance of various methods as it is the most receptive period by both mothers and their families.

In the present study majority of them knew about condoms (97.6%) and abstinence (97.6%), followed by sterilization (96.9%), oral contraceptive pills (86.6%), and Intrauterine contraceptive devices (79.5%) with the least known being Injectables (37%). The practice observed was 18.4% for condoms, 76.3% for abstinence 1.3% for OC pills and 44.7% for IUCDs. High knowledge was found for condoms and least for Injectables in similar studies done by Singh et al.,[10]

and Qazi et al[12]. In the present study, 48.7% of the study participants have practiced family planning methods compared to 32.8%, 33.4%, 37.5%, and 60% in Joshi et al., Murry et al., Singh A. et al., and Quazi M et al. respectively.[10,12,14,15]

Knowledge among the study participants regarding various family planning methods is good but it has not been translated into practice. This is impeded by several variables, including fear of adverse effects, ignorance, refusal by spouses and family members, and religious beliefs.

In the present study around 88% of the study participants felt that contraceptives are useful to limit the number of children, to increase the time interval between pregnancies and 78% agreed that it helps to regain strength after delivery. In a study conducted by Prachi et al.,[13] 98% agreed that it is beneficial to use contraceptives and 93.2% have said that they would encourage their friends and relatives in using family planning methods where as it was only 44.8% in the present study. 70.5% of the postpartum mothers felt that partner discussion is needed compared to only 15.4% in a study done by Singh A et al.[10] 3.8% of study participants believed that using family planning was sinful. In a study conducted by Murry et al.,[15]the median response to the question "My religion forbids me from using family planning" was 2. We can offer effective counselling services and achieve favourable outcomes provided that there is a less negative attitude towards family planning options.

Our study identified challenges such as lack of knowledge, and fear of side effects which were similar to a study done by Akers et al.[16]. Lack of appropriate knowledge related to various family planning methods leads to fear of side effects, which make them think that they cause harm to the mother or at sometimes make it difficult to become pregnant again or may make them infertile.

Conclusion

Present study concludes that 81% of postpartum mothers were knowledgeable and majority had a positive attitude. 48.3% used family planning methods, citing fear of side effects and desire for more children as barriers to usage.Our study highlights that knowledge and awareness don't always lead to the use of contraceptives. Various challenges identified by the service providers were related to infrastructure, services, and counselling.

Recommendations:

Health care workers such as ASHAs and Auxiliary Nurse Midwives, are crucial in advancing community knowledge and practice of family planning techniques. Enhance health literacy by addressing fear of side effects and promoting planned pregnancy spacing, especially on specific days like the village health and nutrition day or during their home visits to educate both the family members and the mother. Family planning methods should be fully explored to ensure the commitment of the spouse, family, and community. In the postpartum period, diverse requirements for family planning can be met and misconceptions can be dispelled with the support of prompt and specific behaviour change communication and counselling approaches.Conduct periodic training programs for the service providers in various already existing and new techniques and evaluations of existing infrastructure and facilities will help increase the utilization rates.

Conflict of interest: Nil

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Original Article

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Mucormycosis: An Increasing Concern; Experience from a Tertiary Care Centre

Charu Nayyar[1], Dimple Kapoor[2], Mahesh Mohta[3], Sankalp Sethi[4], Navdeep Singh[5], PC Swami[6], Cherry Bansal[7]

[1]MD Microbiology, Associate Professor, Department of Microbiology, Dr S S Tantia Medical College, Hospital and Research Center, Sriganganagar, Rajasthan, [2]MD Pathology, Associate Professor, Department of Pathology, Dr S S Tantia Medical College, Hospital and Research Center, Sriganganagar, Rajasthan, [3]MS ENT, Associate Professor, Department of ENT & Head Neck oncology, Dr S S Tantia Medical College, Hospital and Research Center, Sriganganagar, Rajasthan, [4]DNB Radiology, Consultant Radiology, Ish Imaging Centre, Sriganganagar, Rajasthan, [5]MD Medicine, Assistant Professor, Department of General Medicine, Dr S S Tantia Medical College, Hospital and Research Center, Sriganganagar, Rajasthan, [6]MDS, Assistant Professor, Department of Oral & Maxillofacial Surgery , Dr S S Tantia Medical College, Hospital and Research Center, Sriganganagar, Rajasthan, [7]MD Pathology, Professor, Department of Pathology, Dr S S Tantia Medical College, Hospital and Research Center, Sriganganagar, Rajasthan.

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Abstract

Background: Mucormycosis is an angioinvasive life threatening infection caused by the fungus belonging to the order Mucorales and family Mucoraceae. The prevalence of mucormycosis is on a rising trend. The known risk factors for mucormycosis includes uncontrolled diabetes mellitus, malignancies such as lymphomas, leukemia, organ transplant, long term corticosteroid or immunosuppressive therapy, renal failure, burns, protein-energy-malnutrition etc.

Material and methods: This is a prospective study conducted over a period of six months. Samples showing broad aseptate ribbon like fungal hyphae were included in the study. Clinical, demographic details, risk factors, results of radiological and pathological investigations were collected and analysed.

Results: In the study period, 76 samples were received for KOH examination in the laboratory, out of which 15 samples were found to be positive for broad aseptate ribbon like fungal hyphae. The mean age of the study group was 43.4 years. Out of 15 patients, 66.6% were males and 33.3% were females. All the cases were of Rhinocerebral

Corresponding Author: Cherry Bansal, Professor, Department of Pathology Dr SS Tantia Medical College, Hospital and Research Center Sriganganagar, Rajasthan.

E-mail: drcherrybansal@gmail.com

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mucormycosis and uncontrolled diabetes mellitus was the risk factor present in all the cases. Five patients were diagnosed with diabetes at the time of admission. Three cases presented with diabetic ketoacidosis, two cases had chronic kidney disease and one was a known case of pulmonary tuberculosis.

Conclusion: In the past few years, there has been a steady increase in the cases of mucormycosis, both worldwide and in India. As the disease progresses rapidly, prompt diagnosis and early management plays a crucial role in survival of the patient.

Key words: mucormycosis, Uncontrolled diabetes mellitus, Rhinocerebral.

Introduction

Mucormycosis, an angio-invasive potentially life-threatening infection is known to be caused by a fungus belonging to the order Mucorales and family Mucoraceae. The deadly disease has been known to the mankind since 1876, when in Germany the first case was described by a scientist named Furbinger. Fungal hyphae and sporangia were detected in the haemorrhagic infarct of the right lung of the patient who died of cancer. Following this, the first case was published in the year 1885, when Arnold Paltauf's drawings demonstrated rhizoid like structures and sporangiophores. The disease has evolved over the years and currently, it is the second most common mould pathogen after *Aspergillus*, known to cause invasive fungal disease in immunocompromised patients.[1-4]

Currently, the incidence of mucormycosis is considered to be highest in Indian subcontinent with a rate of 140 cases per 1,000,000 population per year in India and Pakistan. The incidence is the lowest in United states estimated to be 1.7 cases per 1,000,000 population per year.[1]

The known risk factors for mucormycosis includes uncontrolled diabetes mellitus, malignancies such as lymphomas, leukemia, organ transplant, long term corticosteroid or immunosuppressive therapy, renal failure, burns, protein-energy-malnutrition etc.[1,3,5-7]

Based on the anatomic site involved and the clinical manifestations, mucormycosis is classified into at least six clinical categories: (i) rhinocerebral, (ii) pulmonary, (iii) cutaneous, (iv) gastrointestinal, (v) disseminated, and (iv) miscellaneous. Miscellaneous includes forms like osteomyelitis, peritonitis, endocarditis, renal etc.[2,4] Amongst these forms, Rhinocerebral mucormycosis is the most common clinical form. It alone accounts for almost one third to half of all the cases of mucormycosis.[4,8]

This study was conducted to find out the incidence of mucormycosis, to study the various types and risk factors present in a tertiary care centre in north Rajasthan. To the best of our knowledge such data is not present form this part of India.

Aims and objectives:

The study was conducted to study the demography, epidemiology, risk factors, correlation of microbiological, histopathological and radiological picture of patients with mucormycosis.

Inclusion criteria

All consecutive individuals diagnosed with mucormycosis were included in this study. Patients with mucormycosis were defined as those individuals with clinical symptoms and the demonstration of fungi in the tissue either by direct microscopy (broad ribbon like aseptate hyphae), or culture methods.

Exclusion criteria

Individuals with any other fungal infection or no fungal infection were excluded from the study.

Material and Methods

This is a prospective study done over a period of six months from October 2023 to March 2024 at Dr S S Tantia Medical college, hospital and research centre at Sriganganagar, Rajasthan. We receive various samples from different clinical departments such as otorhinolarungology, medicine, Dental for KOH (potassium hydroxide) examination. We collected information of patients whose samples showed broad ribbon like aseptate fungal hyphae on KOH examination. All the clinical details of these patients were collected such as demographic detail, chief complaints, site involved, comorbidities present, risk factors (such as diabetes, malignancy etc) radiological investigation, microbiological, histopathological findings etc. Tissue samples, such as nasal/sinus

tissue biopsies were subjected to conventional microscopy, culture and histopathological examination. Microscopy was performed using the KOH mount method. Samples were also inoculated onto two sets of Sabouraud dextrose agar with and without chloramphenicol. The positive cultures were identified by their macroscopic and microscopic characteristics. The tissue samples submitted for histopathological examination were examined using haematoxylin & eosin and periodic acid Schiff stain. Informed consent was obtained from all the patients included in the study.

Results

In the study period, 76 samples were received for KOH examination in the laboratory, out of which 15 samples were found to be positive for broad aseptate fungal hyphae. The mean age of the study group was 43.4 years .Out of 15 patients, 66.6% were males and 33.3% were females.

Clinical presentation

Most common clinical presentation was periorbital swelling (46.6%) followed by pain in one side of jaw (33.3%) , difficulty in breathing (13.3%) and foul smelling nasal discharge (6.6%). (Fig. 1) All of the fifteen patients were diagnosed to have rhino-cerebro-orbital-mucormycosis.

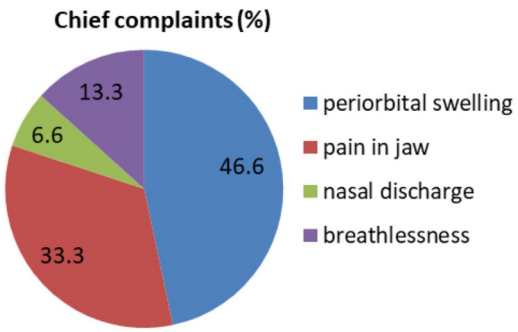


Fig. 1 Chief complaints of patients diagnosed with mucormycosis

Microbiological investigation

A nasal tissue was collected from all these patients and sent to microbiology department for KOH examination. Immediately on receiving the sample, KOH examination was performed which revealed presence of broad ribbon shaped aseptate hyaline fungal hyphae. (Fig. 2) Eleven of the samples demonstrated growth on culture media which was confirmed to be *Rhizopus* spp.



Fig. 2 KOH mount showing broad aseptate ribbon like fungal hyphae

Pathology investigation

Biopsy was performed for all the patients. A nasal tissue collected in formalin was sent to the pathology department Histopathological examination revealed broad aseptate ribbon like fungal hyphae in 14 patients. PAS (periodic acid schiff) stain was also performed in all these samples which were also positive for mucormycosis. (Fig.3)

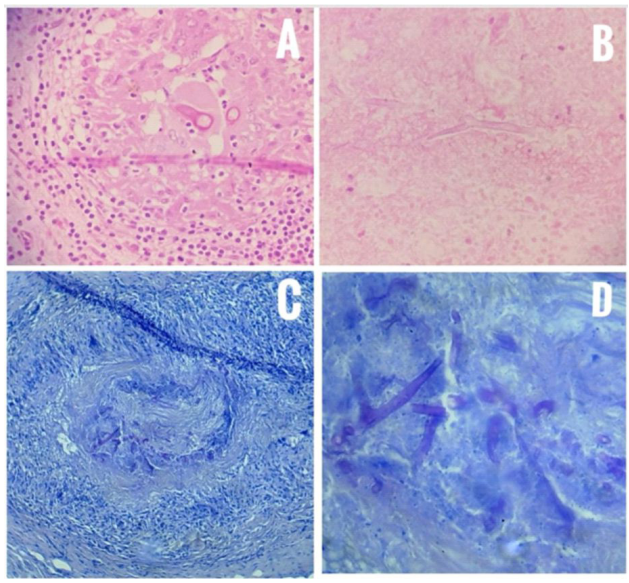


Fig. 3A, 3B- H and E stained section shows areas of necrosis and broad aseptate hyphae. 3C, 3D- PAS stained section shows positive staining for fungal hyphae. PAS stained image show vascular wall invaded with fungal hyphae suggestive of angioinvasion.

Radiology investigation

Various radiological examination performed were NCCT PNS (non contrast computed tomography paranasal sinuses), CECT (contrast enhanced computed tomography) maxilla and MRI(magnetic resonance imaging) orbit depending on the clinical symptoms. Imaging studies were done in 12 patients which showed findings suggestive of fungal sinusitis. (Fig. 4)

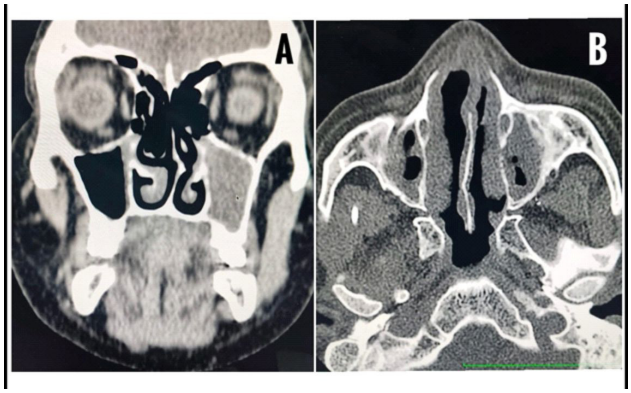


Fig. 4 A- Coronal CT showing bilateral maxillary sinusitis (left >right) with obliteration of left osteomeatal complex containing hyperdense foci likely representing fungal sinusitis. 4B-Axial CT PNS showing mucosal thickening in bilateral maxillary sinusitis with hyperdense contents and rarefaction/remodeling of walls of maxillary sinuses likely representing fungal sinusitis.

Risk factors

All the patients were diabetic, five of them were diagnosed for the first time at the time of admission. Average HbA1c (glycosylated hemoglobin) was found out to be 9.9. Three patients presented with ketoacidosis at the time of admission. Two patients were known case of chronic kidney disease. One patient was a known case of pulmonary tuberculosis.(Fig.5)

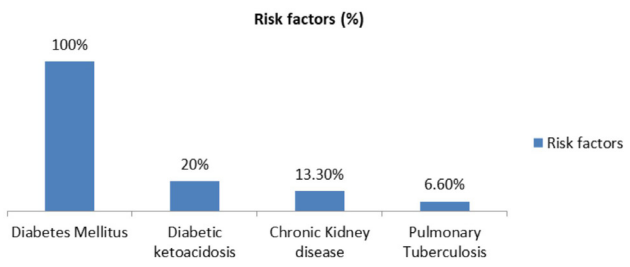


Fig. 5 Risk factors present in patients diagnosed with mucormycosis

Management

Two of the patients underwent surgical debridement at our institute. Amphotericin B is not available at our institute, so all the patients were referred to a higher centre for further medical treatment of mucormycosis. Therefore, follow up of patients for final outcome could not be performed.

Discussion

In the past few years, there has been a steady increase in the cases of mucormycosis, both worldwide and in India.[5,9-11]

The most common type of clinical presentation in our study was rhino-cerebral mucormycosis, which is the most common type worldwide.[1,4,8]

The patients usually present with facial swelling, pain around the eye, pain in and around jaw, headache and in some cases black colored lesions can be seen in and around nasal and oral cavity. The disease begins with involvement of sinuses followed by orbits and if not treated promptly may involve brain. Blindness is the most common and morbid complication of the disease.[12]

Majority of our patients were males (66.6) with a mean age of 43.4 years. Similar data have been published by Yadav *et al*[1] in 2021 from Jodhpur, Rajasthan who showed mean age of 47.5 years with 60% patients being males. Studies published by Tamer Roushdy[13] in 2021 and Hoenigl *et al*[14] in 2022 also demonstrated similar results (75% and 78% males respectively).

Diabetes mellitus is the commonest risk factor for mucormycosis in Asian subcontinent and almost 70% of rhinocerebral cases have been detected in diabetic patients.[4,5,9]

Uncontrolled Diabetes is associated with a higher risk of acquiring mucormycosis infection because of the following changes that occur in a diabetic patient (i) there is availability of glucose to the pathogen, (ii) the T cell response as well as the humoral response is deranged,(iii) in the presence of lower pH there is reduced inhibitory activity of the serum towards Rhizopus pathogen, (iv) there is increased expression of certain host cell receptor that helps in invasion of the epithelial cells by the pathogen and (v) there is excessive production of reactive oxygen species.[8,12,15]

All the cases in our study were either known diabetic or were diagnosed with diabetes at the time of admission. Two of our patients were diagnosed with diabetic ketoacidosis. It is known that the enzyme ketoreductase produced by *Rhizopus* allows the organism to utilize patient's ketone bodies and hence increases the risk of acquiring mucormycosis infection. Also, the ketone bodies transiently damages the ability of transferring to bind to iron and thus allows the microorganism to evade the host defense mechanism and thus the growth of pathogen flourishes.[7]

As the disease progresses rapidly, prompt diagnosis and early management plays a crucial role in survival of the patient. Depending on the clinical manifestations, various modalities available are antifungal therapy, surgical debridement, use of hyperbaric oxygen.[12]

With the growing number of diabetic patients in the country, India has been labeled as the world capital of diabetes. The main reason for this is the change in the lifestyle pattern of people which is leading to increase in obesity , hypertension, physical inactivity.[16,17]

Globally, it has also been observed that the incidence of patients with undiagnosed diabetes is steadily increasing.[17] As per World Health Organisation data for 2015, 69.2 million (8.7%) of world population remain undetected for diabetes mellitus type 2.[16] The prevalence of diabetes in India has risen from 7.1% in 2009 to 8.9% in 2019.[18] It is also estimated that nearly 57% of adults with diabetes are undiagnosed in India[17].

As Diabetes mellitus alters the normal immunological response, therefore a diabetic patient becomes susceptible not only to the classical complications of diabetes but also to the otherwise rare and fatal infections like mucormycosis.[6,7]

Our study highlights the following important facts. (i) There is a constant increase in incidence of mucormycosis in India. (ii) uncontrolled diabetes mellitus is the most common risk factor (iii) Rhino-cerebro-orbital mucormycosis is the most common presentation in our setting. (iv) awareness of fungal diseases is increasing among the clinicians at our centre.

Limitations

Our study was conducted for a small duration of time. A larger study should be planned at our setting in collaboration with all the clinical departments to study in detail the disease of mucormycosis.

Conclusion

With the increasing prevalence of diabetes, undiagnosed diabetes and rare infections like mucormycosis in diabetics, it has become a matter of public health concern to improve measures to diagnose and treat diabetes effectively. The prevalence of mucormycosis is increasing in diabetic patients. For effective management of mucormycosis, it has become imperative for the clinicians to work in collaboration with the laboratory. Prompt diagnosis and aggressive surgical as well as medical management are the corner stone for effective control of the disease.

Ethical statement: The article does not involve any intervention on human subjects hence ethical clearance was not taken.

Conflict of interest: NIL

Financial support: NIL

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Original Article

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Psycho-Social Morbidity and its Determinants among Geriatric Population in a Rural Field Practice Area: A Cross–Sectional Study

D. Sivakumar[1], S. Suganthi[2], P. Parthiban[3], J. Nagarajan[4]

[1,3]Associate Professor, [4]Assistant Professor, Department of Community Medicine, Government Vellore Medical college, Vellore, Tamilnadu, India, [2]Associate Professor, Department of Community Medicine, Government Kilpauk Medical college, Chennai, Tamilnadu, India.

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Abstract

Introduction: One in four older adults worldwide, suffer from mental health disorders such as depression, anxiety, and dementia, according to the WHO. Studies indicate high rates of depression, anxiety, and dementia among older adults, emphasizing the need for comprehensive healthcare strategies. Addressing psychosocial morbidities through early identification and intervention is crucial for improving the quality of life for elderly individuals in India. The objective of the present study is to study the prevalence and determinants of psychosocial morbidity in elderly patients in the geriatric clinic.

Methodology: This is a cross-sectional community based study conducted in a rural field practice area of Government Vellore Medical College, Vellore, Tamil Nadu, India. The study population constituted of individuals aged >60 years. The study used a sample size of 91. P value ≤ 0.05 was considered as the level of significance for the statistical tests. Depression and dementia were screened using standardized scales, and data analysis was performed using SPSS.

Results: About 39 (42.8%) were habituated to alcohol. 47 (51.65%) sometimes faced social maladjustment and 3 (3. 2%) always live with social maladjustments. 41[45.1%] reported anxiety. Dementia was diagnosed in 25.3% and 56% of the people reported depression according to a psychological assessment.

Conclusion: Early identification and intervention for mental health conditions, along with programs promoting social engagement and healthy lifestyles, are crucial in enhancing the quality of life for the growing elderly population.

Keywords: Psycho-social, Depression, Geriatric, Dementia, social security, social Maladjustment.

Introduction

The National Policy on Elderly Persons adopted by the Government of India in January 1999 defines an elderly person as a person aged 60 years or above. Life expectancy at birth also increased from 67.36 to 70.15 from 2011 to 2020[1,2]. The population

Corresponding Author: J. Nagarajan, Assistant Professor, Department of Community Medicine, Government Vellore Medical college, Vellore, Tamilnadu, India.

E-mail: siva86683@gmail.com

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demographic is increasing due to better health control of communicable diseases, better treatment options for such diseases and better nutrition, resulting in longer life expectancy leads. According to the WHO, one in four older adults suffers from a mental health disorder, such as depression, anxiety and dementia. Nearly 17.13 million Indian elderly suffer from mental health problems in India[4]. The most common psychosocial problems include memory impairment, reduced intelligence, anxiety, depression, fixed attitude, addiction, loneliness, dissatisfaction with family, death of close people, job income, unpleasant thoughts dominated by negative feelings [3]. Psychiatric morbidity, which increases with age, is 4.66% more common in the geriatric group than in the non-geriatric group[4]. The prevalence of depression, the most common problem, is between 13 and 22%. Over 20% of adults over 60 years of age suffer from mental disorders, accounting for 6.6% of total disabilities in this age group[5].

Joshi PC et al. found that the prevalence of depression, the most common problem, is between 13 and 22 percent[17]. Due to urbanization and modernization, major changes occurred in family structure and values, as well as in the care and support of the elderly. Improved health care promises longevity, but social and economic conditions such as poverty, broken families and poor services for the elderly pose a social threat to them. They rely on their families as many would need assistance with activities of daily living. Bruce et al. found that 13.5% of nursing home patients suffered from severe depression[6]. Ritchie et al. found a lifetime prevalence of 26.5% and 30% of depression and anxiety disorders in geriatric patients [7]. Tiwari and Srivatsava conducted a study in the rural population in Uttar Pradesh and found that the prevalence of psychiatric disorders is higher in the older age group [42.21%] than in the non-geriatric population 3.97% [8]. In South Asia, the prevalence of dementia was 1.9% in 2005 and is expected to increase to 3.6 million by 2020 and 7.5 million by 2040[10]. According to several epidemiological studies, the prevalence of dementia in India ranges from 2/1000 to 35/1000 people [11,12]

Older adults are more likely to experience events such as bereavement or physical disability, which can impact emotional well-being and lead to poor mental health. Psychosocial morbidities also result from a lack of independence and autonomy. Social exclusion has far-reaching consequences of psychosocial morbidity that go beyond regular activities and access to resources and knowledge. Social exclusion is an important social determinant of health [9]. Furthermore, identifying psychological morbidity and treating it appropriately at its earliest stages shortens the duration of suffering and improves quality of life [5]. The objective of the present study is to study the prevalence and determinants of psychosocial morbidity in elderly patients in the geriatric clinic. Despite a high morbidity pattern among the elderly in India, very few and limited studies have been conducted in Indian states.

Methodology

This is a cross-sectional community based study conducted in a rural field practice area of Government Vellore Medical College, Vellore, Tamil Nadu, India. The study population constituted of individuals aged >60 years and residents of study area were participating in the study. Those who were sick, ill, not giving consent and those who could not complete the questions were excluded from study. The study was conducted over a 3-month period from March 2023 to May 2023. The study was carried out by interview using pre-tested, semi-structured questionnaire. The purpose of the study, along with informed consent and confidentiality, was explained to the participants.

Taking the prevalence of depression among the geriatric population as 40.7%[20], precision to be 11%. Using the formula $4pq/d^2$ the sample size was 77. The total sample size was taken as 91. House to house visits were conducted and a complete enumeration of elderly individual in selected area was done. Then, a sample was taken using systemic random sampling. P value ≤ 0.05 was considered as the level of significance for the statistical tests.

Depression and Dementia were screened using Geriatric Depression scale and Mini Mental state examination respectively[18,19]. The data was entered in MS EXCEL and analyzed using SPSS (16). Central tendency and dispersion were calculated for continuous variables and proportions were calculated for categorical variables. Univariate

analysis using chi-square tests was conducted to check for association.

Results

Total of 91 respondents were interviewed. Among the respondents, 51 (56%) were male and 40 (44%) were female. Among the respondents, 24 (26.3%) were semi-skilled and 20 (21.9%) were semi-professional. The majority of 44 [48.3%] were between 60 and 70 years old and 8 [8.8%] were >80 years old. The results are shown in the table below.

Table 1: Sociodemographics

GENDER	**N (%)**
Male	51(56%)
Female	40(44%)
PREVIOUS OCCUPATION	
Unemployed	17(18.60)
Unskilled	10(10.9)
Semi-skilled	24(26.3)
Skilled	3(3.3)
Clerical	4(4.4)
Farmer	11(12.1)
Semi-professional	20(21.9)
Professional	2(2.2)
AGE in Years	
60-70	44(48.3)
70-80	39(42.8)
>80	8(8.8)

Most of the respondents, 90 (98.9%) lived with family and 1 (1.1%) lived alone. About 39 (42.8%) were habituated to alcohol. Of the respondents, 47 (51.65%) sometimes faced social maladjustment and 3 (3. 2%) always live with social maladjustments. The results are shown in the table below.

Table 2: Social Determinants and Social Morbidity

SOCIAL MALADJUSTMENTS	**N (%)**
Always	3(3.2)
Sometimes	47(51.6)
Never	10(10.5)
SOCIAL LIVING	
Living with spouse/children	90(98.9)
Alone	1(1.1)

Continue.....

SUPPORT FROM FAMILY	
Yes	74(81.3)
No	17(18.7)
LEISURE ACTIVITY	
Gardening	35(38.5)
Physical interaction	25(27.5)
TV watching	31(34.1)
HABITS	
Alcoholic	39(42.8)
Tobacco abuse	38(41.7)
Nose stuffing	2(2.2)
LOCAL GROUP	
Formal group	39(42.8)
Informal group	46(50.5)
Nil	6(6.6)

The most common comorbidities are high blood pressure, followed by asthma, diabetes mellitus and ENT problems. Among the respondents, 34 [33.3] had hypertension, 23 (25.35%) had asthma, 1 (1.1%]) had oral cancer and 1(1.1%) heart disease, 6 (6.6%) had no comorbidities. The results are shown in the table below.

Table 3: Comorbidity

COMORBIDITY	**N(%)**
Asthma	23(25.3)
ENT related issues	1(1.1)
Diabetes mellitus	11(12.1)
kidney disease	4(4.4)
Eye disease	9(9.9)
Heart disease	1(1.1)
Hypertension	34(33.3)
Oral cancer	1(1.1)
None	6(6.6)

Of the respondents, 41[45.1%] reported anxiety. The results are shown in the table below. Dementia was diagnosed in 25.3% of those surveyed according to a psychological assessment, 3 (3.3%) self-reported it, 56% of the people reported depression according to a psychological assessment, and 32 (36.6%) of the people admitted them self is suffering from depression. Dementia and depression were assessed using a mini-mental state examination and a geriatric depression scale, respectively[18,19]. The results are shown in the table below

Table 4: Psychiatric Morbidity

Age Related	Self Reported	Psychological Assessment
Anxiety	41(45.1)	-
Dementia	3(3.3)	23(25.3)
Depression	32(36.4)	51(56.04)

Approximately 10 (10.9%) visit a health facility weekly. Majority 75 (82.4%) spent Rs 1,000-5,000 per month on medical expenses. About 16 (17.6%) had health facilities within a radius of more than 10 km. 43 (47.2%) received a state pension.

Table 5: Health Seeking Behaviour

FREQUENCY OF VISITS	N (%)
Weekly/Frequent visits	17(18.7)
Monthly	38(41.8)
Yearly	8(8.8)
Rarely	28(30.8)
MEDICAL EXPENDITURE	
Government supply	2(2.2)
1000-5000	75(82.4)
>5000	4(4.4)
No expenditure	4(4.4)
MEDICAL SERVICES AVAILABILITY	
5-10km	20(21.9)
<5 km	56(61.5)
>10 km	16(17.6)
GOVERNMENT SCHEME	
Pension	43(47.2)
No pension	48(52.7)

Associations have been found between psychiatric morbidity and gender, family type. The results are shown in the table below. From the above analysis, it appears that dementia is more common in the nuclear family, although this is not statistically significant. Depression and dementia are more common in women, but are not statistically significant. People living with children are more likely to suffer from dementia, but this is not statistically significant.

Dementia and its Association with Selected Social Factors:

FAMILY	INTERPRETATION		P VALUE
	DEMENTIA	NORMAL	
THREE GENERATION FAMILY	2(28.6%)	5(71.4%)	0.62
JOINT FAMILY	3(14.3%)	18(85.7%)	
NUCLEAR FAMILY /LIVING ALONE	18(29.5%)	44(70.5%)	
GENDER			
FEMALE	11(27.5%)	29(72.5%)	0.665
MALE	12(23.5%)	39(76.5%)	
LIVING WITH CHILDREN			
NO	10(35.7%)	18(64.3%)	0.458
YES	13(20.9%)	49(79.0%)	
NO CHILDREN	0	1(100%)	

Depression and its Association With Gender

GENDER	INTERPRETATION		P VALUE
	DEPRESSED	NORMAL	
FEMALE	23(57.5%)	17(42.5%)	0.31
MALE	28(54.9%)	23(45.1%)	

Discussion

In my study, 67 (73.6%) individuals had significant psychosocial morbidity. Dementia was diagnosed in 25.3% of those surveyed, 56% of the people had depression according to a psychological assessment .Similar to our results from Nirmalya manna et al. Kolkata, reported 72 (69.3%)[14] and

K. Seby et al. (2011) reported different degrees in around 30(14.9%)[15]. In my study, 51 (56.1%) people were diagnosed with depression. In contrast, a cross-sectional study in Kamrup by Ankumoni et al. over 83 (27.6%)[13] and k.seby et al. reported 33 (16.3%)[15]. In my study, most of them were habituated to alcohol, 39 (42.8%). In contrast to our study, the cross-sectional study in Kamrupbyankumoni et al. 73 (24.3%)[13] and k.seby et al. reported 6.4%[15]. In contrast to our study, a cross-sectional study in Kamrup by Ankumoni et al. found that 68 (22.7%) lived with spouse and 103 (34.3%) lived with spouse and children[13]. Similar to our study, a cross-sectional study in Calcutta by Nirmalya Manna et al. reported diabetes 12 (11.54%) and in contrast to our study, hypertension 50 (40.08%) and ischemic heart disease 20 (19.23%) as well as COPD 28 (26.92%) [14]and in contrast to our study Purnasinghk et al. (2012) reported DM 87 (29.0%), HTN 163 (54.3%), vision loss 63 (21%) and hearing loss 14 (4.2%)[21]

Conclusion

This study highlights the significant prevalence of psychological morbidity among the elderly population. Nearly half of the studied elderly population exhibited co-occurring condition like depression, anxiety and dementia. Social factors like maladjustment, lack of social security and Unhealthy habits such as alcohol and tobacco use further compounds these challenges. These findings empathize the critical need for comprehensive health care approaches that address both the psychological and social well being of older adults. Early identification and intervention for mental health conditions, along with programs promoting social engagement and healthy lifestyles, are crucial in enhancing the quality of life for the growing elderly population.

Conflict of interest: None Declared

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Ethical Approval: The study was approved by Institutional Ethics Committee

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A Study on Clinical Response and Toxicity in Locally Advanced Head and Neck Cancers

Dasari Praveena[1], B Sweta[2], G David Chakravarthi[3], P Naga Jyothi[4], V Nagesh Kumar[5]

[1]Assistant Professor, Radiotherapy, Government Medical College, Kadapa, [2]Assistant Professor, Radiotherapy, Kurnool Medical College/ Government General Hospital, Kurnool, [3]Assistant Professor, Radiology, Government Medical College, Kadapa, [4]Assistant Professor, Oral Medicine and Radiology, Government Medical College, Kadapa, [5]Assistant Professor, Government Medical College, Kadapa.

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Abstract

Background: Treatment of locally advanced head and neck cancer is a clinical challenge and requires aggressive and concerted measures. Radiotherapy with concurrent chemotherapy is the standard curative treatment strategy for the locally advanced head and neck cancer. The ultimate aim of radiation therapy is the maximum local control of the tumour with minimal toxicity.

Objectives: To assess the clinical response of treatment using Response Evaluation Criteria In Solid Tumors (RECIST) (version1.1) criteria. To assess the toxicities among the study population during chemo-radiation.

Methodology: Hospital based observational prospective study was conducted at Department of Radiation oncology, in a Tertiary cancer care centre among Head and neck Cancer patients.

Results: Most common site of head and neck cancer in the study was oral cavity followed by oropharynx and hypo pharynx. At the end of 4th week 58.33% had grade1 and 33.33% grade 2 mucositis. Response to treatment was found to be statistically significant.

Conclusion: Mucositis was significant toxicities during treatment followed by dysphagia and radiation dermatitis. Complete response is seen in 50% of the patients clinically and radiologically. No patient died during treatment or at follow up.

Key words: Toxicities, Head & Neck cancer, Radiotherapy

Introduction

Head and neck cancer (HNC) was the seventh most common cancer worldwide in 2018 (890,000 new cases and 450,000 deaths).[1] 197649 new cases and 117728 deaths reported in India according to GLOBOCAN 2018 report showing HNC statistics

Corresponding Author: P Naga Jyothi, Assistant Professor, Oral Medicine and Radiology, Government Medical College, Kadapa.

E-mail: aarushank@gmail.com

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of India. In India, among patients diagnosed with HNC, 86.5% were reported as tobacco users and 23.2% were reported as alcohol users. Head and neck squamous cell carcinoma can arise from subsites within the oral cavity, oropharynx, hypopharynx, larynx, and nasopharynx. Around 30% of HNC patients in India and Southeast Asia present with genetic abnormalities like preponderance of Ha-ras mutations, loss of heterozygosity of Ha-ras, N-ras amplification, and N-myc amplification. These rasonco genes mutations are uncommon in the westernworld.[2]

Treatment of locally advanced head and neck cancer is a clinical challenge and requires aggressive and concerted measures. Radiotherapy with concurrent chemotherapy is the standard curative treatment strategy for the locally advanced head and neck cancer. The ultimate aim of radiation therapy is the maximum local control of the tumor with minimal toxicity. Introduction of three-dimensional conformal radiotherapy (3D-CRT) allowed irradiating the target volumes more precisely with better sparing of surrounding healthy tissues. Advent of intensity-modulated radiotherapy (IMRT) facilitated even more conformity in dose shaping, providing higher dose to target volumes, further limiting the dose to organs at risk thus leading to less toxicity[(3,4)]. The state of the art regarding radiation dose fractionation has evolved from once-daily treatment to hyper fractionation and accelerated fractionation. Several chemotherapy regimens using cisplatin, 5 Fluorouracil, paclitaxel have been used with increased local control but higher toxicities. The most frequently utilized regimen for concurrent chemoradiotherapy remains single-agent cisplatin. Anti–EGFR-targeted therapy also enhances the effectiveness of RT in recurrent and advanced-stage disease.

Objectives:

To assess the clinical response of treatment using RECIST (version1.1) criteria and also assess the toxicities by CTCAEv5 among the study population both compared with baseline, during chemo-radiation of 1st week, 4th week, 7th week and after two months of treatment.

Methodology

Study design and setting: Hospital based observational prospective study was conducted at Department of Radiation oncology, Tertiary cancer care centre.

Duration of study: January 2020-December 2021 (24 months)

Sample Size: The following formula was used to calculate the required number of patients in the study: N=4PQ/L2; where P is the prevalence of head and neck cancers, which is 10% approximately at this Hospital; Q is 100-P and L=permissible error=10%. Hence, n=4x10x90/100=36.thus, 36 patients were enrolled who underwent treatment at Department of Radiation oncology, Tertiary cancer care centre.

Study subjects: Head and neck Cancer patients

Inclusion criteria:

Age: 18-75 years.

ECOG: Performance status 0-2 on a scale of 0-5.

Histopathologically confirmed squamous cell carcinoma in locally advanced head and neck cancers.

Normal hemogram, Renal function tests and Liver function tests within normal limits.

Patients who gave informed consent.

Exclusion criteria:

1. Any prior treatment received for tumour.
2. Patients with distant metastasis.
3. Patients with thyroid carcinoma, salivary gland tumours are excluded.

Ethical permissions and informed consent: This study was initiated after obtaining approval from the Institutional ethical committee (IEC NRIMC 141 dated 25-01-2020). After taking informed consent from the patients, evaluation and enrolment started.

Initial evaluation: Complete medical history, physical examination and diagnostic workup were done. X ray chest PA view and radiological assessment with a contrast enhanced CT scan for site and extent of the disease. Assessment of ECOG performance score.

Treatment planning and delivery:

Dose prescription and Treatment delivery: patients received 66-70Gy/33-35 fractions over 7 weeks: Phase 1: 54 Gy/27 fractions, 5 fractions per week to volume comprising the gross disease with extension and the nodal areas at risk.

Phase 2: 12-16 Gy/6-8 fractions, 5 fractions per week to the boost volume, which included the gross tumour volume with margin.

IMRT radiation therapy plans were generated for the patients. Radiotherapy was delivered by linear accelerator (LINAC) using 6MV X rays. Concurrent chemotherapy planned with weekly with cisplatin 40 mg/m2 iv in 90 minutes. Premedication with Inj.Palanosetron, Inj. Rantac, given. Patient is pre-hydrated with at least 500 ml of normal saline. Before administering Cisplatin, Mannitol (20%) 100 ml is given intravenously. Minimum of one litre normal saline post hydration fluid is given.

All patients were assessed at 1st week, 4th week and 7th week for treatment related acute toxicity. Acute treatment related toxicity was assessed and graded using Common terminology criteria for adverse events (CTCAEv5) and supportive treatment was given.

Follow up: After completion of treatment, patients were followed up as outlined below:

First follow up was done at 4 weeks from the completion of treatment. Second follow up at 8 weeks from the completion of treatment.

Patients were assessed for acute toxicity and tumour response at 2nd month follow up based on: Symptom history and toxicity grading using CTCAEv5.

Local examination using inspection, palpation, and indirect laryngoscopy to assess mucosal integrity, skin integrity, tumour and nodal status including bi-dimensional measurement of the tumour and the nodal site. CT scan at second follow up visit to know tumour and nodal response.

Patients were also encouraged to visit earlier if new or progressive symptoms developed. All patients were encouraged to adhere to the prescribed regimen for good oral hygiene and abstain from any form of tobacco use.

Locoregional tumour response evaluation was done by clinically and radiologically at 8 weeks using the RECIST (1.1) criteria which has defined various outcomes as follows:

Complete Response (CR): Disappearance of all target lesions. Any pathological lymph nodes (whether target or non-target) must have reduction in short axis to <10 mm.

Partial Response (PR): At least a 30% decrease in the sum of diameters of target lesions, taking as reference the baseline sum diameters.

Progressive Disease (PD): At least a 20% increase in the sum of diameters of target lesions, taking as reference the smallest sum on study (this includes the baseline sum if that is the smallest on study). In addition to the relative increase of 20%, the sum must also demonstrate an absolute increase of at least 5 mm. (Note: the appearance of one or more new lesions is also considered progression).

Stable Disease (SD): Neither sufficient shrinkage to qualify for PR nor sufficient increase to qualify for PD, taking as reference the smallest sum diameters while on study.

Data collection and statistical analysis: The collected data was analysed using standard statistical software package (SSPS version 26.0).

Response to treatment was assessed; analysis was done using descriptive statistics and using Chi square test.

Results and Discussion

Thirty six subjects were participated and all of them received radiotherapy by IMRT technique. Eighty percent were males and twenty percent were female subjects with an age range of 34-70 years.

Table 1: Baseline data of the study participants (n=36)

Variable		Frequency (%)
Presenting symptoms	Ulcer	18 (58.33)
	Dysphasia	10(19.44)
	Epistaxis	1 (2.78)
	Shortness of breath	3 (8.33)
	Neck swelling	4 (11.11)
Histopathology	Well differentiated squamous cell carcinoma	20 (55.56)
	Moderately differentiated squamous cell carcinoma	12 (33.33)
	Poorly differentiated squamous cell carcinoma	4 (11.11)
Stage	Stage III	13 (36.11)
	Stage IV A	19 (52.78)
	Stage IV B	4 (11.11)
Over all treatment time	Less than 50days	9 (25)
	More than 50days	27 (75)
Tumour site	Oral cavity	18 (50)
	Oropharynx	9 (25)
	Hypo pharynx	7 (19.44)
	Nasopharynx	1 (2.78)
	Nasal cavity	1 (2.78)

The ulcer was most common symptom seen in 58.33% patients. Other symptoms were dysphagia, epistaxis, shortness of breath, neck swelling. Among 55.56% patients had well differentiated squamous cell carcinoma being the most common histology. Of which 36.11% patients of stage III, 52.78% of stage IV A and 11.11% patients of stage IV B. Average duration of treatment was 50 days. Most common site of head and neck cancer in the study was oral cavity (50%) followed by oropharynx and hypo pharynx. In a study by *N. Kucha et al.* Median age of the patients was 52 years of which 82% were male and 18% were female. Oropharynx, larynx and hypopharnx as primary tumor site was in 58.9%.

TABLE 2: Response at end of treatment and 2months follow-up (n=36)

Response	At end of treatment	At 2 months follow-up	
Complete response	12 (33%)	18 (50%)	X^2=7.8316
Partial response	24 (67%)	14 (39%)	
Progression of disease	0	4 (11%)	P value=0.0199

Response to treatment was found to be statistically significant. Rate of response to treatment was good at 2months of follow-up as compared to at end of treatment. There was no progression of disease. No patient died during treatment.

Similar results were seen in a study conducted by Saptarshi Ghosh et al.[5] single-institution retrospective study showed the most common site of involvement was the oral cavity Response to treatment was assessed till two months after the completion of treatment.

Singh NP, Khurana R,[6] Complete response was seen in 42 (93.33%), partial response in 2 (4.44%) and progressive disease in 1 (2.22%) patient.

Table 3: Toxicities at week 1, week 4 and week 7 (n=36)

Toxicity		Week 1	Week 4	Week 7	P value
Dysphagia	Grade I	41.67	3 (8.33)	1 (2.78)	χ^2= 3.4706
	Grade II	0	19 (52.78)	15 (41.67)	p=0.176
	Grade III	0	6 (16.67)	12 (33.33)	
Mucositis	Grade I	0	21 (58.33)	5 (13.80)	χ^2= 20.6942
	Grade II	0	12 (33.33)	19 (52.78)	**p=0.000032**
	Grade III	0	1 (2.78)	12 (33.33)	
Skin Reaction	Grade I	0	28 (77.78)	9 (25)	χ^2=23.0899
	Grade II	0	5 (13.89)	23 (63.89)	**p=0.00001**
	Grade III	0	1 (2.78)	4 (11.11)	
Xerostomia	Grade I	0	27 (75)	22 (61.11)	χ^2=8.8591
	Grade II	0	2 (5.56)	14 (38.89)	**p=0.0029**
Nausea	Grade I	30.56	22 (61.11)	7 (19.44)	χ^2= 21.118
	Grade II	0	11 (30.56)	23 (63.89)	**p=0.0003**
	Grade III	0	1 (2.78)	5 (13.89)	
	Grade IV	0	1 (2.78)	10 (27.78)	
	Grade V	0	1 (2.78)	1 (2.78)	
Anorexia	Grade I	88.89	12 (33.33)	5 (13.89)	χ^2= 13.770
	Grade II	11.11	22 (61.11)	16 (44.44)	**p=0.0010**
	Grade III	0	2 (5.56)	15 (41.67)	
Weight loss	Grade I	0	7 (19.44)	22 (61.11)	χ^2= 0.0575
	Grade II	0	2 (5.55)	5 (13.89)	p=0.8105
Pain	Score 2	38.89	4 (11.11)	1 (2.78)	χ^2= 16.384
	Score 4	58.33	14 (38.89)	6 (16.67)	p=**0.00094**
	Score 6	2.78	18 (50)	16 (44.44)	
	Score 8	0	1 (2.78)	14 (38.89)	

*percentages were shown in the brackets

41.67% patients had grade 1 dysphagia, 19.44% grade 2 dysphagia at the end of 1st week. At the end of 4th week 8.33% patients had grade1, 52.78% had grade 2 ,16.67% patients had grade 3 dysphagia .2.78% had grade 1 ,41.67 % had grade 2,33.33% had grade 3 dysphagia at the end of treatment which was not stastically signifant.

At the end of 4th week 58.33% had grade1 and 33.33% grade 2 mucositis. 13.89% had grade 1, 52.78% had grade 2, 33.33% had grade3 mucositis at the end of treatment. At the end of 4th week 77.78% patients had grade 1, 13.89% had grade 2 skin reaction.25% patients had grade 1,63.89% had grade 2 ,11.11% had grade 3, no had grade4 skin reaction at the end of treatment.

Similar results were seen in a study done by Bhide SA et al.[11] The acute toxicities of RT include mucositis, dysphagia, xerostomia, dermatitis, and pain. Muhammad Shahid Iqbal et al.,[7] reported that 33% had mucositis, 41% dermatitis, 15% dysphagia and 17% mouth/neck pain. In a study by Mauro palazzi et al.[9] dermatitis was the most frequent adverse event, sparing <1 % population, at treatment completion, skin toxicity was Grade 1 in 31%, Grade 2 in 56%, and Grade 3 in 12% patients, similar to

this study. Contrast to this study Andy Trotti et al.[10] reported mucositis in 90% of patients undergoing chemoradiotherapy, out of which grade 3-4 mucositis was seen in 43% patients.

25% patients needed NG tube feeds at the end of 4th week, 58.33% by the end of treatment. 17(47.22%) patients continued NG tube feeding even at 2nd month follow up, while 5 patients (13.88%) were able take oral feeds among who had NG tube at the end of treatment. Findings of Nguyen NP et al.13 regarding dysphagia, loss of weight, need for Ryles tube similar to present study.

At the end of 4th week 75% patients had grade1, 5.56% had grade2 xerostomia.61.11% patients had grade 1, 38.89% had grade 2 xerostomia at the end of treatment. Findings of Tejpal Gupta et al. 12 were in line with this study. 30.56% patients had grade 1 nausea at the end of 1st week. At the end of 4th week 61.11% patients had grade 1, 30.56% had grade 2 .19.44 % patients had grade 1 nausea, 30.56% had grade 2 ,13.89% had grade 3 nausea at the end of treatment. 5.56%patients had grade1 at the end of 1st week. At the end of 4th week 27.78% patients had grade1, 2.78% had grade2 and 2.78 % patients had grade3 vomiting.44.44 % patients had grade 1,27.78% had grade 2 vomiting at the end of treatment. 88.89%patients had grade 1, 11.11% patients had grade 2 anorexia at the end of 1st week. At the end of 4th week 33.33% patients had grade1, 61.11% had grade2 and 5.56 % patients had grade3 anorexia.13.89% patients had grade1,44.44 had grade 2,41.67 % had grade 3 anorexia at the end of treatment. At the end of 4th week 19.44% patients had grade1, 5.56% had grade2 weight loss.61.11% patients had grade1, and 13.89% patients had grade 2weight loss at the end of treatment. grade 1 loss of weight was seen in more number patients, and grade 2 weight loss was seen less number of patients when compared to study done by Pirus Ghadjar et al.,.15

On visual analogue scale pain score is measured .38.89%patients had score of 2, 58.33% patients had score of 4 and 2.78% had score of 6 at the end of 1st week. At the end of 4th week 11.11% patients had score 2, 38.89% had score of 4 and 50 % patients had score of 6.16.67 % patients had score of 4, 44.44 % had score of 6,38.89% had score 8 at the end of treatment. Mauro palazzi et al.9 observed that the pain of any grade from RT was reported by 93% of patients (40% reported Grade 3 pain at the end of treatment).

There was a general trend toward decreasing the incidence of toxicities as the type of radiation therapy advanced from lateral opposing fields to IMRT.

Conclusion

Mucositis was significant toxicities during treatment followed by dysphagia and radiation dermatitis, but they were not severe due to the advanced IMRT technique resulting in less toxicity. Complete response is seen in 50% of the patients clinically and radiologically. No patient died during treatment or at follow up.

Conflict of Interest & Source of Funding Statement: Nil

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Original Article

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Polycystic Ovaries and Associated Biochemical Features in Medical Students of the Women Medical College in Haryana

Deepika Kataria[1], Monika[2], Babita Rani[3], Renu Garg[4], Rajiv Mahendru[5], SK Jha[6], Chiranjeev[7]

[1]Senior resident, Department of Community Medicine, [2]Intern student, [3]Professor, Department of Community Medicine, [4]Professor & Head, Dept. of Biochemistry, [5]Professor & Head, Dept. of Obstetrics & Gynaecology, [6]Professor& Head, Department of Community Medicine, [7]Professor& Head, Dept. of Radiodiagnosis, BPS GMC (W) Khanpur Kalan, Sonepat, Haryana.

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Abstract

Background: Polycystic ovarian syndrome (PCOS) is a heterogenous endocrinal disorder and one of the leading causes of infertility worldwide. Its diagnosis is based on abnormalities of the reproductive system, hyperandrogenism and persistent anovulation after exclusion of primary diseases of the ovaries and adrenal and pituitary glands.

Methods: This Cross – sectional study was conducted among 362 MBBS students of a government medical college in Haryana chosen by simple random sampling. After taking written consent, interview was conducted. Categorical variables were presented in the form of frequency and proportions while continuous variables as mean and standard deviation.

Results: Prevalence of PCOS among the study population was 15.74%. The mean age of onset of PCOS was 21.32 ± 1.35 years. Significant risk factors for PCOS were family h/o, drug intake for any illness, testosterone, DHEAS values, thyroid profile, Ultrasonography (USG) findings, BMI and Menstrual Irregularity with p-value < 0.005.

Conclusion: PCOS is an emerging disorder that has been linked to a number of health issues, including obesity, anovulation and irregular menstruation. Age-related increases in PCOS prevalence and symptoms highlight the necessity for a multidisciplinary approach to early detection of this condition.

Keywords: PCOS, Hyperandrogenism, Adolescence, Risk factors.

Introduction

Polycystic ovarian syndrome (PCOS) is a heterogenous endocrinal disorder and one of the leading causes of infertility worldwide.[1] It

Corresponding Author: Babita Rani, Professor, Department of Community Medicine, BPS GMC (W) Khanpur Kalan, Sonepat, Haryana.

E-mail: drbabitajangra@gmail.com

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is characterized by elevated androgen levels, menstrual irregularities, and/or small cysts on one or both ovaries.[2] The syndrome is associated with multiple gynaecologic, dermatologic, metabolic and psychologic aberrations, of which hyperandrogenism, anovulation and polycystic ovaries are the hallmark features.[3] Incidence of PCOS is increasing rapidly due to changes in lifestyle and stress.

Globally, prevalence estimates of PCOS are highly variable, ranging from 2.2% to as high as 26%.[4-6] Community-based studies using Rotterdam criteria among reproductive age group women have demonstrated varied prevalence figures in few Asian countries ranging from 2% to 7.5% in China[7,8] to 6.3% in Srilanka.[9]

The prevalence estimates of PCOS are between 8.2% and 22.5% in India, depending on the diagnostic criteria used.[10,11] In a study conducted in Haryana among reproductive age group women the prevalence was found 4.21%.[12] Very few studies have been conducted among young girls. A prevalence rate of 21.05 % was identified in a study conducted among medical students in Mumbai.[13]

Out of many criteria used for the diagnosis of PCOS, Rotterdam and AES criteria are most commonly used. According to the Rotterdam criteria, the women should fulfil two of the following: oligo-ovulation or anovulation, clinical or biochemical signs of hyperandrogenism, and/ or polycystic ovarian morphology,[14] whereas the AES has further broadened the criteria as a woman having clinical or biochemical hyperandrogenism, ovarian dysfunction (oligo-anovulation and/ or polycystic ovaries) and exclusion of other androgen excess or related disorders.[15]

There is a wide spectrum of signs and symptoms associated with PCOS. These signs and symptoms vary widely between women and within individuals over time. PCOS is one of the primary causes of infertility in women. Overweight and obesity, sedentary lifestyle and a family history of PCOS may predispose a young girl to PCOS. Although the aetiology of this condition remains uncertain, its diagnosis is based on abnormalities of the reproductive system, hyperandrogenism and persistent anovulation after exclusion of primary diseases of the ovaries and adrenal and pituitary glands.[4]

Teenagers frequently experience irregular menstrual cycles, which makes it possible that PCOS will go undiagnosed during adolescence and not be found until much later in adulthood. Therefore, identifying young women who are at risk of developing PCOS is essential to improving their lives and ensuring they receive the necessary therapy.

Preventive methods such as regular exercise, eating a balanced diet, engaging in meditation, calming exercise that reduce stress levels etc. are crucial in lowering the difficulties associated with PCOS. Although there is currently no cure for PCOS, long-term consequences can be avoided and its symptoms can be managed. This study was carried out to determine the prevalence of PCOS in medical undergraduates at the rural medical college in Haryana, which is the only medical college for women in the state, in light of the previously mentioned causes and the fact that prevalence of this syndrome in medical undergraduates in Haryana is still unknown.

Material and Methods

This Cross – sectional study was conducted among the MBBS students of a government medical college in Haryana. 120 MBBS girl students are admitted every year in this medical college.

Sample size: The sample size was determined at a 95% confidence level and a 20% relative accuracy based on the results of a prior study[13], which showed that 21.05% of medical college students had PCOS. This resulted in an estimated sample size of 362. Simple random sample by lottery was the type of sampling that was employed.

Data collection: The interview was conducted once consent was obtained. The information was gathered using a pre-tested semi-structured proforma that contained details about the individual's personal history, sociodemographic profile, Body mass index (BMI) was computed using calibrated devices and established methodology to assess height and weight. PCOS was diagnosed using the 2003 Rotterdam criteria. Women who were found to have neither clinical nor biochemical hyperandrogenism nor monthly abnormalities were classified as not having PCOS, whereas those who had both conditions were

classified as having PCOS. Ultrasonography was used to evaluate the remaining women who had one symptom—either hyperandrogenism or irregular menstruation—in order to confirm PCOS.

Statistical analysis: A Microsoft Excel file contained all of the data that had been gathered. For categorical data, percentages and proportions were computed. The chi square test was used to see whether there was any correlation between PCOS risk factors and the condition. A statistically significant P-value was defined as less than 0.05.

Ethical Consideration: The Institutional Ethics Committee of the institute approved the study (Registration number- BPSGMCW/RC763/IEC/22 dated16/8/2022). The methods used in the present study were implemented in accordance with the approved protocols.

Results

The present study was carried out in 362 medical undergraduates. The data were coded and entered in excel spreadsheet. The findings of the study are as follows:

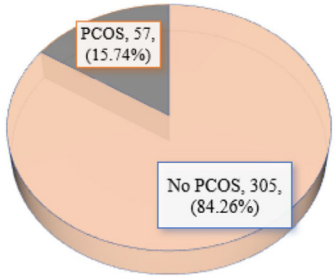


Figure 1: Prevalence of PCOS among the study population

Figure 1 shows that out of 362 students majority were not having PCOS but 57 students were diagnosed with PCOS so the prevalence of PCOS among the study population was 15.74%.

Table 1: **Distribution of study population according to Sociodemographic features (n=362)**

Variables		No PCOS	PCOS	Total	p value
Age (Years)	18-20	91 (86.7)	14 (13.3)	105	0.651
	20-22	166 (83.8)	32 (16.2)	198	
	>22	48 (81.4)	11 (18.6)	59	
	Mean age	21.16±1.33	21.32±1.35		0.43
Type of family	Joint	79 (81.4)	18 (18.6)	97	0.374
	Nuclear	226 (85.3)	39 (14.7)	265	
Family h/o PCOS	No	299 (86.2)	48 (13.8)	347	<0.001
	Yes	6 (40)	9 (60)	15	
Drug intake for any illness	No	277 (85.8)	46 (14.2)	323	0.024
	Yes	28 (71.8)	11 (28.2)	39	

The mean age of onset of PCOS was 21.32 ± 1.35 years. Maximum number of students belonged to 20-22 years age group followed by 18-20 years and least from >22 years age group. But the prevalence of PCOS was more among students who belonged to >22 years age group and least prevalence is seen in 18-20 years age group.

Maximum number of students belonged to the nuclear type of families but prevalence of PCOS was more among students who belonged to joint families. Majority of the population were not having family history of PCOS but out of those who had family history of PCOS, they also had PCOS. Majority of the study subjects did not take any drug but prevalence of PCOS was higher among those who were already on a drug for any illness.

The difference in prevalence in relation to family history of PCOS and drug intake for any illness was found to be statistically significant. (Table 1)

Table 2: Distribution of study population according to Biochemical features

Variables		No PCOS	PCOS	Total	p value
Testosterone values (n=362)	Normal	297 (85.8)	49 (14.2)	346	< 0.001
	Raised	8 (50)	8 (50)	16	
	Mean level	2.14±0.56	2.60±0.99		<0.001
DHEAS (n=362)	Normal	238 (92.2)	20 (7.8)	258	< 0.001
	Raised	67 (64.4)	37 (35.6)	104	
	Mean level	3.10±1.26	4.28±1.61		<0.001
Thyroid Status (n=362)	Normal	294 (85.7)	49 (14.3)	343	<0.001
	Hyperthyroid	5 (100)	0 (0)	5	
	Hypothyroid	6 (42.9)	8 (57.1)	14	
	Mean level	0.90±2.3	0.68±0.57		0.49
Prolactin level (n=362)	Normal	235 (83.9)	45 (16.1)	280	0.753
	Raised	70 (85.4)	12 (14.6)	82	
USG (n=50)	Normal USG	25(58.1)	18(41.9)	43	0.004
	Poly cystic ovaries in USG	0	07 (100)	07	

Majority of the participants had normal range of testosterone but the prevalence of PCOS was higher (50%) among those having raised values of testosterone. Majority of the participants had normal range of DHEAS but the prevalence of PCOS was higher (35.6%) among those having raised values of DHEAS. Majority of the study participants had normal thyroid profile followed by hypothyroid and then by hyperthyroid. Prevalence of PCOS was maximum (57.1%) in hypothyroid and least in hyperthyroid. Majority of the study participants had normal values of prolactin. Also, prevalence of PCOS was slightly higher in the normal range of values of PCOS.

Ultrasonography was done only in 50 cases who were having either menstrual irregularities or hyperandrogenism. Poly cystic ovaries in USG were found in all the PCOS cases as compared to non PCOS. Normal findings on USG were found in more than half of cases without PCOS. The difference in occurrence of PCOS in relation to testosterone, DHEAS values, thyroid profile and Ultrasonography (USG) findings was found statistically significant. (Table 2)

Table 3: Distribution of study population according to personal history (n=362)

Variables		No PCOS	PCOS	Total	p value
Sleep Duration (hrs)	≤ 6	146 (82)	32 (18)	178	0.252
	> 6	159 (86.4)	25 (13.6)	184	
Exercise	No	154 (88)	21 (12)	175	0.058
	Yes	151 (80.7)	36 (19.3)	187	
Scale of Stress	Low	66 (88)	9 (12)	75	0.257
	Moderate	198 (84.6)	36 (15.4)	234	
	High	41 (77.4)	12 (22.6)	53	
Body Mass Index (BMI) (Kg/m^2)	Underweight (<18)	43 (93.5)	3 (6.5)	46	0.048
	Normal (18-22.9)	193 (85)	34 (15)	227	
	Overweight (>23)	69 (77.5)	20 (22.5)	89	
	Mean	21.05±2.86	22.30±3.25		0.003
Menstrual Irregularity	No	286 (93.8)	19 (6.2)	305	<0.001
	Yes	19 (33.3)	38 (66.7)	57	

Prevalence of PCOS was slightly higher in participants with less sleep duration and those who do some physical activity. Majority of the study population had moderate stress level and a small proportion had high stress level. Prevalence of PCOS was maximum in high scale of stress and least in low stress scale. Majority of the population had normal BMI followed by overweight category and then by underweight. Prevalence of PCOS was maximum in normal BMI and least in underweight. About 2/3rd of participants (66.7%) who had menstrual irregularities, also had PCOS. This difference in occurrence of PCOS in relation to BMI and menstrual irregularity was statistically significant. (Table 3)

Discussion

PCOS among young women is an emerging problem that needs careful assessment, timely intervention and appropriate treatment. In the present study, prevalence of PCOS among study subjects was 15.74% by Rotterdam criteria. Desai et al in their school-based study in adolescent girls in Ahmedabad found the prevalence as 13.54% which was almost similar to the results of the present study.[16] The prevalence of PCOS was found 21.05% in a study conducted in Mumbai[13] which is higher as compared to present study. Previous Indian studies reported a prevalence of 8.1%[17] in a study done in south India and 10.97% in a study done in Andhra Pradesh.[18] This difference in prevalence may be due to different geographic areas, use of different diagnostic criteria and socio-cultural factors.

A significant proportion of females had a positive family history of PCOS in the PCOS group, similar finding was reported by Vishnubhotla et al[19] in their study. This point toward the likely role of genetic factors in the pathogenesis of the disease and all females with a known family history have to be routinely screened for the symptoms of the disease and aggressively counselled.

In the present study prevalence of PCOS was higher (50%) among those having raised values of testosterone and DHEAS, this finding was in consistent with the study done by Joshi B et al in Mumbai in which the hormonal levels were significantly higher among PCOS cases.[11]

Yildiz et al in their study found that Weight gain and body fat are strongly associated with PCOS, and obesity is well known to worsen the severity of this disorder.[20] Also, with every unit increase in BMI, the risk of getting PCOS increases by 9%.[21] During the past decades, the increasing prevalence of PCOS in adolescents has coincided with the rise in obesity, similar to adults.[22] The prevalence of overweight and obesity in PCOS girls were higher than non-PCOS girls in the present study which was similar with other study report.[23] Thus, there is significant correlation between obesity and PCOS.

In this study it was found that about two third of girls with PCOS were having menstrual irregularity as compared to normal girls which coincide with findings of the study done in Mumbai among medical students which reported higher menstrual irregularities among PCOS students than normal.[13]

This study has several merits. Firstly, it is one of the few that reports the prevalence of PCOS in teenage girls and young women, as most studies only cover women in the reproductive age group. The use of ultrasonography and biochemical markers in the diagnosis of PCOS is another strength. To sum up, the reports' correctness and consistency were improved since a single laboratory technician conducted all of the studies in a single lab.

Conclusion

According to the present study, PCOS is an emerging disorder that has been linked to a number of health issues, including obesity, anovulation and irregular menstruation—all of which were frequent endocrine abnormalities among teenage females. Important risk factors for PCOS included a family history of the condition, hyperandrogenism and hypothyroidism. Health care professionals and teenage girls need to be more aware of early PCOS diagnosis and treatments as they may offer the chance to cure the condition and avert further complications. Girls who are overweight or obese should receive special attention since they have a higher risk of PCOS, which may be treated with a change in lifestyle. Therefore, there is an immediate need to raise public awareness of the requirement of changing one's lifestyle to lose weight, as well as the need of early detection and treatment to avoid long-term problems.

Recommendations:

Age-related increases in PCOS prevalence and symptoms highlight the necessity for a multidisciplinary approach to early detection of this condition. To effectively treat PCOS patients, a long-term individualized care approach comprising evidence-based practice from a team of dermatologists, appropriate referral to doctors and endocrinologists and counselling from obstetricians and gynaecologists is necessary. This plan can help with menstrual cycle regulation, acne and hirsutism treatment, PCOS-related dermatological concerns, reducing obesity and the risk of various metabolic consequences and addressing quality of life difficulties associated with the syndrome.

Ethical Consideration: The Institutional Ethics Committee of the institute approved the study (Registration number- BPSGMCW/RC763/IEC/22 dated16/8/2022)

Conflict of interest: Nil

Source of funding: Nil

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Original Article

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Awareness of Occupational Health Hazards and Practice of Safety Measures Among Construction Workers in Rewa City

Shikhar Sharma[1], Anshuman Sharma[2], Sandeep Singh[3], Anamika Rai[4], Neera Marathe[5], Chakresh Jain[6], Priyanshi Namdeo[7]

[1]Junior Resident, [2,3]Associate Professor, [4]Junior Resident, [5]Professor and Head, [6]Associate Professor, [7]Junior Resident, Department Community Medicine Shyam Shah Medical College Rewa, India.

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Abstract

Context/Background: Occupational hazards refer to potential risks and dangers that exist in the workplace, which can harm the health, safety, and well-being of workers. Understanding and managing occupational hazards is necessary to ensure a safe and healthy working environment for employees.

Aims/Objectives: The study is aimed at studying the demographic profile of the construction workers, awareness and knowledge regarding occupational health problems, occupational safety, and practices of occupational safety measures.

Methodology: This community-based cross-sectional study was carried out in various construction projects of unorganized sector in Rewa City. About 180 construction site workers were included in the study. 14 construction sites in Rewa city were identified and randomly 13 construction workers from each site were selected by simple random sampling. Managers/supervisors of the selected projects were contacted, and data was collected using an interview administered questionnaire from construction workers giving consent to participate in the study.

Conclusion: From the study, it is evident that it is essential to come up with measures that can create awareness among the construction workers on the importance of safety measures and preventions. To improve the safety of construction workers, it is necessary to identify certain factors that are essential to safety practice, be it education or personal behavior.

Key-words: Occupational hazard, occupational health, construction workers, safety measures.

Introduction

Occupational hazards refer to potential risks and dangers that exist in the workplace, which can harm the health, safety, and well-being of workers. These hazards can arise from various sources, such as physical, chemical, biological, ergonomic, and psychosocial factors. Understanding and managing

Corresponding Author: Anamika Rai, Junior Resident, Department Of Community Medicine, Shyam Shah Medical College, Rewa (MP).

E-mail: doctoranamikarai@gmail.com

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occupational hazards is crucial to ensure a safe and healthy working environment for employees. The impact of occupational health and safety hazards faced by construction workers in developing countries is 10 to 20 times higher than those in industrialized countries.[1,2] Factors contributing to these prevalence rates of occupational injuries were lack of safety training, job stress, the absence of safety signs, sleep problems, workload & drinking alcohol.[3-5]

World Health Organization (WHO) stated poor occupational health and reduced capacity of workers can make loss up to 10–20% of the gross national product (GNP) of a country. Worldwide, occupational diseases, illnesses, and death accounts for an estimated loss of 4% of the country's gross domestic product.[6]

Construction is an important component of the developmental work in our country. Nearly half of the government expenditure in its Five-Year Plans has been devoted to construction activities - be it in the area of irrigation, power, roads, surface transport, communications, health, housing, or urban development. This sector attracts huge investment from individual house owners as well as from big contractors/companies, having a very high rate of return. In recent years, this has been one of the fastest growing sectors of the economy. After agriculture, it is the largest provider of employment for people, with one out of every seven workers in the country employed in construction-related activities. However, construction is among the most unregulated sectors in the country.[7]

Objectives:

1. To analyse the demographic profile of the construction workers.
2. To assess knowledge & awareness regarding occupational health problems among construction workers.
3. To assess the practices of occupational safety measures among construction workers.

Methodology

The cross-sectional study took place in Rewa district, facilitated by the Department of Community Medicine, Shyam Shah Medical College, Rewa (MP) from December to February 2023. The determination of the minimum required sample size was derived from a previously reported morbidity prevalence of 47.8%, aiming for a precision of 5% at a 95% confidence level, resulting in an approximate minimum sample size of 180[8].

The research was carried out across diverse construction projects of unorganized sector within Rewa City, involving a total of 180 construction site workers. The selection process encompassed various roles such as labourers, earth/ground workers, digging workers, cement workers, and concreting workers, which were randomly identified among construction sites in Rewa City. Unorganized sector was chosen as workers employed here have no organized occupational health service and their compliance with safety measures is not known. Specifically, 14 sites were randomly chosen for inclusion in the study. Subsequently, 13 construction workers were randomly selected from each of these sites through a simple random method to meet the sample size of 180 participants.

To ensure participation and adherence to ethical standards, managers/supervisors of the selected projects were contacted and briefed about the study. Participants below the age of 18 years were excluded from the study. Data collection was done through the administration of interview-based questionnaires to construction workers who gave their consent to participate in the study.

This research used a semi-structured questionnaire that included questions about sociodemographic details including average daily income, smoking, and alcohol intake at the workplace. Additionally, the questionnaire explored participants' knowledge and awareness of occupational health hazards and safety measures in construction, along with their reported & observed practices of safety measures. A pilot test of the interview schedule was done among construction workers, specifically chosen from outside the final study participants.

The study protocol underwent approval from the institutional ethics committee, and data collection was done only after obtaining informed consent from the participants.

Data analysis:

The data was entered into a Microsoft Excel spreadsheet and analysed using the statistical software SPSS version 25. Presentation of data was done in terms of frequency and percentages. To test for association, the Chi-Square test was employed, with a significance probability set at 5%.

Results

Table 1: Sociodemographic profile of study participants

SOCIODEMOGRAPHIC PROFILE		
AGE-WISE DISTRIBUTION OF RESPONDENTS		
AGE	**COUNT**	**PERCENTAGE**
18-25	53	29.4%
26-34	66	36.6%
35-43	36	20%
44-52	19	10.5%
53 & above	6	3.3%
Total	180	100%

GENDER-WISE DISTRIBUTION OF RESPONDENTS		
GENDER	**COUNT**	**PERCENTAGE**
Female	46	25.6 %
Male	134	74.4 %

RELIGION-WISE DISTRIBUTION OF RESPONDENTS		
RELIGION	**COUNT**	**PERCENTAGE**
Hindu	136	75.6 %
Muslim	33	18.3 %
Others	11	6.1 %

EDUCATIONAL QUALIFICATION OF RESPONDENTS		
EDUCATION	**COUNT**	**PERCENTAGE**
No formal education	94	52%
Primary (1 to 4)	60	33%
Secondary (5 to 10)	17	9%
Higher Secondary (11 & 12)	9	5%

YEARS OF EXPERIENCE AS A CONSTRUCTION WORKER		
EXPERIENCE (YEARS)	**COUNT**	**PERCENTAGE**
0 To 5	66	36.7 %
6 To 10	53	29.4 %
More than 10	61	33.9 %

ALCOHOL INTAKE AT WORK		
	COUNT	**PERCENTAGE**
Yes	34	18.9%
No	146	81.1%

SMOKING AT WORK		
	COUNT	**PERCENTAGE**
Yes	56	31.1%
No	124	68.9%

AVERAGE DAILY WORKING HOURS		
	COUNT	**PERCENTAGE**
0-7	44	24.4 %
8 or Above	136	75.6 %

Table 1 outlines the sociodemographic profile of construction workers in the study, consisting of 180 respondents, it reveals a predominant age group of 26-34 years (36.6%), with distribution as follows: 18-25 years (29.4%), 35-43 years (20%), 44-52 years (10.5%), and 53 years and above (3.3%). In terms of gender, 74.4% are male, while 25.6% are female. The religious composition shows a majority identifying as Hindu (75.6%), followed by Muslims (18.3%), and others (6.1%). Regarding educational qualifications, 52% have no formal education, 33% completed primary education (1 to 4 years), 9% completed secondary education (5 to 10 years), and 5% completed higher secondary education (11 & 12 years). Experience as construction workers is varied, with 36.7% having 0-5 years, 29.4% having 6-10 years, and 33.9% having more than 10 years of experience. In terms of habits, 18.9% reported alcohol intake at work, while the majority (81.1%) did not, and 31.1% reported smoking at work, while 68.9% did not. Additionally, the distribution of respondents based on daily working hours indicates that 24.4% work for 0-7 hours, while the majority (75.6%) work 8 hours and above daily.

Table 2: Knowledge of study participants on occupational hazards & safety measures in construction.

KNOWLEDGE OF OCCUPATIONAL HAZARDS & SAFETY MEASURES IN CONSTRUCTION		
INFORMATION	**COUNT**	**PERCENTAGE**
Exposure to occupational hazards can result in work-related injuries or disease.	130	72.2%
Wearing personal protective equipment protects workers from occupational hazards.	148	82.2%
Strict compliance with occupational safety rules and regulations protects workers from occupational injuries.	123	68.3%

Table 2 presents the knowledge of occupational hazards and safety measures among construction workers based on their responses. Among the respondents, 72.2% acknowledged that exposure to occupational hazards can lead to work-related injuries or diseases. Additionally, 82.2% recognized that wearing personal protective equipment is a crucial measure to safeguard workers from occupational hazards. Furthermore, 68.3% of the respondents emphasized the importance of strict compliance with occupational safety rules and regulations as a means of protecting workers from occupational injuries.

Table 3: Awareness of study participants on different exposures as occupational health hazard

AWARENESS OF THE FOLLOWING AS OCCUPATIONAL HEALTH HAZARDS		
EXPOSURE	**FREQUENCY**	**PERCENTAGE**
Dust	147	81.7%
Extreme Heat	169	93.9%
Extreme Cold	125	69.4%
Manual Handling (Lifting & Carrying)	114	63.3%
Excessive Noise	135	75%
Prolonged Work Under Sunlight	150	83%
Mosquito Bites	158	87.8%
Stress	142	78.8%
Fire & Electricity	169	94%

Table 3 outlines the awareness of construction workers concerning various occupational health hazards, with a substantial majority recognizing the following hazards: dust (81.7%), extreme heat (93.9%), extreme cold (69.4%), manual handling (lifting & carrying) (63.3%), excessive noise (75%), prolonged work under sunlight (83%), mosquito bites (87.8%), stress (78.8%), and fire & electricity (94%).

Table 4: Awareness of Different Types of Morbidity Among Survey Participants

AWARE ABOUT TYPE OF MORBIDITY*		
EXPOSURE	**FREQUENCY**	**PERCENTAGE**
Ocular morbidities	130	72%
Skin injury	100	56%
Respiratory morbidities	66	37%
Postural problems	34	19%
Hearing problems	75	42%

*Multiple responses

Table 4 outlines construction workers' awareness of various types of morbidities resulting from occupational exposures, revealing that 72% are aware of ocular morbidities, 56% recognize the risk of skin injuries, 37% acknowledge respiratory morbidities, 19% identify postural problems, and 42% are cognizant of the potential for hearing problems associated with their work.

Table 5: Utilization patterns of personal protective equipment (PPE) among construction worker respondents (reported)

RESPONDENTS' REPORTED PRACTICE OF OCCUPATIONAL SAFETY MEASURES		
PRACTICE	**FREQUENCY**	**PERCENTAGE**
Use gloves while mixing cement	45	25%
Wear protective cap (helmet) when working on site	30	16.7%
Put face mask while mixing cement	55	30.6%
Wear long boots/canvas while working on sites	23	12.8%
Work more than 8 hours a day	113	62.8%
Use earplugs when exposed to loud sound or noise	22	12.2%
Use elevating work platform (ladder, step ladders, scarf holding) or safety belts while working at higher level	45	25%
Take rest in between work	149	82.7%
Use repellent while working on site to prevent insect bites	22	12.2%

Table 5 displays the reported practice of occupational safety measures among construction workers in Rewa City. The data reveals that 25% of respondents use gloves while mixing cement, 16.7% wear protective caps (helmets) on-site, 30.6% employ face masks during cement mixing, and 12.8% wear long boots/canvas while working on sites. Additionally, 62.8% of respondents reported working more than 8 hours a day, 12.2% use earplugs in loud environments, and 25% utilize elevating work platforms or safety belts when working at higher levels. Furthermore, 82.7% of respondents take breaks between work sessions, and 12.2% use repellent to prevent insect bites while working on-site.

Table 6: Utilization patterns of personal protective equipment (PPE) among construction worker respondents (observed)

RESPONDENT'S OBSERVED PRACTICES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)		
PPE	**FREQUENCY**	**PERCENTAGE**
Head Protector/Helmet	9	5%
Hand Gloves	22	12.2%
Leg Boot /Canvas	13	7.2%
Face Mask	27	15%
Safety Glasses	9	5%
Ear Plugs	7	4%
Safety Clothing	11	6%

Table 6 shows construction workers' observed practices regarding the utilization of Personal Protective Equipment (PPE), with 5% observed wearing Head Protectors/Helmets, 12.2% using Hand Gloves, 7.2% wearing Leg Boots/Canvas, 15% employing Face Masks, 5% utilizing Safety Glasses, 4% using Ear Plugs, and 6% observed wearing Safety Clothing.

Table 7: Association between correct responses on knowledge questions, use of gloves while mixing cement, and demographic factors among construction workers.

VARIABLES	CORRECT RESPONSE ON KNOWLEDGE QUESTIONS				USE GLOVES WHILE MIXING CEMENT		
Gender	1 or Less	2	3		Yes	No	
Female	7	23	16	χ^2= 3.799	2	44	χ^2= 13.978
Male	22	46	66	p= 0.1496	43	91	p= 0.0002*
Educational Qualification	**1 or Less**	**2**	**3**		**Yes**	**No**	
No Formal Education	18	35	36	χ^2= 11.309	2	21	χ^2= 26.737
Primary (1 To 4)	7	14	24		14	75	
Secondary (5 To 10)	2	14	7	p= 0.0793	24	21	p< 0.0001*
Higher Secondary (11 & 12)	2	6	15		5	18	
Average Daily Income (In Rs.)	**1 or Less**	**2**	**3**		**Yes**	**No**	
500 To 1000	5	14	25	χ^2= 3.081	15	29	χ^2= 2.553
Less Than 500	24	55	57	p= 0.214	30	106	p= 0.1101
Experience As A Construction Worker (Years)	**1 or Less**	**2**	**3**		**Yes**	**No**	
0 To 5	8	27	31	χ^2= 3.062	21	45	χ^2= 2.588
6 To 10	9	23	21	p= 0.547	11	42	p= 0.2741
More Than 10	12	19	30		13	48	
Alcohol Intake At Work	**1 or Less**	**2**	**3**		**Yes**	**No**	
Yes	4	14	16	χ^2= 0.602	2	32	χ^2= 8.125
No	25	55	66	p= 0.740	43	103	p= 0.0044*
Smoking At Work	**1 or Less**	**2**	**3**		**Yes**	**No**	
Yes	5	16	35	χ^2= 9.747	24	32	χ^2= 13.748
No	24	53	47	p= 0.0076*	21	103	p= 0.0002*
Total	29	69	82	180	45	135	180

Table 7 reveals knowledge distribution among construction workers, showing no significant gender differences, a borderline significant variance based on educational qualification, and no significant distinctions related to income or years of experience. Notably, a significant difference in knowledge exists between those who smoke at work and those who do not (χ2= 9.747, p= 0.0076*).

The table also reveals significant differences in the usage of gloves while mixing cement among construction workers based on various factors. Notably, there is a significant gender difference (χ2= 13.978, p= 0.0002*), with more males using gloves. Educational qualification also significantly influences glove usage (χ2= 26.737, p<0.0001*), showing variations across different education levels. Additionally, significant differences are observed based on alcohol intake at work (χ2= 8.125, p= 0.0044*) and smoking at work (χ2= 13.748, p= 0.0002*), with non-alcohol consumers and non-smokers showing higher glove usage. No significant differences are found based on income or years of experience.

Discussion

This research investigated the knowledge & awareness of occupational hazards and the

implementation of safety measures among construction workers at selected construction sites of unorganized sector in Rewa district (MP).

The sociodemographic profile of construction workers, consisting of 180 respondents, revealed a predominant age group of 26-34 years (36.6%) and a male majority (74.4%). Hinduism was the dominant religion (75.6%), and educational levels varied, with 52% having no formal education. Experience ranged from 0 to over 10 years with a majority of participants with 0-5 years of work experience (36.7%), and a substantial portion reported alcohol (18.9%) and smoking (31.1%) habits. Most respondents worked 8 hours and above daily (75.6%). Previous research by Tam & Fung (2008)[9]& Gebremeskel and Yimer (2018)[10] has also indicated a significant prevalence of young male workers with similar work experience in the construction industry with more than 8 hours of average work duration a day.

In terms of lifestyle factors, a noteworthy portion of respondents abstained from smoking (68.9%) or alcohol consumption (81.1%) during work hours, whereas a minority was involved in these activities while on duty. Earlier research has indicated the detection of ethanol in the blood of construction workers who experienced fatal occupational injuries.[11]

The knowledge assessment indicated a high awareness level among construction workers regarding occupational hazards and safety measures. A significant majority recognized the link between exposure to hazards and work-related injuries or diseases (72.2%). The importance of personal protective equipment (82.2%) and adherence to safety rules (68.3%) was well-understood. The respondents' awareness regarding occupational hazards, injuries, work-related illnesses, and safety measures is likely shaped by their direct exposure to such situations, either through personal experiences or incidents involving co-workers.

The awareness of various occupational health hazards was substantial, with notable recognition of dust (81.7%), extreme heat (93.9%), and stress (78.8%). Similarly, respondents demonstrated awareness of potential morbidities, including ocular issues (72%) and hearing problems (42%), associated with their work. The substantial awareness of various occupational health hazards among the respondents, could be attributed to workplace exposure as construction workers are directly exposed to these hazards during their daily tasks, leading to firsth and experiences and heightened awareness, industry knowledge, previous incidents, and communication & information. The awareness of various occupational health hazards, such as dust, extreme heat, and stress, is consistent with findings from other study done by Oluwafemi FS et al in 2017 [12]. Reported practices of occupational safety measures highlighted variations in adherence. While some measures like taking breaks (82.7%) were commonly followed, others, such as using safety equipment, showed room for improvement. Observations regarding Personal Protective Equipment (PPE) utilization indicated varying practices. For instance, while face masks were used by 15% of respondents, only 5% were observed wearing head protectors/helmets. Consistent with the current study, prior research has consistently highlighted inadequate compliance and irregular adherence to safety measures among construction workers, particularly in developing countries. The root causes often include the absence of robust occupational health and safety policies [12,13,14]. The lack of adoption of safety devices among workers may be attributed to forgetfulness or the perception that these measures are inconvenient or deemed unnecessary. Some workers also reported that they are not supplied with essential protective gear, including boots, gloves, helmets, and masks, required for their respective activities. Examining knowledge distribution, no significant gender differences were noted, but educational qualifications influenced knowledge. Significant differences were observed in the reported practice of using gloves while mixing cement, particularly related to gender, educational qualification, alcohol intake, and smoking habits.

Conclusion

To conclude, this study highlights a strong awareness among construction workers in Rewa city regarding occupational hazards and safety practices. Although the respondents displayed a satisfactory level of understanding, there was a notable discrepancy in the implementation of occupational safety measures. It emphasizes the necessity for

effective occupational health and safety policies to address variations in safety practices and ensure the provision of essential protective gear, contributing to a safer working environment for construction workers in the unorganized sector.

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Original Article

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Prevalence of Protein Energy Undernutrition and Selected Micronutrient Deficiency Manifestations among School Children in Ariyur, Puducherry: A Cross-Sectional Study

A. Arunan[1], J. Barathalakshmi[2], J. Thamizhmathi[3]

[1]Post graduate, [2]Professor and HOD, [3]Senior Resident, Department of Community Medicine, Sri Venkateshwara medical college hospital and research center, Puducherry

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Abstract

Background: India is the largest contributor of undernourished people in the world with around 14.37% of its population not receiving enough nutrition. The prevalence of malnutrition was 46.8%. Nutritional deficiencies in India contributed to about 0.5% of all deaths. This study, helps us to determine the prevalence and risk factors of protein energy undernutrition and specific micronutrient deficiency among school going children in a selected school of Puducherry.

Methods: This is a cross sectional study conducted in school going children studying 5th to 10th standard in government and private high school in Puducherry. After getting consent from the parents, in-person interview was conducted, anthropometric measurement and head-to-toe examinations were done.

Results: Among 428 participants, 28.7%, 15.2%, 11.4%, 0.7%, 13.1%,1.9%0.7%1.4%, 9.6%,9.6% 53% has Anemia, Riboflavin deficiency, vitamin C, Iodine, Fluoride excess, Fluoride deficiency, Zinc, Calcium and Essential fatty acids respectively. Among 428 participants, 56.1%, 8.4% were moderately stunted and severe stunted respectively. It was noted that height for age was statistically significant with Sex and age (p value < 0.05).

Conclusions: Early detection of protein energy deficiency and nutritional deficiencies will aid in the development of our country in many ways since youngsters are the future foundations of our society.

Keywords: Deficiency, undernutrition, anemia

Introduction

Malnutrition, with its two constituents - protein–energy malnutrition and micronutrient deficiencies, continues to be a major health burden in developing countries. Malnutrition continues to be a major public health problem throughout the developing world, particularly in southern Asia.[1]Micronutrient

Corresponding Author: A.Arunan, Post graduate, Department of Community Medicine, Sri Venkateshwara medical college hospital and research center, Puducherry.

E-mail: arunan2109@gmail.com

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deficiencies are a critical global health concern is taking a toll on the vulnerable population including infants, preschoolers, adolescents, pregnant women, lactating mothers and the aged population. Micronutrient deficiencies are amongst the highest risk driving variables for morbidity and poor quality of life among the vulnerable groups. The term "hidden hunger" is used to explain "chronic micronutrient deficiencies" as they mainly exist in children who are not grouped as malnourished according to the measurements of stunting or wasting.[2] School-going age is very significant because this is the main period of life to make the body store nutrients. These stores help in the rapid growth of children. Good nutrition means a stronger immune system, low illness, better health, and a productive society.[3]Comprehensive National Nutrition Survey (CNNS) 2019 reported one fourth of children and adolescents were thin in India, of which 5·0–6·5% were severely thin. It also reported that 3·7–4·8% were overweight and 1·1–1·3% were obese in this age group.[4-5] ''Micronutrients'' is the collective termapplied to essential vitamins and trace minerals. Mild to moderate deficiencies also have important consequences for human.[6] Undernutrition has been defined as a disorder of nutri-tional status resulting from reduced nutrient intake or impaired metabolism.[7] Cross-sectional studies have linked stunting(short stature for age) and low weight-for-age to poor development and school achievement in infants and children[2]. The detrimental effects of undernutrition early in life (, 2 years of age) on intellectual development seem irreversible and remain apparent during childhood and adolescence.[8] Essential nutritional deficiencies apart from causing growth faltering is also known to impair various facets of immune system thereby reducing the host resistance to infectious agents.[9] The effects of malnutrition and infection on children are synergistic and their combined effect on mortality can be devastating.[10] The micronutrients associated with linear growth are those believed to be nutritionally significant or essential; reduction in the availability of these micronutrients below a certain threshold consistently leads to a reduction in one or more physiologically important functions.[11] However, there is good evidence that the deficiency of some micro-nutrients influence the cognition and behaviour of children.[12] Research has shown that nutrition intervention reduces the morbidity in children[9]. Public health interventions aimed at preventing or correcting micronutrient deficiencies can be expected to reduce both mortality and disability substantially, especially in children. Interventions to control these deficiencies can have broad benefits across a range of important infectious diseases, the prevention or treatment of which by other means has proved to be difficult in many settings. Furthermore, the reduction of illness and of disabilities such as cognitive impairment and decreased work capacity can have a strong positive effect on social and economic development in low- and middle in come countries. Public health interventions that can prevent or correct these micronutrient deficiencies merit the highest priority for national programmes and donor investment.[6]

Methods

This is a Cross sectional study conducted with Institutional Scientific Research committee and ethical committee approval, during the period of January to march 2024, among school going children in a government and Private high school, ariyur, Puducherry. 428 Students of Class 5th to 10th standard were included in the study. Students who are not willing to participate, those who were absent during the study period, who are already in treatment for malnourishment and those who are chronically ill were excluded from the study. After getting informed consent from the parents, Students were interviewed for general information variables like name, age, sex, study year. After that anthropometric measurements were taken and they will be classified as per WHO growth chart for children. Then Specific Head to Toe examination for assessing the signs of micronutrient deficiency such as pale conjunctiva, bleeding gums, dermatitis, phrynoderma, dental caries, mottling of teeth, marasmus, kwashiorkor, thyroid enlargement, skeletal deformities, hair and nail deformities was done and recorded. The data was then analysed using SPSS software for statistical analysis using Chi Square test.

Results

Among 428 students, 218(50.9%) were found to be female and most of the students belong to the age group of 15 years (35.5%). 65.9% of students belongs to upper middle class of socioeconomic status through modified kuppusamy scale.(Table 1)

Table 1: Sociodemographic details of the study participants (N= 428)

Socio demographic details	Frequency (%)
Gender	
Male	218 (50.9%)
Female	210 (49.1%)
Age	
12 years	3 (0.7%)
13 years	117 (27.3%)
14 years	139 (32.5%)
15 years	152 (35.5%)
16 years	17 (4.0%)
Socio Economic Status (Modified Kuppusamy scale)	
Upper	39 (9.1%)
Upper middle	282 (65.9%)
Middle	54 (12.6%)
Lower Middle	53 (12.4%)

Table 2: Association of Stunting(Ht) with Sex, Recent Infection, Handwashing and Socio-Economic Status.

STUNTING		Mild n=109	Moderate n=144	Severe n=36	P value
Sex	Male (n=218)	61(28%)	84(38.5%)	32(14.7%)	0.000(50.570)
	Female(n=210)	48(22.9%)	60(28.6%)	4(1.9%)	
Recent infection	Present(n=28)	8(28.6%)	2(7.1%)	6(21.4%)	0.004(13.397)
	Absent(n=400)	101(25.2%)	142(35.5%)	30(7.5%)	
Hand Washing	Present(n=416)	104(25%)	144(34.6%)	32(7.7%)	0.002(14.755)
	Absent(n=12)	5(41.7%)	0(0)	4(33.3%)	
Socio economic status	1(n=39)	10(25.6%)	14(35.9%)	2(5.1%)	0.112(14.301)
	2(n=282)	75(26.6%)	90(31.9%)	22(7.8%)	
	3(n=54)	13(24.1%)	27(50%)	5(9.3%)	
	4(n=53)	11(20.8%)	13(24.5%)	7(13.2%)	

On assessing the nutritional status with sex, recent infection, handwashing, socioeconomic status, stunting was found to be statistically significant with sex, recent infection and handwashing.(Table-2).

On assessing the health practices among students, almost 97.2% of students practice the habit of handwashingwhen necessary, while 2.80% deny the habit of handwashing frequently.(Figure 1)



Figure 1: Hand washing practices among the study participants

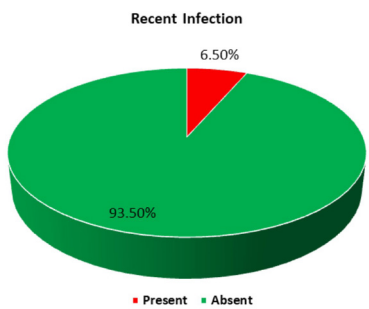


Figure 2: Prevalence of recent infection among the study participants:

Almost 93.5% of students were exposed to recent infections and taking antibiotic medications, the frequency of infection among these students was also high.(FIGURE 2)

Table 3: Prevalence of Micronutrient deficiency among the study participants (N= 428)

Deficiency Signs	Suggested Nutrient Abnormality	Category	Frequency (%)
Pale Conjunctive	Anemia	Present	123 (28.7%)
		Absent	305 (71.3%)
Corneal xerosis, Bitot's Spot	Vitamin A	Present	0 (0.0%)
		Absent	428 (100%)
Angular Stomatitis	Riboflavin	Present	65 (15.2%)
		Absent	363 (84.8%)
Spongy Bleeding Gums	Vitamin C	Present	49 (11.4%)
		Absent	378 (88.6%)
Kwashiorkor, Marasmus	Protein Energy Malnutrition	Present	0 (0.0%)
		Absent	428 (100%)
Thyroid enlargement	Iodine	Present	3 (0.7%)
		Absent	425 (99.3%)
Dental Caries	Fluoride Excess	Present	56 (13.1%)
		Absent	372 (86.9%)
Mottling of teeth	Fluoride Deficiency	Present	8 (1.9%)
		Absent	420 (98.1%)
Dermatitis	Zinc, Niacin	Present	3 (0.7%)
		Absent	425 (99.3%)
Skeletal Deformity, chvostek sign	Calcium	Present	6 (1.4 %)
		Absent	422 (98.6 %)
Hairs	Iron & Calcium	Present	41 (9.6%)
		Absent	387 (90.4%)
Nails	Iron	Present	41 (9.6%)
		Absent	387 (90.4%)
Phrynoderma	Essential fatty acids	Present	227 (53%)
		Absent	201 (47%)

(Table 2) Among 428 students, 123(28.7%) students had pallor conjunctiva suggesting iron deficiency. Hair and nails defects of iron deficiency was found among 41(9.6%)students.65(15.2%) students had angular stomatitis, a sign of riboflavin deficiency, bleeding gums – a sign of Vitamin C deficiency was seen in 49(11.4%) students.

3(0.7%) of 428 students showed thyroid enlargement, a sign of iodine deficiency. Dental caries, a sign of fluoride excess was found among 56(13.1%) students. 8(1.9%) of students had mottling of teeth showing fluoride deficiency. Almost 227(53%) of students had phrynoderma indicating Essential fatty acid deficiency. No students had signs of Vitamin A and Protein energy malnutrition.

Table 4: Association of Micronutrient Deficiency With Sexand Socio-Economic Status

SUGGESTED NUTRIENT ABNORMALITY	SEX			SOCIO -ECONOMIC STATUS				
	MALE n=218	FEMALE n=210	P VALUE	1 n=39	2 n=282	3 n=54	n=53	P VALUE
ANAEMIA	85(39%)	38(18.1%)	0.00 (22.805)	15 (38%)	72 (25.5%)	24 (44.4%)	12 (22.6%)	0.014 (10.68)
RIBOFLAVIN	40(18.3%)	25(11.9%)	0.042(3.448)	10 (25.6%)	46 (16.3%)	2 (3.7%)	7 (13.2%)	0.026 (9.276)
VITAMIN C	36(16.5%)	13(6.2%)	0.001(11.24)	12 (30.8%)	30 (10.6%)	0 (0%)	7 (13.2%)	0.00 (21.686)
IODINE	0(0%)	3(1.4%)	0.117(3.136)	0 (0%)	3 (1.1%)	0 (0%)	0 (0%)	0.668 (1.564)
FLUORIDE EXCESS	49(22.5%)	7(3.3%)	0.000(34.470)	10 (25.6%)	40 (14.2%)	0 (0%)	6 (11.3%)	0.03 (13.982)
FLUORIDE DEFICIENCY	7(3.2%)	1(0.5%)	0.038(4.362)	2 (5.1%)	6 (2.1%)	0 (0%)	0 (0%)	0.221 (4.399)
ZINC,NIACIN	2(0.9%)	1(0.5%)	0.514(0.299)	2 (5.1%)	1 (0.4%)	0 (0%)	0 (0%)	0.007 (12.224)
CALCIUM	6(2.8%)	6(1.4%)	0.17(5.862)	0 (0%)	5 (1.8%)	0 (0%)	1 (1.9%)	0.638 (1.694)
ESSENTIAL FATTY ACIDS	125(57.3%)	102(48.6%)	0.069(3.301	23 (59%)	152 (53.9%)	22 (40.7%)	30 (56.6%)	0.242 (4.185)

As per TABLE – 3, deficiencies of micronutrients such as iron, riboflavin, vitamin C, fluoride was found to be significantly associated with sex. On studying socioeconomic status with nutrient deficiency, iron, riboflavin, vitamin C, fluoride, zinc, niacin deficiencies were significantly associated with socio-economic status.

Table 5: Association of Micronutrient Deficiency With Recent Infections and Handwashing

SUGGESTED NUTRIENT ABNORMALITY	RECENT INFECTION			HANDWASHING		
	PRESENT n=28	ABSENT n=400	P VALUE	PRESENT n=416	ABSENT n=12	P VALUE
ANAEMIA	24 (85.7%)	99 (24.8%)	0.000 (47.49)	112 (26.9%)	11 (91.7%)	0.00 (23.87)
RIBOFLAVIN	24 (85.7%)	41 (10.2%)	0.000 (115.698)	54 (13%)	11 (91.7%)	0.000 (56.065)
VITAMIN C	21 (75%)	28 (7%)	0.000 (119.356)	39 (9.4%)	10 (83.3%)	0.000 (62.930)
IODINE	0 (0%)	3 (0.8%)	0.646 (0.211)	3 (0.7%)	0 (0%)	0.768 (0.087)

Continue.....

FLUORIDE EXCESS	23 (82.1%)	33 (8.2%)	0.000 (125.642)	44 (10.6%)	12 (100%)	0.000 (82.014)
FLUORIDE DEFICIENCY	7 (25%)	1 (0.2%)	0.000 (87.392)	6 (1.4%)	2 (16.7%)	0.000 (14.739)
ZINC,NIACIN	2 (7.1%)	1 (0.2%)	0.000 (17.863)	3 (0.7%)	0 (0.0%)	0.768 (0.087)
CALCIUM	6 (21.4%)	0 (0.0%)	0.000 (86.933)	6 (1.4%)	0 (0.0%)	0.675 (0.176)
ESSENTIAL FATTY ACIDS	22 (78.6%)	205 (51.2%)	0.005 (7.842)	217 (52.2%)	10 (83.3%)	0.033 (4.50)

As per TABLE – 4, all micronutrient deficiencies except iodine deficiency was found to be significantly associated with recent infections. On studying handwashing with nutrient deficiency, iron, riboflavin, vitamin C, fluoride, essential fatty acid deficiencies were significantly associated with handwashing.

Discussion

On assessing nutritional status of 428 students, stunting was more in male than female and is found to be statistically significant. Malaysavalia et al stated that stunting was more in female(35.27%) than male(34.13%).[13] In a study done by Mohammed Ali alzain et al, it was found that male was found to have more stunting(18.1%) than female(7.8%) which is correlating with our study.[14]

Stunting was found to be significantly associated with recent infections which was correlating with the study done by Zemichael Gizaw et al[15] which states that stunted children have distinct immune function and are more prone to infections. Study done by Kuda mutasa etal[16] states that antibacterial immune function in a low income setting was shaped by their stunting status and prior exposure to maternal inflammation. Heterogenity in immune function is due to adverse exposures in early life which leads the children to be more infection susceptible.

In our study handwashing and stunting was found to be statistically significant which is correlating with the study of Jennifer saxten et al [17] who proved that the children's growth can be improved by reducing exposure to indoor air pollution, improved handwashing practices and reducing diarrhoeal infections. Study of C S Kwami et al[18] states that integration of WASH can reduce the prevalence of stunting through promotion of safe drinking water sources and handwashing practices.

There is no significant correlation between socio-economic status and stunting as per our study. However, Christian Bonner et al[19] showed us that stunting prevalence is more pronounced in the poorest than in the richest quartile. Since more of our sample belong to upper middle class correlation could not be made effectively.

Among micronutrient deficiencies, Iron deficiency was screened through the signs of pallor conjunctiva, hair & nail changes and it was found that more male children 85(39%) was found to be anaemic. Iron deficiency was found to be statistically significant with sex, socio-economic status, recent infection and handwashing which is correlated with the study conducted by Shally Awasthi et al[20].

Riboflavin deficiency screened by the presence of angular stomatitis and glossitis were more prevalent in males 24(85%) and was statistically significant with sex, socioecomic status, recent infection and handwashing as stated by [20]25 Hydroxy Vitamin D, Vitamin B12 and Folate.

Vitamin C deficiency noted through signs of bleeding gums, growth deficiency was found to be statistically significant with sex, socio-economic status, recent infection and handwashing which is correlated with the study of Harri Hemelia et al who stated that even less severe vitamin C deficiency –

marginal Vitamin C deficiency can also be associated wit increased risk and severity of infections.[21]In our study Iodine deficiency shows no significant correlation with sex, socio-economic status, recent infection and handwashing.

In our study Fluoride excess was found to be statistically significant with sex, socio-economic status, recent infection and handwashing. Fluoride deficiency was found to be statistically significant with sex, recent infection and handwashing. Sudhanshu Saxena et al, stated that there is no statistically significant difference of fluoride deficiency in relation with gender (P-0.967) and socio-economic status (0.896). Data from this research supports that children exposed to fluoride are at risk of impaired development of intelligence. Millions of children around the world are exposed to high concentration of fluoride in water and urgent attention needs to be focused on this health problem.[22]

Zinc and niacin deficiency was found to be statistically significant with socio-economic status and recent infection which is correlating with the study conducted by Shally et al[20].

Calcium deficiency was found to be statistically significant with recent infection. Shally et alstated that calcium deficiency is significantly correlated with sex, age, anthropometric indicators, dietary inatke and socio-economic status.[20]

Essential fatty acid deficiency screened through signs of dry scaly rash, hair loss, depigmentation of hair, poor wound healing, growth restriction in children was found to be statistically significant with recent infection and handwashing. C.W. Yameogo et al in a study stated that infection, inflammationhemoglobin, anthropometry and diet were correlates of PUFAs concentration in children with malnutrition.[23]

Conclusion

Prevalence of malnutrition was found to be associated with sex, socio-economic status, hygienic practices like handwashing. The extent of malnutrition can be countered by educating the parents with respect to basic nutritional requirements of their children and encouraging them to consume locally available low cost nutritious foods. The study would enable us to understand the prevalence of malnutrition among Puducherry's school-aged children. We will be able to spot malnutrition in this population and launch targeted actions to deal with it. Early detection of protein energy deficiency and nutritional deficiencies will aid in the development of our country in many ways since youngsters are the future foundations of our society.

Declarations

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Conflict of interest: None

Ethical approval: Approved by Institutional Ethical committee. Ethical approval: Approved by Institutional Ethical committee (ref.no – 110/ SVMCH/IEC-Cert/October23 dated 13.10.2023.

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Original Article

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Seroprevalence of Hepatitis C Virus (HCV) Infection and Role of Serological and Molecular Assay in HCV Detection and Management: A Step Towards Achieving the Aim of National Viral Hepatitis Control Program (NVHCP)

Vaishali Solanke-Surase[1], Shashir W. Wanjare[2], Ranjana N. Thate[3], Chaya A. Kumar[4], Gita Nataraj[5]

[1,2,3]Additional Professor, Professor and Head[4], Professor Emeritus[5], Dept. of Microbiology, Seth GSMC & KEM Hospital,Parel, Mumbai

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Abstract

Purpose: Hepatitis C virus (HCV) is a small, enveloped, single stranded RNA virus of Flaviviridae family. HCV causes both acute and chronic infection. Diagnosis of HCV can be done by indirect serological tests that detect antibodies against HCV (anti-HCV) and direct test that detects and quantifies components of viral RNA particles. As per CDC recommendation; HCV testing should be initiated with anti-HCV test, those anti-HCV positive/ reactive should have follow-up testing with Nucleic Acid Test. If the HCV RNA is detected, patient should be directed for the treatment with highly effective direct acting antiviral (DAA).

This study aims to determine the seroprevalence of HCV infection, to estimate presumptive HCV infection by using serological assay by anti-HCV ELISA, to estimate the current HCV infection by detecting HCV-RNA using RT-PCR molecular assay and, to highlight the role of HCV RNA for initiation of treatment.

Methods: This study is retrospective observational analysis of 36500 samples obtained for anti-HCV ELISA test from Jan to Dec 2022. The ELISA kit used was a 3rd generation sandwich assay.

All ELISA positive samples were tested for HCV RNA, by automated qRT-PCR method.

Results: Out of 36500 samples, 361 tested positive by anti-HCV ELISA with 0.9% seroprevalence.

Out of 361, only 336 were tested for HCV RNA. Of 336, 240 samples were negative as target not detected, and 96 samples showed values as viral copies in IU/mL. Most common age group affected was 18-40 years, for both serology and molecular test.

Conclusion: In current study, only 96 samples showed viral copies indicating current HCV infection and need to start treatment. Hepatitis C is curable; with the availability of highly effective DAA both in a brand and generic form can cure > 95% of infected people, so the possibility of achieving the target of elimination HCV by 2030 can be predicted.

Keywords: Serology, Molecular, DAA, NVHCP.

Corresponding Author: Chaya A. Kumar, Professor and Head, Dept.ofMicrobiology, Seth GSMC & KEM Hospital, Parel, Mumbai.

E-mail: chayakumar@kem.edu

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Introduction

Hepatitis C virus (HCV) is a small, enveloped, positive-sense single stranded RNA virus belonging to Flaviviridae family. HCV causes both acute and chronic infection. Acute HCV infections are usually asymptomatic and most do not lead to a life-threatening disease. Around 30% (15–45%) of infected persons naturally clear the virus within 6 months of infection without any treatment. The remaining 70% (55–85%) will develop chronic HCV infection with risk of cirrhosis ranging from 15% to 30% within 20 years.[1] Diagnosis of HCV can be done by indirect serologic tests which detect antibodies against HCV (anti-HCV) using rapid diagnostic test or ELISA and direct test which detects, and quantifies components of viral RNA particles.[2] In HCV patients, anti-HCV may persist throughout life, or decrease slightly while remaining detectable, or gradually disappear after several years.[3] The serological window period is the time duration between infection and appearance of antibody, has decreased from approximately 16 weeks to 10 weeks and finally to 8 weeks with the introduction of first-, second-, and third-generation anti-HCV ELISAs, respectively.[4] Also there has been improvement in the sensitivity and specificity of anti-HCV ELISA from 70-80% sensitivity and poor specificity of first generation to greater than 99% sensitivity and specificity of third generation. There is also availability of the most recent fourth generation which detects HCV core antigen and anti HCV antibodies simultaneously.[5] Detection of HCV using the most accurate and sensitive nucleic acid test (NAT) assay likereal time RT-PCR will reduce the risk of transmission of HCV and help in the early detection even during serological window period as it can detect HCV RNA in one to three weeks after infection.[6] In recent years, the development and widespread use of techniques for detection and quantitation of HCV RNA has provided useful information on viral dynamics during natural history of the infection and antiviral treatment, and has permitted the identification of predictors of response to therapy (genotype, viral load and quasispecies).[7] As per Centers for Disease Control and Prevention (CDC) recommendation, HCV testing should be initiated with a Food and Drug Administration (FDA) approved anti-HCV test. People testing anti-HCV positive/reactive should have follow-up testing with an FDA-approved nucleic acid test (NAT) for detection of HCV RNA. If the HCV RNA is detected, the patient is considered of having current HCV infection and should be directed for the treatment. Treatment with highly effective direct acting antiviral (DAA) drugs for HCV infection is available. Over 90% of HCV infected people can be cured of their infection, regardless of HCV genotype, with 8–12 weeks of oral therapy, leading to the possibility of eliminating HCV by 2030.[8,9,10] Hepatitis C virus (HCV) infection is a major public health problem, with an estimated global prevalence of 3%. Worldwide, there are about 180 million carriers and 3-4 million new infections annually.[11] World Health Organization (WHO) has projected that 10-24 million people are living with active HCV infection in India and seroprevalence among healthy population ranged from 0.09-2.02% in India.[12] The seroprevalence of HCV infection inthe present setup is not known; hence the this retrospective study is being carried out with following aims and objective

Aims: To determine the seroprevalence of Hepatitis C virus (HCV) infection in patients attending tertiary care teaching hospital of Mumbai

Objectives:

1. To estimate presumptive (current or past) HCV infection by using serological (anti-HCV ELISA) diagnostic assays.
2. To estimate the current HCV infection by using molecular (HCV-RNA by RT-PCR) diagnostic assays.
3. To highlight the role of HCV RNA for initiation of treatment.

Material and Method

Study Type: Retrospective and Observational study.

Inclusion Criteria: All patients tested for anti-HCV ELISA and all anti-HCV ELISA positive tested for HCV RNA by RT-PCR

Exclusion Criteria: Nil

Study Duration: Jan 2022 to Dec 2022

Methodology

This study is the retrospective and observational analysis of 36500 samples obtained for anti-HCV

ELISA test over a period of one year from January 2022 to December 2022. Patients of all age groups were included in the study, which was carried out in a tertiary care teaching hospital in Mumbai. The kit used for ELISA was a sandwich format 3rd generation assay which detects antibodies against structural core and non-structural NS3, NS4 and NS5 proteins. And, all anti-HCV ELISA positive samples were tested for HCV RNA, which was detected by automated qRT-PCR method by Cobas Ampli Prep/ CobasTaqMan kit.

Anti – HCV ELISA test – Serological test

The patient's blood was collected in plain tube and serum was separated. The assay was performed on the serum samples in accordance with the manufacturer's instructions (Meril Diagnostics).

HCV Quantitative PCR- Molecular test

The anti- HCV ELISA positive samples were tested for HCV RNA by RT-PCR. Patient's samples were collected in EDTA tube and plasma was separated for the test. HCV RNA was detected by automated qRT-PCR method by Cobas Ampli Prep/ Cobas TaqMan kit (Roche Molecular Systems, Inc.). This molecular test is considered as the gold standard for detecting active HCV replication.[5]

Statistical analysis

The laboratory register were scrutinised for the results. The results of both the tests were recorded and the same were analysed. Seroprevalence was calculated as proportion of samples that tested positive for anti-HCV antibody from those that were tested. The results of RTPCR of the above antibody positive samples were analysed as both anti-HCV ELISA and PCR positive (viral copies IU/mL), and anti- HCV ELISA positive andPCR negative (Target not detected). Chi Square test was used for statistical analysis. P≤0.05 were considered statistically significant.

Ethics Approval- This study was approved by the institutional ethics committee EC/ OA-96/2023(IEC III/ OUT/ 428/2023)

Results

Out of 36500 samples received from indoor patient department (IPD) and outdoor patient department (OPD), 361 were tested positive by anti-HCV ELISA with 0.9% seroprevalence (Table-1).

Table 1: Distribution of IPD and OPD in anti-HCVELISA positive samples (n=361)

Location	ELISA Positive	ELISA Negative	Total
IPD	202(56%)	21525	21727
OPD	159(44%)	14614	14773
Total	361	36139	36500

The result is not significantat p <.05.

Gender distribution with Male (M) to Female (F) ratio was 1.2:1 (Table-2).

Table 2: Gender distribution in anti-HCVELIS Apositive samples (n=361)

Gender	IPD	OPD	Total
Male	112	88	200(55.4%)
Female	90	71	161(44.6%)
Total	202	159	361

The result is not significant at p <.05.

Of these positives, maximum samples were from Medicine department for both OPD and IPD, followed by Orthopaedics for IPD and GI Medicine for OPD (Figure -1).

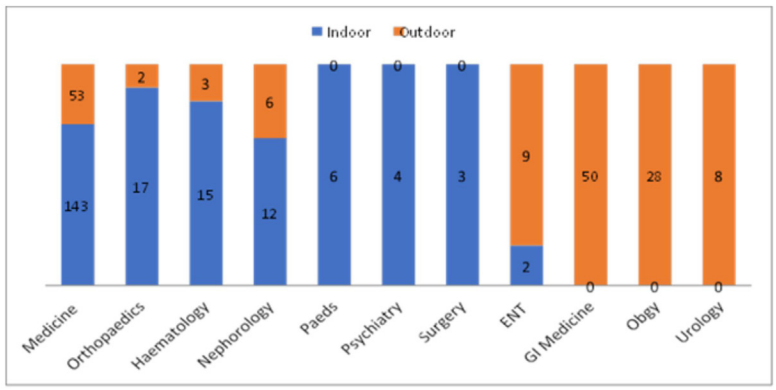


Figure 1: Department wise distribution of anti-HCVELISA positive samples

Out of 361 anti-HCV ELISA positive samples, only 336 were tested for HCV RNA by RTPCR. The default of 25 samples could be due to non-compliance, or migration or death of patients. Out of 336 HCV RNA tested, 240 samples were negative as target not detected, and 96 samples showed values as viral copies in IU/mL, of these 96, 50 were male and 46 females with M:F ratio as 1:1 (Table-3).

Table 3: Gender Distribution in RTPCR samples (n=336)

Test	Target not detected	Copiesin IU/mL	Total
Male	129	50	179(53.3%)
Female	111	46	157(46.7%)
Total	240(71.4%)	96(28.6%)	336(100%)

The result is not significant at $p < .05$

Most common age group affected was 18-40 years, for both serology and molecular test (Table-4).

Table 4: Distribution of age group in anti-HCVELISA and PCR positive samples

Age group (in years)	ELISA (n=361)	PCR (n=336)
<18	19(5.2%)	12(3.5%)
18-40	162(44.8%)	154(45.8%)
41-60	135(37.3%)	133(39.5%)
>61	45(12.4%)	37(11.0%)

Discussion

In order to estimate the seroprevalence of HCV in this region, patients visiting both IPD and OPD were screened for presence of anti-HCV antibody as per the investigations sent by the respective treating clinicians. The seroprevalence of present study is 0.9%. As reported by Goel et al. in his meta-analysis of four community-based studies from India with 11118subjects included from three states, i.e., Punjab (n=5258), West Bengal (n=2973), and Maharashtra (1054 and 1833, respectively). The anti-HCV prevalence rates varied widely being highest in Punjab (5.17%) than in West Bengal (0.87%) and Maharashtra (0.00% and 0.09%) with the weighted pooled anti-HCV prevalence of 0.85% (95%CI: 0.00–3.98%)[13], which is similar to this study. In South-East Asian countries, the seroprevalence ranged from as low as 0.23% (95%CI 0.21–0.25) in Sri Lanka to as high as 2.65% (95% CI 2.26–3.11) in Myanmar.[14] In western, northern and central Europe, HCV can be found in less than 0.5%of the population while in many countries of Eastern Europe and Central Asia the figure can be as high as 3–5%.[15] The prevalence rate as well as the significance of HCV infection varies from country to country. This may be because of cultural factors and social habits that influence its transmission. And amongst different states of country, the variation could be due to different sample size, genetic and immunity difference, socio-economical and behavioral practices. In current study, M:F ratio was 1.2:1 with 55.4% male and 44.6% female for serology test by anti- HCV ELISA, and 1:1 with 53.3% male and 46.7% female for molecular test by RT-PCR. The gender based difference was not significant. Most common age group affected was18-40 years, by both serology and molecular test. Similar results were seen in study from Haryana, with 58% male, 42% female and 21-40 years (51.86%) as the most affected age group, followed by 41-60 years (37.45%), 61/above (5.63%) and upto 20 years (5.04%).[16]The study from Ireland, in contrast, showed significantly higher seroprevalence in men (1.6%; 95%CI: 1.1–2.2%) than in women (0.42%; 95%CI: 0.25–0.71%), with age group of 30–39 years (1.9%; 95%CI: 1.2–3.1%) and 40–49 years (1.5%; 95% CI: 0.96– 2.4%) affected most.[17] As per recent reports for year 2022 of United States, high rates of new HCV infections were predominantly among young adults aged 20-29 years and aged 30-39 years[18], the present study also showed the similar age group involvement. The study from West Bengal by Chaudhary et al. reported no difference in gender but age-specific prevalence of HCV was low in children (0.31%), and increased gradually from adolescents (0.83%) to adults (1%) and older persons (1.85%).[19] Similar low prevalence of HCV infection has been reported in children (0.2%) and adolescents (0.4%) from the United States.[20] In this study pediatric age group showed prevalence of 5.2% for ELISA and3.5% for PCR.

A reactive HCV antibody result indicates any one of the situation i.e. current HCV infectionor past HCV infection that has resolved or false positive.[21] As per CDC guidelines, People testing anti-HCV positive/reactive should have follow-up testing with HCV RNA. If the HCV RNA is detected, the patient

is considered of having current HCV infection and should be directed for the treatment. In present study amongst the 336 anti-HCV positive samples which were tested for HCV RNA, only 96 samples showed viral copies indicating current HCV infection with a need to start on treatment and rest 240 samples showed target not detected with no indication for treatment. The high number of anti –HCV positive and PCR negative 240 samples, could be due to acute, chronic, resolved, or false positive condition. A false-positive HCV antibody result may occur because of cross-reactivity with other viralantigens or the presence of immunologic disorders, such as lupus or rheumatoid arthritis.[22] In the study by Berry N et al. HCV RNA and anti-HCV were present together in only7/62 (11.3%) cases and this false positive reactions of anti-HCV antibody may be due to multiple infections encountered in the tropical countries producing hypergammaglobulinemia. So, they recommended that testing for both antibody and HCVRNA would be more apt than either test alone.[7] Also the study by S Kaya et al. suggested that in routine laboratories RT-PCR appears to be a valuable assay for HCV RNA determination for diagnosis and follow up therapies and using ELISA and RT-PCR methods at the same time would help to confirm the positive results and early diagnosis.[23] Hepatitis C is curable; new antiviral medicines can cure more than 95% of infected people, reducing the risk of complications and death. Highly effective direct acting antiviral (DAA) drugs for chronic HCV infection are now available.[24] The effectiveness of antiviral treatment is assessed according to the proportion of patients achieving sustained virologic response (SVR). SVR is the essential goal of treatment and is defined as undetectable (below the lower limit of quantification) HCV RNA at 12–24 weeks after cessation of treatment. SVR rates with a DAA in combination with peg IFN plus ribavirin currently range from approx. 80–90% for treatment-naïve patients, whilst SVR rates of up to 99% have been reported with combinations of two DAAs.[25] The high price of these medications has severely limited its access, especially in low and middle income countries such as India.[26] Recently, generic DAA drugs (sofosbuvir, ledipasvir, daclatasvir, and velpatasvir) are also available and several observational reports with SVR of over 95% with these drugs have been published.[27] With the availability of effective treatment modalities, the possibility of achieving the target of elimination HCV by 2030 can be predicted. This study wants to focus the need of performing HCV RNA for all anti-HCV ELISA positive samples so we can concentrate on those 96 patients with the current HCV infection, who are in actual need of treatment with avoidance of unnecessary or unrequired exposure of medication for rest 240 patients, and thus helping in strengthening the NVHCP programme to successfully reaching its aim.

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Limitation: It is prevalence study and not incidence study.

Follow up of patients after 12 weeks of treatment is not studied so therapy outcome is not known. Further studies are required for detailed analysis of treatment and SVR (sustained virologic response).

Advantage – Large sample size. Use of third generation ELISA kit with sensitivity of 100% and specificity of >99.5%. This study is the first step towards the analysis of HCV data by both serological and molecular method for effective implementation of NVHCP programme.

Benefit of the study: This study helps in highlighting the importance of detection of HCV-RNA by RT-PCR in patients to differentiate current HCV infection that indicates active HCV replication and need for initiation of treatment from presumptive (current or past or biological false positive) HCV infection detected by ELISA test.

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Original Article

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Comparison of Ultra Sonogram and Mammography for Diagnosis of Breast Cancer: A Prospective Study

J.A.Jayalal[1], Selwyn J Kumar[2], J.Ajin Manovah[3], S.P.K.Kiren[4], P.Ajin Daniel[5]

[1]Professor, [2]Associate Professor, [3]Assistant Professor,[4]Post Graduate Student, Dept. of Surgery, Kanyakumari Govt Medical College, Asaripallam.

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Abstract

Background: Ultra sonogram is an imaging test that can be used to detect breast cancer. Mammograms can find micro calcifications that sometimes indicate the presence of breast cancer. They are used to check for breast cancer after a lump or other sign or symptom of the disease has been found.

Aim : This study is specifically aimed to compare mammography and ultrasonography in early detection of breast cancer. major purpose is to compare both screening methods.

Methodology: This study is a prospective single centered study on patients who had breast imaging and biopsy during 7 months period. Patients who come to Kanyakumari government medical college, surgery department OPD with complaints of breast lump are subjected to ultrasound and mammogram and finally subjected to biopsy. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of USG and MMG were calculated with histology as the gold standard.

Conclusion: Study concludes that ultra sonogram is more efficient to diagnose factors suggestive of breast cancer that cannot be detected on mammography. It also has the potential to evaluate cancer among dense breast women. It is advisable to combine both investigations to achieve good outcome.

Keywords: Breast Cancer, Mammography, Ultrasonogram, Screening.

Introduction

All around the world, cancer holds a significant value of consideration due to its high morbidity and mortality ratio. Among women, breast cancer holds a significant place in mortality and disability[1.] Considerably 5,35, 000 deaths from breast cancer are reported every year in both developed and developing countries. In recent years, a high prevalence of breast cancer is majorly observed in underdeveloped countries[2]. Aging and bad lifestyles including smoking, poor diet, physical inactivity are triggering factors for breast cancer[3]. In developing countries,

Corresponding Author: Ajin Daniel, Assistant Professor of General Surgery, Kanyakumari Government Medical College.

E-mail: ajinbelteshazzar@gmail.com

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there is a great urge to initiate preventive measures especially cancer screening. Since 1970 mammography is used as a primary screening method for breast cancer. Due to less availability of mammography equipment, it is not widely available in under developed countries so they used Ultrasonography as an alternative method of screening[3]. Women having dense breast has a low sensitivity to mammography[4]. These women may have a high risk of breast cancer as compared to less dense breasts[5] In Denmark and Netherlands, researchers claim that every one of three women suffering from cancer is diagnosed with breast cancer[6,7]. In recent years supplemental ultrasonography is considered the best screening method to detect more variations of breast cancer as compared to primary mammography[8-11].

Mammogram(MMG)

Mammography is a common screening tool [12].It is reported in multiple studies to help decrease cancer death rates[13, 14.] Although mammography can be used to imaging young, compact breasts, it is insufficiently sensitive to detect lesions since the surrounding fibro glandular tissue obscures lesions appearance [15]. Mammography on film is the "gold standard" of detecting breast neoplasm[16]. Though it can also be used for early identification and follow-up of tumours[13], does have some inherent limitations, such as screen-film mammography's limitations, poor contrast features[17]. Full-field digital mammography (FFDM) is a useful imaging that offers a number of benefits over traditional film-based treatments. Reduced dose, telemedicine, softcopy review, tomosynthesis and digital archiving are just a few of the advantages [18]

Ultrasonogram (USG) Breast cancer is diagnosed via ultrasonography, which is a standard imaging procedure Ultrasound is a technology used as a follow-up examination to clarify equivocal findings[19]. In primarily fatty breasts and dense breasts, ultrasonography can be used to assess the orientation and morphology[20]. A panoramic high resolution image of the breast is obtained using extended field of view imaging [21,22]. Elastic sonography is a typical approach for detecting breast lesions using ultrasonic detection[23]. Ultrasound with contrast is used to detect and monitor the progress of local treatment[24]. Intravenously injected gas microbubbles are used in this approach [25]. The volume of a lesion can be calculated using 3D ultrasonography[26].

Materials and Methods

This study is prospective single centered study on patients who had breast imaging and biopsy during june to December 2023, 7 months period. Patients who come to Kanyakumari Government medical college hospital (KGMCH) General Surgery department OPD with complaints of breast lump, breast pain or discomfort. The patients were subjected to ultrasound and mammogram and finally subjected to biopsy. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of USG and MMG were calculated with histology as the gold standard.

- Parameters studied
- Age distribution
- Pain on presentation
- Assess the discomfort of study
- Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of USG and MMG

Patient data and selection criteria: Approval for this study was obtained from the local institutional review board on 21/5/2023, 33/05/CSI/2023. Informed consent for this study was obtained from each participant, Patient is subjected to mammogram and then to ultra-sonogram .Each done by different radiologist and the corresponding test report is masked from the concerned radiologist. Finally the lesion is subjected for core needle biopsy. Breast Imaging Reporting and Data System (BI-RADS) reporting abnormal mammographic findings were classified as an asymmetry, mass, architectural distortion or suspicious micro calcification.

Study type

Single centred prospective study

Inclusion criteria

1. Patients giving consent for study
2. AGE > 30 YEARS
3. Participants willing for both ultrasound and mammogram

Exclusion criteria

1. Diagnosed as breast cancer
2. AGE less than 30
3. pregnant patients
4. unavailability for follow up

Statistical Analysis

Sensitivity = TP / (TP + FN**),**

Accuracy = (TP + TN) / (TP + TN + FP + FN),

Specificity = TN/(TN+FP),

PPV = TP/ (TP+FP),

NPV=FN/(FN+TN)

P value <0.05 is significant

Chi square test - $X^{2.}$

TP- True positive, TN- True negative, FN- False negative, FP- False positive, PPV - Positive predictive value, NPV- Negative predictive value.

Results

There were a total of 70 breast lesions. The majority of malignant lesions were detected in women aged 50 to 59 years (38%). Lesions that were diagnosed with both modalities were most frequently encountered in women aged between 50 to 59 years. Histology showed 43 (62%) benign and 27 (38%) malignant lesions. Benign histology included: benign breast tissue (n=20), benign proliferative disease (n=13), fibroadenoma (n=9), phyllodes tumour (n=1). Malignant histology included: infiltrating ductal carcinoma (n=15), ductal carcinoma in situ (n=10), infiltrating lobular carcinoma (n=1), and lobular carcinoma in situ (n=1). Compared with histology as the gold standard, USG had better sensitivity than MMG (82% and 49% respectively). The false negative rates for MMG and USG were 51% and 18% respectively. In patients with normal MMG, 7 had malignant lesions that were detected on USG. In patients with benign USG, one had a malignant lesion detected on MMG. The 7 malignant lesions that were occult on MMG were nodules detected on USG and the one malignant lesion that was occult on USG was clustered micro calcifications detected on MMG. The sensitivity and specificity of USG and MMG of these 70 lesions were compared and analysed.

The 75% sensitivity of USG was 31% (95% CI 15% to 47%) higher than the 44% sensitivity of MMG (CI-Confidence interval). The higher sensitivity of USG was statistically significant (X^2 1=6.095, p=0.014). The 91% specificity of MMG was 12% (95% CI 5% to 18%) higher than the 79% specificity of USG. The higher specificity of MMG was statistically significant (X^2 1=27.114, p<0.001).Of the 27 lesions with malignant histology, 6 were in women aged less than 50 years. Of the lesions with benign histology, 35 were in women aged less than 50 years. In women aged less than 50 years, the sensitivity of USG was 50% (95% CI 10%-90%) higher than the sensitivity of MMG However, due to the small number of total lesions with malignant histology, there was no statistically significance difference in sensitivity for the two modalities (X2 1=0.000, p=1.000). In women aged 50 years and above, the sensitivity of USG was 27% (95% CI 19%-36%) higher than the sensitivity of MMG. The higher sensitivity of USG was statistically significant (X2 1=5.866, p=0.015). On the other hand, in women aged less than 50 years, the specificity of USG and MMG were the same.

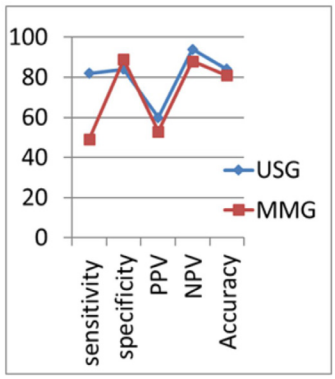


Figure 1: Showing validity of USG and MMG

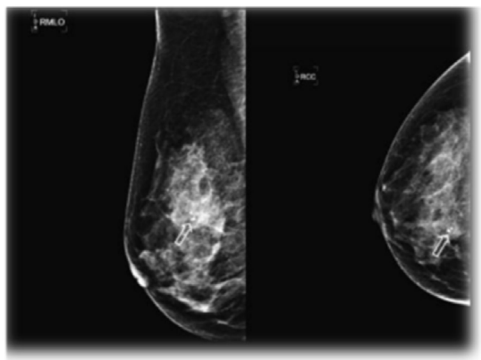


Figure 2: Mammogram : Right mammogram of a 58-year-old woman. The breasts were dense. Coarse calcifications were noted at the right upper-mid quadrant (block arrow) and reported as involuting fibro adenoma.

Table 1: Validity of USG and MMG in all lesions imaged

Validity	USG	MMG
SENSITIVITY (%)	82	49
SPECIFICITY (%)	84	89
PPV (%)	60	53
NPV (%)	94	88
ACCURACY (%)	84	81

In women aged 50 years and above, the specificity of MMG was 21% (95% CI 12%-31%) higher than specificity of USG. The higher specificity of MMG was statistically significant

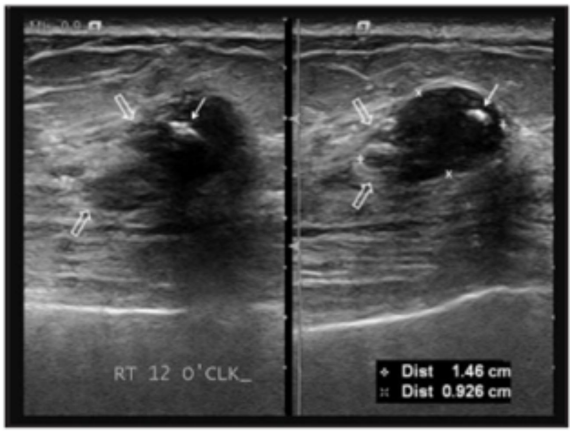


Figure 3: The ultrasound of the breast of the same patient as in Figure A. The calcifications seen in the mammogram were noted to be within a hypoechoic nodule (arrow). This nodule was reported to be suspicious of malignancy because its lateral margins were irregular (block arrows).



Figure 4: Showing discomfort in study procedures.

Discussion

In this study, the accuracy for the detection of breast cancer was 84% with USG and 81% with MMG. Sensitivity for this study was higher with USG (82%) compared with MMG (49%). These findings are similar to previous studies that showed a higher sensitivity for USG (73-83%) as compared with MMG (52-78%) [27-30]. The higher sensitivity of USG was noted in studies that involved either women with breast symptoms or asymptomatic women in a screening program[27-30]. Many reports have concluded that USG is more sensitive in young women and those with dense breasts and that the sensitivity of MMG improves with age when the breasts involute and become fatty[31-34]. This study did not concur with these reports because USG was found to be more sensitive regardless of age. However, MMG did show better specificity in those older than 50 years. Furthermore, this study showed that USG was more sensitive while MMG more specific regardless of the breast density. Although these findings differ from previous reports, the conclusion that USG is an effective supplement to MMG remains indisputable. The combination of USG and MMG has been shown to have higher sensitivity in detecting breast cancer in symptomatic patients of all ages[35,36]. It has been reported that cancers that are occult on MMG can be detected by USG in 10-40% of cases depending on the patient's age and breast density[28,37]**.** In this study, 20% of breast cancers detected were occult on MMG and seen only on USG. Dense breasts obscure lesions within the breasts. Malignant lesions are hypoechoic on USG in contrast to the relatively hyperechoic normal breast tissue. As such, USG imaging is not impaired by dense breast parenchyma. Furthermore, USG provide convenient and easy guidance for percutaneous procedures such as biopsy of a breast lesion. Moreover around 85 % patients reported mammogram to be uncomfortable or painful.

Conclusion

Accuracy of USG was higher compared with MMG. USG was more sensitive than MMG regardless of age group, but MMG was more specific in those aged 50 years and older. USG was more sensitive and MMG was more specific regardless of breast density. In this study, 20% of breast cancers detected were occult on MMG and seen only on USG .Mammogram leaves a unpleasant experience for the patients when compared to Ultrasound imaging. It is wise to advocate for combining both investigations to achieve a successful diagnosis.

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Conflict of Interest: None

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Original Article

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Assessment of Psychiatric Morbidity among Patients with Chronic Kidney Disease on Dialysis Attending Tertiary Care Hospital: A Cross-Sectional Single Centre Study

Jarupula Akanksha[1], Surada Chandrika[2], A. Krishnaveni[3]

[1]Intern, Government Medical College, Srikakulam, [2]Assistant Professor, Department of Community Medicine, Andhra Medical College, Visakhapatnam, [3]Professor & HOD, Department of Community Medicine, Andhra Medical College, Visakhapatnam.

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Abstract

Background: Chronic Kidney Disease (CKD) poses a growing public health concern, affecting up to 10% of adults worldwide.

Aim & Objective: This study aims to assess psychiatric morbidities and associated risk factors among chronic kidney disease patients undergoing hemodialysis.

Methodology: An observational cross-sectional study was conducted among 100 cases, both male and female patients diagnosed with Chronic kidney disease attending Dialysis Center of the General Medicine Department in a tertiary care hospital within the age group of 18 to 60 years. A systemic randomized technique was employed for patient selection, involving every second CKD patient. After obtaining permission from the Institutional Ethical Committee and Informed written consent from participants, a pretested questionnaire was administered. Data was entered in MS Excel and analyzed using SPSS software.

Results: In this study 24% of participants found with mild depression, 25% had moderate, 17% had severe depression and 13% had very severe depression. Additionally, 14% with mild anxiety, 23% had mild to moderate anxiety, and 20% had moderate to severe anxiety.

Conclusion: The overall prevalence of depression and anxiety among CKD patients undergoing dialysis was found to be 79% and 57% respectively.

Key words: Chronic kidney Disease, Dialysis, Psychiatric morbidity, Tertiary care hospital.

Introduction

Chronic kidney disease (CKD) presents a growing challenge in public health, significantly contributing to morbidity and mortality from non-communicable diseases.[1] Addressing CKD is crucial for achieving the UN's Sustainable Development Goal, aiming to reduce premature mortality from non-communicable diseases by a third by 2030.[2]

Corresponding Author: Surada Chandrika, Assistant Professor, Department of Community Medicine, Andhra Medical College, Visakhapatnam.

E-mail: suradachandrika@gmail.com

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The global burden of CKD is on the rise and is anticipated to become the fifth most common cause of years of life lost globally by 2040.[3,4] Due to the irreversible nature and unfavorable prognostic outcomes, psychiatric disorders, particularly depression, are prevalent among patients with renal disease.[5-7] A study revealed that End Stage Renal Disease (ESRD) patients face nearly a fourfold higher risk of depression than the general population.[8] Notably, depression not only extends hospitalization by 30%[9] but also more than doubles the likelihood of mortality in ESRD patients compared to those without depression.[8] Recognizing depression, coupled with appropriate therapeutic management, can enhance patient's mental well-being, improve their quality of life, and potentially positively impact long-term survival.[10]

Despite numerous studies on kidney diseases, few have specifically addressed psychiatric symptoms in CKD patients, such as depression and anxiety. Therefore, this study primarily focuses on psychiatric morbidities among CKD patients, such as depression and anxiety, hence this study primarily focuses on psychiatric morbidities among CKD patients, aiming to expedite diagnosis, reduce the disease burden, and alleviate treatment costs. Therefore, delays in diagnosis can be avoided and this will help in reducing the disease burden as well as treatment cost.

Aim and Objectives:

a. To assess the psychiatric morbidities among chronic kidney disease patients on hemodialysis.

b. To determine associated risk factors among chronic kidney disease patients on hemodialysis.

Material and Methods

Study type & study design: An observational cross-sectional study

Study setting: Patients diagnosed with Chronic kidney disease attending a Dialysis center in a tertiary care hospital.

Study population: All male and female patients diagnosed with Chronic kidney disease undergoing hemodialysis.

Inclusion Criteria:

a. Both male and female patients are diagnosed with chronic kidney disease based on laboratory results and clinical findings for at least one year.

b. Age group 18 years to 60 years

c. Patients who were willing to participate in the study.

Exclusion criteria:

a. Patients who were currently on treatment for psychiatric disorders.

b. Neurological conditions

Sample size: A study done by Sohail Tanvir et al[11] found that the prevalence of depression among chronic kidney disease patients on hemodialysis to be about 57.3%. According to this prevalence rate, considering the allowable error of 10% at a 95% confidence interval thus the sample size was calculated by using

$N= Z^2\alpha PQ/L^2$.

Where, Zα= Standard normal table value

P = Prevalence, Q 100-P, and L = allowable error (10%). Sample size (N) = $Z^2\alpha PQ/L^2$

= $[(1.96)^2 \times 57.3 \times 42.7) / (10 \times 10)] = 97$

Hence, N = 100 patients.

Sampling technique: A systemic randomized technique was followed. The study was carried out for 2 months, using the average patient flow (i.e.200). The sampling interval was (K= Population size/ Sample size)

2. So every 2nd patient with CKD attending a dialysis center was selected for the study.

Study period: 2 months

Ethical consideration: After obtaining permission from the Institutional Ethical Committee, the study was commenced. Informed consent was taken from all the study participants before administering the questionnaire.

Method of data collection& study tools: After taking training from the psychiatrist of the psychiatric department regarding questionnaires. The study participants were explained the purpose of the study and efforts were made for their maximum

cooperation in the study. After taking informed and written consent questionnaire was administered. It is a Standardized tool. It contains 3 parts. Part –A includes socio-demographic details of the study subjects like age, gender, religion, marital status, education, income, socio-economic status, etc, part-B contains Hamilton Depression Rating Scale (HAM-D) & Part C includes Hamilton Anxiety Rating Scale (HAM-A). The questionnaire was translated into the local language and validated.

Hamilton Depression Rating Scale (HAM-D) [12] was a 17-item rating scale designed to measure the severity and symptomatology of depression. The scores were interpreted as 0–7 = normal, 8–13 = mild depression, 14–18 = moderate depression, 19–22 = severe depression, and 23–>23 = very severe depression.

Hamilton Anxiety Rating Scale (HAM-A)[13] was a 14-item rating scale designed to measure the severity, symptoms, and pattern of anxiety. Each item was scored on a scale of 0 (not present) to 4 (severe), with a total score range of 0–56, where 14–17 indicates mild severity, 18–24 mild to moderate severity, and 25– 30 moderate to severe.

Statistical analysis: Data was entered in a Microsoft Excel worksheet and analysis was done by using SPSS software. Categorical variables were represented as proportions or percentages and quantitative variables were represented as means and standard deviation. A chi-square test was done to find out the significance of association. P value < 0.05 is considered statistical significance at a 95% confidence interval. The odds ratio was calculated for associated risk factors.

Observations and Results

A total of 100 participants were studied.

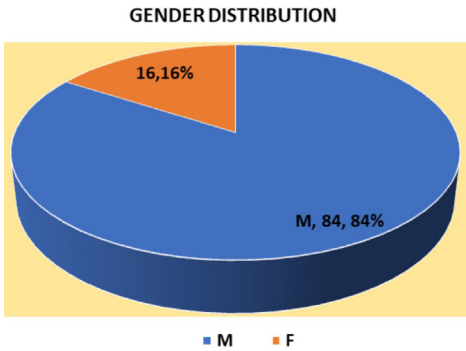


Figure 1: Distribution of the study population based on gender

From figure 1, in the present study majority were male 84(84%) and remaining 16 (16%) were female.

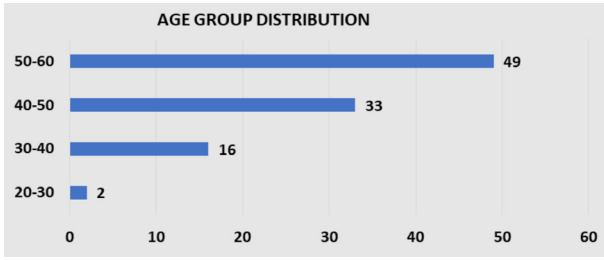


Figure 2: Distribution of study population by age group

From figure 2, majority of the study participants were in the age group 50 to 60 years i.e. 49% followed by 40 to 50 years 33% and 16% were in the age group 30 to 40 years and 2% were in the age group 20 to 30 years.

Table 1: Distribution of study population based on demographic details

Variables	Subcategory	Frequency	Percentage
Religion	HINDU	87	87
	CHRISTIAN	1	1
	MUSLIM	12	12
Marital status	Married	97	97
	Unmarried	2	2
	Divorced	1	1
Type of family	NUCLEAR	68	68
	JOINT	2	2
	THREE GENERATION	30	30
Education	GRADUATE	11	11
	HIGH SCHOOL	6	6
	SECONDARY	13	13
	PRIMARY	11	11
	ILLITERATE	59	59
Place of residence	RURAL	75	75
	URBAN	25	25

From the table 1, majority of the study participants were Hindu 87 (87%) by religion followed by 12 (12%) were Christian and 1 (1%) were Muslim, most of the study participants were married i.e., 97 (97%) and remaining 2 (2%), majority were belonged to nuclear family i.e. 68% followed by three generation family 30% and joint family 2%. More than half of the study population were illiterate i.e.59% followed by 13% of the study population were studied up to secondary school, 11% up to primary school and 6% were studied up to high school.

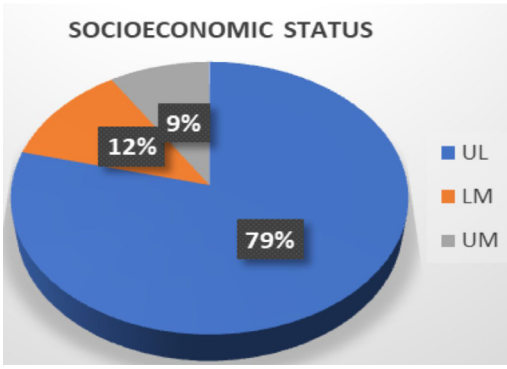


Figure 3: Distribution of study participants based on socioeconomic class

From figure 3, themajority of the study population were belonged to upper lower socioeconomic class (79%) followed by lower middle socioeconomic class (12%) and 9% of the study participants were belonged to upper middle socioeconomic class.

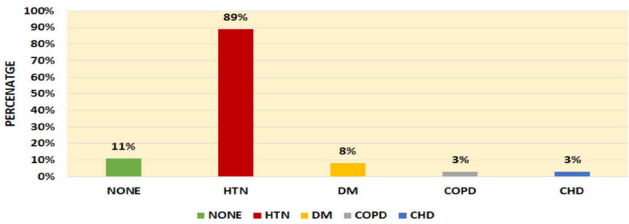


Figure 4: Distribution of study population based on associated conditions

From figure 4, the common associated condition was Hypertension (89%) and diabetes among 8% of the study population and 3% of the study population had COPD and 3% of the study participants had Coronary heart disease. In this study 75% of the study population were from rural area and remaining 25% were from urban area.

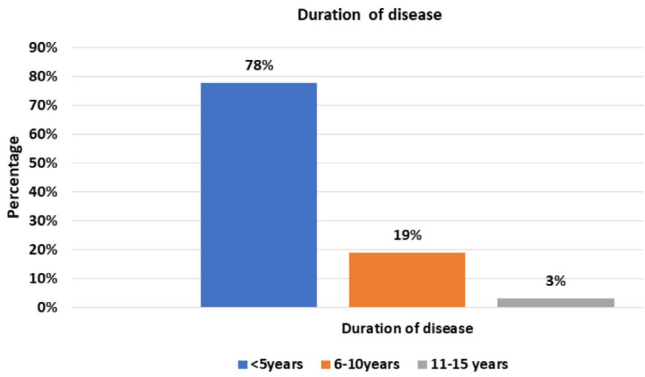


Figure 5: Distribution of study participants based on duration of disease

From the figure 5, in the present study majority of the study participants had disease duration less than 5 years were 78% followed by 6-10 years (19%) and 11-15 years were (3%).

Table 3: Distribution of study participants based on depression

Depression	Male n (%)	Female n (%)	Total n (%)
Normal	19 (22.6%)	2 (12.5%)	21 (21%)
Mild (0-7)	19 (22.6%)	5 (31.3%)	24 (24%)
Moderate (8-13)	21 (25%)	4 (25%)	25 (25%)
Severe (14-22)	15 (17.9%)	2 (12.5%)	17 (17%)
Very severe (>23)	10 (11.9%)	3 (18.8%)	13 (13%)
Total	84 (100%)	16 (100%)	100 (100%)
	P value = 0.77		

In this study 24% of the study population had mild depression followed by 25% had moderate depression and 17% of the study participants had severe depression and 13 % of the study population had very severe depression.

Table 4: Distribution of study participants based on anxiety

Anxiety	Male n (%)	Female n (%)	Total n (%)
Normal	40 (47.6%)	3 (18.7%)	43 (43%)
Mild (14-17)	8 (9.5%)	6 (37.5%)	14 (14%)
Mild to Moderate (18-24)	20 (23.8%)	3 (18.8%)	23 (23%)
Moderate to Severe (25-30)	16 (19%)	4 (25%)	20 (20%)
Total	84 (100%)	16 (100%)	100 (100%)
	P value = 0.07		

From table 4, in this study14% of the study population had mild anxiety followed by 23% had mild to moderate anxiety and 20% of the study participants had moderate to severe anxiety (20%).

Table 5: Associated Factors Vs Depression

Variables	Subcategory	Depression		Odds ratio	P value
		YES	NO		
Gender	Male	65 (77.4%)	19 (22.6%)	2.04	0.36
	Female	14 (87.5%)	2 (15.5%)		
Age group	<40yrs	10 (55.6%)	8 (44.4%)	0.23	0.005
	>40yrs	69 (84.1%)	13 (15.9%)		
Place of residence	Rural	61 (81.3%)	14 (18.7%)	1.69	0.32
	Urban	17 (72%)	7 (28%)		
Marital status	Married	77 (79.4%)	20 (20.6%)	1.92	0.59
	Unmarried	2 (66.7%)	1 (33.3%)		
Socioeconomic class	Upper middle & lower middle	9 (81.8%)	2 (18.2%)	1.22	0.80
	Lower class	70 (78.7%)	19 (21.3%)		
Duration of disease	<5yrs	60 (83.3%)	12 (16.7%)	2.36	0.08
	>5yrs	19 (67.95)	9 (32.1%)		

From table 5, Depression was more common among females, those aged> 40 years age group, married people, from rural areas people, and cases belonging to the upper middle class and with a duration of disease < 5 years but the difference observed between the groups was not statistically significant. (p>0.05).

Table 6: Associated Factors Vs Anxiety

Variables	Subcategory	Anxiety		Odds ratio	P value
		YES	NO		
Gender	Male	45 (53.6%)	39 (46.4%)	2.60	0.11
	Female	12 (75%)	4 (25%)		
Age group	<40yrs	8 (44.4%)	10 (55.6%)	0.53	0.23
	>40yrs	49 (59.8%)	33 (40.2%)		
Place of residence	Rural	44 (58.7%)	31 (41.3%)	1.31	0.56
	Urban	13 (52%)	12 (48%)		
Marital status	Married	56 (57.7%)	41 (42.3%)	2.73	0.40
	Unmarried & divorced	1 (33.3%)	2 (66.7%)		
Socioeconomic class	Upper middle & lower middle	7 (63.6%)	4 (36.4%)	1.36	0.63
	Lower class	50 (56.2%)	39 (43.8%)		
Duration of disease	<5yrs	41 (56.9%)	31 (43.1%)	0.99	0.98
	>5yrs	16 (57.1)	12 (42.9%)		

From Table 6, anxiety was more among females, age > 40 years age group, married people, from rural areas people, cases belonged to the upper middle class and with duration of disease > 5 years but the difference observed between the groups was not statistically significant. (p>0.05).

Discussion

The present study was conducted to assess psychiatric morbidities among patients with chronic kidney disease on hemodialysis attending tertiary care hospital. In the present study, the majority were male 84(84%) and the remaining 16 (16%) were

female. Similar study findings were observed in the following studies done by Taskapan H et al.,[14] et al., who found that the majority of the study population was male 63.7%. Bossola M et al[5] found that the majority were male 63.5%. Shafi ST, et al.[1] who reported that the majority of the study participants were male 61.5%, Turkistani I et al.[15] who stated that 58.2% were male. More than half of the study population were illiterate i.e.59%. The present study findings were inconsistent with the findings of the following studies done by Taskapan H et al.,[14] et al., who found that the majority were studied up to primary and secondary school i.e. 47.5%. Turkistani I et al.,[15] stated that 54.4% were studied up to secondary school.

In this study a total 79% of the study population had depression, 24% of the study population had mild depression followed by 25% had moderate depression and 17% of the study participants had severe depression and 13 % of the study population had very severe depression. Similar study findings were observed in a study done by Taskapan H et al.,[14] et al., who found that 35% of the study participants had depression. Bossola M et al.,[5] found that the majority had depression 52.5%. Shafi ST, et al.,[1] reported that the majority 72.2% had depression. And 34.6% had moderate to severe depression. Drayer RA et al.,[16] stated that 28% had moderate to severe depression. Turkistani I et al.,[13] stated that 23.3% were probable cases of depression. Sohail Tanvir et al.,[11] reported that 57.30% of ESRD patients had depression of which 39.2% had mild depression, 24.49% had moderate depression and 13.72% had severe depression.

In this study a total of 57% of the study population was found to have anxiety, of which 14% of the study population had mild anxiety followed by 23% had mild to moderate anxiety, and 20% of the study participants had moderate to severe anxiety (20%). Similar study findings were observed in a study done by Taskapan H et al.,[14] who found that 30% of the study population had anxiety. Bossola M et al.,[5] found that the majority had anxiety (mild-47.5% and moderate to severe- 48.7%) Shafi ST, et al.,[1] reported that the majority had 71.2% anxiety. 38.5% moderate to severe anxiety. Turkistani I et al.,[15] stated that 21.1% of participants were probable cases of anxiety. Sohail Tanvir et al.,[11] reported that the percentage of patients suffering from anxiety disorder is 42.69% out of which 47.36% had mild anxiety, and 28.94% had moderate anxiety.

Depression was more common among females, aged> 40 years age group, married people, from rural areas people, cases belonging to the upper middle class, and those with a duration of disease < 5 years. Similar study findings were observed in a study done by Taskapan H et al.,[14] et al., who found a relationship between psychiatric disorder and age, sex, duration of dialysis therapy, education, marital status, employment, and socioeconomic status. Anxiety was more prevalent among females, aged> 40 years age group, married people, from rural areas people, cases belonging to the upper middle class, and those with a duration of disease > 5 years. Similar study findings were observed in a study done by Taskapan H et al.,[14] et al., who found no relationship between psychiatric disorder and age, sex, duration of dialysis therapy, education, marital status, employment, and socioeconomic status.

Conclusion

The results concluded that more than half of the study population was found to have depression (79%) and anxiety (57%). This shows that there is a need for consultancy with the psychiatrist in every patient with CKD who is on hemodialysis. Any patient on treatment for chronic kidney disease must be screened for psychiatric symptoms and treated accordingly. Through periodic and intense health education and awareness programs, all the healthcare professionals have to be made aware of the relationship between Chronic kidney disease and psychiatric morbidities and can be offered psychiatric referrals.

Limitation:

- It was a hospital-based study and it should be done in the community also.

Conflicts of interest: Nil

Source of funding: ICMR-STS project 2022.

Ethics Approval: approved, Dated 22july2022, ECR/492/Inst/AP/2013/RR-20.

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Original Article

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Association Between Different Type of Addictions and Oral Cancer: A Case Control Study in Sonipat District of Haryana

Jashanpreet Singh[1], Deepika Kataria[2], Babita Rani[3], Sarita Yadav[4], Uma Garg[5], Parveen Rana Kundu[6]

[1]District nodal officer, NCDs, Immunization and Child health, Health department, District Ambala, [2]Senior resident, Department of Community Medicine, [3]Professor, Department of Community Medicine, [4]Professor, Department of Microbiology, [5]Professor and Head, Department of Otorhinolaryngology, [6]Professor, Department of Pathology, BPS GMC (W) Khanpur Kalan, Sonepat, Haryana.

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Abstract

Background: Incidence of oral cancer is increasing day by day in both males and females with increased smoking. The early-age onset of consumption, duration of use, frequency of chewing tobacco, bidis or smoked cigarettes and drinking alcohol on daily basis are strongly linked to oral cancer.

Methods: This study included 86 cases of oral cancer aged ≥18 years and 86 controls. Consecutive cases were taken. After taking written consent, interview was conducted. Categorical variables were presented in the form of frequency and proportions while continuous variables as mean and standard deviation.

Results: The findings indicate that mean age for cases was 52.74±5.21 years. We found significant risk factors for oral cancer in relation to various habits like: passive smoking; usage of cigarette, bidi, hookah, smokeless tobacco products (types) and alcohol (types and amount) along with age of their initiation.

Conclusion: To mitigate the increasing incidence of oral cancer in India, extensive public education campaigns and health promotion tactics targeting alcohol and tobacco use must be put into place.

Keywords: Oral cancer, Smoking, Alcohol, Risk factors

Introduction

Oral cancer (OC) is one of the most common cancers that dominates globally and is known for its lethal effects and disastrous outcomes. Oral cancer has become an important component of global oral health problems, with a significant economic impact on society making this an essential component of public health policy.[1]

8,90,000 new head and neck cancers (HNCs)—lip and oral cavity (LOC), nasopharynx, other pharynx,

Corresponding Author: Deepika Kataria, Senior resident, Department of Community Medicine, BPS GMC (W) Khanpur Kalan, Sonepat, Haryana.

E-mail: deepikakataria93@gmail.com

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and larynx—were expected to be diagnosed globally in 2020 according to the Global Burden of Disease (GBD) study. This amounts to 5.3% of all cancer cases (not including non-melanoma skin cancers). LOC tumors were the most common among them, followed by malignancies of the larynx. HNCs caused 507 000 fatalities in terms of mortality, or 5.3% of all cancer-related deaths.[2]

In India alone, 1,20,000 new patients with OC were diagnosed in 2020, of which 72,000 patients died. OC is one of the three most common cancers in the country, with an age-standardised rate of 7.2/100000 population compared with 3.8 in Asia; this being attributed to tobacco consumption. The epidemiological studies had strongly linked the association between the OC and cigarette smoking.[3]

The early-age onset of consumption, duration of use and frequency of chewing of bidis or smoked cigarettes on a daily basis are strongly linked to OC. Smoked tobacco is a risk factor for the upper respiratory tract cancer which shows linear relationship. The risk for OC in people who use tobacco is 1.4 – 1.7 times higher than those who do not consume tobacco.[4] Prevalence of tobacco consumption in India among men and women was reported as 44.5% and 6.8%, by National Family Health Survey (NFHS 5).[5] Statistical report of National Institute of Cancer Prevention and Research shows as many as 2,500 persons die daily due to tobacco-related diseases in India. In fact, India has the world's highest incidence of OC with 75,000 to 80,000 new cases a year.[3]Risk of oral cavity malignancy is increased by drinking alcohol; the higher the daily intake and duration of use, the higher the risk of oral cavity cancer.[6]

Hence, there is a need to analyse various risk factors in patients suffering from oral cancer with different age, gender, socioeconomic status (SES)and investigate effects of tobacco/ betel quid chewing, smoking and alcohol. In the present study, we aimed to find out prevalent risk factors for OC in our population and to compare our findings with healthy controls to establish their significance.

Material and Methods

This hospital-based case-control study was conducted at the Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, located in rural area of block Gohana, District Sonepat, Haryana.

Inclusion and exclusion criteria for cases: Histopathologically diagnosed new cases of oral cancer aged ≥ 18 years who gave their consent to participate in the study were included; while those with other malignancy or current debilitating medical or related condition like mental illness, end-stage cancer, blindness which made them unable to be interviewed were excluded.

Inclusion and exclusion criteria for controls: Those who gave their consent to participate in the study aged ≥ 18 years were included while patients having any history, sign and symptoms of oral cavity and oropharynx disease; those with other malignancy or current debilitating medical or related condition like mental illness, end-stage cancer, blindness were excluded.

Sampling Technique: Consecutive cases were taken, while controls were selected by simple random sampling from the patients visiting the BPS GMC(W) Khanpur Kalan in the outdoors of otorhinolaryngology Department not having any complaints of oral cavity and oropharynx. Controls were matched for age with difference of ±2 years; gender; residence and had no history of trauma, precancerous lesions, cancerous lesions, or any other pathology in oral cavity and oropharynx. Case to control ratio was 1:1, so 86 cases and 86 controls were taken as study participants.

Sample size

Using nMaster 2.0 software, sample size was estimated on basis of reference study[7] which reported percentage of controls exposed to tobacco chewing 23.6%, anticipated OR 2.5, power 80%, confidence interval 95%, and thus the calculated sample size was 86 cases and 86 controls.

Data collection tools and measurements

Investigator personally interviewed cases and controls by using a semi-structured questionnaire after obtaining written consent. Interviews were conducted in the local language and information related to various socio-demographic characteristics were taken in detail with special emphasis on tobacco and alcohol intake which was recorded in a predesigned, pretested semi-structured proforma.

Operational definitions In our study, 'Oral Cancer' is used as a collective term for cancers of oral cavity and oropharynx.

Statistical analysis

A Microsoft Excel spreadsheet was created using the acquired data. SPSS software was used for the analyses. To summarize the results for continuous variables mean and standard deviation were used. Frequency and proportions were used to display the categorical variables. Chi-Square test and odds ratio with 95% confidence interval were used to statistically assess the categorical data. Statistical significance was attained when the p-value was < 0.05.

Ethical consideration:

Ethical clearance for the study was taken from the Institutional Ethics Committee of Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan vide IEC registration number: BPSGMCW/RC531/IEC/19 dated 21/12/2019.

Results

Table 1: Distribution of study population as per sociodemographic information (n=172)

Variables		Cases	Controls	p value	Odds ratio
Age (Years)	40-50	36(41.9)	35(40.7)	Matched	
	51-60	45(52.3)	48(55.8)		
	>60	05(5.8)	03(3.5)		
	Mean age (SD)	52.74±5.21	52.38±4.78		
Sex	Male	68(79.1)	68(79.1)		
	Female	18(20.9)	18(20.9)		
Marital status	Married	77(89.5)	51(59.3)	<0.001	5.871
	Widowed	9(10.5)	35(40.7)		1
Religion	Hindu	61(70.9)	68(79.1)	0.218	0.646
	Muslim	25(29.1)	18(20.9)		1
Caste	Scheduled caste	48(55.8)	45(52.3)	0.891	1.067
	Other Backward class	32(37.2)	35(40.7)		0.914
	General class	6(7)	6(7)		1

All the cases were in the age range of the 44 to 62 years, while the controls were ranged between 44 to 61 years. Majority of cases and controls were in age group of 51-60 years. 79.1% of cases and controls were males. Cases and controls were matched for gender and age with a range of ±2years. 89.5% cases were married. This difference was statistically significant. 70.9% cases and 79.1% controls belonged to the Hindu community followed by Muslim.55.8% cases and 52.3%controls belonged to the Scheduled caste community. (Table 1)

Table 2: Distribution of study population by Addiction history

Variables		Cases	Controls	p value	Odds ratio
History of chronic drug use (n=172)	Yes	69(80.2)	11(12.8)	<0.001	27.674
	No	17(19.8)	75(87.2)		1
Cigarette use (n=172)	Yes	61(70.9)	25(29.1)	<0.001	5.954
	No	25(29.1)	61(70.9)		1
Age of initiation of cigarette (n=86)	<25 years	51(83.6)	4(16)	<0.001	26.775
	≥25 years	10(16.4)	21(84)		1
Bidi use (n=172)	Yes	62(72.1)	27(31.4)	<0.001	5.645
	No	24(27.9)	59(68.6)		1

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Age of initiation of bidi(n=89)	<25 years	51(82.3)	2(7.4)	<0.001	57.95
	≥25 years	11(17.7)	25(92.6)		1
Use of smokeless tobacco (n=172)	Yes	68(79.1)	16(18.6)	<0.001	16.528
	No	18(20.9)	70(81.4)		1
Initiation age of smokeless tobacco (n=84)	<25 years	54(79.4)	8(50)	<0.001	3.857
	≥25 years	14(20.6)	8(50)		1
Type of smokeless tobacco product (n=84)	BQ with tobacco	17(25)	8(50)	0.002	0.708
	Gutka supari	33(48.5)	2(12.5)		5.5
	Khaini	18(26.5)	6(37.5)		1
Site of placement of smokeless tobacco product (n=84)	Right alveolar margin	47(67.1)	8(50)	0.198	2.043
	Left alveolar margin	23(32.9)	8(50)		1
Hookah use (n=172)	Yes	65(75.6)	27(31.4)	<0.001	6.764
	No	21(24.4)	59(68.6)		1
Age of hookah initiation (n=92)	<25 years	45(69.2)	12(32.4)	<0.001	4.687
	≥25 years	20(30.8)	25(67.6)		1
Passive Smoking (n=172)	Yes	66(76.7)	21(24.4)	<0.001	10.214
	No	20(23.3)	65(75.6)		1

80.2% of the cases had history of chronic drug use (OR=27.6), while 87.2% had no such significant history. 70.9% of cases were habitual of cigarette use (OR=5.9), while equal number of controls (70.9%) were non-users of cigarette. Maximum number of the cases (72.1%) were habitual of bidi use (OR=5.6), while majority of controls (68.6%) were non-users of bidi.

79.1% cases were users of smokeless tobacco products (OR=16.5), while 81.4% controls were non-users. Out of those study participants using smokeless tobacco product, about half of the cases (48.5%) were users of Gutka supari (OR=5.5). 67.1%cases had habit of placing smokeless tobacco product at right alveolar margin, while equal number of controls (50%) had habit of placing smokeless tobacco product at both right and left alveolar margins. 75.6%cases were users of hookah (OR=6.7) while68.6% controls were non-users. 76.7% cases had history of passive smoking at home or at workplace (OR=10.2), while 75.6% controls had no such history.

History of usage of chronic drug, cigarette, bidi, smokeless tobacco products, hookah and age of their initiation and passive smoking showed statistically significant association with oral cancer.(Table 2)

Table 3: Distribution of study population by usage of alcohol

Variables		**Cases**	**Controls**	**p value**	**Odds ratio**
Alcohol use (n=172)	Yes	58(67.4)	13(15.1)	<0.001	11.632
	No	28(32.6)	73(84.9)		1
Initiation age of alcohol (n=71)	<25 years	46(79.3)	5(38.4)	<0.001	6.13
	≥25 years	12(20.7)	8(61.6)		1
Type of alcohol consumed (n=71)	Local	38(65.5)	2(15.4)	<0.001	10.45
	Branded	20(34.5)	11(84.6)		1
Amount of alcohol consumed (n=71)	<2 pegs	28(48.3)	12(92.3)	<0.001	0.077
	≥2 pegs	30(51.7)	1(7.7)		1

67.4% cases were habitual of alcohol use (OR=11.6), while 84.9% controls were non-users of alcohol. Out of those study participants using alcohol, 65.5% of the cases were consumers of local made alcohol (OR=10.4) and had habit of consuming more than 2 pegs of alcohol daily (51.7%). All the factors of alcohol showed statistically significant association with oral cancer. (Table 3)

Table 4: Distribution of study population by past history

Variables		Cases	Controls	p value	Odds ratio
History of pre malignant lesion (n=172)	Yes	56(65.1)	16(18.6)	<0.001	8.167
	No	30(34.9)	70(81.4)		1
Family history of cancer (n=172)	Yes	10(11.6)	2(2.3)	<0.001	5.53
	No	76(88.4)	84(97.7)		1
Relation with study participant (n=12)	Parents	7(70)	1(50)	0.001	2.3
	Sibling	3(30)	1(50)		1
Cancer awareness (n=172)	Present	62(72.1)	84(97.7)	<0.001	0.062
	Absent	24(27.9)	2(2.3)		1

65.1% cases had past history of pre-malignant lesion (OR=8.1), while 81.4% controls had no such history. 11.6% of the cases had family history of cancer (OR=5.5), while only 2.3% of controls had such history. 72.1% of the cases were aware of cancer as outcome of tobacco/Alcohol use, while 97.7% of the controls had such awareness. Past history of pre-malignant lesion, family history of cancer and cancer awareness showed statistically significant association with oral cancer. (Table 4)

Discussion

In India the average age range of patients with oral cancer is between 60-70 years and showing increasing trend with age due to increasing length of exposure to disease specific risk factors leading to accumulation of somatic mutations.[8] In the present study, 58% cases were in the age group ≥ 50 years. The youngest patient was 44-year-old and oldest was 62 years. Mean age of cases was 52.74 years. This figure corresponds well with the results of others workers [9,10] who had studied about risk factors for oral cancer.

In India, cancer of the oral cavity and oropharynx is the commonest cancer in men and third commonest cancer in women.[5] The male predominance in most studies[10,11] including ours, may be attributed to the lifestyle factors like early initiation with higher and regular combined consumption of alcohol and tobacco and passive smoking at home and at workplace.[12]

In our study, 89.5% of study cases were married. Studies done by Modi et al[9] and Babashet et al[11] also showed a higher percentage of married population with tobacco habits and lesions and significant association. Studies done in some other parts of India[10,13,14] had concordant findings in relation to religion. Reason for high incidence in Hindu community in our study can be due to predominant population of study area was Hindu.

Respondents belonging to scheduled castes and tribes were significantly more likely to report early, combined and regular use of alcohol as well as smoking and chewing tobacco/STPs which may be due to low education and consequent low awareness apart from economic crunch making health services inaccessible, inapproachable and unaffordable. Moreover, the type of alcohol and tobacco consumed by them was local made, adulterated and sub-standard.[15]

In this study, 90% cases were habitors. 79.1% of the cases were users of smokeless tobacco products, out of which 79.4% had its initiation at an early age of <25 years. 48.5% of STP habitors were users of *Gutka/supari* and 67.1% had habit of placing smokeless tobacco product at right alveolar margin; supported by other studies done [14,16,17] at different places and at different time periods. However, other studies[6,18] found that tobacco smoking was the most frequent habit followed by tobacco chewing which

is discordant with the present study. This preference of chewing over smoking may be due to social stigma, public ban of smoking, influence on people's perceptions and attitude towards smoking and smoker; apart from cheaper availability of chewing form of tobacco.[15]

In our study, 70.9%,72.1% and75.6% of the cases were habitual of cigarette, *bidi and* hookahuse and out of them, 83.6%,82.3% and 69.2% had its initiation at an early age of <25 years respectively. 76.7% of the cases had history of passive smoking at home or at workplace. 67.4% of the cases were habitual of alcohol use, while 84.9% controls were non-users of alcohol; out of which, 65.5% were consumers of local made alcohol, 79.3% had its initiation at an early age of <25 years; and 51.75 had habit of consuming > 2 pegs of alcohol daily.

Tobacco produces cancer due to its property of chronic irritation. The irritation is mechanical as well as chemical due to presence of anthracin, phenanthracin and benzopyridin. Lime, besides its catalytic action, might be responsible for removing the protective mucus covering the oral mucosa, thus allowing the tobacco and alkaloids to come in close and intimate contact with it and produce its harmful effects. In support of this argument, low incidence of oral cancer in Afganistan, where chewing habit is common, is due to the non-incorporation of lime in tobacco quid.[4]

The habit often starts among young people, usually as a fashion, because of peer pressure, or to imitate parents. It is often used by adults engaged in such as drivers or merchants or other elementary workers, to cope with irregular meals, stress, or to stay awake during shift work and even to relieve toothache.[15]

Bidi smokers were at higher-risk of developing oral cancer compared to nonsmokers. This could be due to poor combustibility as well as nicotine and tar content which exceeds that of cigarette; and qualitative difference between bidi & cigarette smoking due to additional burning of dried temburni leaf. More over in India, bidi smoking is affordable to mass of population and so it is more common than cigarette smoking. The number of bidis smoked per day, a longer duration of smoking and a younger age at starting to smoke were associated with oral cancer.[4]

A multicenter case-control study[19]showed the association of tobacco (OR=2.3) and alcohol (OR=1.04) with the risk of oral cancer. Alcohol has been identified as a co-agent, most probably through a topical effect and by inhibiting folate absorption. Alcohol interferes with the correct transport and metabolism of folate, increasing the risk of cancer, since it alters the synthesis, repair and methylation of the DNA of oral epithelial squamous cells. Furthermore, acetaldehyde production from ethanol occurs in the oral cavity, possibly impeding the potential beneficial effects of folate.[17]

In our study, 72.1% of the cases were aware of cancer as outcome of tobacco/alcohol use, while 97.7% of the controls had such awareness which was statistically significant. Other studies[1,7]also had similar results and active awareness campaigns were advocated.

Strengths and limitations: This is one of the most thorough studies on the risk factors for oral cancer conducted in this region of the nation since all of the cases and controls. The results of this study can be utilized to create cohort studies that will help to clarify the relationship between different risk variables and lesions related to oral cancer. There could have been three types of bias: observer bias, recollection bias and Berkesonian bias. The results of this study cannot be generalized because it was conducted solely within a single hospital and all of the patients were from the Sonipat district.

Conclusion and Recommendations

The difference of occurrence of oral cancer in relation to marital status, family history of cancer, various habits like: passive smoking; usage of cigarette, bidi, hookah, smokeless tobacco products (types) and alcohol (types and amount) along with age of their initiation were statistically significant.

As addiction is a modifiable risk factor, we recommend tobacco cessation training should be made mandatory in education and training of health care professionals so that they can effectively implement tobacco cessation advice in their routine health care practice. Population-based preventive campaigns with the aim of reducing or eliminating tobacco and alcohol should be encouraged and implemented.

Ethical consideration:

Ethical clearance for the study was taken from the Institutional Ethics Committee of Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan vide IEC registration number: BPSGMCW/RC531/IEC/19 dated 21/12/2019.

Conflict of Interest: Nil

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Original Article

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Mobile App for Rating Health Care Facilities and to Report on Respectful Maternity Care in Public Sector Hospitals: A Pilot Study

Jayagowri Sastry[1], Papa Dasari[2], Mahalakshmy T[3], Kayathri Karthikeyan[4], Jane Fischer[5]

[1]Senior Research Fellow,,Global and Women's Health Unit, Division of Planetary Health, School of Public Health and Preventive Medicine, Monash University 553 St Kilda Rd, Melbourne Victoria, Jayagowri, [2]Professor, Dept of Obstetrics and Gynaecology, WCH Block, JIPMER Campus, Gorimedu, Puducherry, [3]Additional Professor, Dept of Preventive and Social Medicine, JISPH, JIPMER Campus, Gorimedu, Puducherry, [4]Field Investigator (Translator), Dept of Obstetrics and Gynaecology, WCH Block, JIPMER Campus, Gorimedu, Puducherry, [5]Finkel Professor, Co-Director, Global and Women's Health Unit, Division of Planetary Health, School of Public Health and Preventive Medicine, Monash University 553 St Kilda Rd, Melbourne Victoria.

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Abstract

Over the past two decades there has been a substantial reduction in maternal mortality World over due to various strategies adopted to reduce the same. One of the strategies was institutionalizing child birth and at present in India 85% of the births takes place in medical settings. This has led to overcrowding of health care facilities and disrespect and abuse (D&A) surfaced, making it necessary to preserve Respectful maternity care (RMC) which has become one of the integral part of maternal and child health programmes. The standards as categorised by Browser and Hill (2010) are cumbersome and require long hours to collect data to assess RMC. There is a need for simple methods of knowing D&A so that measures can be taken to correct and eliminate the same. We developed a simple App for assessing quality of health care facilities and reporting D&A and did a study to pilot test the App involving postpartum women and Birth companions. Overall the prevalence of D&A was 47% and the most common type was non-dignified care.

Key Words: Postpartum women, Birth companion, Disrespect and Abuse, Mobile App, Quality circle.

Introduction

Respectful maternity care (RMC) is a quality health care initiative undertaken globally to address disrespect and abuse faced by women especially during pregnancy and child birth. The prevalence of disrespect and abuse (D&A) is reported to be as high

Corresponding Author: Papa Dasari, Professor, Dept of Obstetrics and Gynaecology, WCH Block, JIPMER Campus, Gorimedu, Puducherry.

E-mail: dasaripapa@gmail.com

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as 97% in developing countries like Africa, Pakistan and India[1]**.** The literature shows that the prevalence of disrespect and abuse (D&A) during childbirth is high in public hospitals[1,2],[3]. Women suffer in silence and do not come forward to share their experiences of D&A with the care givers or the administrators because of fear of more abuse and denial of treatment. This is a major concern and challenge for Institutions to tackle, ***as per WHO if women experience D&A they may not come to health care facility and remain at home risking their lives and their new born lives***.

The current goal is to reduce 'Maternal Mortality Rate' (MMR) to less than 70 /100,000 live births by 2030 and neonatal mortality to 12/1000 and if D&A prevails it may not be possible to achieve the goal[4]. Hence there is a need to know the prevalence of D&A, develop simple mechanisms to report it and tackle the same so as to protect the reproductive rights of child bearing women and promote Respectful Maternity care (RMC).

The largest systematic review which evaluated the validated tools for measuring child birth experiences found 36 instruments but these are cumbersome and not simple though scientifically sound. They recommended that the researchers should adopt on the existing tools and improve up on them to fit in to their region and objectives of the research [5]. The aim of this publication is to describe the development and pilot testing of the mobile App to report D&A and to rate the health care facilities and to find out the prevalence and the type of D&A experienced by women in labour and immediate postpartum using Mobile App. This is a part of the project entitled "***Actions louder than words: development and evaluation of a curriculum for health professionals and a mobile phone app for intrapartum women to actualize respectful maternal care (RMC) in India*** 'SPARC (Project No. 862) IIT, Khargpur, India.

Methodology

Setting: The study was conducted at a tertiary care Institute, in India with infra-structure and facilities for practicing and promoting RMC and a consent form for birth companion participation is also available. The policy of birth companionship was officially introduced one year prior to the commencement of this study.

The approvals for undertaking the project were taken at the site of the study, i.e., JIPMER Jawaharlal Institute of Postgraduate and Medical Education and Research ,(Ethical approval-JIP/IEC/2019/340) a tertiary care Institute, South India and it was registered under ICMR (Approval: 2020-9548 /F1) as per the requirements to conduct the project. This was a mixed method study and had six primary and one secondary objective. The Participants were different for each Objective. The primary objectives were 1. To determine the proportion of women treated with Disrespect and Abuse and identify the type of disrespect and abuse experienced in the immediate postpartum period *among women who gave birth* at JIPMER's Women and Children Hospital (JWCH) based on the USAID-MCHIP (United States Agency for International Development-Maternal and Child Health Integrated Programme) scale. 2. To determine the proportion of women treated with Disrespect and Abuse and identify the type of disrespect and abuse as perceived *by the birth companions of women* who give birth at JIPMER's Women and Children Hospital (JWCH) based on the USAID-MCHIP scale. 3. To measure the Empathy Quotient (EQ) and self-esteem among second year and final year medical and nursing students interns, doctors and qualified nurses who are involved in care of women who give birth at JWCH.4. To identify the needs of staff managing the labor rooms for RMC.5. To explore the opinion of local obstetric and nursing care experts on the key elements to be included in the curriculum training and practice of health professionals to promote RMC.6. To develop and evaluate a curriculum on RMC for health professionals based on the above finding. ***The secondary objective was the development of mobile App (to help the women in labour to report D&A based on the prevalence of D&A and pilot testing of App by postpartum women and birth companions***. This was innovative as there was no such intervention provided to women during

child birth as per our literature search prior to 2019 when the project was planned and approved. This manuscript describes the development and results of pilot testing of this App.

Development of Mobile App:

Phase I of the study recruited 380 postpartum women and 30 birth companions. After taking written informed consent, D&A was assessed by the Questionnaire adopted from USAID-MCHIP[6] which had a binary response of "YES" or "No". Same participants rated D & A they perceived on a10 point rating scale (0 -No D &A and 10- severe D&A). Qualitative data was obtained immediately after filling the Questionnaire regarding their views about RMC to and suggestions to improve RMC. The types of D&A experienced, and their prevalence was analysed. RMC Standards I to VII were followed as per Browser and Hill [2] and the type of D&A was expressed as frequencies and percentages. There was high prevalence of D&A as per the questionnaire (USAID-MCHIP) and low prevalence as per the rating scale as reported in our earlier publication on assessment of D&A as per our first objective [7].

After identifying the gaps from Phase I (Quantitative and Qualitative analysis) a mobile App was developed with the help of a technical assistant in simple terms in an understandable way in English and Local language (Tamil) to assess the health care facilities and to report abuse and disrespect during and immediately after child birth. The first page of App has the format for choosing language and giving consent (Fig 1). The second page has components for rating services on a 5 point Likert scale.(Fig 2) The third page has categories of D&A in to 9 items for easy understanding and to avoid duplication of reporting (Fig 3).

Figure 1

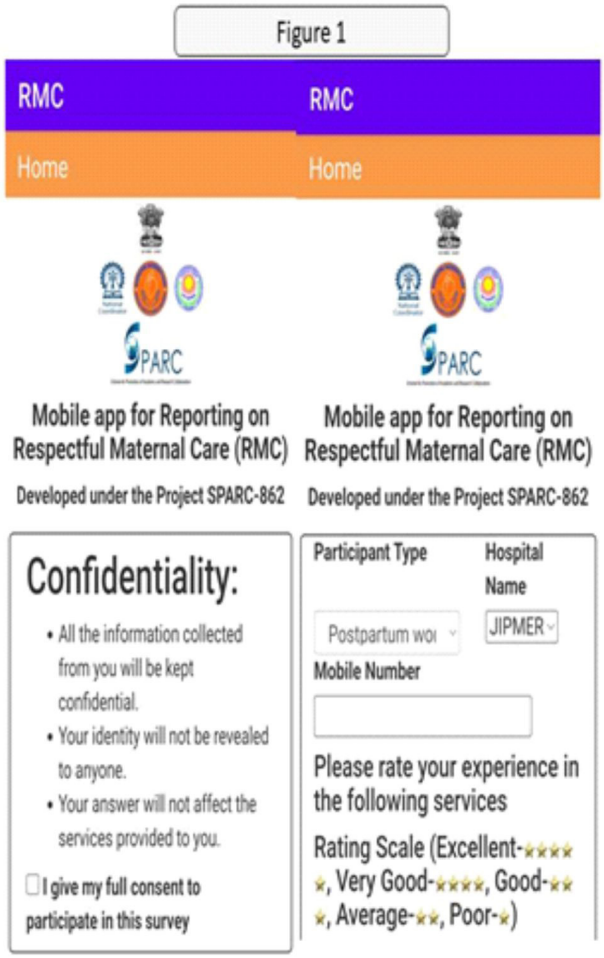
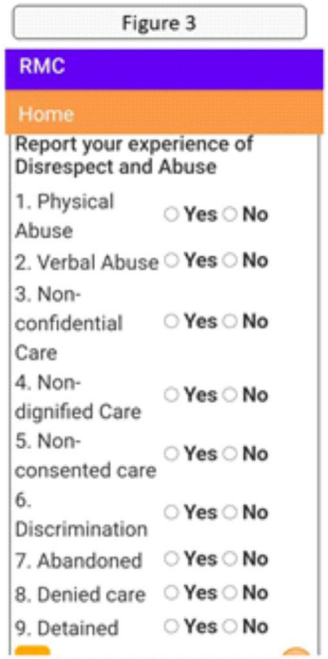


Figure 2



Figure 3



Study tool and data collection:

Pilot-testing of App: Thirty participants (10 -birth companions and 20 postpartum women) who had smart phone were recruited. Each participant was explained about the project as a whole and the need for pilot testing of the App (http://www.rmcsparc.com) and those who were willing to report were shown how to use the App independently and their doubts were cleared by the project assistant and the Indian investigators. Physical abuse and verbal abuse is self explanatory; Non confidential care was when they feel their health condition/record was disclosed to others who were not health care workers or not their relatives. They asked to choose non-dignified care when they were not examined with privacy, and birth companion was not allowed. Non consented care was to be chosen when they were not explained about the clinical examination or procedures like instrumental delivery, caesarean section etc., and prior to performing the same. Discriminated was easy to understand and they were asked to choose when they got the feeling that health care workers were not paying attention because of certain reasons like socioeconomic status, low education, caste , religion etc. Abandoned to be chosen when no health care worker comes to speak/ enquire /examine them. Denied care to be chosen when asked for support or medical care, the women did not get the same. Detained to be chosen when they request for discharge they were kept against their will. Each participant (30) was individually explained regarding the study and showed how to use the App. The data was accessed from cloud computing and was analysed. D&A was categorised as 9 types and interpreted as per 7 standards so as to enable us to compare with the data obtained by USAID_MCHIP Questionnaire in phase I. The results were expressed as frequencies and percentages.

Results

Total 26 participants (10 birth companions, 16 postpartum women) only used the App out of 30 who were recruited Seventy seven percent reported services during child birth to be excellent. Fifty percent reported pain relief and nutritional support as excellent. Less than 10 % reported them as poor (Table 1). Overall D&A was reported by 47% and the most common types of D&A were non-dignified care15.4% (verbal abuse, not allowing birth companion, no privacy: as per RMC standard) and non-confidential care 7.7% (Table 2). None of the participants found the App difficult to use.

Table 1: Rating of services by mobile App (N=26)

Rating Scale: 5 (Excellent; 4-Very good; 3- Good; 2- average 1- Poor

S. No	Description of services	5	4	3	2	1
		N (%)	N (%)	N (%)	N (%)	N (%)
1.	Services received during child birth	20 (76.9%)	4 (15.3%)	1 (3.8%)	1 (3.8%)	-
2	Cleanliness of Place of birth	17 (65.3%)	7 (26.9%)	1 (3.8%)	1 (3.8%)	-
3	Attitude/Behaviour of health care providers	17 (65.3%)	6 (23%)	3 (11.5%)	-	-
4	Emotional support	11 (42..3%)	12 4(6.1%)	3 (11.5%)	-	-
5	Nutritional support	13 (50%)	7(26.9%)	3 (11.5%	2 (7.7%)	1 (3.8%)
6	Pain relief	13 (50%)	10 (38.4%)	1	1	1

Table 2. Categories of D&A as per App Data

S. NO	Category of D&A (*)	Number (26)	Percentage
1	Physical Abuse (I)	1	3.8
2	Verbal abuse (IV)	1	3.8
3	Non –Confidential care(II)	2	7.7
4	Non--Dignified Care (IV)	2	7.7
5	Non-Consented Care (II)	1	3.8
6	Discriminated (V)	2	7.7
7	Abandoned (VI)	1	3.8
8	Denied Care (VI)	2	7.7
9	Detained (VII)	0	0

(*) – AS per categories of D&A (USAID_MCHIP)

Discussion

Respectful maternal care (RMC) is the right of every woman and this is to receive the highest attainable standard of health care, It includes the right to dignified, respectful health care at all health systems around the world for child bearing woman throughout her pregnancy, during labour, and delivery, and the postnatal period. (WHO 2014)[4]. In 2010, Bowser and Hill conducted an analysis with a global perspective and presented 7 categories for D&A including physical abuse, discrimination, non-consented clinical care, non-dignified care, non-confidential care, abandonment of care, and detention in health facilities[2]. Women hesitate to report any mistreatment and disrespect and fear it may affect their further care during the hospital stay and hence they suffer in silence. Innovation is necessary so that they may report the quality of services and type of D&A anonymously. WHO statement on "Respectful maternity care "recommends research in to the innovative approaches that need to be further developed and tested to integrate RMC into quality improvement initiatives.

Innovation in health care can be an idea, product, service or a care pathway that has clear benefits when compared to the current practice and it involves invention+adoption+diffusion[8]. The development of the mobile App for reporting disrespect and abuse as well as rating the health care facilities fulfils these criteria. Though Browser and Hill recommended measuring D&A as 7 categories we used physical abuse and Verbal abuse separately for clarity of reporting.

Mobile health surveys are becoming the standard in the current era of Digital Health. Face-to face surveys which were standard have taken back seat. Health care delivery and follow up is becoming easy in remote areas where patients are taught how to use technology in their language to communicate to health care workers or to major health facilities. Through mobile phones the surveys are: the use of short message service (SMS), interactive voice response (IVR), and computer-assisted telephone interviews (CATI) which are called mobile phone surveys (MPS). A systematic review of mobile phone surveys in Low income and middle income countries found CATI to be the commonest mode.[9]

With regards to maternal health there are 8 apps which addressed different health care aspects especially for LMICS, [10] viz 1. Gifted Mom (Pregnancy follow-up, breast feeding, Vaccination) 2. Zero mothers die (to curb maternal health inaccessibility) 3. May (for infertile couples), 4. Safe delivery (to health care workers to strengthen the quality of maternal Care), 5.MAMA (warning signs, health tips, reminders) 6. Mobile midwife (text and pre-recorded voice messages for midwifes and nurses, tracking the pregnant and women in labour) 7. Suyojana (mobile-based clinical-decision support system) for ANMs. .8. Safe Pregnancy and Birth (Staying healthy during pregnancy, danger signs during pregnancy, Danger signs during birth and danger signs after birth etc) for expectant mothers and health care providers.

In India a pilot study using telephone interviews in antenatal care improved dietary interventions significantly compared to the control group[11]. hAPPy Mamma app is another ground breaking innovation where in addition to providing the knowledge regarding pregnancy and child birth it also takes feedback and allows women to answer questionnaire provided by the app[12]. The feedback can be utilised to improve the health care services.

Regarding apps for assessing respectful maternity care, there are none. A phone tool to measure RMC by face- to- face interviews was developed by Amnesty E LeFevre and colleagues [13] with the aim of using such a tool in routine measurement of RMC in India. This tool is also complex and deviated from the categories put forth by Browser and Hill. The tool includes Questionnaire on as per Bohren and colleagues (1) physical abuse; (2) sexual abuse; (3) verbal abuse; (4) stigma and discrimination; (5) failure to meet professional standards of care; (6) poor rapport between women and providers; and (7) health system conditions and constraints and these are grouped in to 2 main groups.

The prevalence of D&A was 47 % as determined by using the App and this was the assessment both by postpartum women who suffered and birth companions who witnessed the same. This was less than the prevalence as assessed by Questionnaire (85%) and more than that perceived by rating scale (33.6%)[7]. The most common type of D & A was **non-dignified care as assessed by both methods (Questionnaire and App).** Categorising D &A in to 9 types may avoid over lapping of the results in reporting.

There are many tools for measuring women's experiences during child birth other than those described by Browser and Hill, which are very elaborate involving as many as 33 indicators[14,15] and these are time consuming.

Conclusion

The type of Disrespect and Abuse that was prevalent in the same health care facility as assessed by App was similar to that of the MCHIP Questionnaire. The prevalence differed (less than Questionnaire) most probably because of the minimum number of participants and this study report is only pilot testing.

This App is a simple and fast method to assess the health care facility and the presence of type of disrespect and abuse can be conveyed to the health care administrators sometimes in an anonymous way so that immediate corrective measures can be taken.

The key qualities of successful innovations are ease of usage and desirable to use and this App has both these key qualities.

Implications of the Research:

Reporting D &A is to be done on day today basis and the method of reporting should be simple, understandable and objective so as to implement measures to tackle the same and promote RMC at the health care facility. IEC activities on RMC can slowly curb D &A and this can be planned depending on the type of D&A prevalent at each facility. Clarity in reporting disrespect and abuse, facilitates the health care administrators and policy makers to undertake specific measures and actions.

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Ethical clearance: The approvals for undertaking the project were taken at the site of the study, i.e., JIPMER Jawaharlal Institute of Postgraduate and Medical Education and Research ,(Ethical approval-JIP/IEC/2019/340) a tertiary care Institute, South India and it was registered under ICMR

(Approval: 2020-9548 /F1) as per the requirements to conduct the project.

Conflict of interest: *The authors report that there are no competing interests to declare*

Data availability statement: Because of ethical considerations, de-identified data present can be provide on request

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Original Article

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Conventional Method of Dissection versus Identification of Rouviere's Sulcus and Cystic Lymph Node as Safety Landmarks in Laparoscopic Cholecystectomy: A Comparative Study

Jeevan Kumar[1], Darpan Bansal[2], Rachhpal Singh[3], Simranpreet Singh[4]

[1]Junior Resident, [2]Associate Professor, [3]Assistant Professor, [4]Junior Resident, Department of General Surgery, Sri Guru Ram Das Institute of Medical Sciences and Research, Sri Amritsar, Punjab, India.

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Abstract

Background: Laparoscopic Cholecystectomy (LC) is the Gold Standard procedure for symptomatic gallstones. With the development of laparoscopic procedure, surgical interest in the Rouviere's sulcus and cystic lymph node in relation to the right portal pedicle and prevention of bile duct injury has increased recently. This prospective study aimed at safety landmarks for avoiding Bile Duct Injuries during surgery and reducing the number of intraoperative and postoperative complications in laparoscopic cholecystectomy. The aim of the study is to compare the frequency of bile duct injury in conventional method of dissection versus the frequency of bile duct injury by delineating rouviere's sulcus and cystic lymph node as safety landmark in laparoscopic cholecystectomy.

Material and Method: A comparative study was conducted on 60 patients of cholelithiasis who underwent laparoscopic cholecystectomy at our institution in two-year period. All patients were evaluated in terms of clinical, biochemical, haematological and ultrasonographic parameters and randomised in two groups. Patients were allocated group A and B depending upon Ticket picked by them. Group A patient: Rouviere's sulcus and cystic lymph node was identified intraoperatively and an imaginary line (R4U) that passed from the sulcus across the base of segment 4 to the umbilical fissure drawn and cystic line is an imaginary line running through cystic lymph node and parallel to hepatoduodenal ligament was drawn and dissection superolateral to intersection of these lines along with achievement of CVS. Group B patients: Underwent conventional method of dissection (calot's Triangle dissection with critical view of safety achievement). Patients were followed up after 7 days and assessment was done.

Conclusion: The study concluded that before commencement of calot's triangle dissection identification of Rouviere's sulcus [RS] and cystic lymph node of lund is an extra biliary, easily accessible and reliable anatomical land mark from where we can draw two imaginary line [R4U and cystic line] and dissection start above and lateral to intersection of these line and no injury was observed and one bile duct injury was noted during convention method of dissection. So it can help us as an additional safe reference point to avoid bile duct injury and dissection in safe area close to gall bladder in laparoscopic cholecystectomy.

Keywords: Rouviere's sulcus, Calot's Triangle, cystic node, CVS, laparoscopic cholecystectomy, bile duct injury.

Corresponding Author: Darpan Bansal, Associate professor, Department of General Surgery, Sri Guru Ram Das Institute of Medical Sciences and Research, Sri Amritsar, Punjab, India.

E-mail: gargjeevan7@gmail.com

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Introduction

Gallstones are common with prevalences as high as 60% to 70% in American Indians and 10% to 15% in white adults of developed countries. Ethnic differences abound with a reduced frequency in black Americans and those from East Asia, while being rare in sub-Saharan Africa. Certain risk factors for gallstones are immutable: female gender, increasing age, and ethnicity/family (genetic traits). Others are modifiable: obesity, the metabolic syndrome, rapid weight loss, certain diseases (cirrhosis and Crohn disease), gallbladder stasis (from spinal cord injury or drugs, such as somatostatin), and lifestyle.[1] Laparoscopic Cholecystectomy is one of the most performed abdominal surgical procedures. By number of studies and research work it is stated that LC is superior to conventional open method because of its advantage like smaller incision, early recovery, less post operative pain and hospital stay and better cosmesis but it is still associated with higher incidence of bile duct injury when compared to open cholecystectomy. Nowadays it has been proven that misconstruction of biliary anatomy is responsible for 71–97% of bile duct injuries (BDI) cases.[2]

So, to decrease the incidence of biliary track injury, we should focus on the defects of the current techniques in the localisation of the cystic duct. The biliary track injury has been a subject for study throughout ages. The main cause of biliary track injury is misinterpretation of anatomy mistaking CBD for cystic duct.[3,4,5] The biliary tract injury is mainly due to anatomical Structural misidentification. Thus, the key solution to such problem should have an anatomical background. So, practicing laparoscopic cholecystectomy safely is based largely on careful delineation of the anatomy. Upon analysis of the new technical strategy of the laparoscopic cholecystectomy, three major overlapping changes could be observed:

- The first was the change of area of dissection by the introduction of the CVS that rapidly replaced the old infundibular approach technique.
- Intraoperative cholangiography
- Identification of extra biliary landmarks
  - Rouvier's sulcus identification
  - Cystic lymph node identification

CVS: The concept of CVS was first introduced by Strasberg in 1995. The Envisages before dividing the cystic duct and artery there structures should be clearly identified.

Three Components:

- Clearing the all fibrofatty tissue of hepatocystic triangle.
- Dissecting distal 1/3rd of the gall bladder from the cystic plate
- Identify that only two structures i.e. cystic duct and artery entering the gall bladder.

In about 90-95% of patients there are high chances to establish CVS identify the structure clearly and then divide, ensuring that the cholecystectomy is performed safely

Olsen cholangiocatheter[6] and endoscopically placed optical fiber in the common bile duct, but its disadvantages are to be invasive and increase operative time.[7-9] So it was not used in routine procedure.

Rouvier's sulcus: It is also described as Incisura Dextra of Gansv[10], by Reynaud et al.[11]and also by Stringer.[12] Rouvier's sulcus is 2–5 cm sulcus running to the right lobe of and right to the liver hilum, anterior to the caudate lobe. It was found in 80-90% of patients. Different types of rouvier's sulcus (open type, closed type , slit type, scar type) are found intraoperatively.

Cystic lymph node: Another useful anatomic landmark for leading gallbladder dissection is the "Mascagni's node" or "cystic lymph node," which should represent the medial end for dissection, lying lateral to the biliary tree.[13]

Materials and Methods

Study design: The present study was a prospective comparative Study. Study Area: The study was conducted in the Department of General Surgery at a Sri Guru Ram Das Institute of Medical Sciences and Research Amritsar, Punjab from 01 January 2023to 31st March 2024. Patients from either sex with no age limit presenting with symptomatic cholelithiasis was taken in the study after an informed consent. The study was conducted after approval from institutional thesis ethical committee. (24/06/2023,ref. no.SGRDU/Cont/Thesis/23-329)

Inclusion Criteria: Patients with symptomatic cholelithiasis who underwent elective laparoscopic cholecystectomy.

Exclusion Criteria: Diagnosed cases of hepatobiliary malignancies, those with previous laparotomy or laparoscopic surgeries were also excluded, patient with history of chronic liver disease.

Procedure: A comparative study was done on 60 patients of cholelithiasis who underwent LC at our institution in two year period. All patients were evaluated in terms of clinical, biochemical, haematological and ultrasonographic parameters and was randomised in two groups. Patient were allocated group A and B depending upon Ticket picked by them. During laparoscopic cholecystectomy standard four port technique was used. Group A patient: Rouviere'ssulcus and cystic lymph node was identified intraoperatively and an imaginary line (R4U) that passed from the sulcus across the base of segment 4 to the umblical fissure was drawn and cystic line is an imaginary line running through cystic lymph node and parallel to hepatoduodenal ligament was drawn. Dissection lateral to intersection of these imaginary lines along with achievement of CVS mark the safe zone of dissection to prevent bile duct injury. Group B patients: Underwent conventional method of dissection (calot's Triangle dissection). Cystic duct and cystic artery were ligated carefully. The outcome was evaluated in all patients in terms of presence or absences of bile duct injury. Drain was inserted in liver bed and was removed post operatively depending upon drain output. Patients were followed up after 7 days and assessment was done. The data was collected and analyzed using appropriate statistical method and conclusion was drawn.

Results

Table 1: Table showing association of group A and group B study subjects with age group.

Age group	Group A		Group B	
	No.	%age	No.	%age
<20	1	3.333	1	3.333
21-30	7	23.333	8	26.667
31-40	9	30.000	8	26.667
41-50	6	20.000	4	13.333
51-60	1	3.333	5	16.667
61-70	4	13.333	1	3.333
>70	2	6.667	3	10.000
Total	30	100.000	30	100.000
Mean age	42.067±16.273		42.300±17.998	
p-value	0.958			

Table 2. Table showing association of group A and group B study subjects with gender.

Gender	Group A		Group B	
	No.	%age	No.	%age
F	26	86.667	28	93.333
M	4	13.333	2	6.667
Total	30	100.000	30	100.000
p-value	X^2: 0.741; p=0.389			

Table 3. Table showing association of group A and group B study subjects with post operative complications/ bile duct injury.

Post operative complications	Group A		Group B	
	No.	%age	No.	%age
1.0	0	0.000	1	3.333
3.0	30	100.000	29	96.667
Total	30	100.000	30	100.000
p-value	X^2: 1.017; p=0.313			

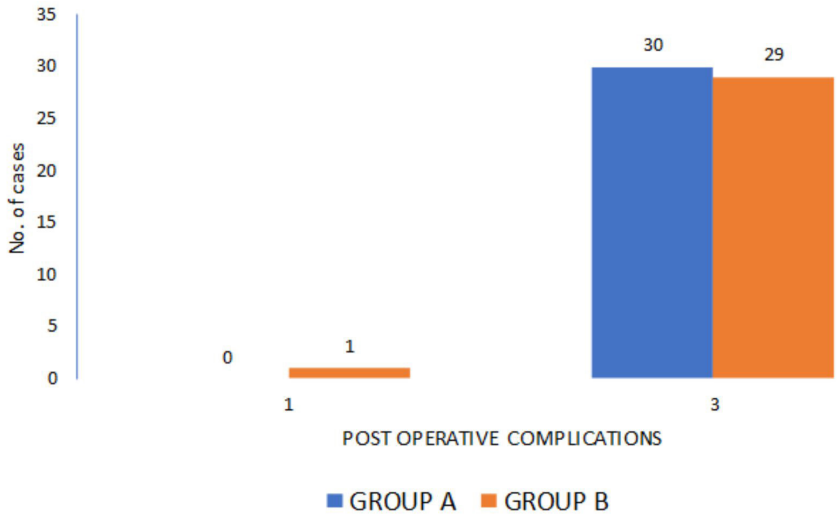


Figure 1: Distribution of study subjects according to post operative complications.

Table 1 shows that Out of total 30 patients in group A, 1 were under the age of 20 years, 16 were in age group of 20-40 years, 7 were in age group of 40-60 years and 6 were in the age group of more than 60 years while in case of group B, there were 1 patient in less than 20 years, 16 were in the age group of 20 -40 years, 9 were in age group of 40-60 years and 4 were in more than 60 years age group. The mean age of group a patients was 42.067±16.273 while that of group B patients was 42.300±17.998. The difference was not statistically significant. Table 2 shows that 86.66% females and 13.33% males were present in group A while 93.33% females and 6.66% males were present in group B. The difference was statistically insignificant. Table 3 shows that in group A patients no post operative complication/ bile duct injury was seen whereas in group B patients only 1 patient had post operative complications. The difference was statistically insignificant.

Discussion

In our study, we present our experience of comparison between 60 cases of laparoscopic cholecystectomy. Study sample were divided into two groups. In group A (30) patients, we drew two imaginary lines intraoperatively i.e. R4U line (passes from rouvier's sulcus -the base of segment IV - umbilical fissure) and cystic line (start from the cystic lymph node and running parallel to hepatoduodenal ligament). Dissection superior to R4U line, lateral to cystic line and superolateral to this intersection of R4U and cystic line with the achievement of CVS and Calot triangle dissection define the safe area of dissection to prevent bile duct injury. In Group B (30) patients we used traditional method of laparoscopic cholecystectomy i.e. Calot's triangle dissection with Critical View of Safety achievement without using any extra biliary landmarks. Outcomes have been compared in terms of number of injuries encountered in group A (identification of Rouviere's sulcus and cystic lymph node as extra biliary safety landmarks) versus Group B (dissection of Calot's triangle with achievement of critical view of safety).

In our study according to the age distribution maximum study subjects belonged to fourth decade. Kumar et al.[14] also conducted a similar study in

2020 and he also concluded that maximum study subject belongs to fourth decade. Sharma et al.[15] was conducted a similar study in 2023 and he also concluded that maximum patients present in fourth decade of life.

According to gender wise distribution of study subjects, our study showed that more number females undergo laparoscopic cholecystectomy. Similar female predominance was present in study conducted by Kumar et al.[14] in 2020. Sharma et al.[15] also conducted a same study in 2023 where he also concluded female predominance in study subjects.

Outcome comparison:

- Group A patients – out of 30 patients no bile duct injury seen.
- Group B- 1 patient had bile duct injury out of 30 patients.

Sharma et al.[15] also conducted a similar study in 2023 he also concluded that rouvier's sulcus and cystic lymph node are extra biliary safety landmark and give a better understanding of major bile duct area and help in prevention of bile duct injury. Abdelmonem et al.[16], conducted a similar study on 250 patients in 2023 and he concluded that more than one safety landmarks like rouvier's sulcus and cystic lymph node help in safeguarding of major bile duct and prevent from any post operative complication. Pathak et al.[17] in 2023 conducted a similar study on 500 patients and he observed that rouvier's sulcus was present in 465 cases no bile duct injury was seen after dissection start from rouvier's sulcus as fixed extra biliary safety landmark along with cvs achievement and he concluded that rouvier's sulcus is safety landmark in laparoscopic cholecystectomy to decrease the incidence of biliary track injury. Similar study conducted by Greene et al.[18], Gupta et al.[19] ,Bajpayee et al.[20] and Baukala et al.[21] showed that rouvier sulcus and cystic lymph node is important landmark during dissection in LC.

Conclusion

Apart from the well-established calot's triangle dissection with CVS achievement major bile duct injury was still 0.3-0.5% and it was commonly happened because of misidentification of cystic duct [either aberrant origin or normal course of cystic duct]. Before commencement of calot's triangle dissection identification of Rouviere's sulcus [RS] and cystic lymph node of lund is an extra biliary, easily accessible and reliable anatomical land mark from where we can draw two imaginary line [R4U and cystic line] and dissection start above and lateral to intersection of these line and no injury was observed in our study. So it can be help us as an additional safe reference point to avoid bile duct injury and dissection in safe area close to gall bladder in laparoscopic cholecystectomy

Adoption of extra biliary safety landmark technique help in reducing the incidence of bile duct injury. Benefits of decrease bile duct injuries:

- Early return to normal daily activities and increase quality of life.
- Lowering healthcare costs and significant cost saving for the patient. .
- No need of any secondary procedure (ERCP stenting, hepaticojejunostomy, CBD exploration) which is associated with bile duct injury.
- Decrease morbidity and mortality associated with bile duct injury.

Limitation:

Being a single-Centre and single surgeon study, it limits the number of patients included in study however, it's the first study to include both imaginary lines [R4U line and cystic line] and its intersection and superolateral plane of dissection as extra biliary safety landmarks of dissection before commencement of calot's triangle dissection. Because of small study sample size, the results of our study were insignificant [$p>0.05$], but no bile duct injury was observed when we use some extra biliary landmarks and safe zone of dissection after intersection of imaginary line in comparison to traditional method of dissection [calot's triangle dissection with CVS achievement].

Ethical Clearance: The study was conducted after approval from institutional thesis ethical committee. (24/06/2023, ref. no.SGRDU/Cont/Thesis/23-329)

Conflict of interest: There is no conflicts of interest.

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Original Article

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Medication Adherence among Patients with Non Communicable Diseases in a Rural Primary Health Centre in Tamil Nadu, A Cross Sectional Study

Jeevapriya Ravi[1], Parameswary Ramamoorthy[2]

[1]Tutor, Department of Community Medicine, Government Thiruvarur Medical College, [2]Assistant Professor, Department of Community Medicine, Government Thiruvarur Medical College.

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Abstract

Background: Non communicable diseases has become the leading cause of mortality accounting to 63% in India. Poor control status of the patients is the key contributor of the rising morbidity and mortality due to non communicable diseases. Out of several factors contributing to the poor control status, medication non adherence is the most common and modifiable cause of inadequate control of NCDs.

Objectives: 1. To estimate the prevalence of medication adherence among NCD patients registered in NCD clinics of four primary health centres in rural area of Thiruvarur, Tamil Nadu, 2. To determine the factors associated with medication non adherence.

Methodology: This Analytical Cross sectional study was conducted on 235 Diabetic and/or Hypertensive patients who were enrolled by Simple random sampling method. Medication adherence was assessed using Morisky Medication Adherence Scale (MMAS – 8). The data collected was entered in Microsoft excel and analyzed using SPSS 21.0 software. Results are expressed in mean, proportions and Odds ratio appropriately.

Conclusion: This study reported that poor adherence to medications was noted in more than half (57.6%) of the study population. It shows the importance of periodic counseling sessions to the patients undergoing treatment to reinforce the importance of strict adherence to treatment.

Keywords: Medication adherence, MMAS-8, Non communicable diseases.

Introduction

Non communicable diseases are a group of diseases which affect a person for a prolonged period of time increasing the morbidity and at the same time has a negative impact on the socioeconomic development of the nation. The 2030 Agenda for Sustainable Development recognizes NCDs as a major challenge for sustainable development. So one of the targets taken is to reduce by one third; premature mortality from NCDs through prevention and treatment by 2030(SDG target 3.4)[1].

Corresponding Author: Jeevapriya Ravi, Tutor, Department of Community Medicine, Government Thiruvarur Medical College.

E-mail: dr.mrjeevapriya@gmail.com

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In India, the disease pattern is changing rapidly with increasing burden of non communicable diseases due to epidemiologic transition[2].Non communicable diseases has become the leading cause of mortality accounting to 63% in India[3]. Poor control status of the patients is the key contributor of the rising morbidity and mortality due to non communicable diseases. Out of several factors contributing to the poor control status, medication non adherence is the most common and modifiable cause of inadequate control of NCDs[4].

Treatment adherence has been defined by the WHO as "the extent to which a person's behavior — taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider." Poor medication adherence can result in increased risk of complications resulting in increased out of pocket expenditure due to emergency visits to the outpatient department and also hospitalization due to the uncontrolled status[4]. It is better if the adherence to treatment has been reinforced to the patients at the primary health care level itself before any complications develop. Hence this study is done to assess the medication adherence among NCD patients registered in NCD clinics of primary health centres in a rural area in Tamil Nadu.

Objectives:

1. To estimate the prevalence of medication adherence among NCD patients registered in NCD clinics of four primary health centres in rural area of Thiruvarur, Tamil Nadu
2. To determine the factors associated with medication non adherence.

Materials and Methods

Study design and Setting:

This Analytical Cross sectional study was conducted on the patients with Diabetes and / or Hypertension registered in NCD clinics in a Primary Health Centre in Thiruvarur district. Out of 50 primary health centres in Thiruvarur Health Unit District, one PHC was chosen by Simple random sampling.

Study Population:

For an expected prevalence (p) of medication non adherence of 32.7% in NCDs from previous studies[4], the Sample size was calculated as 235. Data was collected from 235 Diabetic and/or Hypertensive patients who were enrolled by Simple random sampling method using Diabetic and / Hypertensive patients registered in NCD clinic of that PHC between the months of February and April 2023 as the sampling frame. Those who had Non communicable diseases other than Diabetes and Hypertension and those who are visitors to the PHC to get drugs but not registered in the NCD clinic were excluded from the study.

Ethics approval:

Institutional Ethics Committee (IEC) of Government Thiruvarur Medical College has approved the study (EC/NEW/INST/2023/TN/0296). Participants were explained about the purpose of the study and informed written consent was obtained from the participants.

Data collection:

After obtaining consent, pretested semi-structured questionnaire was administered and data was collected from the participants who fulfilled the inclusion criteria. Medication adherence was assessed using Morisky Medication Adherence Scale (MMAS – 8) and responses were recorded.

The questionnaire had two sections as following:

Section 1: This section deals with socio demographic factors. This includes age, sex, education, occupation, Living arrangements, Tobacco and alcohol usage. Also the information regarding the NCD diagnosis, duration since diagnosis and treatment regimen were included in this section.

Section 2: Medication adherence in the study participants was assessed using Morisky Medication Adherence Scale (MMAS – 8). MMAS-8 is validated in India and other parts of world in different languages with reliability value (α) of 0.83.

MMAS – 8 score ranges from 0 to 8 where score < 6 indicates low adherence, moderate adherence is defined as scores from 6 to less than 8 and good adherence is defined as MMAS – 8 score of 8.

Operational definitions and study variables:

Adherence to medication: Low adherence is defined as MMAS – 8 score < 6, moderate adherence is defined as scores from 6 to less than 8 and good adherence is defined as MMAS – 8 score of 8.

Duration of disease: Maximum duration since the patient is diagnosed with a non communicable

disease. For example, if the patient has diabetes since two years and hypertension since one year, the duration of disease would be two years.

Dosage regimen: Patients dosage is considered Once Daily, Twice Daily or Thrice Daily if he/she is consuming at least one drug once in a day, two times a day or three times a day respectively.

Number of drugs: Total number of different drugs which the patients consume in a day which are prescribed by the doctor.

Statistical analysis:

The data collected was entered in Microsoft excel and analyzed using SPSS 21.0 software. Magnitude of medication adherence was given as % and estimates given as 95% CI. Continuous variables were represented as Mean with Standard deviation and Categorical variables were represented as proportions. Association of medication non adherence and factors influencing it was analyzed using multiple logistic regression.

Results

Table 1: Socio demographic factors in the study population:

Variable	Frequency (n)	Percentage (%)
Age group (In years)		
31 - 40	12	4.7%
41 - 50	66	28.1%
51 – 60	76	32.3%
> 60 years	81	34.5%
Gender		
Male	124	52.8%
Female	111	47.2%
Education		
No formal education	67	28.5%
Primary school	58	24.7%
Middle school	56	23.8%
High school	43	18.3%
Degree holder	11	4.7%
Occupation		
Employed	75	31.9%
Retired	26	11.1%
Unemployed	134	57%
Family arrangement		
Lives with spouse / Children	205	87.2%
Lives with relatives	20	8.5%
Lives alone	9	3.8%
Lives with parents	1	0.4%
Smoking status		
Current smoker	16	6.8%
Former smoker	50	21.3%
Non smoker	169	71.9%
Alcohol consumption		
Current alcoholic	19	8.1%
Former alcoholic	57	24.3%
Non alcoholic	159	67.7%

Table 1 shows that around one third of the study population is elderly population (> 60 years). Around 28.5% of the study population had no formal education where as 4.7% of the study population is degree holders. Majority of the study population lives with spouse / children (87.2%). Around two third of the study population are non smoker (71.9%) and non alcoholic (67.7%).

Table 2: NCD status and treatment of the study subjects

Variable	Frequency (n)	Percentage (%)
NCD Diagnosed		
Hypertension only	84	35.7%
Diabetes only	53	22.6%
Both Diabetes and Hypertension	98	41.7%
Duration of NCD		
< 1 year	39	16.6%
1 – 3 years	74	31.5%
3 – 5 years	57	24.3%
> 5 years	65	27.7%
Number of drugs		
1 - 2	104	44.3%
3 - 4	99	42.1%
5 or > 5	32	13.6%
Treatment regimen		
OD	19	8.1%
BD	191	81.3%
TDS	25	10.6%
Adherence to treatment		
Good adherence	46	19.6%
Moderate adherence	53	22.6%
Low adherence	136	57.9%

Table 2 shows NCD status of the study subject and the treatment patterns. Around 41.7% of the study population has both Diabetes and Hypertension. Around one fourth (27.7%) of the study population had NCD for more than 5 years. Around 44.3% of the study population consumes 1 – 2 drugs. Around one fifth of the study population (19.6%) has good adherence to treatment.

Table 3: Association between various independent variables and decreased adherence in the study population based on bivariate analysis

S no	Study variable	Crude OR (95% CI)	p value
1	Age group (n)		
	< 60 years	Reference	0.003
	> 60 years	1.90 (1.25 – 2.90)	
2	Gender		
	Male	Reference	0.02
	Female	1.53 (1.06 – 2.19)	

Continue.....

3	Education status No formal education and Primary education Above primary education	 Reference 0.59 (0.40 – 0.88)	**0.01**
4	Occupation Currently employed Currently unemployed (Including retired)	 Reference 1.46 (1.06 – 2.00)	**0.01**
5	Family arrangement Living with other people Lives alone	 Reference 3.50 (0.72 – 16.84)	0.11
6	Comorbidity Single co morbidity Multiple co morbidity	 Reference 1.39 (0.93 – 2.07)	0.10
7	Duration of treatment for NCDs < 5 years > 5 years	 Reference 2.59 (1.58 – 4.23)	< 0.001
8	Number of drugs consumed/ day < 5 5 or > 5	 Reference 2.55 (1.18 – 5.52)	0.01
9	Treatment regimen Once daily More than once daily	 Reference 1.62 (1.22 – 2.14)	0.001

Table 4: Association between various independent variables and decreased adherence in the study population based on multivariate analysis

S no	Study variable	Crude OR (95% CI)	p value
1	Age group (n) < 60 years > 60 years	 Reference 0.83 (0.43 – 1.60)	0.59
2	Gender Male Female	 Reference 1.38 (0.73 – 2.62)	0.31

Continue.....

3	Education status No formal education and Primary education Above primary education	 Reference 0.16 (0.09 – 0.30)	**< 0.001**
4	Occupation Currently employed Currently unemployed (Including retired)	 Reference 0.90 (0.49 – 1.64)	0.73
5	Duration of treatment for NCDs < 5 years > 5 years	 Reference 2.08 (1.07 – 4.04)	**0.03**
6	Number of drugs consumed/ day < 5 5 or > 5	 Reference 1.72 (0.66 – 4.48)	0.26
7	Treatment regimen Once daily More than once daily	 Reference 2.77 (1.40 – 5.46)	0.003

Table 3 shows that increasing age, Female gender, Education lesser than primary education, those who are currently employed, Duration of NCDs more than 5 years, those who consume more than 5 drugs, those who takes drugs more than once daily are at higher odds of having poor drug adherence. All the variables with significant association are subjected to multivariate analysis and the results are tabulated in Table 4.

It is shown that those who have attained education above Primary level have decreased risk of developing poor adherence. Those who have taken treatment for more than 5 years have 2.08 times increased risk of having poor adherence. Those who takes drugs for more than once daily have 2.77 times increased risk of having poor adherence.

Discussion

Our study conducted among patients of Diabetes and/or Hypertension conducted in a Primary Health Centre in Thiruvarur shows that poor adherence to treatment is noted in 57.6% of the study participants. Those with educational status below primary education, On treatment for NCD for more than 5 years and those who are taking drugs more than once a day have a significant association with low drug adherence and are found to be independent predictors.

In a similar facility based cross sectional study conducted by Yuvaraj et al using MMAS – 4, the prevalence of poor drug adherence was found to be 32.7%[4]. Elderly individuals and Female gender were significantly associated were poor drug adherence[4].

In a similar study conducted by Sridhar D et al in a similar primary care setting (using MMAS – 8) low adherence to medication was only 14.3%[5]. Those who have consumed more than two and four classes of drugs and those with only Hypertension are independently associated with lower drug adherence[5].

Another study conducted in a rural area of Tamil Nadu by M.Vijayakarthikeyan et al shown that the medication adherence was 64.2% but it was a community based study and the study was done only on diabetic individuals. The reasons for the

poor adherence were identified as increased cost of treatment, Side effects of the drugs, Multiple drugs, Reliance on alternative forms of treatment and lack of proper knowledge[6].

A mixed methods study conducted in rural West Bengal (using Medication Compliance Questionnaire) showed that 39.4% of the study participants were non adherent to the NCD medications. Predictors which were significantly associated with non adherence were Increasing age, Female gender, Lower Socio economic status, Decreasing patient empowerment and Decreased trust in the medical profession. New barriers identified were Economic crisis, Fear of contagion and Non availability of investigation facilities[7].

Jeyalakshmi et al in their study conducted among the elderly population with co existing Hypertension and Type 2 Diabetes mellitus observed that 55.6% of the elderly individuals were poorly adhering to the medications. Education and Knowledge, Number of illnesses and impairments were found to be the significant predictors[8].

A study conducted by Marina Andavar et al in a tertiary care hospital using MARS – 5 scale to assess medication adherence showed that the prevalence of poor drug adherence was 40% but interestingly after effective patient counseling, the adherence has improved and the poor adherence rate has dropped down to 13.3% suggesting the importance of empowering the patients about the importance of being compliant to the treatment[9].

A Systematic review on Interventions to promote medication adherence to Chronic diseases in India showed Education of the patient regarding drug adherence by Pharmacists and Community Health Workers along with regular follow up were the promising interventions to improve the adherence[10].

Usage of a scale which is pretested and validated improves the internal validity of the study. However this study also has got few limitations. The cross sectional nature of the study does not prove the causal association of the predictors with poor drug adherence. Also this study when replicated in a community setting might yield different results compared to a single facility.

Conclusion

This study reported that poor adherence to medications was noted in more than half (57.6%) of the study population and lower educational status, longer duration of treatment and frequent dosing regimens in a day are observed to decrease the compliance to treatment. It shows the importance of periodic counseling sessions to the patients undergoing treatment to reinforce the importance of strict adherence to treatment

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Original Article

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Cross Sectional Study on Academic and Health Impact of Social Media Usage in Medical Students of Hyderabad Telangana

K Srinivasulu[1], Meka Sahasra Reddy[2], Bhamidipati Janaki[3], Tirandas Tejaswini[4], Kunche Sowjanya[5]

[1]Professor & HOD Department of Forensic Medicine & Toxicology Malla Reddy Institute Of Medical Sciences, Suraram, Hyderabad, Telangana, [2-5]3rd MBBS, Malla Reddy Institute of Medical Sciences, Suraram, Hyderabad, Telangana.

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Abstract

Social media is a way of electronic communication through which people share their ideas, knowledge and information. Social media users are increasing worldwide. Medical students are also extensively using various social media platforms for academic and non academic purposes. A cross sectional study on impact of social media in academics of medical students of Hyderabad, Telangana was conducted in a medical college of Hyderabad. 200 Medical students participated in the study. Socio demographic and academic details including their usage of social media was collected in the form a pre structured questionnaire, the information obtained from each participant was taken in to MS excel sheet and the data was analyzed with SPSS software. Study results reveal majority of students are using social media for fun and entertainment and academic usage is very minimal. Students are spending more hours at late night causing ill effects to their physical and mental health. We also found social media hampering their effective study hours. Students are frequently absent to classes, distraction in the class room and poor performance in their academics was observed among extensive users in the study group. Males are predominant among extensive users and academic impact also observed more in male participants. Students from highly educated and financially sound families are extensive users of social media. Similar results were found in other studies.

Key words: Social media, Medical students.

Introduction

Social media is a digital technology that allows the sharing of ideas, knowledge and information which include text and visuals with various communities through virtual network. More than 3.48 billion people around the world use social media. In India 310 million people approximately 23% of Indian population using social media[1]. Social media is often referred to as a lifeline for socializing among youth.

Corresponding Author: K Srinivasulu, Professor HOD. Department of Forensic Medicine & Toxicology, Malla Reddy Institute of Medical Sciences Suraram, Hyderabad, Telangana.

E-mail: drksrinivas1968@gmail.com

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The most commonly used social media platforms are Facebook, YouTube, WhatsApp, Instagram, Telegram, Snap chat and LinkedIn. Social media started out as a way to interact with people through network. Social media also used as a platform to share their knowledge, information and talents in virtual world.

Social media users are classified[2] based on the role played and the level of involvement as listeners, activists, spammers, social butterflies, trolls, influencers, and early adopters. Social media enhances medical education by facilitating medical students to acquire information on diseases, treatment and research. Students can have access to academic lectures, virtual CME's and conferences through social media. It enhances competitive spirit among medical students by participation in various quiz and academic activities.

Sedentary behavior particularly sitting long time increases the risk of cardiovascular disease, type 2 diabetes, obesity and poorer mental health status. Study on impact of increasing social media use on sitting time and body mass index[3] shows the rise in social media use may have a negative impact on health.

Social Media Role and Its Impact on Public Health: A Narrative Review by Sushim Kanchan[4], study result showed that social media promotes various health promotion like awareness of menstrual hygiene, breastfeeding techniques and adherence, self-perception and promotion of oral health, significant use of antibiotics, consistency with exercise, sexual health promotion, road safety awareness, smoking cessation, adverse drug reaction etc.

Social media is a double edged sword, it has to be used carefully and ethically any amount of misuse attract legal penalty. According to information technology act 2000, Section 66(a) any offence which is committed via social media to hurt or cause injury to others attract punishment 3 years of imprisonment. Section 69(a) says that the government has all rights to stop or ban the public access to information which is inconsistent with provision to the government.

The aim of the study is to explain social media impact on medical students with objectives to know the various social media platforms used and to assess their academic performance among male and female medical students. This study will be use fulto identify the reasons of its misuse and helps to take various preventive measures.

Material and Methods

A cross sectional and prospective study on impact of social media on academics of medical students of Hyderabad, Telangana was conducted in a medical college of Hyderabad. Study was conducted among medical students of 1st year MBBS to final year MBBS, from 1st October 2023 to 31st March 2024 for a period of six months. A total of 200 Medical students, 100 male and 100 female medical students participated in the study. An informed consent was obtained from each participant before commencement of the study and the names were kept anonymous. Students who are using various social media platforms and willing to participate in the study were included, non users and unwilling to participate in the study are excluded.

The following details regarding social, demographic, academics and their usage of social media were collected in the form of a pre structured questionnaire.

1. Gender (Male/ female). Residence; (Day scholar/hostler). Locality: (Urban / Rural)
2. Personnel habits: (Smoking/ Alcohol/ Substance abuse/ Nil)
3. Year of study of MBBS: (1st yr/ 2ndyr/ 3rd part-1/ 3rd part-2)
4. Education background of parents (up to SSC / Intermediate/ degree/ professional)
5. Occupation – Father (self employed/ government employee/agriculture)
    a. Mother (Homemaker/ Government employee/ Private employee)
6. Family income: (High/ Moderate/ low (Modified Kuppuswamy classification)
7. Siblings: Education (Up to SSC / Intermediate / degree / PG or Professional) and
    a. Social media usage: (extensive user>8 hrs / moderate user>4 hrs /isolator <2hrs)
8. Time spent on social media (Number of hours) and preferable time of the day using social Media (Morning / Afternoon / evening / Night)

9. Most commonly used social media platforms(Face book/ YouTube/ WhatsApp/ Instagram/ Telegram/ Snap chat/ LinkedIn)
10. Type of content commonly referred (academic/non academic) and do you use social media For (Knowledge & Information/ Financial gain/ Entertainment/ Chatting).
11. Academic impact: Attendance: (excellent->90% / good >75% /poor <75%).
12. Concentration in the class: (excellent/ moderate/poor).
13. Performance in last attended exam: (excellent >70% / Good 60-70% / Average 50-60%/ Below average <50%) and effect on reading: (Yes/ No).
14. Impact of social media on physical health: (Sleep disturbance / Obesity/ any other.
15. Impact of social media on mental health: (Stress/ anxiety/ depression/ addiction/ any other mental disorder.
16. How do you interact with people: (Direct interaction in person/ through social media)
17. Whom do you interact with people on social media: (Friend/ Family members/ stranger)
18. Social media impact on your social life: (Yes/ No)
19. Is your family aware of your social media usage: (Yes/ No)

The collected data was taken into an MS excel sheet and statistically analyzed with SPSS software.

Results

A cross sectional study on impact of social media on academics of medical students of Hyderabad, Telangana was conducted among medical students of Hyderabad Telangana, 200 Medical students were participated in the study in which 100 males and 100 females. The following results were found in our study.

Table 1: Showing the socio demographic, social media usage and academic details.

S No	Variable	Results	S No	Variable	Results
1	Residing at	Day scholer-75% Hostler – 25%	12	Time spent on social media	Up to 1 hr – 4.5% 2-4hr – 47% 4-8hrs – 35.5% >8hrs – 12.5%
2	Personal Habits	Smoking – 2% Alcohol – 4% Both – 5.5% Nil – 88.5%	13	Time of the day on social media	Morning – 0.5% Afternoon – 4% Evening – 39% Night – 26.5% Multiple time – 30%
3	Year of Study	1st MBBS – 25% 2nd MBBS – 26.5% 3rd MBBS – 25% 4th MBBS – 23.5%	14	Type of content commonly referred	Academic – 13.5% Non Academic – 86.5%
4	Education of Father	Up to SSC – 8% Intermediate 10.5% Degree – 33.5% Professional – 47% Uneducated – 1%	15	Academic attendance	Good- 86% Poor - 14%

Continue.....

5	Education of Mother	Up to SSC – 15.5% Intermediate – 8.5% Degree – 36.5% Professional – 37% Uneducated – 2.5%	16	Concentration in class	Good – 83% Poor – 17%
6	Occupation of Father	Self employed -72.5% Government employee – 21% Private / Agriculture – 6.5%	17	Effect on reading	Yes – 70% No – 30 %
7	Occupation of Mother	Homemaker – 60.5% Government employee –15% Other – 24.5%	18	Impact on physical health	Sleep disturbance – 49.5% Obesity – 6.5%
9	Family Income	High – 24% Moderate – 70.5% Low – 5.5%	19	How do you interact with people	Direct – 56.5% Social media – 43.5%
10	Whom do you interact in social media	Friends – 52% Family – 2.5% Strangers – 2 % Multiple – 43.5%	20	Impact on social life	Yes – 52.5% N0 – 47.5%
11	Sibling education	Up to ssc – 8.5% Intermediate – 17.5% Degree – 39.5% Professsional-23% No siblings-11.5%	21	Do your family aware of your social media sage	Yes – 92% No – 8%

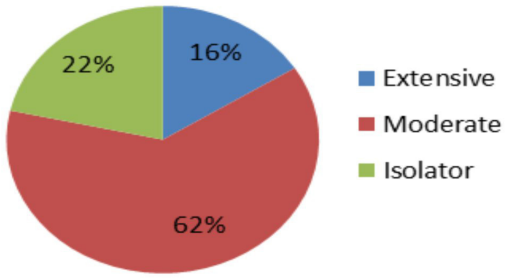


Figure 1: Showing details of social media usage in the study group.

Moderate users (2 – 8 hrs in a day) are 62% in the study population, extensive users (> 8 hrs in a day) are 16% and Isolators (<2 hrs in a day) are 22% in the study group.

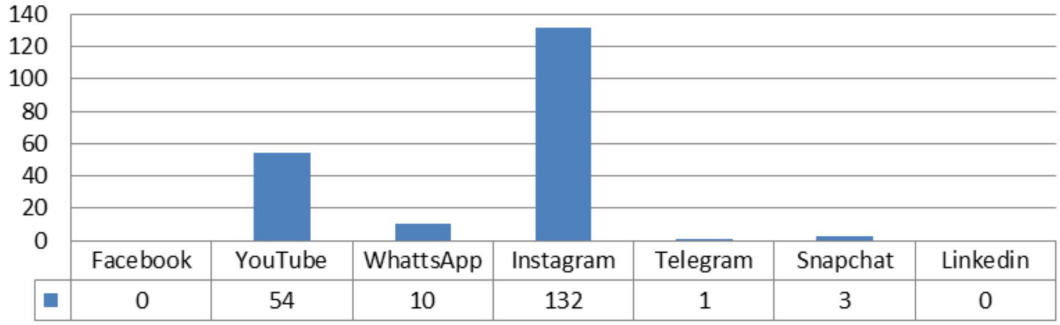


Figure 2: Reveal most commonly used social media platform in the study group.

Instagram users are predominant in the study population 66% followed by YouTube 27%, WhatsApp 5%, Snap chat and Telegram is the least among.

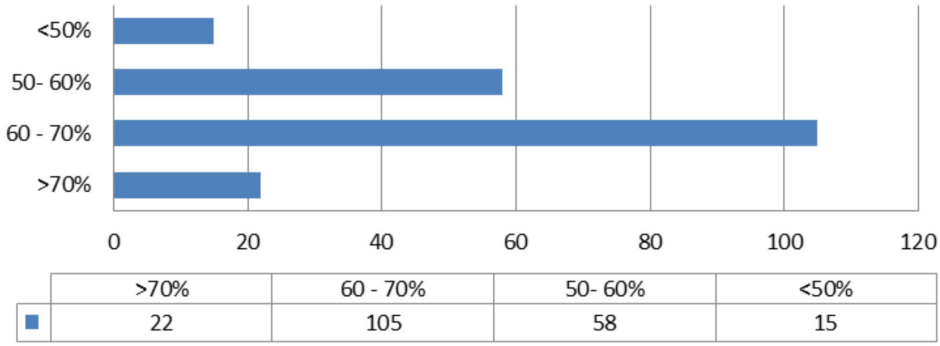


Figure 3: Showing the details of academic performance of social media users.

Academic performance in the last exam, only 11% achieved >70%, 52.5% scored average and 36.5% study population got<60% results.

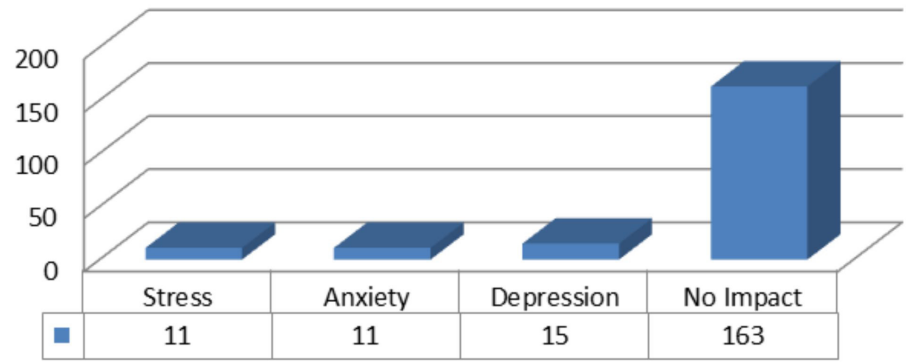


Figure 4: Reveals the impact on mental health among the users in the study group.

81.5% study population had no impact of social media usage where as 18.5% are suffering from various mental health issues.

Discussion

A cross sectional study on impact of social media in academics of medical students was conducted in Hyderabad Telangana. 200 students participated in the study in which 25% students are residing in the hostel and 75% are day scholars in the study group. Majority students 90% were come from an urban area and 10% are from rural area. Study group consist of 25% first MBBS, 26.5% 2nd MBBS, 25% 3rd MBBS part one and 23.5% are from 3rd MBBS part two.

Personnel habits in the study group shows 11.5% are smokers and alcoholics. Majority of study

population are from good educational background. Education of father reveals 47% are Professionals, 33.5% graduation and 18.5% are intermediate education. Education of mother shows 37% professionals, 36.57 graduates and 24% belong to intermediate education. Very less number of study group have come from illiterate family. In regard to occupation of father 72.5% are self employed, 21% government service and 6.5% are from Private and agriculture. Mother occupation shows 60.5% are home makers, 24.5% private employees and 15% are from government services. Family income reveals 24% are from high income group, 70.5% are from moderate income and only 5.5% from low income group (According to modified Kuppuswamy classification). Siblings of study group are 100 % educated and 78.5% are high to moderate users of social media. Majority of study group are from well educated and good family income, easy affordable to electronic gadgets and internet usage.

Social media usage in study population shows 83% are moderate users, 12.5% are using extensively more than 8 hrs in a day and least are isolators using less than 2 hour in a day, among extensive users males are predominant. Preferable time of social media usage among study group reveals that majority are using in evening hours 39% and late night after 10pm are 56.5% and remaining 4.5% are using social media in morning and afternoon. Most commonly used social media among study group wasInstagram 66%, YouTube 27% followed by WhatsApp 5%, Snap chat 1.5% and 0.5% telegram, similar results found in male and female study population. 86.5% in the study group are using for fun and entertainment, only 13.5% users are for academic purpose, academic usage was more in female study group. Majority of the students after attending their college spent their valuable time at evening and night hour in social media usage.

Regarding Academics in the study population we found 86% are maintaining good attendance. 83% in the study group are attentive in the class room and remaining 17% are distracting by social media usage in the class room. Social media affecting on regular reading in 70% of study group remaining 30% are not affected. Academic performance in the last exam found that 11% are excellent, 81.5% are average and 7.5% are poor, females are better in academic performance.

Effect on health due to social media, we found 49.5% have sleep disorder, 6.5% are suffering with obesity. Regarding mental health 18% are suffering from stress, anxiety and depression related disorders. We found 16.5% of study population addicted to social media. Social media impact on social life of study population reveal 52.5%, the effect is less in female study group. We found 43.5% of study population prefers to interact in social media and remaining prefers direct interaction, compared to females, males are interacting more in social media. 4% in study group chat with strangers in social media platforms among which majority observed in males. Family is aware of their social media usage in 92% of study population.

Regarding impact of social media usage in medical students, a study was conducted by Ajay M Bhandarkar[5] at Manipal, Karnataka found that WhatsApp & YouTube are the most widely used applications among medical students and also explained that highest social media users are low in their academics whereas in our study majority preferred Instagram and YouTube and results on academic impact is similar.

A study by Jayant deshpande[6] on effect of internet & social media use among medical students of tertiary care teaching hospital at Maharashtra revealed that excessive use of social media have impact on physical and mental health, similar results were found in our study. Another study by Manikant tripati[7] on Effect of Social Media on Human Health, found mental illness disorders like decreased self-esteem, eating disorders, anxiety, feelings of inferiority and declined focus in work, we also found mental illness among excess users.

Conclusion

Social media impact in medical students, results reveal majority of students are using social media for fun and entertainment, academic usage is very minimal. Students are spending their precious time especially in late night causes ill effects on their physical and mental health. We also found social media causing impact on their effective study hours. Absent to classes, distraction in the class room and

poor performance in their academics was observed in the study group. Students from higher education and financially sound family background are extensive users. Compared to males females are less among extensive users and good in academics. Similar results were found in other studies.

Conflict of interest: Nil.

Source of funds: Self.

Ethical clearance: Ethical clearance was obtained from Institutional ethics committee, vide reference no; MRIMS/DHR-IEC-MBBS-UG/2023/130, dated 29-9-2023.

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Original Article

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Assessment of Knowledge, Attitude and Practice in Hospital Waste Management among Health Care Professionals in a Tertiary Care Hospital, Kurnool, Andhra Pradesh.

K. Suma[1], P. Sudha Kumari[2], B. Renuka[3]

[1]Second Year Postgraduate Student, Department of Community Medicine, Kurnool Medical College, Kurnool, Andhra Pradesh, [2]Professor and Hod, Department of Community medicine, Kurnool Medical College, Kurnool, Andhra Pradesh, [3] Associate Professor, Department of Community Medicine, Kurnool Medical College, Kurnool, Andhra Pradesh.

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Abstract

Background: Enormous amounts of biomedical waste is generated in our country daily, contains hazardous and infectious materials. It is vital that healthcare professionals has correct knowledge, attitudes and practices regarding biomedical waste management.

Objectives: To assess knowledge, attitudes and practices among doctors, interns, nurses and laboratory technicians regarding bio medical waste management in a tertiary care hospital in south India.

Materials and methods: A questionnaire-based cross sectional study was conducted among 150 doctors, 60 interns, 50 nurses and 50 laboratory technicians in government general Hospital in kurnool district of Andhra Pradesh, South India.

Results: Good Knowledge was observed among 135 (90.0%) Doctors, 30 (60.0%) laboratory technicians, 29 (58.0%) nurses followed by 35(58.3%) interns, which is statistically significant. Good attitude was shown by 133 (88.7%) doctors, 33 (66.0%) nurses, 26 (52.0%) laboratory technicians, followed by 30 (50.0%) interns and the difference is statistically significant. Good Practices were followed among 134(89.3%) doctors, 30(60%) nurses, 30 (60%) laboratory technicians and 35 (58.3%) interns, which is statistically significant.

Conclusions: Overall, knowledge, attitudes and practices were better among the doctors and nurses than among the interns and laboratory technicians.

Keywords: Bio medical waste management, Health care professionals, knowledge, attitudes and practices.

Corresponding Author: K. Suma, Second Year Postgraduate Student, Department of Community Medicine, Kurnool Medical College, Kurnool, Andhra Pradesh.

E-mail: Sumakatepogu9@Gmail.Com

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Introduction

Any waste produced during an animal's or human's diagnosis, treatment, or vaccination, as well as during related research or during the manufacturing or testing of biologicals, is referred to as biomedical waste[1]. Every day, a variety of biomedical operations in hospitals all around the world generate massive amounts of toxic and infectious wastes. About 2 kilograms are produced per bed every day in India[2]. In addition to strict adherence to protocol at the healthcare institution level, high-quality biological waste management requires investment in and implementation of disinfection, recycling, and disposal at the terminal site[3]. Health care workers who comprehend segregation and are adequately informed about biomedical waste management guidelines would be better able to dispose of trash in their organizations in an appropriate manner[4]. Teaching institutions are essential to the health care system since it is through them that aspiring medical practitioners and everyone else involved in providing care to the community receive their training[5]. Globally, there is a great deal of awareness of the risks associated with biomedical waste. Furthermore, a number of costly international interventions for the BWM have also been implemented. However, India's performance is utterly appalling and inadequate on these two fronts.[6]. The most important issues surrounding healthcare waste include improper waste management, inadequate financial and human resources, ignorance of the health risks associated with biomedical wastes, and inadequate waste disposal regulation[7]. With this background, the study was carried out to assess the current knowledge, attitude and practices of the health care workers like doctors, interns, nurses and laboratory technicians in a tertiary care teaching hospital with regard to the management of BMW.

Objectives:

1. To assess the knowledge about BioMedical Waste management among doctors, interns, nurses and lab technicians of a tertiary care hospital.
2. To assess the attitude among doctors, interns, nurses and lab technicians of a tertiary care hospital with regard to BioMedical Waste management.
3. To assess the practices among doctors, interns, nurses and lab technicians nurses in a tertiary care hospital with regard to BioMedical Waste management.

Methodology

A hospital based cross-sectional study was conducted in government general Hospital, Kurnool, Andhra Pradesh, South India. The study population comprises of the following: doctors (residents), interns, nurses and laboratory technicians working in the various departments of the hospital. Study was conducted in July 2023 – November 2023.Inclusion criteria include those who are consenting for the study and those who are working in medical field for more than 3 months. Exclusion criteria include those who are not available at the time of study. Ethical clearance for the study was sought from the institutional ethics committee. Simple random sampling technique is used in the study. Assuming 50% of students are aware of biomedical waste management[8] sample size is calculated using formula $4pq/L^2$ with 6% absolute error, a minimum sample size of 278 was calculated. Accounting for 10% non-response, it was 306 individuals which is rounded off to 310 individuals which includes 150 doctors, 60 interns, 50 nurses and 50 laboratory technicians.

Data Collection:

Cadre of staff	Participants
Doctors	150
Interns	60
Nurses	50
Laboratory Technicians	50
Total	310

A semi-structured questionnaire was used as the data collection tool. It contained 30 questions. The knowledge questions assessed the participant's knowledge on facts like – all the colour codes and their meanings, biomedical hazard symbol, incinerability of wastes. The attitude questions pertained to issues such as, whether biomedical waste was considered by the participant was hazardous. The practice questions assessed regarding usage of disinfected sharps. The self-administered questionnaires were filled by the participants. Questions to assess knowledge were of a multiple choice type where only one response was the correct one. Questions to assess attitude

were presented in the agree or disagree response format. Questions to assess practice were presented as always or never response format. Each correct and incorrect response in the knowledge section and each agree and disagree for the attitude and always and never response in practice question were given 1 and 0 mark respectively. Thus, maximum score for each section was 10 and minimum zero. It was assumed that individuals involved in the study would cooperate and give correct information. A self made scoring system was devised to categorize KAP of the study participants as good, average and poor. A score of < 5 was categorized as poor, 5-8 as average and > 8 as good.

Data analysis: The data entry and analysis was done using SPSS version 26. The levels of KAP of doctors, nurses, lab technicians and interns regarding BWM were expressed in both frequency and percentages. To determine whether there was any association between levels of KAP and professional category chi square test was computed. P value <0.05 was considered to be significant.

Results

Table 1: Socio Demographic Characteristics of Health Care Professionals

Characteristics	Doctors	Interns	Nurses	Lab techinicians
Age in years				
21-25	0(0.0%)	59(98.3%)	18(36.0%)	0(0.0%)
26-30	2(1.3%)	1(1.7%)	32(64.0%)	6(12.0%)
31-35	3(2.0%)	0(0.0%)	0(0.0%)	40(80.0%)
>35	145(96.7%)	0(0.0%)	0(0.0%)	4(8.0%)
sex				
male	80(53.3%)	19(31.7%)	21(42.0%)	36(72.0%)
female	70(46.7%)	41(68.3%)	29(58.0%)	14(28.0%)
residence				
rural	50(33.3%)	11(18.3%)	2(4.0%)	11(22.0%)
urban	100(66.7%)	49(81.7%)	48(96.0%)	39(78.0%)
religion				
hindus	100(66.7%)	40(66.7%)	31(62.0%)	28(56.0%)
muslims	25(16.7%)	5(8.3%)	6(12.0%)	12(24.0%)
christians	25(16.7%)	15(25.0%)	13(26.0%)	10(20.0%)

In the present study majority of doctors 145(96.7%) were more than 35 years, majority of lab technicians 40 (80%) belong to 31-35 years, majority of nurses 32 (64%) belong to 26-30 years and majority of interns 59 (98.3%) belong to 21-25 years. Majority of doctors 80(53.3%) and lab technicians 36(72.0%) were males whereas majority of interns 41(68.3%) and nurses 29(58%) were females. Majority of them belong to urban residence. Majority of them belong to hindu religion with doctors 100(66.7%), interns 40(66.7%), nurses 31(62.0%) and lab technicians 28(56.0%).

Table 2: Knowledge of the Health Care Professionals

Occupation	Good	Average	Poor	P Value
DOCTORS	135(90.0%)	12(8.0%)	3(2.0%)	<0.001
INTERNS	35(58.3%)	15(25.0%)	10(16.7%)	
NURSES	29(58.0%)	14(28.0%)	7(14.0%)	
LAB TECHNICIANS	30(60.0%)	11(22.0%)	9(18.0%)	

In the present study Good Knowledge was observed among 135 (90.0%)Doctors,30 (60.0%) laboratory technicians, 29 (58.0%) nurses followed by 35(58.3%) interns, which is statistically significant.

Table 3: Attitude of the Health Care Professionals

OCCUPATION	GOOD	AVERAGE	POOR	P VALUE
DOCTORS	133(88.7%)	10(6.7%)	7(4.7%)	<0.001
INTERNS	30(50.0%)	18(30.0%)	12(20.0%)	
NURSES	33(66.0%)	10(20.0%)	7(14.0%)	
LAB TECHNICIANS	26(52.0%)	15(30.0%)	9(18.0%)	

In the present study Good attitude was shown by 133 (88.7%) doctors, 33 (66.0%) nurses, 26 (52.0%) laboratory technicians, followed by 30 (50.0%) interns and the difference is statistically significant.

Table 4: Practices of the Health Care Professionals

OCCUPATION	GOOD	AVERAGE	POOR	P VALUE
DOCTORS	134(89.3%)	11(7.3%)	5(3.3%)	<0.001
INTERNS	35(58.3%)	15(25.0%)	10(16.7%)	
NURSES	30(60.0%)	15(30.0%)	5(10.0%)	
LAB TECHNICIANS	30(60.0%)	11(22.0%)	9(18.0%)	

In the present study Good Practices were followed among 134(89.3%) doctors, 30(60%) nurses, 30 (60%) laboratory technicians and 35 (58.3%) interns, which is statistically significant.

Discussion

Biomedical wastes are generated from all levels of health care facilities. Segregation of biomedical waste at the point of generation not only reduces the financial expenditure for management of BMW, but also the health hazards due to handling of these wastes. BMW management system of our Institution has been analysed using three determinants, KAP.

Study participants were from various groups (group I-doctors, group II interns, group III- nurses, group IV-laboratory technicians) belonging to our Institution. In the present study majority of doctors 145(96.7%) were more than 35 years, majority of lab technicians 40 (80%) belong to 31-35 years, majority of nurses 32 (64%) belong to26-30 years and majority of interns 59 (98.3%) belong to21-25 years. Soyam GC et al[9] in their study showed among health care workers in Delhi where majority of the participants were in the age group of 30.3+5.6 years. Majority of doctors 80 (53.3%) and lab technicians 36(72.0%) were males whereas majority of interns 41(68.3%) and nurses 29(58%)were females. Majority of them belong to urban residence. Majority of them belong to hindu religion with doctors 100(66.7%), interns 40(66.7%), nurses 31(62.0%) and lab technicians 28(56.0%). The decreasing order of knowledge, attitude and practice seen among the four groups was doctors, followed by nurses, laboratory technicians and interns. In the present study doctors had good knowledge regarding BMW than nurses similar to that conducted by Narang et al[10], opined knowledge was more among the doctors followed by nurses and other paramedical staffs. Deo D et al[11], in their study opined nurses and lab technicians had better knowledge (90%) than medical staff like doctors (80.6%), in contrast to our study where doctors had better than nurses and lab technicians. Vishal et al[12] who in their study in a tertiary care hospital in Bhopal reported that the overall awareness about BWM was highest among the medical professionals. Another study by Madhukumar Set al[13] showed that nurses had better attitude than technicians similar to our study where nurses showed better attitude than lab technicians. Reason for lower KAP values among nurses could be explained by the fact that majority of participants in nurses group were newly recruited juniors, as the senior nurses who had busy work schedule were unable to participate in the study. This is supported by the study done by Ajmera V et al[14], which showed newly appointed nurses used colour coded bins inappropriately. HealthCare Professionals

of our Institution has got better attitude towards BMW management when compared to knowledge and practice. This could be due to the reason that questions on knowledge were answered only if theoretical knowledge was sound and questions on attitude were answered easily because options were of affirmative type.

The study by Ajai Singh et al[15] showed that nurses had better attitude and practice of BMW management even more than doctors on contrary to our study where doctors had better attitude and practice towards BMW management than nurses. Another study by Madhukumar S et al[13] showed that nurses had better attitude than technicians which is similar to our study where nurses showed better attitude than lab technicians. In the present study, doctors were the toppers in all three determinants and nurses had better KAP values than laboratory technicians where as in a study by Mathur V et al[16], on knowledge, attitude and practices about biomedical waste management was found to be better among nurses as compared to doctors. Training of all cadres of staff will help in the analytical evaluations for suitable and applicable management of biomedical waste[17].It is hoped that these findings would help to enhance the effectiveness of orientation or refresher training programmes targeted at these individuals and help make them more focused, relevant and goal-oriented. Thus, as this knowledge spreads to other parts of the nation through this human resource, it will lead to the right annihilation of biomedical wastes, successful reuse, and environmental safety not only in one hospital hub but also elsewhere.

Conclusion

Knowledge, attitude and practice towards biomedical waste management were better among the doctors and nurses than the other cadre of staff. Socontinuing medical education program on BMW is mandatory atleast oncein a year to train new batches of postgraduates, interns, newly appointed health care workers and serves as anup date for the existing health care workers.

Good knowledge of the health care professionals may lead to a positive attitude and proper practice. Importance of adequately supported IEC strategies (information, education and communication) like handouts, stickers, charts, celebrations of various days like hand hygiene day and other days etc. can help in improving the practices of the employees of the organizations.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Taken from institutional ethical committee Date- 25/7/2023 ,reference no-362/2023

Source of Funding: Self

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Original Article

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Involvement of Males in Utilization of Maternal and Child Health Services: A Cross-Sectional Study of Women's Perspective

Kolate Indrajit[1], Aswar Nandkeshav[2], Kale Kalpana[3], Prabhu Priya[4], Bugade Vishvamohini[5]

[1]Junior Resident II (PG student), [2]Professor, [3]Associate Professor, [4]Associate Professor, [5]Senior Resident, Department of Community Medicine, Government Medical College, Miraj.

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Abstract

Background: Men in patriarchal societies of developing countries like India are often identified as decision makers in all aspects of life. Men's supportive stance in MCH services utilization plays crucial role in reduction of maternal and child mortality.

Aim: To study the involvement of males in maternal and child healthcare services.

Objective: To study sociodemographic profile of study participants and knowledge and practices of their husbands about MCH services.

Material and methods: The cross-sectional study was conducted among 130 married women having one living child less than 2 year of attending immunization clinics of Government medical college and hospital, Miraj. Information about socio-demographic and reproductive health characteristics, male participation in reproductive and child health care services was collected entered in MS excel and analyzed.

Results: Among the females 70% were below 25 years of age and age of the husbands of 71% participants were less than 30 years. 64% females were belonging to Muslim religion, 84% were residing in urban area, 82% stayed in joint family, 58% educated up to secondary school, 67% belongs to socio-economic class IV. 61% husbands were decision maker in family planning, 78% husbands accompanied for ANC visit, 79% husbands knew about the govt. MCH scheme 94% husbands knew about increased need for food & rest by pregnant women, 63% were having knowledge about complications of pregnancy and delivery. But only 22% husbands accompanied for child's immunization. Only 34% husband help in domestic work, 63% paid attention on diet/food frequency of their wives and 51% encouraged & paid attention on adequate rest of their wives.

Conclusion: Men are aware of various aspects of antenatal and intra natal care, their husband's involvement during antenatal period was found to be good but it decreases during immunization phase of the child. Involvement for helping in domestic work, encouraging for adequate rest & food during ANC was also less. So, creating specific Health education and SBCC activities about maternal & child health among men may enhance their positive involvement.

Keywords: ANC visit, Immunization, maternal and child healthcare, male involvement, SBCC.

Corresponding Author: Kolate Indrajit Tanaji, Junior Resident II (PG student), Department of Community Medicine, Government Medical College, Miraj.

E-mail: kindrajit24@gmail.com

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Introduction

A maternal and child healthcare service comprises a wide range of health services provided to mothers before pregnancy, during pregnancy, during labour, and after giving birth. These health services include: preconception care, antenatal care (ANC), safe delivery (intrapartum care), postnatal care (PNC), and emergency obstetric care, neonatal and child health services and immunization services. (1)

Most maternal and child health (MCH) programs seek to address the health needs of women and children by engaging and educating pregnant women and mothers in appropriate care-seeking and care-giving practices for themselves and their children. Men tend to be decision-makers within families and often govern behavior regarding the use of contraceptives, the availability of nutritious food, women's workload, women's rest during pregnancy and postnatal period and the allocation of money, transport and time for women to attend health services. In addition, men's behavior influences the reproductive health of both men and women and the health of their children.(1)

The maternal and child health has been one of the most important components of a nation's health. For decades, maternal mortality and infant mortality rates have been used as a measure of a country's progress toward global health goals. The MCH program in India has undergone drastic changes over the years, currently the Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH + A) is built on the concept of continuum of care. World Health Organization (WHO) has recommended the support and active involvement of male for better maternal and child health outcomes.(2)

In a patriarchal society like India, pregnancy, child birth is always considered as exclusive duties belonging to the mother. Many studies in recent times have demonstrated that involving males in antenatal care has resulted in better outcomes for mother and child.(2) Though Maternal mortality rate (MMR) is reducing, the nation is still lagging in meeting the Millennium Development Goals 5 (MDG5). RCH in India has gained the prominence because 81% of its population falls in the age group of 0-45 years covering children, men and women.

Reproductive health research, programs and policies in the past have focused almost exclusively on women. Since a decade however the reproductive health field has shifted its attention to include men's participation in reproductive and child health, recognizing that men's attitude, knowledge and behavior can strongly influence women and child health. Men possess little knowledge regarding reproductive health particularly pregnancy health but have much decision-making power. So obviously the lack of men's knowledge and participation in reproductive health not only damages their own health, but also contributes to the ill health of their female partners and children.(3)

Men's presence during antenatal visits was associated with increase in institutional delivery and higher uptake of postnatal services. In recent years a growing area of interest is men's role in maternal and child health issues, including their role in health care decisions and their responsibilities and role as a father and husband. Hence this study aims to know the men's participation, their knowledge and behavior in reproductive health services utilization by women.(4)

In this study male involvement is defined as men attending antenatal care (ANC) visits, birth plans, encouraging rest, nutritious diet, medications during antenatal and postnatal period, exclusive breast feeding and immunization for their children. This study was conducted by taking women's interview so that their perception about husband's knowledge, practices and behaviour can give us actual idea of Male involvement in utilization of MCH services.

Aim:

To study the involvement of males in maternal and child healthcare services.

Objectives:

1. To study the sociodemographic profile of participants & their husbands.
2. To study the knowledge of husbands about maternal and child health services as perceived by participants.
3. To study the practices of husbands in maternal and child health care.

Methodology

A cross-sectional study was conducted in immunization clinics of Government Medical College and Hospital Miraj from November 2023 to March 2024. The study population were married women having at least one living child of age less than 2 years. Women who did not give consent to participate in study and having last child more than 2 years were excluded.

The sample size was calculated on the basis of 80% of husbands accompany their wives during ANC checkups as per study done by Swetha T et al3 with an allowable error (d) as 7% using formula $N = Z \alpha^2 p \times q / d^2$ estimated sample size was 130. These 130 participants were selected by Convenient sampling method.

A pretested structured questionnaire was used as study tool for data collection. Required information as per the questionnaire was obtained by interview technique. Questionnaire was divided into three sections:

Sociodemographic profile includes variables such as age, education level, income, religion and employment status.

Reproductive health characteristics includes parity, term of delivery, birth weight of child, expenditure during ANC checkups and hospital admission.

Knowledge & practices (involvement) of male partner about MCH Services. It includes knowledge about medications during pregnancy, pregnancy complications, mother and child nutrition, immunization. Participation in birth process, such as accompanied with wives on ANC visit, birth plans, taking care of mother and child nutrition, helping wife in domestic work, accompanied for child immunization.

Ethical clearance was obtained from institutional ethical committee (Vide Letter No. GMCM/ IEC/C/19/2024, Dated - 29/02/2024). Ethical guidelines were followed and participants were recruited after getting informed consent.

Data entered in MS Excel and analyzed in SPSS (version20). Data analysis was carried out by describing study findings in percentages. Modified BG Prasad classification was used to decide socioeconomic status. Primary decision maker in family categorized into 4 possible categories self, in-laws, husband, mutual decision. Husband involvement graded as good or bad by asking 8 questions. Out of these 8 questions, if 4 or more than 4 questions' answer was 'Yes' then it was taken as good involvement of husband. For the assessment of knowledge regarding MCH services 8 questions were asked out of which if 4 or more than 4 was correct then it was taken as good knowledge of husband about MCH services. Chi-square test was used for testing significance of association between demographic variables and involvement of husband, outcome variables. $P < 0.05$ was considered statistically significant.

Results

A total 130 women fulfilling inclusion criteria were included in study. Among them 92 (70%) study participants were up to 25 years of age and 70% of their husbands were up to 30 years of age. 64% of study participants were residing in urban area and 82% from joint family. The sociodemographic details are shown in Table 1.

Table 2 depicts Reproductive & child health characteristics. Among study participants 93% registered their pregnancy before 12 weeks, 52% delivered their last child by LSCS, 85% deliveries were full term, 80% husbands were primary decision maker about family planning, in case of 77% study participants their husbands accompanied them during their ANC visits. Most of the husbands had done expenditure during ANC checkups (86%) and hospitalization (56%).

Table 3 and 4 shows the data about knowledge and involvement of husbands as study participants in MCH Services utilization though 96% husbands were having good knowledge about MCH actual involvement or practices in MCH service utilization is 71%.

Table 5 shows Association between Study Variables and Husbands Involvement about MCH services. Husband involvement in MCH found to be significantly associated with age at the time of marriage, occupation & education of husband.

Table 1: Sociodemographic characteristics of study participants

Variable		Frequency (%)
Age of Wife (Years)	≤25	92 (70.70)
	>25	38 (29.20)
Age of Husband (Years)	≤30	93 (71.50)
	>30	37 (28.50)
Area Of residence	Urban	84 (64.60)
	Rural	46 (35.40)
Religion	Hindu	64 (49.20)
	Muslim	64 (49.20)
	Cristian	02 (01.50)
Type of Family	Joint	107 (82.30)
	Nuclear	23 (17.70)
Education of Husband	Primary to HSC	91 (70.00)
	Graduation & above	28 (21.50)
Education of Wife	Primary to HSC	102 (78.50)
	Graduation & above	28 (21.50)
Occupation of Wife	Housemaker	111 (85.40)
	Employed	19 (14.60)
Occupation of Husband	Salaried	30 (23.00)
	Non salaried & others	100 (77.00)
Socio-economic Class	Class IV	88 (67.70)
	Class III	42 (32.30)
Type of Ration Card	Yellow	20 (15.30)
	Orange	98 (75.30)
	White	12 (09.20)
Primary Decision Maker in Family	In laws	54 (41.60)
	Husband	53 (40.00)
	Mutual Decision	24 (18.40)

Table 2: Obstetric history of study participants

Variable		Frequency (%)
Parity	Primigravida	65 (50.00)
	Multigravida	65 (50.00)
Trimester of registration of pregnancy	Before 12 WKS	121 (93.10)
	After 12 WKS	09 (06.90)
Type of Delivery of Last-Born Child	Vaginal	63 (48.40)
	LSCS	67 (51.60)
Term of Delivery	Preterm	19 (14.60)
	Full Term	111 (85.30)

Continue.....

Birth weight of last child(kg)	< 2.5	38 (29.20)
	≥2.5	92 (70.80)
Decision Maker about Family Planning	Husband	80 (61.50)
	Both	50 (38.50)
Husband accompanied wife during ANC Checkups	Yes	101 (77.70)
	No	29 (22.30)
Expenditure during ANC Checkups	Husband	112 (86.20)
	Wife Maternal Side	08 (06.20)
	Both	10 (07.70)
Expenditure during Hospital Admission	Husband	74 (56.90)
	Wife Maternal Side	44 (33.80)
	Both	12 (09.20)

Table 3: Husband Knowledge about MCH Services

Husband Knowledge about MCH Services	Frequency (%) N = 130
Complications related to pregnancy and delivery	82 (63.07)
Information about nearest health facility	125 (96.15)
Importance of rest for wife during pregnancy	122 (93.84)
Government schemes related to MCH	103 (79.23)
Importance of increased food intake during pregnancy	122 (93.84)
Importance of breastfeeding	123 (94.61)
Awareness of immunization of baby and its importance	122 (93.84)
Importance of iron and folic acid tablets	128 (98.46)

Table 4: Husband involvement in MCH services utilization

Husband Involvement in MCH services utilization	Frequency (%)
Husband accompanied during ANC checkups	101 (77.69)
Husband helped you in domestic works like sweeping, cleaning and also outdoor works like to bring grocery, vegetables etc. from market	47 (36.15)
Husband giving attention on diet and its frequency.	105 (80.76)
Paying attention on type food to be eat during ANC and PNC period	83 (63.84)
Brought every medicine that was prescribed during ANC and PNC period	126 (96.92)
Ever checked about tablets taken or not which were prescribed	112 (86.15)
Encourage to take every day 8 hours sleep and also to take some rest at day time	67 (51.53)
Accompanied during your child immunization	32 (24.61)

Table 5: Association between Study Variables/Outcomes and Husband's Involvement in MCH services

Variable Total (N = 130)		Husband Involvement		Chi square (χ^2) value	*p* value
		Good (%)	Poor (%)		
Age of wife at the time of marriage (Years)	≤ 20	54 (65.90)	28 (34.10)	2.59	0.107
	>20	38 (79.20)	10 (20.80)		
Age of husband at the time of marriage (Years)	≤ 25	48 (61.50)	30 (38.50)	8.03	0.005*
	>25	44 (84.60)	8 (15.40)		

Continue.....

Education of Husband	Primary to HSC	56 (70.00)	35 (30.00)	12.49	0.0004*
	Graduate and more	36 (68.80)	3 (31.40)		
Occupation of Husband	Salaried	25 (83.30)	5 (16.70)	20.47	0.000*
	Non salaried & others	67 (57.30)	33 (23.70)		
Type of family	Joint	75 (70.10)	32 (29.90)	0.13	0.71
	Nuclear	17 (73.90)	6 (26.10)		
Socioeconomic class	Class II	58 (65.90)	30 (34.10)	3.11	0.07
	Class III	34 (80.90)	8 (19.10)		
Primary decision maker in family	In laws	34 (65.20)	19 (35.80)	4.67	0.09
	Husband	43 (81.10)	10 (18.90)		
	Mutual Decision	15 (62.50)	9 (37.50)		
Area of Residence	Urban	63 (75.00)	21 (25.00)	2.05	0.15
	Rural	29 (63.00)	17 (37.00)		
Obstetric history	Primigravida	51 (78.50)	14 (21.50)	3.72	0.05*
	Multigravida	41 (63.10)	24 (36.90)		
Registration of pregnancy	Before 12 Weeks	89 (73.60)	32 (26.40)	6.55	0.01*
	After 12 Weeks	3 (33.30)	6 (66.70)		
Term of delivery	Pre term	9 (47.40)	10 (52.60)	5.89	0.015*
	Full term	83 (74.80)	28 (25.20)		
Birth weight of child	<2.5 kg	19 (50.00)	19 (50.00)	11.19	0.001*
	≥ 2.5 kg	73 (79.30)	19 (20.70)		
Decision about Family Planning	Husband	49 (56.60)	31 (38.80)	9.11	0.003*
	Both	43 (86.00)	7 (14.00)		

***Significant at $p < 0.05$**

Discussion

This study examined the factors associated with male involvement in ANC, child birth, PNC and immunization. In present study the education, husband's age at marriage, occupation, decision making about family planning had statistically significant association with husband involvement in MCH. Swetha T et al also found similar results in their study.[3] Sinha KC et al found that those husbands with higher education among them presence at the time of ANC visit is higher (90%).[8] R. Angusubalakshmi et al stated that age, education, marital status, knowledge of men regarding maternal health were significant predictors of male involvement in maternal health.[10] Sumitra Sharma et al found that sociocultural and socioeconomic factors such as patriarchal family structure, generation gap, male as income generator, female preference to go for MCH activities by themselves, religious factor, village life and negative perception of society hindered men's involvement in MCH activities.[9] S. O. Maluka et al findings revealed that women preferred to be accompanied by their partners to the clinics, especially on the first antenatal care visit. Men did not wish to be more actively involved in antenatal care and delivery.[11] Aparajita Chattopadhyay et al found that following factors to be statistically significant determinants of improved maternal health care: husband's better knowledge as obtained from health workers and better awareness of maternal care, husband's presence at any ANC visit, husband's respectful attitude towards his wife, husband's higher education, mass media exposure, smaller family and better wealth.[13] Mariam Tokhi et al reviewed 13 studies from 9 countries from that stated that interventions to engage men were associated with improved antenatal care attendance, skilled birth attendance, facility birth, postpartum care, birth and complications preparedness and maternal nutrition.[14] Jessica Davis et al in their

research revealed strong agreement amongst policymakers regarding the benefits of involving men in MCH, including increased use of clinic services by women and children, increased use of family planning, and allowing men to support practices that promote MCH and challenge those behaviours that are detrimental to MCH.[16]

In our study 78% of husbands accompanied their wives for ANC checkups. Similarly, Swetha T et al stated that majority (86.2%) of husbands accompanied their wives to ANC checkup.[3] Dharma Nand Bhatta et al, Walia M et al and Mohammed BH et al stated that the percentage of males who accompanied their partners for ANC were 39.3%, 51% and 51.4% respectively.[4],[7],[15]

In present study we found that primary decision makers in family were in-laws (41%). Godbole NB et al also stated that 40% of the participants indicated their in-laws as the primary decision maker. [6]

Good level of husband's involvement was significantly associated with ANC registration before 12 weeks, being primigravida, having term delivery & birth weight being >2.5kg. Most common reason stated for poor or nil involvement of husband during ANC checkups was job responsibilities. Dahake S et al found that education and occupation of husbands were the factors affecting husband's attitude toward involvement in wives ANC. [5] Chakrabarti S et al also found similar results. [12]

In our study only 22% of husbands accompanied during their child's immunization. Suryawanshi D S et al stated that the percentage of husband accompanying during antenatal visit was 72.5% & it was only 20.3% during immunization. Dharma Nand Bhatta et al also found only 10.9% husbands accompanied them for child immunization. [4]

In our study Men's knowledge regarding MCH as reported by women was found to be noticeably good. 94% husbands knew about increased need for food & rest by pregnant women and 96 % husbands knew about the nearest health facility.79% husbands knew about government schemes related to MCH & 63% were having knowledge about complications of pregnancy and delivery.

Suryawanshi DS et al stated that expense for delivery was paid by the mother's side in 74% of the study participants. [2] In our study 86% & 57% husbands had done expenditure during ANC visits and during hospitalization. Expense for delivery was paid by the mother's side in 34% of the study participants. Mohammed BH et al also found that most (82.4%) male partners paid ANC related cost of their partners.

Swetha T et al stated that 93.5% husbands knew the need of increased food frequency by pregnant women and 98% husbands knew that rest is required during pregnancy and 96.5% husbands knew about the nearest health facility. [3]

Dharma Nand Bhatta et al stated that Men who were with higher age and uneducated or had primary level education demonstrated greater involvement. [4] In our study Men who got married after age of 25yrs, were at least graduate, with salaried job, who were primary decision makers in family demonstrated greater involvement.

In present study 34% husbands helped their wives in domestic work during ANC and PNC period and 63% paid attention on diet/food frequency of their wives. 51% encouraged & paid attention on adequate rest of their wives.

Conclusion

The husband's involvement during antenatal period was found to be good but it decreases during immunization phase of the child. Men who got married after age of 25yrs, were at least graduate, with salaried job, who were primary decision makers in family demonstrated greater involvement.

As study was done in government hospital & OPD timings were mostly in morning hours so attending job was most common reason for husbands not accompanied their wives during ANC checkups and immunization. So, implementing the concepts like evening OPDs or Sunday OPD to increase male involvement. There is also need of qualitative research and conducting similar study in male partners.

Creating specific Health education and social behaviour change communication (SBCC) activities about reproductive & child health among men like pre conceptional counselling may enhance their positive involvement in MCH services.

Ethical clearance was obtained from institutional ethical committee (Vide Letter No. GMCM/IEC/C/19/2024, Dated - 29/02/2024). Ethical guidelines were followed and participants were recruited after getting informed consent.

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Conflicts of Interest: Nil

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Original Article

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Sleep Quality and Self-Perceived Stress among Medical Students of Tertiary Care Hospital of District Shahdol (MP), India: A Cross Sectional Survey

Kunal Peepre[1], Yogesh Tiwari[2], Lalit Mohan Patel[3], Aditya Thakur[4]

[1]Assistant Professor, Department of Community Medicine, GMC Shahdol Medical College and Hospital, Shahdol, Madhya Pradesh, India, ORCID ID: https://orcid.org/0000_0002_2501_9467, [2]Assistant Professor, Department of Onco-Surgery, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India, ORCID ID: https://orcid.org/0000_0001_7783_6744, [3]Assistant Professor, Department of Radiotherapy, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India, ORCID ID: https://orcid.org/0000_0002_3865_0901, [4]Associate Professor, Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India, ORCID ID: https://orcid.org/0000_0003_0137_287X.

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Abstract

Introduction: The academic performance of medical students is negatively impacted by poor sleep quality and high levels of daily stress, which can result in anxiety, depression, suicidal thoughts, alcohol and substance misuse, and interpersonal problems.

Objective: To determine the prevalence of poor sleep and its association with self-perceived stress among medical students of tertiary care hospital of district Shahdol (MP).

Methods: The study provides the evidence of high prevalence of poor quality of sleep (44.6%). among the medical students & also the level of perceived stress which is alarmingly high with 67.4% has moderate stress and around 14.2% has high stress level.

Results: Out of 348 students about 332 completed and returned the online proforma. The mean age of participants was 21.35 years. The study provides the evidence of high prevalence of poor quality of sleep (44.6%). among the medical students & also the level of perceived stress which is alarmingly high with 67.4% has moderate stress and around 14.2% has high stress level.

Conclusions: Despite the medical students' generally poor sleep quality and significant levels of reported stress. Students should get instruction in relaxation techniques, behavioural modifications, and sleep information as part of their curriculum.

Keywords: *Sleep, Students, Stress, Quality, and Medical.*

Corresponding Author: Aditya Thakur, Associate Professor, Department of Community Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India.

E-mail: Adityathakur701@gmail.com

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Introduction

Humans need sleep in order for their bodies and brains to function correctly. We sleep for nearly one-third of our lives [1]. For older adults (46–60 years), the recommended standard for sleep duration is 7 hours or more per night on a regular basis; however, for younger persons (18–45 years), even greater durations (>9) are seen reasonable [2].The amount of sleep a student gets has an impact on their mental health. In addition to the pressure of meeting academic standards in college, other factors that might negatively impact a student's mental health include paying for college or securing a postgraduate spot of their choosing.

Numerous studies conducted in many nations, including Pakistan (60%), Thailand (61%), Malaysia (42%), and the United States (57%), have found that medical students experience high levels of stress [3-6]. In India, the percentage of stressed-out pupils is approximately 46.8% [7].The academic performance of medical students is negatively impacted by poor sleep quality and high levels of daily stress, which can result in anxiety, depression, suicidal thoughts, alcohol and substance misuse, and interpersonal problems. It is common knowledge that getting enough sleep is crucial for medical students to improve their memory and learning. With Keeping in view the above rationale, the study conducted with an aim to determine prevalence of poor sleep quality and its association with self-perceived stressamong medical students of tertiary care hospital of district Shahdol (MP).

Methodology

Study Setting and study design

The cross-sectional study was done from May to September 2023 at Birsa Munda Government medical college Shahdol(MP) among the undergraduate medical students (MBBS).

Study population & Sample Size

The sample size needed, was determined by taking P=30% from a prior study, using a 95% confidence interval (CI) and a 5% margin of error [8]. 87 students were chosen from each of the four MBBS admission batches (2019, 2020, 2021, and 2022) after line listing the medical students in each batch. The sample was then drawn through stratified random sampling using Microsoft Excel 2007. After adding 10% non-respondent rate, calculated as 348 students, to obtain an unbiased sample size that represents the whole population. The study excluded students who did not provide consent or who returned their questionnaires incomplete.

Study Tools

The self-administered semi-structured pro forma (through online survey link) was used to collect the data from the medical students consisted of three basic sections,

a) The first section includes sociodemographic data, such as the student's age, sex, weight, height, education, occupation, and the family's economic standing.

b) The Pittsburgh Sleep Quality Index (PSQI), a modified version of which was validated on an Indian population in a study conducted by Md. Dilshad Manzar et al., was used in the second section to gather data on the quality of sleep [9]. It is composed of 17 distinct things, resulting in five components that add up to a score.

c) The third section uses a modified version of the Perceived Stress Scale[10] which was taken from a study conducted on an Indian population by Ruchira Pangtey et al. [11-12]to collect data on the students' stress levels.

Ethical Consideration

The ethical approval with order no- IEC/2023/122 obtained from Institutional Ethics Committee of Birsa Munda Government medical college Shahdol(MP). Informed consent from the participants was taken. Anonymityand confidentiality of data was assured to the participants.

Data Collection

Every student received a combined pro forma via WhatsApp in the form of survey links, along with a brief explaining the purpose of the study and basic instructions on how to fill it out. Before any student could participate, their informed consent was sought. After two reminders, the students had a week to

voluntarily turn in the online proforma. Those who did not answer on time were deemed non-responders and were excluded from the data analysis.

Data Analysis

Data analysis was done using IBM SPSS Statistics version 22 (SPSS IBM Corp., Armonk, NY, USA). The median and interquartile range are used to display descriptive statistics for asymmetrically distributed data, while the mean and standard deviation are used to convey symmetrically distributed data. Pearson's Chi-square test and logistic regression was used to find association between variables.

Results

a) Base-Line Characteristics

Out of 348 students about 332 completed and returned the online proforma, about N=99 (29.81%) were from 2022 admission batch followed by 23%, 25% & 23% from 2019, 2020 and 2021 batches respectively. The mean age of participants was 21.35 years. Of all participants about 57.6% were girls & 44.9% were from general category followed by 27.11%, 14.4% & 14% from OBC, SC & ST category. Maximum students belong to urban area 78.8%. The educational status of the head of the family 42.37% were graduates, 33% were post-graduates and 12.7% & 12% were high-school and higher secondary pass out respectively. About 40% of the participants belongs to class 2 SES followed by 26%, 23%, 11% belongs to class 3, class 1 & class 4 respectively. Majority of the participants 78% has English medium of schooling, about 31.3% scored ≥90% marks in 12th standard & 96% of them has gone for coaching. Table 1

Table 1: Socio-Demographic Characteristics of The Participants

Characteristic	Category	N	%
Gender	M	140	42.3
	F	191	57.7
Admission Year	2022	98	29.6
	2021	78	23.5
	2020	85	25.6
	2019	78	23.5
Caste	UR	149	45.1
	OBC	90	27.1
	SC	47	14.2
	ST	45	13.6
Place of Residence	Urban	263	80.9
	Rural	68	21.7
Education of the Head of the Family	High School	41	13
	Higher Secondary	39	12.3
	Graduate	142	42.5
	Post-Graduate	109	33.5
Socioeconomic Status	Class 1	76	23.2
	Class 2	133	39.8
	Class 3	86	25.5
	Class 4	36	11.5
Medium of School	English	260	77.8
	Hindi	71	22.2
Marks in 12th Std.	≥90%	102	31.3
	<90%	229	68.7
Coaching	Y	321	96
	N	10	4

b) Sleep Quality-The prevalence of poor quality of sleep (PQSI Score ≥6) among the MBBS students was 44.6%(N=151) and the mean PQSI score is 5.51. The mean duration of actual sleep was about 6.6 hours, almost half (N=172) of the students has sleep duration of >7 hours. Table 2 shows that the average time on the clock at which the students goes to bed is around 12.15 AM while for waking up it is 7.30 AM. Majority of them i.e. 72.8% (N=246) goes to bed past 12.00 AM. Most of the students 68.8%(N=233) took less than 30 mins to fell asleep while the average is 24 mins.



Fig.1. Proportion of Quality of Sleep among Students

c) *Perceived stress*-The mean perceived stress scale score of the participant was around 18.58 ±6.3 with maximum score of 38 with 18.2% have low stress while 67.4% has moderate stress and around 14.2% has high stress level.

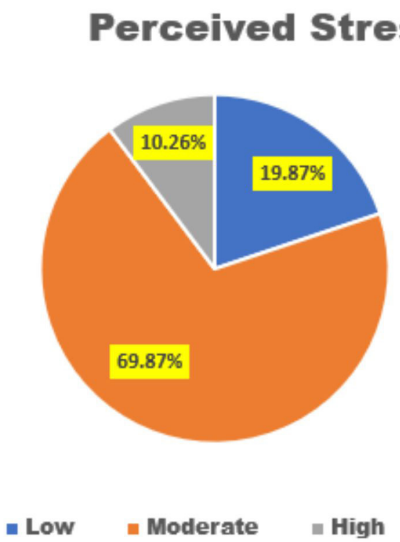


Fig. 2. Distribution of States of Perceived Stress

d) *Association between sleep quality and stress* - There is a statistically significant association between sleep quality and level of perceived stress ($p < 0.001$). The association are shown in table 2. It shows that there is a statistically significant association between quality of sleep and medium of schooling. Additionally, socio-economic status is also statistically found to be associated with quality of sleep.

Table 2: The association between sleep quality and study variables

S. No.	Variable	Categories	Good Sleepers (N=181)		Poor Sleepers (N=151)		P-Value
			N	%	N	%	
1.	Gender	M	82	59.85	55	40.15	.101
		F	99	50.76	96	49.24	
2.	Admission Year	2022	50	47.16	56	52.84	.278
		2021	40	57.97	29	42.03	
		2020	45	60.8	29	39.2	
		2019	46	55.42	37	44.58	
3.	Place Of Residence	Urban	138	52.47	125	47.30	.143
		Rural	43	62.31	26	37.69	
4.	Socio-Economic Status	Class 1	48	48.97	50	51.03	.000019*
		Class 2	68	66	35	34	
		Class 3	51	63.75	29	36.25	
		Class 4	14	27.45	37	72.55	
5.	Medium of Schooling	English	133	50.95	128	49.05	.012*
		Hindi	48	67.6	23	32.4	
6.	Perceived Stress	Low	45	68.18	21	31.82	.003*
		Moderate	127	54.74	105	45.26	
		High	09	26.47	25	73.53	

P values were calculated using the Pearson's chi-square test.* Significant p value (<0.05).

e) **Predictors of quality of sleep**: Furthermore binary logistic regression analysis was done to determine the predictors of quality of sleep(dependent variable) as shown in table 3.It shows that students suffering from severe level of perceived stress are more likely to have poor quality of sleep (OR = 1.67,95% CI 0.357–7.894).Similarly students who have done their schooling in English medium also have a higher odds of having poor quality of sleep (OR = 2.26,95% CI 0.858–5.947).Also the risk of poor quality of sleep is slightly higher in students belonging to class 3 socio-economic status(OR = 1.13,95% CI 0.445–3.899).

Table 3: Logistic regression analysis to determine the predictors of quality of sleep in study participants.

Characteristic	Categories	Poor Quality of Sleep		
		Significance	OR	CI-95%
Stress	Mild†	-	-	-
	Moderate	0.99	1.08	0.277-3.667
	Severe	0.51	1.67	0.357-7.894
Medium of Schooling	English	0.09	2.26	0.858-5.947
	Hindi†	-	-	-
Socio-economic Class	Class 1†	-	-	-
	Class 2	0.739	0.848	0.322-2.234
	Class 3	0.619	1.13	0.445-3.899
	Class 4	0.515	0.636	0.163-2.481

† Reference Group

Discussion

The study shows that a substantial percentage of people (44.6%) had poor sleep quality. Among medical students, there is also a concerningly high degree of perceived stress: 67.4% report moderate stress, and 14.2% report extreme stress. The results are not shocking because earlier studies among medical students at various medical colleges also found a comparable higher prevalence of poor sleep quality and stress levels, which may be related to the demanding nature of the medical curriculum and the pressure to perform well academically.

Rebello et. al. reported 33.8% of Karwar, Karnataka, India's medical students had inadequate sleep quality [13] in accordance to our study, 44% of medical college students in Kathmandu experienced poor sleep quality[4]. Similar results were observed in earlier research by Basu et al., which revealed that MBBS students had a greater percentage of poor sleep quality (63.5%) [14]. Nonetheless, Goyal et al. found that almost 30% of medical students had low sleep quality ratings [15]. A study conducted among medical undergraduate students at Abdulaziz University in Saudi Arabia revealed that 70.4% of them reported having poor sleep quality[16].

Variations in study designs, study sites, sociocultural practices, and academic demands among various demographic cohorts may all have an impact on the variation among studies. Our study's results, however, were consistent with those of prior research that have demonstrated the larger proportion.

According to the current study, female students' sleep was of lower quality than that of their male counterparts. These results align with a number of research investigations[17–18]. It could be because women report experiencing worry and depression at higher rates than men do, and hormone fluctuations associated with menstruation may also contribute to poor sleep. However, the study's cross-sectional methodology restricts the amount of information that can be analysed about gender differences.

The socioeconomic position of a student's family was found to have a strong correlation with sleep deprivation; students from lower socioeconomic backgrounds had lower sleep quality. It is becoming more and more clear that a person's living situation affects both their lifestyle and how they view their health. Low socioeconomic status students are more

likely to have poor sleep quality. Studies conducted in the United States, Brazil, and Africa revealed similar results [19-21].

About 80% of the participants in the current study reported having moderate to high levels of stress. In study at King Abdulaziz University in Saudi Arabia it was found that 65% of them experienced stress[16]. However, other research shows that stress is rather uncommon at King Saud University (53.2%) and Pakistani medical schools (59.7%), respectively [3,22]. It does seem to be lower than previous research, though, which report that over 90% of their students experienced stress [13].

Additionally, the current study shows that poorer sleep quality is correlated with higher stress levels, which is consistent with findings from medical students in Saudi Arabia, Pakistan, and India [3,16,22].

Students suffer greatly from a vicious cycle of sleep deprivation and the release of stress hormones. The "stress hormones," cortisol and adrenaline, are produced in greater amounts during stressful situations [17-18]. While the circadian cycle of cortisol secretion is affected by sleep deprivation. In line with research from King Saud University and a Pakistani medical school, the current study also shows that a high level of stress is a predictor of poor sleep quality, even though the prediction was not significant when tested in our logistic regression model [3,22].

Conclusion

Despite the medical students' generally poor sleep quality and significant levels of reported stress. Our analysis has proven no substantial relationship between the two. However, stress and poor sleep quality are concerning issues in and of themselves. With today's competitive exams and the introduction of a new medical curriculum, students must adapt to the circumstances. Based on these results, curriculum-integrated interventions involving behavioural modifications, sleep education, and relaxation techniques should be taught to students in order to control the kinds of variables that lead to stress and poor sleep quality.

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Original Article

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Households with Access to Clean Fuels for Cooking and Associated Factors Towards Achieving Sustainable Development Goals in India: Insights from National Family Health Survey-5 (2019-21)

M Nagarjuna[1], Visweswara Rao Guthi[2], Nagaraj Kondagunta[3], Sharanya Garg[4]

[1]PG Resident, [2]Associate Professor, [3]Professor and Head, [4]Intern, Department of Community Medicine, SVIMS-Sri Padmavathi Medical College for Women, Tirupati, Andhra Pradesh.

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Abstract

Background: Cooking using open fires or inefficient stoves fuelled by kerosene, biomass (wood, animal dung and crop waste) and coal generates harmful household air pollution. This study tried to estimate the proportion of Households with primary reliance on clean fuels and technology for cooking in India and determine the factors associated with it using the National Family Health Survey (NFHS) 5 data.

Materials and methods: We used data from the 2019–2021, National Family Health Survey (NFHS-5) household level data. Clean cooking fuel was considered as household's who are using electricity, LPG, biogas, natural gas and unclean cooking fuel was considered as any other fuel other than clean fuel. Multivariate logistic regression was performed to estimate the determinants of usage of unclean cooking fuel.

Results: Total 6,36,699 households were included in final analysis. The national level proportion of household's using clean fuel for cooking was 53%. Muslims, Sothern states, households with male Head of the Family (HoF), richest wealth index households, HoF with higher education status were more likely using clean fuels. Whereas Rural households, scheduled tribe households, households with kutcha houses, non-nuclear families and unmarried Hof were more likely using unclean fuels.

Conclusions: More than 50 percentage of households do not have access to clean fuels and technologies for cooking. Focus should be on providing access to North Indian states, rural households, households with female as head of the family (HoF), HoF with poor education, non-nuclear families and Scheduled tribe households to fill the gap to achieve Sustainable Development goals (SDG) target by 2030.

Key words: clean fuels and technologies for cooking, NFHS, sustainable Development goals.

Introduction

Household air pollution is generated when cooking is done using open fires or inefficient stoves that are fuelled by kerosene, biomass (such as wood, animal dung, and crop waste), and coal. Utilizing solid fuels for cooking is a significant contributor to household air pollution (HAP), which is a leading

Corresponding Author: Visweswara Rao Guthi, Associate Professor,Department of Community Medicine, SVIMS-Sri Padmavathi Medical College for Women, Tirupati, Andhra Pradesh.

E-mail: vissumbbs@gmail.com

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cause of mortality worldwide. Additionally, this practice imposes substantial environmental burdens.[1] In 2014, it was estimated that more than 800 million individuals in India did not have access to clean cooking fuel. This suggests that non-poor rural households have also been utilizing solid biomass as a source of energy for cooking.[2] According to reports, the use of solid biomass in inefficient cookstoves leads to approximately 1.3 million premature deaths annually in India.[3] The use of traditional stoves for cooking, especially in poorly ventilated areas, increases the direct exposure of individuals (mainly women and children in the Indian context) to household air pollution (HAP).[4] The implementation of enhanced cooking technology among the poorest third of the global population has been praised as a cost-effective intervention that has the potential to significantly alleviate these challenges.[5] When implemented correctly, which means using clean cooking technologies that counterbalance the use of traditional, polluting stoves and fuels, the adoption of clean cooking technology can contribute to the achievement of at least five of the Sustainable Development Goals (SDGs) outlined in the 2030 Sustainable Development Agenda. The National Programme on Climate Change and Human Health elaborates on the short term and long-term ill effects of air pollution, such as headaches, recurrent ARIs, skin irritation, and Cerebrovascular accidents, diabetes, Hypertension. Household air pollution is produced when cooking is done using open fires or inefficient stoves that are fuelled by kerosene, biomass (such as wood, animal dung, and crop waste), and coal. This study tried to estimate the proportion of Households with primary reliance on clean fuels and technology for cooking in India and determine the factors associated with it using the National Family Health Survey (NFHS) 5 data.

Material and Methods

Study Setting: We used data from the 2019–2020, National Family Health Survey (NFHS-5) household level (IAHR7CFL) data which is a nationally representative household survey that covered each district in all 29 states and 7 union territories of India.

Sampling method: NFHS-5 has adopted uniform sample design, which is representative at the national, state/union territory and district level. It used a two-stage cluster sampling approach. In first stage, primary sampling units (PSUs i.e., villages in rural areas and census enumeration blocks or CEBs in urban areas) were selected using probability proportional to size (PPS) technique. In the second stage, a fixed number of 22 households per cluster (i.e., PSUs) were selected using the technique of systematic random systematic selection from newly created lists of households' living in the selected PSUs. The list of households' is created as a result of the mapping and household listing operation conducted in each selected PSU before the household selection in the second stage. NFHS-5 gathered information from 636,699 households', 724,115 women, and 101,839 men.

Data collection was conducted by using 1,061 field teams. Each team consisted of one field supervisor, three female interviewers, one male interviewer, two health investigators, and a driver.

Dependant variable:

Clean cooking fuel: Clean cooking fuel was considered as household's who are using electricity, LPG, biogas, natural gas and **unclean cooking fuel** was considered as any other fuel other than clean fuel**.** [6]

Independent variables: Number of household members, Type of place of residence(rural/urban), Sex of head of household (Hof), education of Hof (No education, Primary, secondary and higher), religion (Hindu, Muslim, Christian and others), caste (SC, ST, OBC, others), house type (Pucca, Semi pucca, Kutcha), household structure (Nuclear and non-nuclear), Region of country (North, Central, East, North east, West and South), Wealth index (Poorest, poorer, middle, Richer and Richest).

Data analysis: House hold recode file (IAHR7CFL) having household level data was accessed from Demographic and Health surveys (DHS) programme.

The proportions of household with clean cooking fuel along with (95% Confidence interval) has been estimated. The association between socio-demographic factors and Clean cooking fuel were assessed through a bivariate analysis. A multivariate logistic regression model was used to examine the

association between households' socio-demographic factors and clean cooking fuel. Variables with a p-value<0.05on bivariate analysis, and variables with contextual importance were included in the final multivariate logistic regression. A p value <0.05 will be considered statistically significant. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp was used for analysis.

Results

Sample characteristics: During NFHS-5 survey, data from 636699 households was collected during 2019-20. Among them majority of households had less than 5 members in the family (56.1%), rural residents (74.6%), with female Hof (53.7%), age of Hof more than 40 years (54.4%), Hof educated up to secondary school (60.4%) and married (52.7%), poorest wealth index family (33.9%) belong to other backward-caste (56%), pucca type of house (72.3%), nuclear families (53.7%), belong to Muslim religion (57.2%) and population of south region (80%). The Proportion of households using clean cooking fuel was 52.8% (95%CI: 52.7%-53.0%)

Table 1: Socio demographic factors wise distribution of Households (NFHS 5, 2019-20)

Variable		Number	Clean Cooking Fuel		p-value
			Yes	No	
No of household members	< 5	472192	56.1	43.9	<0.001
	≥ 5	162800	44.3	55.7	
Place of residence	Urban	159622	88.7	11.3	<0.001
	Rural	475370	41.1	58.9	
Age of Head of Family	< 40 Years	193163	50	50	<0.001
	≥ 40 years	441829	54.4	45.6	
Wealth index	Poorest	148201	7.7	92.3	<0.001
	Poorer	140618	33.9	66.1	
	Middle	128705	65	35	
	Richer	114826	84	16	
	Richest	102642	95.2	4.8	
Caste	Scheduled Caste	122620	49.8	50.2	<0.001
	Scheduled tribe	123197	34.4	65.6	
	Other backward class	233309	56	44	
	None of them	124012	68.7	31.3	
Sex of Head of Family	Male	525897	52.9	47.1	<0.001
	Female	109079	53.7	46.3	
Religion	Hindu	480734	52.4	47.6	<0.001
	Muslim	72447	57.2	42.8	
	Christian	49605	48	52	
	Others	32106	61.8	38.2	

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Region	North	121490	58.1	41.9	<0.001
	Central	138592	39.4	60.6	
	East	103161	33.1	66.9	
	Northeast	94380	45.2	54.8	
	West	65191	68	32	
	South	112178	80.7	19.3	
Highest level of education attained	No education/ Preschool	188437	37.3	62.7	<0.001
	Primary	117515	45.1	54.9	
	Secondary	268560	60.4	39.6	
	Higher	59925	85	15	
Current marital status	Never married	12457	59.8	40.2	<0.001
	Married	532667	52.7	47.3	
	Living together	89725	54.3	45.7	
Household Type	Kachha	37616	17.7	82.3	<0.001
	Semi-Pucca	245672	31.9	68.1	
	Pucca	342975	72.3	27.7	
Household structure	Nuclear	373494	53.7	46.3	<0.001
	Non nuclear	261498	52.1	47.9	

From Table 1 It was observed that majority of households with family size of < 5 (56.1%), households resided in urban areas (88.7%), households with female Hof (54.4%), Hof aged 40 or older, households belonged to the richest wealth index (95.2%), households belonged to other castes (56%), Muslims (57.2%), households located in the southern region (80.7%), households with Hof educated to higher level of education (85%), households Hof with marital status of never married (59.8%), households residing in pucca (permanent) structure (72.3%), and nuclear families (53.7%) were using clean cooking fuel when compared to their counterparts.

Table 2: Association between sociodemographic factors and Clean cooking fuel (NFHS 2019-21)

Variable		**Clean cooking fuel**	
		U OR (95%CI)	**A OR (95% CI)**
No of household members	< 5	1	1
	≥ 5	0.624(0.617-0.631)	0.652 (0.640-0.664) *
Place of residence	Urban	1	1
	Rural	0.089(0.087-0.090)	0.282 (0.276-0.288) *
Age of Head of Family	< 40 Years	1	1
	≥ 40 years	1.191(1.178-1.204)	0.825(0.811-0.839) *

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Wealth index	Poorest	1	1
	Poorer	6.169(6.034-6.306)	6.315(6.157-6.477) *
	Middle	22.422(21.927-22.978)	24.997(24.292-25.722) *
	Richer	63.118(61.572-64.703)	75.312(72.812-77.898) *
	Richest	240.937(232.763-249.398)	313.527(299.633-328.066) *
Caste	Scheduled Caste	1	1
	Scheduled tribe	1.217(1.198-1.236)	0.717(0.699-0.736) *
	Other backward class	0.841(0.825-0.856)	0.778(0.763-0.794) *
	None of them	1.471(1.437-1.505)	0.997(0.974-1.021) *
Sex of Head of Family	Male	1	1
	Female	1.032(1.019-1.046)	6.315(6.157-6.477) *
Religion	Hindu	1	1
	Muslim	0.530(0.522-0.539)	1.408(1.372-1.446) *
	Christian	1.286(1.269-1.304)	0.726(0.701-0.752) *
	Others	2.216(2.180-2.253)	1.184(1.144-1.225) *
Region	North	1	1
	Central	0.468(0.461-0.475)	1.786(1.744-1.829) *
	East	0.357(0.351-0.364)	2.242(2.183-2.302) *
	Northeast	0.595(0.585-0.685)	3.598(3.490-3.710) *
	West	1.533(1.502-1.564)	4.501(4.371-4.635) *
	South	3.010(2.954-3.067)	8.558(8.330-8.792) *
Highest level of education attained	No education	1	1
	Primary	1.379(1.359-1.400)	0.922(0.902-0.942) *
	Secondary	2.568(2.537-2.600)	1.051(1.031-1.071) *
	Higher	9.553(9.324-9.789)	1.576(1.522-1.631) *
Current marital status	Never married	1	1
	Married	0.749(0.722-0.776)	0.640(0.607-0.676) *
	Living together	0.799(0.770-0.831)	0.813(0.767-0.862) *
Household Type	Pucca	1	1
	Semi-Pucca	2.177(2.118-2.239)	0.842(0.814-0.871) *
	Kaccha	12.129(11.800-12.468)	0.589(0.568-0.611) *
Household structure	Nuclear	1	1
	Non-nuclear	0.935(0.926-0.944)	0.842(0.814-0.871) *

*Significant, UOR – Unadjusted odds ratio, AOR- Adjusted odds ratio.

From Table 2 It was observed that households with family size of ≥ 5 (AOR-0.652% (95% CI: 0.640% - 0.664%), rural residence households (AOR-0.282% (95% CI: 0.276%-0.288), Households with Hof aged ≥40 years (AOR-0.825% (95% CI: 0.811%-0.839), Scheduled tribe households (AOR- 0.717(0.699-0.736), Christian religion households (AOR-0.726(0.701-0.752), Households with Hof educated up to primary education (AOR-0.922(0.902-0.942), households with Married Hof (AOR-0.813%(95% CI: 0.767%-0.862%), Household residing in kaccha houses (AOR- 0.589(0.568-0.611), Household structure with nonnuclear (AOR- 0.842%(95% CI: 0.814%-0.871) were less likely using clean cooking fuels. Whereas households belonged to richest wealth index (AOR-313.527(299.633-328.066), households in the southern region (AOR-8.558(8.330-8.792), Households with Hof educated up to higher education (AOR-1.576(1.522-1.631) were more likely using clean cooking fuels.

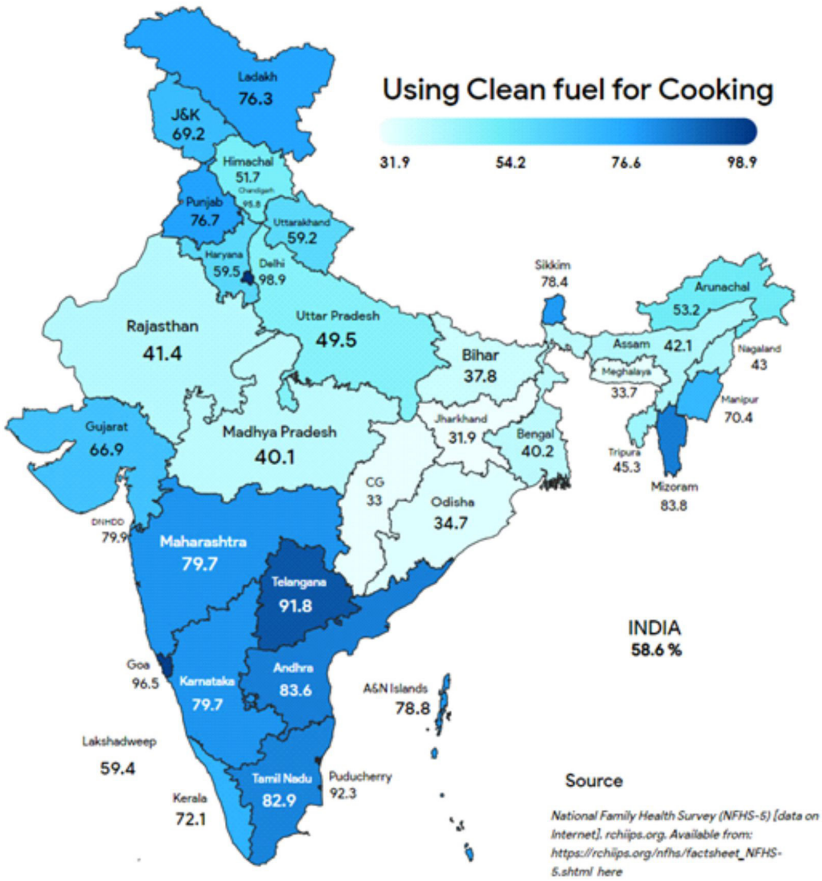


Figure 1: Showing the usage of clean cooking fuel in India as per National Health Family Survey NFHS-5 (2019-2021)

State wise proportion of usage of clean fuel was ranging from 31.9% to 98.9%. Jharkhand was the lowest and Delhi was the highest proportion of using clean cooking fuel.(Figure 1)

Discussion

This study used a wide range of variables to assess the availability and use of clean cooking fuels in Indian households, out of which women's education and wealth including their share in household expenditure seem to have the most significant impact on the use of clean fuel.[7]

The relevance of this study is highlighted as we delve into the worldwide statistics, among which the one that stands out the most is a WHO study published in the Global health observatory in 2022, stating that a staggering 2.3 billion people worldwide still remain without access to clean cooking fuel, with the lowest coverage found in Sub-Saharan Africa.[8]

Approximately 2.5 million premature deaths occur annually as a result of household air pollution, primarily caused by cooking smoke. Recent data shows a progressive decline worldwide in the number of people who do not have access to clean cooking facilities. However, this decline has not been sufficient to keep up with the population growth in numerous countries, particularly in sub-Saharan Africa. The Covid-19 pandemic exacerbated the problems, increasing the number of people without clean cooking by 1% between 2019 and 2021.[9] Approximately 1.5 billion individuals residing in developing Asia, which accounts for 60% of the global population, lack access to clean cooking facilities.[10] Of overwhelming concern is the fact that use of unclean fuel is a contributes significantly to household air pollution which is caused by release of particulate matter, CO, NO, CO2 and other noxious gases. The majorly affected were women[11], young children[12] and causing a huge impact on incidence of LRTI in under-6 children, low birth weight[13] and under-five mortality. In other studies, conducted in India, it was found that women exposed to biomass fuel gas had higher adverse ophthalmic, dermatological, cardiovascular and obstetric outcomes[15]. Studies conducted in African countries reflect wide urban-rural gaps in clean fuel accessibility and consumption and a very slow, disheartening progress towards adoption of clean fuel.[16] Similarly, studies conducted in other parts of the world showcase allied results, and even highlight some underestimated individual health issues. Studies done in rural China show that use of solid cooking fuels and the resultant HAP from it is associated with rapid decline of mental health among the elderly[17] as well as cognitive dysfunction[18] and higher depression symptoms/similar diseases[19-20]. In addition, use of clean fuels has shown to drastically improve the health of women.[21] It is estimated that HAP due to use of solid cooking fuels is a major drive for global warming[22], as well as other environmental and health hazards associated with solid biomass.[23]

Clean fuel utilization is linked to various factors apart from wealth index, such as educational status, caste, gender variables, religion and marital status to name a few, as has been highlighted in our current study. Hence, studies emphasizing on social factors are able to provide a clearer picture to the hidden variables that are sometimes overlooked. For instance, the number of households having access to LPG has been estimated at a 97.5% by the GOI.[24] However, a study conducted by IRES[25] estimates this number at only 85%. This vast gap is explained by the fact that just the number of domestic household connections is insufficient to determine LPG penetration, pinpointing at possible duplication of connections. Other concerns highlighted in the study which hinder the adoption of clean fuel include unaffordability of LPG especially for people living in kutcha/semi kutcha houses[26], and the stacking of solid fuels in rural India by no less than 38% of the houses, which has been attributed to the recurring expense of refills associated with LPG connections, as well as lack of refills and non-receipt of subsidy payment.[27]

One of the initiatives taken by the Indian government to achieve the sustainable development goal 7is the launch of the Pradhan Mantri Ujjawala Yojana[28], under which LPG cylinders are distributed at a subsidized price to the lower caste, BPL, forest dwellers and people on islands.[29]China, the implementation of natural gas infrastructure and African clean cooking energy solutions (ACCES) initiatives has been taken up to meet the SDG 7.[30]

Strengths and limitations:

This study used data from the NFHS-5, ensuring reliable, national data for a full analysis. National data collection eliminates cultural and personal biases and minimizes inaccuracies. The study evaluates wealth, housing type, quality of life, religion, marriage, and education to understand how socio-demographic factors affect cleaner cooking practices. Since grassroots data is not collected directly, it is impossible to ascertain its acquisition techniques. Which family members attended the collection process, and how freely could the interviewees respond? The study neglects the influence of children on the data and their well-being, especially female children. We could have also addressed the difference in healthcare expenditures between households using clean fuel and those using non-clean fuel, as well as their financial implications.

Conclusions

More than 50% of households do not have access to clean fuels and technologies for cooking. Focus should be on providing access to North Indian states,

rural households, households with female as head of the family (HoF), HoF with poor education, non-nuclear families and Scheduled tribe households to fill the gap to achieve Sustainable Development goals (SDG) target by 2030.

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Availability of data and material: The data can be downloaded from the website of the Demographic and Health Survey (DHS) (http://dhsprogram.com/Data/).

Ethical Considerations: This study based on secondary dataset, is available in public domain for research use. Hence, no ethical approval was required from any institutional review board

Conflict of Interest: None Declared

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Original Article

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Determinants and the Correlates of Menstrual Cup usage among Medical Students in a Tertiary Care Hospital in Puducherry

M. MercyJafrin[1], S. Pravinraj[2], R. Ishwarya[3]

[1,2]Assistant Professor, [3]Post Graduate, Department of Community Medicine, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, Affiliated to Bharath Institute of Higher Education and Research.

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Abstract

Introduction: Adolescence is the period between 10-19 years of life and about 1/5th total female population in the world are adolescent girls who requires specific and special attention. Menstruation is a unique phenomenon happening at this age which has lots of social stigma attached to it. It affects the physical, mental and social functioning of any teenager which is of greater concern in order to prevent any major disorder of sexual and reproductive health in future.

Objectives: To determine the prevalence of usage of menstrual cup among medical students and to determine the barriers and facilitators regarding the use of menstrual cup and finally to estimate the knowledge and practises and its association with various determinants of menstrual cup.

Methods: This study was a analytical cross sectional study conducted among the female medical students of a private medical college in Pondicherry. The study tool was a Google form comprising the socio demographic details of the study participant and the details regarding the usage of menstrual products especially menstrual cup. This study followed the universal sampling method and a total of 328 students responded. The responses were downloaded in the Microsoft excel and analysed using the SPSS version 21.

Results: Out of the total 328 study participants 54.9% belonged to the age group of 18-23 years, 45.1% were in age group of 24-27 years. Of these 62% were I – III years, 37.8% were IV- CRRI, these students resided in all the types of families, such as 42.1% in the nuclear type, 57.9% in the three-generation type and the joint family. The knowledge prevalence of menstrual cups was 42% among the study participants. The prevalence of the usage of menstrual cups was 41.5%. The logistic regression model showed statistical significance with age (OR=5.078, p = 0.003). Students aged 18 to 23 were 5.078 times more likely to face barriers to using menstrual cups than those aged 24 to 27. Furthermore, increasing age was associated with a decrease in the likelihood of barriers to usage. Those in lesser years of study were 12.086 times more likely to have a barrier.

Corresponding Author: M. MercyJafrin, Assistant Professor, Department of Community Medicine, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, Affiliated to Bharath Institute of Higher Education and Research.

E-mail: dr.m.mercy@gmail.com

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Conclusion: From this study its evident that literacy about a concept plays a key role in adapting to a new change. Thus behaviour change communication has to be the key strategy in formulating the change in behaviour to convert theory into practise.

Key Words: Medical students, menstrual hygiene, menstrual cup.

Introduction

Adolescence is the period between 10-19 years of life and about 1/5th total female population in the world are adolescent girls who requires specific and special attention. Menstruation is a unique phenomenon happening at this age which has lots of social stigma attached to it. [1,2] It affects the physical, mental and social functioning of any teenager which is of greater concern in order to prevent any major disorder of sexual and reproductive health in future.It is a normal physiological process which is addressed with enormous cultural and social taboos which is traumatising to the teenage girl. This adolescent period in any girl is fallen prey to the societal perspectives and subjective opinions of the community.[3,4]Although menstruation is a normal physiology is has various influences in sexual and reproductive health of the girl who becomes the future women hood of a society. Women having a higher knowledge regarding menstrual hygiene and safe menstrual practices are less prone to reproductive tract infections and its consequences. In the contrary girls with less knowledge and attitudes leading to unhygienic menstrual practices are prone for a lot of reproductive tract infections and can lead to infertility in future. This study focuses on the new menstrual hygienic practises that is introduced in the market and how far it is accepted among the student population. Hence an initiative was taken to determine the prevalence of usage of menstrual cup among medical students and to determine the barriers regarding the use of menstrual cup and to assess the facilitators regarding its usage and finally estimate the knowledge and practises about the menstrual cup and its associations. This study was aimed mainly to determine the knowledge regarding the newer sustainable menstrual cup among medical fraternity who will disseminate the utility to the public and bridge the knowledge and practise gap.

Aims and Objectives:

1. To determine the prevalence of usage of menstrual cup among medical students.
2. To determine the barriers and facilitators regarding the use of menstrual cup.
3. To estimate the knowledge and practises regarding the use of menstrual cup.
4. To evaluate the association with various determinants about the menstrual cup.

Methods

This study was a analytical cross sectional study conducted among the female medical students of a private medical college in Pondicherry. The study protocol was designed and conceptualised and presented to the Institutional Ethical Committee and approval was obtained on 12/4/22 with IEC no/C-P/6.The study tool was a structured ,pre validated and pre tested questionnaire which was converted into the Google forms and circulated among the medical students through whats app and e mail. The study tool has four parts comprising the socio demographic details of the study participant and the details regarding the usage of menstrual products especially menstrual cup, its utility, knowledge regarding it and the attitude and practises of sustainable menstrual hygienic practices. The facilitators and barriers regarding the usage of menstrual cup were also assessed with respective questions. The data was collected by sending the link of the questionnaire through Google link. This study followed the universal sampling method and thus all the participants who are willing to participate were included in the study. The main purpose of this study was to assess the knowledge regarding the newer sustainable menstrual cup and so all the female medical students of the college were included. The basis of sample size was derived from the study by Manorama et al [5] which showed a prevalence of knowledge of menstrual hygienic practises among adolescents as 70.4%% and 5% of absolute precision of prevalence, the sample size was derived to be 328 considering the non response rate and attrition also. The participants were explained about the study protocol and procedure of the study and the willingness was obtained with the help of participant

information sheet and informed consent forms. Then the research was carried out with the help of Google forms. The participants included all the female M.B.B.S students across all the four academic years and the those students who were undergoing internship. The responses were downloaded in the Microsoft excel and analysed using the SPSS version 21. The results were presented in descriptive and inferential statistics. The categorical variables were expressed as frequency and percentages and the continuous variables were converted into class intervals and presented as frequency and percentages. Chi square test was used to see for any association between users and non-users. Logistic regression analysis was done to ascertain the effects of age, year of study, Type of family, and knowledge of menstrual cups on the likelihood that respondents had barriers to usage of menstrual cups.

Results

Out of 328 female medical students, 54.9% belonged to the age group of 18–23 years, and 45.1% were in the age group of 24–27 years. Of these, 62% were I – III years, 37.8% were IV- CRRI, these students resided in all the types of families, such as 42.1% in the nuclear type, 57.9% in the three-generation type and the joint family. The knowledge prevalence of menstrual cups was 42% among the study participants. The prevalence of the usage of menstrual cups was 41.5%

Table 1: Baseline characters of the study participants (N=328)

VARIABLE	CATEGORY	FREQUENCY n(%)
AGE (YEARS)	18-23	180(54.9)
	24-27	148(45.1)
Year of Study	I Year – III year	204(62.2)
	IV year - CRRI	124(37.8)
Type of family	NUCLEAR FAMILY	138(42.1)
	OTHERS	190(57.9)
Usage of menstrual cup	YES	**136(41.5)**
	NO	192(58.5)
Knowledge of menstrual cup	YES	138(42.1)
	NO	190(57.9)

(Table 1).All the participants who are currently using menstrual cups were using sanitary pads previously. An average amount of around Rs.500 to Rs.1000 to the menstrual hygienic products per month. Those participants who did not use menstrual cup gave the following reasons as barriers in using the menstrual cup like pain (32%), fear of leakage in 44%, socio cultural hindrances 13%,difficulty in insertion 10%, and inability to maintain the hygiene in 1%.These were the main barriers addressed and brought out by this study . About 21% cited that they were able to insert it correctly only after about five trials. This showed the trial and error method of insertion of the menstrual cup. Out of the users, about 42% have advised others to use it. Only about 47% of the users used it in a public restroom. (Figure 1). The non users of menstrual cup stated the most common factor which enhanced the usage of other products like sanitary pads and cloth were the ease of use sanitary pad(71%). easy availability (24%), and easy to maintain the hygiene(5%). The non users of menstrual cup told that they will use it in future (36%) after trying out the new method. The primary reasons for switching from other menstrual products to menstrual cups, according to the students, were that they were more environmentally safe, cost effective, more comfortable, less likely to cause rashes.(Figure 2).

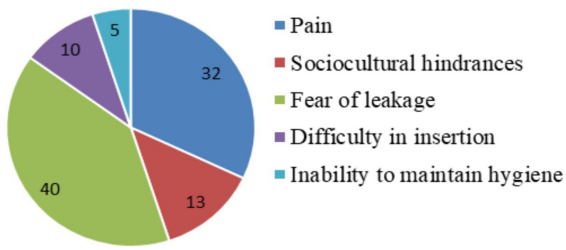


Figure 1: Barriers in using the menstrual cup

Participants who did not use menstrual cups cited the following reasons as barriers to use: pain (32%), fear of leakage (40%), sociocultural barriers (13%), difficulty with insertion (10%), and inability to maintain hygiene (1%). These were the primary barriers addressed and highlighted by this study.

The primary reasons for switching from other menstrual products to menstrual cups, according to the students, were that they were more environmentally safe, cost effective, more comfortable, less likely to

cause rashes.

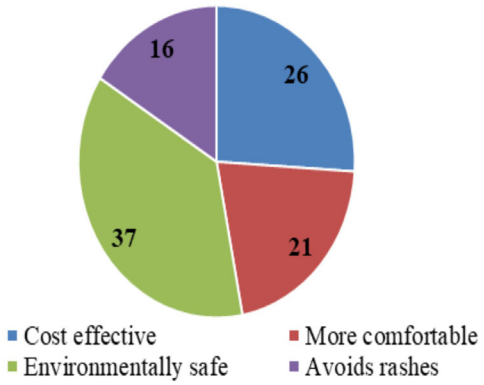


Figure 2: Reasons for shifting to menstrual cup

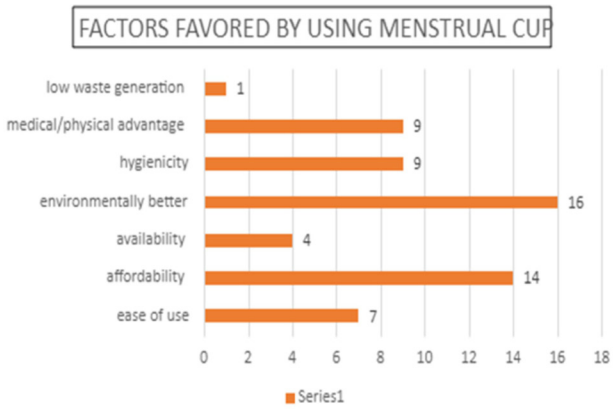


Fig 3: Distribution of factors favouring the usage of the menstrual cup

From the Figure 3 it is clear that the various factors which are facilitators for usage of menstrual cup are environmental friendly nature of it, affordability, ease of usage ,hygienic and low waste generation which is the need of the hour for sustainable development of the society.

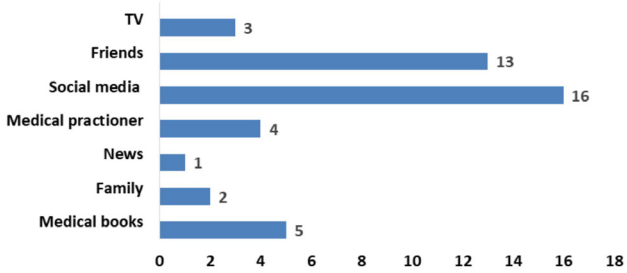


Figure 4 represents that 16% responded their source of information regarding menstrual cup as social media, 13% as friends, 5% as medical books and from other sources of information.

Table: 2 The Level of Association

There was a statistically significant association between age group and barrier in the usage of the menstrual cup (p-value<0.05). There was an association found between the year of study (YOS) of the respondents and its barrier. Data show that IV and CRRI students have a better understanding than students in lower years of study. Participants who resided in the nuclear family had more barriers when compared to other type of family's students. There was also an association between Knowledge of menstrual cup and its barrier in usage (p-values=0.000).

Table 2: Association between barriers and its usage

Variable	Category	Barriers		P value
		Present	Absent	
Age (years)	18-23	136(70.8)	44(32.4)	0.000
	24-27	56(29.2)	92(67.6)	
Year of Study	I Year – III year	162(84.4)	42(30.9)	0.000
	IV year - CRRI	30(15.6)	94(69.1)	
Type of family	Nuclear family	40(20.8)	98(72.1)	0.000
	Others	152(79.2)	38(27.9)	
Knowledge of menstrual cup	Yes	38(19.8)	100(73.5)	0.000
	No	154(80.2)	36(26.5)	

Table 3: Regression analysis on barriers in using the menstrual cup

Variable	Odds Ratio	95% C.I for Exp (B)		P value
		Lower	Upper	
Age	5.078	3.157	8.168	0.001
Year of Study	12.086	7.092	20.595	0.000
Type of family	9.800	5.876	16.344	0.000
Knowledge of menstrual cup	0.089	0.053	0.150	0.000

Table 3: Logistic regression analyses were performed to ascertain the effects of age, year of study, Type of family, and knowledge of menstrual cups on the likelihood that respondents had barriers to usage of menstrual cups. The logistic regression model showed statistical significance with age (OR=5.078, p = 0.003). Students aged 18 to 23 were 5.078 times more likely to face barriers to using menstrual cups than those aged 24 to 27. Furthermore, increasing age was associated with a decrease in the likelihood of barriers to usage. Those in lesser years of study were 12.086 times more likely to have a barrier. Students in nuclear families faced 9.800 times more barriers than other types of families. Less knowledgeable students faced greater obstacles when attempting to use it.

Discussion

In this study were 328 participants responded, the knowledge prevalence of menstrual cup was 42%. The prevalence of usage of menstrual cup was 41.5%. All the participants who are currently using cups were using sanitary pads previously. This showed the acceptance of a new method is not very easily possible even in a highly educated group. Average amount spent was around Rs.500 to Rs.1000 per month. Those participants who did not use menstrual cup felt that it caused pain (32%), there was a fear of leakage in 44%, socio cultural hindrances 13%,there was a difficulty in insertion 10%, inability to maintain the hygienicity in 1%. These were the hindering factors that was brought out by the study to use a new modality .About 21% cited that they were able to insert it correctly only after about five trials. So the easy ease in use of any new method is possible only after certain trial and error policy which is dependent on the individual level of proficiency. Out of the users, about 42% have advised others to use it. Even the users didn't disseminate the knowledge to the fullest .Only a proportion was happy enough to share their experiences to others and cultivate the habit of knowledge dissemination. Only about 47% of the users used it in a public restroom. The non users of menstrual cup stated the most common factor was the ease of use sanitary pad(71%).easy availability (24%), and easy to maintain the hygiene(5%).These were some facilitators to the usage of other products like sanitary pads and clothes.The non users of menstrual cup told that they will use it in future (36%). In a study conducted by A Dasgupta and M Sarkar[5,6]showed that 11.25% of girls used sanitary pads, 48.75% girls used cloth pieces, and 40% girls used both sanitary pads and cloth pieces. None of the girls used any other product of menstrual hygiene. In a study conducted by Sharjeea Arshad Ali et al [7] significantly lower number of females from general population were found to be aware of tampons and menstrual cup (15.9 and 11.4% respectively). It was seen that the most important criteria while choosing a menstrual hygiene product was the comfort for disposable sanitary pads (31.3%) and custom fit for menstrual cup (50.7%).[8] In their study 89% females used pads and 1.6% used menstrual cup. This was in contrast to our study where the prevalence of menstrual cup was more, because medical students are well informed about the advantages and disadvantages about any new advancement in medical field. So this platform should be used by the students to inform the public about the sustainable menstrual practises and its utility to provide a safe and healthy environment. These environment friendly modalities should made available at a low cost and ease to use. Similarly in our study among reproductive age medical students, it was seen that 95% used sanitary pads and their most important criteria for choosing pads was comfort and ease of use (71%). In a study conducted by DikshaPokhrel et al [6]among

13–19-year-old females in Nepal most participants found the menstrual cup easy and convenient to use (67%) and found it economically and environmentally advantageous(45%). In a systemic review and meta-analysis study conducted by Anna Maria Eijk et al [7,9,10]on Menstrual Hygiene Management Among Adolescent Girls in India reported that 73% wished to continue the use of menstrual cup after switching from their previous menstrual hygiene product. Thus the menstrual hygiene products and awareness depends on the individuals' perspectives and socio cultural surroundings that favours or hinders the usage of any product or practise. This new sustainable product will prevent the development of sexual and reproductive tract infections in the adolescents due to the durability and sanitary method of usage. So much insight has to be tailored to the advancement in the knowledge dissemination regarding the sexual and reproductive health and safe and durable and sustainable practises and products.

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Original Article

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Depression among Elderly in a Rural Area of Tamilnadu: A Cross Sectional Study

Malai Ammal. M[1], Vijayalakshmi. M[2]

[1]Assistant Professor, Department of Community Medicine, Government Medical College, Omandurar Government Estate, Chennai, Tamilnadu, [2]Professor and HOD, Department of Community Medicine, Government Medical College, Thiruvallur, Tamilnadu.

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Abstract

Background: Depression is a common problem in older adults but it is not a part of normal ageing process. According to Centre for Disease Control and Prevention (CDC), 1% to 5% of the general elderly population are affected by depression. It is often misdiagnosed as many of its symptoms mimic normal age related issues. Depression in older adults may affect their daily activities, reduces their quality of life and increases their suicidal risk. Hence this study is conducted to assess prevalence of depression among elderly people in a rural population.

Methods: A community based cross sectional study was conducted in a rural area of Tamilnadu among elderly people aged 60 and above using a semi-structured questionnaire containing sociodemographic details and Geriatric Depression Scale(GDS)- Short Form after obtaining informed consent from the participants.

Conclusion: Among 166 participants, 42.8% had depression. Depression was more prevalent in elderly who were 80 years and above, female participants, who were economically dependent on others, living alone and widowed/ separated. Depression has to be diagnosed early and promptly treated to prevent adverse outcomes.

Key words: Depression, Nutrition, Elderly, Older Adults.

Introduction

The world's population is rapidly ageing. Longevity is an incredible resource for society where elder people contribute as mentors, caregivers, artists, consumers, innovators, entrepreneurs and members of the workforce. Yet the extent of the opportunities that arise from increasing longevity will be heavily dependent on one key factor – the health of the older populations.[1]

Globally, the 60-plus population constitutes about 11.5 percent of the total population of 7 billion. By 2050, this proportion is projected to increase to about 22 percent when the elderly will out-number children (below 15 years of age). By the end of the

Corresponding Author: Malai Ammal. M, Assistant Professor, Department of Community Medicine, Government Medical College, Omandurar Government Estate. Chennai.Tamilnadu.

E-mail: malaisiva08@gmail.com

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century, the elderly will constitute nearly 34 percent of the total population in the country. In Tamilnadu, elderly people constitutes 11.2% of total population according to 2011 census.[2,3]

Non-clinical depression is a common mental disorder among elderly. Depression plays a major role in physical health, nutritional intake, ADL and quality of life. On the other hand, many recent studies are showing association between mental health and sense of well-being.

The relationship between health and depression is a vicious cycle. Geriatric population, who are more prone for dependency either physically or economically are at the risk of developing depressive disorders.

This study was conducted among older people in a rural area to study the prevalence of depression and its associated risk factors.

Objectives:

1. To assess the prevalence of depression among elderly people.
2. To identify the risk factors contributing to the development of depression

Materials and Methods

This cross sectional study was conducted among 166 community dwelling elders in a rural area of North Tamilnadu.

After obtaining institutional ethical committee approval, the participants were selected using simple random sampling from the list of elders obtained from the local multipurpose health worker. Information about the study and its purpose were explained. After obtaining written consent from the participants, they were interviewed using a pre-tested questionnaire containing three sections-

i. Socio-demographic details,

ii. Depression assessed by Geriatric Depression scale.[4]

iii. Nutritional status assessed using Mini Nutritional Assessment[5]and

The data were entered in MS excel and analysed using SPSS version 21.

Results

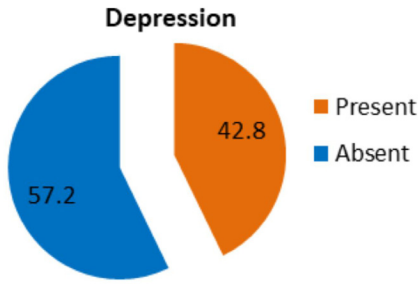


Figure 1: Prevalence of Depression

Depression was found to be present among 42.8% (n=77) of study participants (Figure 1). Among the participants, 8.4%(14) were 80 years and above, 66.9%(n=111) were female and 64.5%9107) had no formal education. Of the participants, 15.7%(26) were living alone and 63.3%(105) had financial dependency. (Table 1)

Table 1: Sociodemographic profile:

S.No	Characteristics	Percentage(n)	Chi-square value	p-value
1.	**Age Group**			
	80 years and above	8.4(14)	12.823	0.001
	70 – 79 years	20.5(34)		
	60 – 69 years	71.1(118)		
2.	**Gender**			
	Female	66.9(111)	10.076	0.002
	Male	33.1(55)		
3.	**Education**			
	Illiterate	64.5(107)	7.798	0.168
	Literate	35.5(59)		

Continue.....

4.	**Living arrangement**			
	Alone	15.7(26)	38.783	<0.001
	Lives with Family	84.3(140)		
5.	**Financial dependency**			
	None	36.7(61)	8.649	0.003
	Present	63.3(105)		

About 59.6%(99) had at-least one comorbidity. 12%(20) were underweight and 11.4%(19) were obese.(Table 2)

Nutritional status assessed by MNA scale showed 23.5%(39) were undernourished and 27.1%(45) were at risk of developing undernutrition.(Table 2).

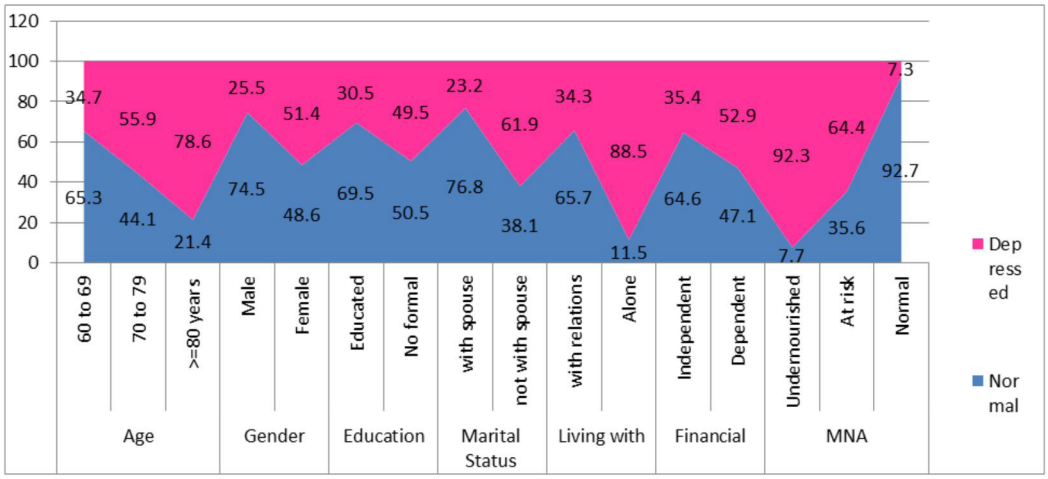


Figure 2: Prevalence of Depression among various factors

Prevalence of Depression was found to be more in elders aged >80 years (78.6%), females (51.4%), with no formal education(49.5%), living alone(88.5%), financially dependent (52.9%) and poor nutritional status (92.3%) (Figure 2). Statistically significant association was found between depression and age, gender, economic dependency, living arrangement, presence of comorbidity and nutritional status.

Table 2: Association between BMI, Comorbidity and depression.

S.No	Characteristics	Percentage(n)	Chi-square value	p-value
1.	**Comorbidity**			
	At-least one	59.6(99)	1.143	0.285
	None	40.4(67)		
2.	**BMI**			
	Underweight	12(20)	0.542	0.144
	Normal	49.4(82)		
	Overweight	27.2(45)		
	Obese	11.4(19)		
3.	**Nutritional status**			
	Undernourished	23.5(39)	89.843	<0.001
	At risk of undernutrition	27.5(45)		
	Normal	49.4(82)		

Discussion

Prevalence of depression was 42.8% among 166 participants of the study.In a study done in Maharashtra by Kamble et al, the prevalence of depression found to be 31.4%[6]. And in Andhra rural area, the prevalence of depression was found to be 44.7% in a study conducted by Bodhare et al whereas prevalence was 47% in Reddy et al study conducted in Tamilnadu[7,8].

In this study, it was observed depression was more prevalent in participants who were of age 80 years and above, female participants, economically dependent, who were living alone, who had no formal education and in undernourished elders. Similarly, Reddy et al noted that depression was more among females, illiterates, lower social class, those living alone, financially and physically dependent elders.

Significant statistical association was found in age >80 years, females, those living alone, economically dependent and poor nutritional status. Similar findings were found in Grover et al review article[9]. Whereas age and female gender were not significantly associated with geriatric depression in a study done by Rajkumaret al[10]. The difference in findings might be due to difference in study setting, study population and study tool employed.

Conclusion

This study concludes that psychosocial factors play a major role in depression among elderly people. Comprehensive Geriatric Care incorporating mental health and addressing all domains of ageing must be provided from primary care. Targeted interventions to counteract modifiable risk factors for depression can be planned and implemented. Geriatric gatherings can be promoted in residential areas which will combat depression and improve social life of elderly people.

The study participants with depression were encouraged to get help from the nearest public health facility.

Ethical clearance: Obtained from Institutional Ethics Committee of Madras Medical College, Chennai, Tamilnadu, India.(Dated-05.12.2017, No – 30122017)

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Conflict of Interest: Nil

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Original Article

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Clinical Profile, Immunization Status and Antitoxin Administration of Diphtheria Cases During an Outbreak in Rural North India

Pooja T[1], Meetu Yadav[2]

[1]Junior Resident, Department of Paediatrics, SHKM GMC Nuh Haryan, [2]Associate Professor, Department of Paediatrics, SHKM GMC Nuh Haryana.

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Abstract

Introduction: Diphtheria is an acute potentially fatal infectious disease caused by the toxigenic strains of Corynebacterium diphtheriae. Acute respiratory obstruction, toxic myocarditis and neurologic weakness are the most important complications of diphtheria. The clinical presentation and severity of diphtheria vary in immunised and non immunised children. Early diagnosis and prompt treatment including administration of diphtheria antitoxin and antibiotics minimise mortality.

Aim: To study the clinical profile of diphtheria during the 2019 outbreak and its association with immunisation status and antitoxin administration.

Methods: Records of 215 children admitted with the diagnosis of clinical diphtheria in a tertiary care teaching hospital in Nuh, Haryana, from January, 2019 to December, 2019 were analysed with respect to clinical features, immunization status, complications and mortality. Patients were divided into survivors and non-survivors' variables were compared between the two groups

Results: Data of 215 children was obtained. Young children (median age 5 year) were predominantly affected, and only 5(2.3%) children were fully immunized. Pseudomembrane was present in 113 (52.5%) cases. Albert staining and culture were positive in 57.2% (123) and 8.8% (19) cases, respectively. Complications developed in 38.1% (n=82) cases and included: airway compromise 15.3% (n=33), palatal palsy 4.7% (n=10), symmetric polyneuropathy 0.9% (n=2), diphtheritic cardiomyopathy 8.8% (n=19), acute kidney injury 2.3% (n=5), thrombocytopenia 6.6% (n=12) and hepatitis 0.4% (n=1) cases. Anti-diphtheritic serum (ADS) was administered to all admitted patients. Tracheostomy was done in (n=33) (15.3%) children. Case fatality rate was 12.1%.

Conclusion: Diphtheria mostly affected young unvaccinated or partially vaccinated children. Complications and mortality was high in unimmunized or partially immunized young children and those with bull neck, pseudomembrance, delayed (5 days) administration of ADS, acute kidney injury, thrombocytopenia and leukocytosis. Regular monitoring helped to detect asymptomatic myocarditis. The outbreak highlighted the need to improve awareness about diphtheria and better vaccination coverage. Administration of diphtheria antitoxin within 72 hours of presentation decreases the development of neurological complications. Regular anticipatory screening for cardiac involvement has a specific role in management.

Keywords: Leucocytosis, mortality, myocarditis, outcome.

Corresponding Author: Meetu Yadav, Associate Professor, Department of Paediatrics, SHKM GMC Nuh Haryana.

E-mail: Poojalekha.18@gmail.com

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Diphtheria is an acute potentially fatal infectious disease caused by the toxigenic strains of Corynebacterium diphtheriae [1]. In the pre-vaccine era, more than 40% of cases occurred in children below five years. Recently an upward shift in age is observed both in developed and developing countries [2,3]. Acute respiratory obstruction, toxic myocarditis and neurologic weakness are the most important complications of this disease. Cardiac involvement may be asymptomatic {characterised only by changes in Electrocardiogram (ECG) and/or raised cardiac enzymes) or symptomatic (with clinical features of heart failure)} [4]. The main modality of treatment is administration of diphtheria antitoxin and antibiotics. The rapidity of seeking medical care and administering specific treatment is known to decrease the mortality [1]. Immunisation status of the individual affects the clinical presentation and severity of the disease [5]

Diphtheria has been virtually eliminated from developed countries but is still endemic in developing countries [6, 7]. World Health Organization (WHO) surveillance reports indicate that most cases of diphtheria worldwide occur in Southeast Asia and Africa regions [8]. Several outbreaks of diphtheria have been reported in various Indian states in recent times, including one in Mewat (Nuh) district of Haryana, in 2018-2020. Mewat is one of the socio-economically backward districts, with majority (90%) living in rural areas [9]. Coverage Evaluation survey (CES) conducted by Government of India in 2018 reported full vaccination coverage of 40.8% in Mewat [10]. The objective of this study was to report on the epidemiological profile, immunization status, clinical spectrum, outcome and the predictors of poor outcome in children with diphtheria during this outbreak.





Figure 1 and 2: Images showing Bull's neck in diphtheria

Methods

This was a review of hospital records conducted in the department of pediatrics of a government medical college in Haryana after approval by the institutional ethics committee. The study population included children aged up to 15 years admitted over a period of three years (January, 2019 to December, 2019) with the clinical diagnosis of diphtheria. Diphtheria was defined as per World Health Organization (WHO) definition "an illness of upper respiratory tract characterized" by pharyngitis, naso-pharyngitis, tonsillitis or laryngitis and a firmly adherent greyish white, thick patchy to confluent membrane, which bleeds on dislodgement.

Inclusion criteria: Inclusion criteria: All children below 12 years of age who met the operational definition of diphtheria and were admitted to Paediatric Infectious Disease Unit from January 2019 to December 2019 were included in the study. A total of 80 children met the clinical case definition.

Exclusion criteria: included patients with age >15 years, known case of structural heart disease, those with an alternative diagnosis (other causes of membranous tonsillitis), absconded, discharge against medical advice (DAMA), referred and patients with incomplete data.

Procedure

Data regarding demography, clinical profile, immunization status, history of contact with a known case of diphtheria, site and extent of pseudomembrane, complications, laboratory and microbiological investigations, treatment details and outcome were collected from case records of all patients and recorded in predesigned case proforma. Patients were classified as survivors and nonsurvivors, depending on course during hospital stay.

The assessment of immunization status was done on the basis of immunization history mentioned in case files, which was assumed to be taken by recall method. Children who had received three primary doses of diphtheria-pertussis-tetanus (DPT) vaccine starting at 6 weeks of age followed by booster doses at 16-24 months and 5-6 years were considered 'immunized'. Those who had not received any dose

were considered 'Unimmunized'. Patients who had missed one or more of the primary doses or booster doses were considered 'Partially immunized'. Those in whom the immunization status was not known by the parents(s) or attendant were labelled as 'Unknow immunization status. Platelet count less than 150x109/L was considered as thrombocytopenia, and leukocytosis was defined as total leucocyte count more than 14 x109/L.

Throat swab culture: As per the protocol of the department, a case of membranous tonsillitis was evaluated by collecting throat and nasopharyngeal swabs, which were transported in Amies medium to the microbiology department of the hospital for Gram staining and Albert staining. Swabs of all Albert stain positive cases were sent to Maharishi Valmiki Infectious Disease Hospital (MVIDH), New Delhi for isolation, biochemical identification of the isolates, and testing for the toxigenicity.

Laboratory test: The laboratory tests include complete blood counts, Erythrocyte Sedimentation Rate (ESR), hepatic transaminases, renal function tests and urinalysis were done in all children at the time of admission and during clinical deterioration. ECG was taken soon after admission and was repeated on every alternate day during the inpatient stay, at the time of discharge and during follow-up visits.

Management: Albert stain positive cases were isolated and treated in a dedicated 10-bedded diphtheria (isolation) ward with Anti-diphtheritic serum (ADS), oral erythromycin or intravenous aqueous penicillin, and other supportive care as per standard guidelines. Patients with complications were treated in the pediatric intensive care unit (PICU) isolation rooms. Other causes of membranous tonsillitis were managed according to the underlying etiology.

Statistical Analysis

Statistical analysis was done using STATA v16. Normality of data was checked using Skewness and Kurtosis measurement. Since the continuous data was skewed, we report median (IQR) for quantitative variables. The outcomes were classified as survivors and non-survivors. Patients who absconded or were discharged against medical advice (DAMA) were excluded from multivariable analysis. The Wilcoxon ranksum test (Mann-Whitney U test) was used for comparison of the categorical or quantitative variables between the survivor and non-survivor groups. Comparison of the categorical variables between the two groups was done by the adjusted odds ratio (aOR) of complications in non-survivors against survivors, adjusted for potential confounding variables viz., age, duration of illness before admission; and history of contact with a known case of diphtheria. For all tests of significance, a Pvalue <0.05 was taken as significant.

Results

Records of 215 children were analyzed. Most cases were admitted between August to November. On comparing the variables between survivors and non-survivors, it was found that median age was significantly lower (P=0.001) and duration of illness before admission was significantly higher (P=0.026) in the non-survivor group. The Odds ratio (OR) for having airway compromise, myocarditis, cardiogenic shock, heart block, acute kidney injury (AKI), thrombocytopenia and leuko-cytosis were significantly higher for non-survivor group. Myocarditis was strongly associated with death [OR (95%CI) 140.54 (18.31-1078.37); P=<0.001]. The results were are follows

Demographic and Clinical Profile of Children With Diphtheria

Age group (y) 5yrs (3-8)

Male gender 163 (75.8%)

Immunization status

Unimmunized 210(97.7)

Immunized 5 (2.3)

Pseudomembrane 113(52.5)

Type of involvement

Pharyngeal 102 (47.5)

Laryngeal 10 (4.6)

Culture positivity

Albert stain positive 123(57.2)

Culture positive 19 (8.8)

Table 1: Clinical Features

Fever	96 (44.6%)
Dysphagia	94 (43.8%)
Breathing difficulty	41 (19%)
Bull neck	17 (7.9%)

Table 2 Complications

Palatal palsy	10 (4.7%)
Symmetric polyneuropathy	2 (0.9%)
Airway compromise / Tracheostomy	33 (15.3%)
Diphtheritic cardiomyopathy	19 (8.8%)
Acute kidney injury	5 (2.3%)
Thrombocytopenia	12 (6.6%)
Hepatitis	1 (0.4%)
Death	26 (11.9%)

Discussion

In our study, majority of the cases were aged less than 5 years; whereas, in previous Indian studies majority of the cases were older than five years, with 48.3% and 69% of children fully immunized for age [11, 12]. This is because in the absence of routine immunization, diphtheria mainly affects children less than 5 years of age, as was observed in the pre-vaccination era [13]. With increasing coverage of under-five children with primary vaccination schedule, an upward shift in the age for diphtheria has been observed from preschool to school age (5-15 year) [11]. Similar seasonal patternhas been previously reported [14, 15]. Increased mortality in those who presented late, with most ofthe deaths occurring within two days of admission were also noticed by other authors [10], similar to our study. Studies have shown a significant association between immunization status and disease severity. Low culture positivity rate observed in our study may be due to pre-treatment with antibiotics, improper swab collection technique, difficulty in collecting swabs from young/uncooperative children and delayed transportation of samples to the accredited laboratory.

Airway compromise seen in this study was higher than the reported incidence of airway compromise of 4-15% [16]. The incidence of diphtheritic cardiomyopathy in our study was much lower than the rate of 19-68% reported in previous studies [13, 17-19]. The mean interval between the onset of symptoms and cardiac abnormalities was similar to the reported range of 6.5-8.5 days, although the interval has been reported to be as long as 25 days [13, 17, 18]. Contrary to its classical description of occurrence between the second and third week of illness, the onset of diphtheritic cardiomyopathy was earlier in our study (first week of illness). This may be because of poor immunization status of our study population. Jayshree, et al. [13] observed that myocarditis more commonly developed in children who had severe respiratory symptoms, presence of bull neck, inadequate immunization, presence of pseudo-membrane and delayed administration of ADS [13]. The combination of pseudomembrane and bull neck strongly predicted the development of cardiomyopathy [20]. In a previous study from northern India, incidence of AKI was high (35.4%), and death occurred in 88.2% of AKI patients [13]. Only one child who received antitoxin within 72 hours of disease onset developed neurological complications and this was statistically significant (p-value <0.05). Higher incidence and mortality of AKI in this study may be because this study was conducted on diphtheria patients admitted in paediatric intensive care unit only [13]. Incidence of thrombocytopenia in the same study was 31.2% and mortality was observed in 66.7% cases [13].The case fatality rate (CFR) observed in our study was 12.1%. The mortality rate is generally between 5%-10% [21]. It may be as high as 20% in children below five years and adults over 40 years of age [21]. High mortality rate observed in our study might be due to young unimmunized Cases presenting late (> 5 days) with consequent delayed administration of ADS and development of complications. Another reason for high mortality rate in our study was lack of facilities like continuous ECG monitoring, pace-maker insertion and peritoneal dialysis.

Limitations

Details on nutritional status, socio-economic status, culture positivity and toxigenicity were not present, therefore, the impact of these variables on disease burden, severity and outcome could not be studied. Immunization status of patients may be inaccurate (presumed to be taken by recall method), which may affect the study results. Reason(s) for poor vaccination coverage could not be explored due

to lack of such data. Cases of underlying structural heart disease (when suspected)could not be ruled out due to lack of facility of echocardiography.

Conclusion

In conclusion, poor routine immunization coverage was an important factor for diphtheria outbreak in the study. Mortality was high in unvaccinated young children who develop complications, often multiple. Myocarditis, AKI, thrombocytopenia and leukocytosis were associated with poor prognosis. Mortality was high with delayed (> 5 days) administration of ADS even if the dose was adequate. AKI patients frequently developed concomitant thrombocytopenia with or without clinical bleeding. Characteristics which can help to anticipate the development of myocarditis include younger age (<5 year), unimmunized/partially/ unknown immunization status, bull neck, presence of pseudo membrane, administration of ADS three or more days after onset of illness andleukocytosis

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Original Article

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Determinants and Outcomes of COVID-19 during the Third Wave: A Cross Sectional Study

Moirangthem Arun Singh[1], Nepram Sanjib Singh[2], Laishram Trinity Meetei[3], Kshetrimayum Birendra Singh[4], Y. Arunkumar Singh[5], Th. Suraj Singh[6]

[1]Statistical Assistant, Medical Record Department, RIMS Hospital, [2]Professor, Department of Plastic Surgery, RIMS Hospital, [3]Assistant Professor, Department of Obstetrics & Gynaecology, RIMS Hospital, [4]Professor, Department of Medicine, RIMS Hospital, [5]Assistant Professor, Department of Anaesthesia, RIMS Hospital, [6]Professor, Department of Neuromedicine, RIMS Hospital.

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Abstract

Aim: The threat of COVID-19 has been continuing as a recurring wave with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) since its outbreak in December 2019 with the virus changing its variant form frequently. This study was conducted with the aim to study the clinical profile, laboratory parameters, complications, and other outcomes of patients who were hospitalized with COVID-19 infection during the third wave in a tertiary care hospital in Manipur, India.

Materials and methods: This is a single-centre retrospective study. The data were collected from the medical record department of the Regional Institute of Medical Sciences (RIMS), Imphal. The case records of COVID-19 positive patients who were hospitalized in the RIMS Hospital from 1st January 2022 to 31st March 2022 have been collected. Corresponding data on demographic profile, clinical symptoms, laboratory findings, complications, and clinical outcome were also collected and were compared between patients classified as non-severe and severe cases.

Results: The analysis included 275 confirmed COVID-19 patients. Median age was 37 years and IQR (Inter quartile range) was 27-62 years. Of the 275 cases, 41.5% (n = 114) were male and severity is more among the male patients with 58.1%. Old age, duration of hospitalization and d-dimer were independent factors increasing the risk of death due to COVID-19 ($p<0.001$). Nevertheless, vaccination was significantly associated with the severity of disease among the older population.

Conclusion: In summary, vaccination and severity of disease were associated among the older population. Severity rate is more among the male patients. Old age, duration of hospitalization and d-dimer were independent factors increasing the risk of death due to COVID-19.

Key words: COVID-19, Pandemic, Specialized hospital, Third wave, d-dimer

Corresponding Author: Nepram Sanjib Singh, Professor, Department of Plastic Surgery, RIMS Hospital.

E-mail: snepram@yahoo.com

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Introduction

The COVID-19 pandemic represents a significant global health emergency, rapidly disseminating worldwide since its initial identification in December 2019 in Wuhan, China. The World Health Organization (WHO) formally declared the outbreak a pandemic on March 11, 2020[1]. Therefore the world witnessed emergence of other variant with the emergence of omicron variance in November 2021 in South Africa[2,3] On 26th November 2021, WHO declared the omicron variant a variant of concern[4]. India witnessed the first case of new variant on 2nd December 2021 in Karnataka indicating its infectious and transmissibility as well as raised the concerns of severely affecting the children [5–9] .Subsequently, it spread to many other countries around the world, which came as no surprise given the characteristics of this particular variant. This indicated the high infectivity and transmissibility of this particular variant. The third dose of the COVID vaccine was rolled out in the beginning of 2022 on priority groups basis in India.[6,10] Hence, the COVID-19 cases during the third wave has been particularly chosen as a matter of study and contemplation for the purpose of creating a clinical profile, laboratory parameters, complications, and other outcomes.

Methods

As stated, this is a single-centre retrospective, observational study, where data has been collected from the medical record department of RIMS Hospital, Imphal. In this study, the case sheet records of COVID 19 positive patients who were admitted in the RIMS Hospital from 1st January 2022 to 30th March 2022 were collected. Corresponding data on demographic profile, clinical symptoms, laboratory findings, complications, and clinical outcome were collected and compared between patients classified as non-severe and severe cases. Cases with incomplete data were excluded.

Patients with severe dyspnoea, low oxygen saturation (SpO2 < 93%), respiratory distress, or requiring mechanical ventilation and ICU admission has been defined as severe cases. Patients with mild symptoms and/or not requiring any respiratory support or ICU admission has been categorised as non-severe cases[11].

The clinical and laboratory data of all the patients has been collected from the case sheets available in the Medical Record department (MRD) of the hospital. Two study investigators checked the collected data independently. Data abstracted includes age, gender, prior history of COVID-19 infection, vaccination history, history of underlying comorbidities (Hypertension(HTN), Diabetes(DM), cardiovascular disease, chronic pulmonary disease, Chronic Liver Disease(CLD), Chronic Kidney Disease(CKD), malignancy, etc.), symptoms (fever, cough, dyspnoea, backache etc.), vital signs at admission (heart rate, blood pressure, and respiratory rate) and laboratory parameters on admission [blood glucose level, CBC, KFT, serum electrolytes, chest X-ray, chest computed tomography (CT) scans (when indicated)]. Details like duration from the onset of symptoms to admission, the total length of stay in the hospital, development of any other complications, and mortality were also recorded and thus availed. A comprehensive comparison of the demographic profile, clinical characteristics, and other outcomes of patients with severe and non-severe cases has been conducted.

Data Collection

The data was collected from the medical record department of RIMS Hospital, Imphal. Patients condition has been deemed to be improved if they satisfy the criteria for discharge as recommended by the Ministry of Health and Family Welfare, government of India[12]. Data obtained were entered in Microsoft Excel and Statistical analysis was done by using IBM SPSS Version 22 for windows (IBM, Armonk, New York, USA). Continuous variables have been presented as mean ± standard deviation (SD) or median (IQR) according to the nature of data. Categorical variables are expressed as frequency (percentages, %). Univariate analysis was done using Chi-square test for categorical variables and independent t-test or Mann-Whitney U test for continuous variables. For all the statistical analyses, p-value < 0.05 was considered as statistically significant. Explanatory factors were incorporated into a multiple logistic regression if p values were less than 0.05 by univariate analysis.

Results

Demographic Profiles

A total of 275 patients were included with median age of 39 years and interquartile range (IQR) 27-62 years out of which 161(58.5%) were female. Of the 275 cases 114(41.5%) were from the age group 18-40 years while 72(26.2%) were from 60 years and above and only 29(10.5%) cases from the age group less than 18 years. Severe cases were 62 in number (22.5%) while 213 (77.5%) cases were labelled as non severe disease (table 1). The median age of the severe cases was 65(48.8-71.5) was significantly higher as compare with the non-severe cases 33(26-51.5). Significant association between severe and non-severe group in terms of smoking (p = 0.034) and alcoholic habit (p = 0.001) were observed. The median duration from symptom onset to admission was 2 days. Specifically, for non-severe cases, the median elapsed time from onset to hospitalization was also 2 days, with an interquartile range (IQR) of 1-2 days. In contrast, severe cases exhibited a median elapsed time of 3 days (with an IQR of 2-23 days). The P-value being less than 0.001 indicates a statistically significant difference in the time elapsed from onset to hospitalization between non-severe and severe cases.

Symptoms and laboratory findings

The most common symptoms on admission were fever ≥37.5^{0}C (22.9%), followed by cough (20.4%), weakness (18.9%), shortness of breath (16.0%) and loss of appetite (10.5%). It is observed that shortness of breath, general weakness, loss of appetite was significantly associated with severity of COVID-19. The most common comorbidities were hypertension (HTN), followed by diabetes mellitus (DM) (table 2). Also, it is observed that the prevalence of HTN, DM, Chronic kidney disease (CKD) and cerebrovascular accident (CVA) were significantly higher among those patients classified as severe as compared to that non-severe group.

The laboratory values/parameters were statistically significant between non-severe and severe groups in relation to haemoglobin [12.3(11.3-13.1)g/dl Vs 10.9(9.1-11.7)g/dl, p<0.001], WBC count [7.4(6.3-8.3) Vs 11.6(9.0-14.6), p<0.001], platelet count [2.7(2.2-3.3) Vs 1.8(1.4-2.5), p<0.001], d-dimer [427(314-493) Vs 619(470.3-1485.3), p<0.001], ALT[24(15-35) Vs 36(26.7-49.5)], AST[24(16.0-34) Vs 38(24-48.3)], RBS [109(100-118) Vs 181(139.0-248.4), p<0.001], urea [28.0(19.5-39.0) Vs 60.5(45-91), p<0.001], Serum creatinine [1.0(0.8-1.0) Vs 1.3(1.0-1.0), p<0.001], sodium [138(136.0-140.0) Vs 136(134-139), p<0.001] and potassium [3.8(3.6-4.4) Vs 4.5(3.6-5.0), p<0.001] (table.2).

Treatment and outcome

While comparing the median duration of hospital stay/hospitalization between the two groups: severe and non-severe groups, severe groups had significantly longer hospital stay compared to non-severe group (p<0.001)(Fig.1). Also, severe groups received more antiviral and steroid therapy as compared with the non-severe group, which was significantly high (Table.4). All the patients with severe condition required respiratory support. Of 62 patients with severe condition during treatment, 24(38.7%) were transferred to other ward after COVID negative for further management of post COVID 19 complications (Table.4). All the patients who were transferred to others wards for post COVID management have history of comorbidity. It is observed that vaccination and severity of the disease were associated among the older age group (Table.3). Whereas vaccination and severity of disease were not related among the younger population as severity was very less in both vaccinated and unvaccinated group and majority were asymptomatic.

Among those who improved during treatment/ hospital stay those with severe condition were significantly older, predominantly male sex having more comorbid conditions. Logistic multivariate analysis revealed that old age, length of hospital stay and d-dimer would be responsible for severity of the disease.

Table 1: Baseline demographic and clinical characteristics of COVID 19 patients

Characteristics	Total (n=275)	Non Severe cases (n=213)	Severe Cases (n=62)	P-value
Age, Median(IQR)	39(27-62)	33(26.0-51.5)	65(48.75-71.5)	<0.001
Age Distribution				
Less than 18	29(10.5%)	25(11.7%)	4(6.5%)	
18-40yrs	114(41.5%)	108(50.7%)	6(9.7%)	
41-60 yrs	60(21.8%)	41(19.2%)	19(30.6%)	
Above 60 yrs	72(26.2%)	39(18.3%)	33(53.2%)	
Gender				0.003
Male	114(41.5%)	78(36.6%)	36(58.1%)	
Female	161(58.5%)	135(63.4%)	26(41.9%)	
Personal habit				
Smoker	19(6.9%)	11(5.2%)	8(12.9%)	0.034
Alcoholic	22(8.0%)	11(5.2%)	11(17.7%)	0.001
Elapsed time from onset to hospitalization ([IQR], range)	2(1-2)	2(1-2)	3(2-3)	<0.001
Symptoms				
Fever	63(22.9%)	50(23.5%)	13(21.0%)	0.679
Cough	56(20.4%)	33(15.5%)	23(37.1%)	0.001
Generalised weakness	52(18.9%)	30(14.1%)	22(35.5%)	0.001
SOB	44(16.0%)	22(10.3%)	22(35.5%)	0.000
Loss appetite	29(10.5%)	21(9.9%)	8(12.9%)	0.137
Nausea vomiting	26(9.5%)	21(9.9%)	5(8.1%)	0.671
Headache	10(3.6%)	7(3.3%)	3(4.8%)	0.615
Sore throat	7(2.5%)	6(2.8%)	1(1.6%)	0.596
Co morbidity	110(40.0%)	62(29.1%)	48(77.4%)	<0.001
HTN	56(20.4%)	33(15.5%)	23(37.1%)	<0.001
DM	34(12.4%)	16(7.5%)	18(29.0%)	<0.001
CKD	15(5.5%)	7(3.3%)	8(12.9%)	0.003
CLD	15(5.5%)	10(4.7%)	5(8.1%)	0.340
CVA	10(3.6%)	3(1.4%)	7(11.3%)	<0.001

Table 2: laboratory findings among hospitalize COVID 19 patients between severe and non-severe cases

Parameters	Normal range	Non severe (n=213)	Severe (n=62)	P-value
Haemoglobin	(12-15)gm/dl	12.3(11.3-13.1)	10.9(9.1-11.7)	<0.001
WBC $\times 10^3$(cells/µL)	4-11	7.4(6.3-8.3)	11.6(9.0-14.6	<0.001
Platelet count$\times 10^5$	1.5-4	2.7(2.2-3.3)	1.8(1.4-2.5)	<0.001
D.dimer	<500 ng/mL	427.0(314.0-493.0)	619.5(470.3-1485.3)	<0.001
ALT	5-50U/L	24.0(15.0-35.0)	36(26.7-49.5)	<0.001
AST	5-40 U/L	24.0(16.0-34.0)	38(24.0-48.3)	<0.001
Albumin	3.4-5.4 gm/dL	3.9(3.3-4.4)	3.75(3.1-4.7)	0.804
RBS	80-120	109.0(100-118)	181(139.0-248.4)	<0.001
Urea	10-50 mg%	28.0(19.5-39.0)	60.5(45-91)	<0.001
Creatinine	0.5-1.2 mg/dL	1.0(0.8-1.0)	1.3(1.0-1.9)	<0.001
Sodium	135-145 mEq/L	138.0(136.0-140.0)	136(134-139)	<0.001
potassium	3.5-5 mEq/L	3.8(3.6-4.4)	4.5(3.6-5.0)	<0.001

Data are expressed as median (interquartile range, IQR)

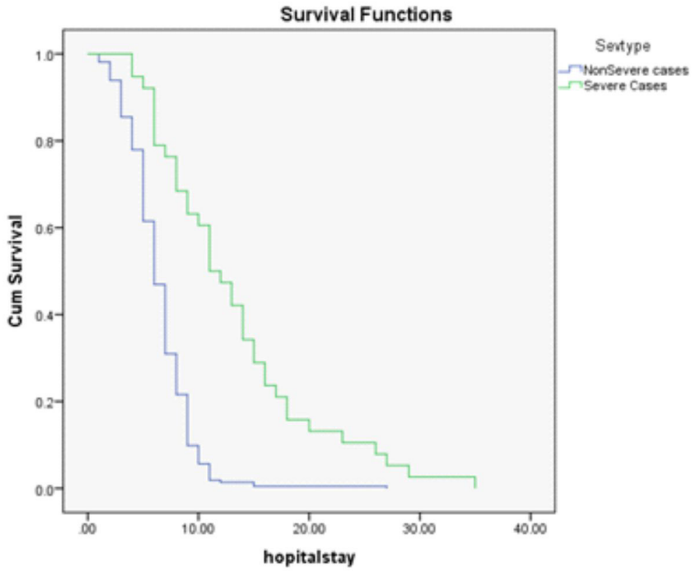


Fig.1. Kaplan Meier curve showing differences in hospital stay of COVID-19 patients on the basis of severe and non severe group (p<0.001)

Table 3: Vaccination status between severe and non severe groups

Younger Age Group (18-60 Yrs)	**Total n=174**	**Non-Severe cases n=149**	**Severe Cases n=25**	**P-value**
Unvaccinated	108(29.9%)	95(63.76%)	13(52.0%)	0.479
Only One Dose	17(9.2%)	13(8.72%)	4(16.0%)	
Only Two Dose	46(18.4%)	38(25.50%)	8(32.0%)	
3rd Dose	3(0.0%)	3(2.01%)	00.0	
Vaccination Status for Older Age Group (Above 60 Yrs)	**Total n=72**	**Non-Severe cases n=39**	**Severe Cases n=33**	
Unvaccinated	36(96.8%)	13(33.33%)	23(69.7%)	0.005
Only One Dose	9(16.8%)	5(12.82%)	4(12.1%)	
Only Two Dose	27(25.3%)	21(53.85%)	6(18.2%)	

Table 4: Treatment and outcome between severe and non severe groups

Treatment	**Total (%) n=275**	**NonSevere cases (%) n=213**	**Severe Cases (%) n=62**	**P-value**
O2 support	97(35.3%)	361(6.9%)	62(100.0%)	<0.001
NIV	20(7.3%)	2(0.9%)	18(29.0%)	<0.001
Mechanical Ventilation	12(4.4%)	0(0.0%)	12(19.4%)	<0.001
Steroid	88(32.0%)	35(16.4%)	53(85.5%)	<0.001
Inotropes	13(4.7%)	1(0.5%)	12(19.4%)	<0.001
Antibiotic	275(100.0%)	213(100.0%)	62(100.0%)	
Outcome Death	24(8.7%)	1(0.5%)	23(37.1%)	<0.001
Transferred	102(37.1%)	0(0.0%)	24(38.7%)	<0.001
Home Isolation	78(28.4%)	76(35.7%)	2(3.2%)	<0.001

Table 5: Multivariate logistic model for mortality in COVID during hospitalization

Model	Exp(B)	95% C.I.for EXP(B)		Sig.
		Lower	Upper	
Age	1.066	1.021	1.113	.003
Hospital stay	1.328	1.168	1.511	.000
D-dimer	1.016	1.009	1.023	.000

Discussion

From this retrospective study, it is observed that a different pattern of clinical characteristics and outcomes were seen in the third wave of COVID-19. Of 275 COVID-19 positive patients, 213 had non-severe (mild) and remaining 62 had severe condition. Approximately 45.8% patients were asymptomatic and 54.2% were symptomatic. The median age of the study was 39 years which is similar to the other studies done by mitra et al. 2023 in India; kim et al. 2022 in South Korea; Maslo ey al. 2022 in South Africa.[9,13,14]

The median duration from symptom onset to admission was around two days. It was also notably shorter than the 6-7 days reported in a large cohort study in Japan, indicating a rapid deterioration of respiratory condition despite prompt admission following symptom onset[15,16] Commonly observed symptoms include fever, cough, and fatigue, consistent with findings from prior studies[9]. Hypertension (HT) and diabetes mellitus (DM) were notable representative comorbidities. Vaccination stands as a promising strategy for both preventing COVID-19 infection and mitigating its severity, and it has been widely implemented worldwide[17]. In this study vaccination is significantly associated with the severity of the disease among the older population. Despite the shortened time from symptom onset to admission, the mortality rate was lower compared to the second wave[16].

Conclusion

In summary, vaccination and severity of disease has been associated among the older population. It is observed that patients having history of comorbiditysuch as HTN, DM, CKD and CVA have more chance of severity. Severity rate is more among the male patients. Age, duration of hospital stay and d-dimer were responsible for mortality due to COVID 19 disease.

Limitations

This study was conducted using data from the medical record department. This study may provide a glimpse into the virus's dynamics during the specified period. However, lack of genomic information limits our ability to discern the specific variants involved. Furthermore, because of the small sample size, the results may not be representative of the entire population. Therefore, while the study contributes to our understanding of the third wave, its conclusions should be considered preliminary and may benefit from further investigation with larger and more diverse datasets.

Data management: Patient data was used ethically. Personal indentifiers were removed from the data before analysis.

Source of Funding: Self

Conflict of Interest: There was no conflict of interest.

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Original Article

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The Study of the Knowledge, Attitude, and Practice about the Air Pollution among the Residents of Kolar Town of South India

Prashanth V[1], Usha G. Shenoy[2]

[1]MBBS student [2] Assistant Professor, Dept of Physiology Sri Devraj Urs Medical College Kolar.

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Abstract

Introduction: Air pollution is a major environmental health problem affecting everyone.Few studies have revealed the specific needs of the residents; hence the thought demand for residents to the knowledge of air pollution information was explored using a questionnaire.

Aims and objective: To develop awareness and understanding of pollution hazards and their prevention among the Kolar population on air pollution by using a questionnaire.

Materials and methods: A cross-sectional study was conducted among 120 subjects in Kolar town by Purposive sampling technique with a validated, standard questionnaire by interview method and collected was analysed by SPSS version 20.

Results: Majority gained knowledge on air pollution from mobile phones and television, While a few said from the public and newspapers. Regarding attitude, 91% agreed that air pollution affected their health and the environment, with 116 (96.7%) 106 (88.3%) saying it from outdoor and indoor activities respectively. Statistically significant association was established between knowledge gained among educators with (P=0.004) and attitude toward outdoor air pollution with (P=0.001) and changes in behavioural patterns with (P=0.042).

Conclusion: This work served as a starting point for a more timely and complete survey on air pollution and its relation to health and economic growth.

Keywords: Environment, Air pollution, Knowledge, Attitude, Practice

Introduction

Air pollution is the leading risk factor causing premature death and disease which has prominent environmental health hazard worldwide.[1–2] These occupational health risks have become a concern, especially where there is unplanned urbanization.[3] The KAP study has not been performed in Kolar region. The Air pollution index (AQI) had not been calculated as other air pollutants

Corresponding Author: Usha G. Shenoy, Assistant Professor, Dept of Physiology Sri Devraj Urs Medical College Kolar

E-mail: ushaudupi@gmail.com

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have not been assessed in this area, the respirable suspended particulate matter recorded was 149.1 mg/m3 that is above the 100 mg/m3 notified as safe by the central pollution board and would come under the category of moderate pollution in AQI. Global Burden of Disease study has confirmed that ambient air pollution is a leading risk factor for adverse health effects.[4]India contributes second highest premature deaths caused by outdoor air pollution**.** [5]Primary sources of ambient particulate matter pollution in India are residential and commercial biomass burning, windblown mineral dust, coal burning for energy generation, industrial emissions, construction activities**,.**[6-7]Household air pollution is caused mainly by using solid fuels for cooking, such as wood, dung, coal, and charcoal.[8-9]

This study was chosen to understand the association of the current knowledge of residents on air pollution. The findings of this study can help healthcare workers to identify and change the behaviour towards it.[10].

Methodology

The study was undertaken in Kolar after the ethical clearance from the Institutional ethical committee Sri Devraj Urs Medical college Kolar No DMC/KLR/IEC/218/2023-24 dated 3-07-2023 Studied during the month of June to August 2021.

Sampling Technique: Cross-sectional survey of 120 subjects selected through purposive sampling.

Sample size: The formula for estimating the sample size is n = [μα2 p (1-p)/δ2] × (1 + 20%), α = 0 .05, μα = 1.96, p =0.6459, δ = 0.15p, n ≈ 120.

The study was conducted among the residents of Kolar to understand oftheir knowledge, attitude, and practice on air pollution using questionnaire.

Inclusion criteria: The sample included subjects between age group of 18 to 60 yrs regularly outdoors with good health and mentally fit staying in Kolar for more than one year.

Exclusion criteria: Subjects with mental illness more than 60 yrs always indoors and staying in Kolar town for less than a year. Brief information about the study in local language was provided and informed consent was obtained.

Questions on demographic profile, Knowledge, attitude and the practice of Air pollution was determined using a validated questionnaire. The data was analysed using SPSS version 20. Descriptive statistics were performed and expressed in terms of proportions, and presented Chi-square tests were applied for demographic factors. Multiple logistic regression was used to assess the associations between knowledge outcome and demographic factors, and 95% confidence intervals (CIs) were presented. P<0.05 was considered statistically significant.

Results

Demographic profile of 120 subjects of Kolar is represented **(Table 1).**

Table 1: Demographic details of the population of Kolar town

S. No	Parameters	Sub division	Population n=120 (%)
1.	Gender	Males	52 (43.3)
		Females	68 (56.7)
2.	Religion	Hindu	116 (96.7)
		Muslims	02 (1.7)
		Christians	02 (1.7)
3.	Marital Status	Single	40 (33.3)
		Married	72 (60.0)
		Widow	08 (6.7)
4.	Education	Illiterate	06 (5)
		Primary	18 (15)
		Secondary	42 (35)
		University	54 (45)
5.	Occupation	Retired	03 (2.5)
		House wife	48 (40)
		Agriculturist	07 (5.8)
		Unskilled	02 (1.7)
		Business	32 (26.7)
		Government worker	01 (0.8)
		Others	08 (6.7)

Knowledge

Of the 120 participants110 (91.7.1%) agreed that the air around their surroundings was polluted, and about 113 (94.2%) were worried about air pollution. They conveyed that 68 (56.7%) and 44 (36.7%) gained awareness and knowledge from mobile phones and

television respectively. Regarding the contributors of air pollution, 94 (78.3%) felt it was from vehicular pollutants, and only 15 (12.5%) people thought it was due to industrialization. Harmful effects of air pollution was answered by 110 participants who said that it would affect health and ecosystem, table-2 However, very few knew the contribution to air pollution was due to global warming and deforestation.

Table 2: Survey regarding Knowledge on air pollution in Kolar town

	Survey question	**Response N=120n(%)**
1.	Do you think the air your surrounding ispolluted	
	Yes	110 (91.7)
	NO	10 (8.3)
2.	Are you worried of the Air pollution in your place	
	Yes	113 (94.2)
	No	07 ((5.8)
3.	From where did you gain knowledge about air pollution?	
	Television	44 (36.7)
	Mobile Phone	68 (56.7)
	News Paper	04 (3.3)
	Radio	00 (00)
	Public	04 (3.3)
4.	What do you think contributes to air pollution?	
	Deforestation	08 (6.7)
	Vehicular Pollution	94 (78.3)
	House hold pollution	02 (1.7)
	Industrialization	15 (12.5)
	Global warming	01 (0.8)
	Others	00 (00)
5.	What knowledge you have about air pollution?	
	I think it will harm the health of the individual	06 (5.0)
	I think it will harm the eco system	03 (2.5)
	I think both the above are true	110 (91.7)
	None of the above are true	01 (0.8)

Attitude

Out of 120, 119 (99.2%) of subjects felt that air pollution causes problems, 116 (96.7%) and 106 (88.3%) felt it affects their outdoor and indoor activities. However, only 87 (72.5%) felt they need to change their habits to prevent air pollution. Regarding bringing changes to the publicon air pollution, 75 (62.5%) felt the need to bring awareness through talking to the public, and 31 (25.8%) felt growing plants in the surrounding. The rest answered that its possible by speaking to their children. **(Table 3)**

Table 3: Survey of Air pollution regarding attitude in Kolar town

	Survey question	**Response N=120 n(%)**
1.	Does Air pollution cause any trouble or problem to your life	
	Yes	119 (99.2)
	NO	1 (0.8)
2.	Does air pollution effect your outdoor activity?	
	Yes	116 (96.7)
	No	04(3.3)
3.	Does air pollution effect your indoor activity?	
	Yes	106 (88.3)
	No	14 (11.7)
4.	Do you change your habits due to Air Pollution?	
	Not applicable	2 (1.7)
	Not at all	6 (5.0)
	Neutral	24 (20.0)
	Yes	87 (72.5)
	Always	1 (0.8)
5.	How would you like to bring a change to public about air pollution?	
	Talk to my friends about it always	6 (5.0)
	Tell my children about it and spread it around	8 (6.7)
	Grow plants around the surrounding	31 (25.8)
	Bring awareness to the public	75 (62.5)
	None of the above	00

Practice

Regarding behaviour, 114(95%) said they practiced protecting themselves from air pollution, with 72 (60%) and 32 (26.7%) by wearing masks, and covering face with handkerchief and the rest by using air purifiers, and staying indoor. 115 (95.5) of them agreed that lungs is the organ which gets affected due to air pollution Around 69(57.5%) of the participants felt that minimal effort is taken by government towards handling air pollution, and 118 (98.3%)felt economic growth would get impaired.

Discussion

In this study most of the respondents were literate with basic primary education and felt that the surrounding was polluted. This observation has been accurate based on the place they lived and their exposure to air pollution. This was an important point to note because educational background increased awareness of the problem, which showed a significance in the P value of 0.004, which is <0.05 in similar lines to study by Onunkor Etal from Knowledge, attitude, and perception of air pollution in Accra, Ghana. Education which was the main factor that was significant in knowledge compared with other demographic profiles. The study also pointed that the awareness was low among the elderly and less educated respondents and most of the residents admitted improving air quality is the responsibility of every citizen [10]

Our study showed that most subjects were worried about air pollution in their town. Majority of them said they gained knowledge from the mobile phone, television which was abundantly utilized by the current generation for their daily activities of their life. In contrast, a few gained knowledge from the public and newspapers. Similar findings were consistent with Qian X et. al..[11]

To prevent air pollution, it is essential to create awareness among the public and educate them. [12] Individual and collective perception regarding the quality of the environment around them is imperative to bring about behavioral changes and accept interventional strategies.[13] Education status, and culture can further influence risk perception.[14] Hence, we studied their knowledge of air pollution. In this regard, 91% of respondents felt that their residential areas and surrounding areas were polluted, and 94% believed that it affected their health. These findings were coincident with those of previous studies.[15] showing a significant P value of 0.004 association with knowledge and education **(Table 4).**

Table 4: Association between demographic characteristics and Knowledge of air pollution

Parameters	Population N(%) N=120 Yes	No	$\chi 2$	df	P value
1. Do you think in your surrounding is polluted?					
Education	110 (91.7)	10 (8.3)	13.333	3	0.004*
2. Are you worried about the air pollution in your place					
Education	110 (91.7)	10 (8.3)	13.333	3	0.004*

Chi square test for association with P<0.05

Regarding their knowledge of pollutants in the surroundings, 78.3% of the respondents in our study believed that vehicles were the leading cause of air pollution, similar to several studies that have linked exhaust from vehicles, which is one of the leading causes of air pollution.[16] This was followed by industrial waste and household pollution. Regarding vehicular pollutants, the Government of India has already taken several measures, including a ban or special permission to use vehicles that are 15years old and higher, standards for exhaust emission pollutants standardized, and engine requirements in manufacturing. Electrostatic precipitators have also been added to industries' chimneys to prevent particulate matter's emission into the environment. We should seriously consider alternative energy and renewable energy use to reduce pollution.[17]

Knowing the attitude and behavioural aspects of the respondents to the health and ecosystem, 91% agreed that air pollution had effected their health as well as the environment, with 116 (96.7%) saying it has severe effects on one's health and in their outdoor and 106 (88.3%) the indoor activities. 85 (72.5%) said they would change their behavioural habits due to air pollution in the study conducted by Qiu et al., 2018.[18]

Age showed a significant value towards health issues as older people were worried about their health and wanted a clean and green environment **(Table 5).**

Table 5: Association between demographic characteristics and Attitude of air pollution

Parameters	Population N(%) N=120 Yes	No	χ 2	Df	P value
1. Does air pollution cause any trouble or problem to your life?					
Age	119 (99.2)	1 (0.8)	9.076	4	0.050*
2. Does air pollution effect you're outdoor activity?					
Religion	116 (96.7)	4(3.3)	13.787	2	0.001**
3. Does air pollution effect you're indoor activity?					
Gender	106 (88.3)	14 (11.7)	5.446	1	0.017*

Chisquare test for association with Pvalue of 0.001**

Concerning the outdoor activities in the religion showed a highly significant P value of 0.001. This may be due to the cause that the people were worried about dust allergy and that outdoor activities would worsen the situation. It may be the cause as this survey was done in June and July, which are the windy and dusty seasons, and the respondents were much bothered of their health. Our study showed a significant P value with 0.017 for the indoor activities as in with gender response which was clear that the female were more concerned about the indoor air pollution, due to wind and the construction work near their locality**.** Indoor pollution may be due to the use of the open fire's unsafe fuels and combustion of biomass fuels inadequate ventilation as Kolar town is a semiurban area where most use kerosene stove for cooking, which was cause for household air pollution.[19]

The response to the question on the changing their habits for air pollution was responded positively by many showing that they would stop their vehicles and start utilize public transport, which would in protecting their health, similar to the study by Qui F et. al[20]

When the respondents were enquired about their behaviour in protecting against air pollution, wearing of mask and using hankey to cover the face proved these practices have indicated that certain self-protection consciousness seems to be developing about the safe threshold among the people around, which was similar to Qian X etal.[11]

Our study showed that the respondents' behaviour to air pollution was affirmative, among the married and educated, with the significant P value of 0.028 and 0.042, showing that they were responsible for their duties.[21] Protective measures were used by them throug face masks and handkerchiefs. as shown in **(Table 6)** Hence these policies should be encouraged for awareness for the future generation that suggest environmental education can be transferred between generations and indirectly induce targeted behavioural changes.[22]

Table 6: Association between demographic characteristics and Practice of air pollution

Parameters	Population N (%) N=120 Yes	No	χ 2	Df	P value
1.Do you use any protection against air pollution					
Marital Status	114 (95)	06 (05)	7.135	2	0.028*
Education	114 (95)	06 (05)	7.719	3	0.042*
2. Do you think the air pollution will impair economic growth					
No significance observed with any of the demographic profile					

Chi square test for association with P < 0.05

Their opinion towards the contribution of the government towards air pollution, 69 (57%) reported that the government did little to control air pollution and further the impairment regarding economic growth, 118 (98.3%) said that there was a fall in the economic growth which would affect the public. Hence, the government should bring awareness among youngsters by bringing a healthy environment concerning economic growth, and educating them. This may help policymakers in guidance to make residents aware of sources of air pollution and related health risks.[20]

Conclusion

This study has highlighted that primary education increased awareness of air pollution and knowledge regarding its presence, effects, and prevention. This work will be a starting point for getting more timely and complete survey of opinions on air pollution and its relation to health and economic growth.

Ethical clearance: The study was undertaken in Kolarafter the ethical clearance from the Institutional ethical committee Sri Devraj Urs Medical college Kolar No DMC/KLR/IEC/218/2023-24 dated 3-07-2023 Studied during the month of June to August 2021.

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Conflict of Interest: Nil

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Original Article

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A Descriptive Study to Assess the Prevalence of Domestic Violence and its Effect among Women whose Spouses Indulge in Substance Abuse

Aditi Lalotra[1], Akanksha Verma[2], Akriti Devi[3], Akshita Anand[4], Anjali Billowria[5], Shailla Cannie[6], Neha Bharti[7]

[1,2,3,4,5]Students, [6]Dean & Principal at Shri Mata Vaishno Devi College of Nursing, Kakryal (J&K), [7]Nursing Tutor at Shri Mata Vaishno Devi College of Nursing, Kakryal (J&K)

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Abstract

Domestic violence, characterized by a pattern of assault and coercive behavior, poses a significant threat to the safety and well-being of intimate partners, with women being disproportionately affected. In recent times, the issue of domestic violence has become more pronounced among women whose spouses engage in substance abuse. The main aim of the study was to assess the prevalence of domestic violence and its effects among women whose spouses indulge in substance abuse, with the intention of providing an informational booklet. A non-experimental approach with convenient sampling was employed, and data were collected using the WHO (World Health Organization) questionnaire module including 46 questions. The study was conducted in Narwal, Jammu, and descriptive and inferential statistics were used for data analysis. The results revealed a concerning prevalence of domestic violence, with 61% of subjects experiencing moderate violence, additionally, it was noted that a massive number of subjects were not seeking proper help, with only 40% seeking legal help and 20% each seeking help from the police or resorting to physical retaliation against domestic violence. Furthermore, the study found no significant association between women's education levels and autonomy, as shown by p-values of 0.276 and 0.095 for social support and property ownership, respectively. These findings underscore the urgent need for targeted interventions and support services to address the complex dynamics of domestic violence among women affected by substance abuse within marital relationships.

Key Words: Domestic Violence, Women, Spouses indulge in Substance abuse, Substance Abuse.

Background

Domestic violence remains a pervasive issue affecting millions of individuals worldwide. Globally, it is estimated that approximately 1 in 3 (35%) of women have experienced either physical and/or sexual intimate partner violence or non-partner sexual violence in their lifetime.[1] A study found that 71% of women experienced physical or sexual

Corresponding Author: Neha Bharti, Nursing Tutor, Shri Mata Vaishno Devi College of Nursing, Kakryal (J&K).

E-mail: nehabhartismvdcon@gmail.com

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violence by an intimate partner in their lifetime in Ethiopia which indicates a highest prevalence of Domestic Violence,[2] whereas, a study reported that about 9% of women have experienced intimate partner violence in Singapore which indicates lowest prevalence of Domestic Violence.[3]In India, the prevalence of domestic violence is alarmingly high, with around 31% of ever-married women aged 15-49 having experienced spousal violence.[4] According to the National Family Health Survey (NFHS-5) conducted in 2019-2020, approximately 8.4% of ever-married women aged 18-49 years in Jammu and Kashmir reported experiencing physical violence by their spouse at some point in their lives.[5] This statistic highlights the on-going issue of domestic violence in the region and underscores the need for targeted interventions and support services for victims. Domestic violence has profound and far-reaching impacts on the health and well-being of victims. These effects can be physical, psychological, and emotional. Physically, victims may suffer from injuries ranging from bruises and fractures to more severe consequences such as chronic pain, gastrointestinal disorders, and even death. Psychologically, domestic violence can lead to depression, anxiety, post-traumatic stress disorder (PTSD), and suicidal tendencies.[6]Emotionally; victims often experience feelings of shame, guilt, and low self-esteem, which can further exacerbate their mental health issues. Health professionals play a crucial role in identifying, addressing, and preventing domestic violence. They are often the first point of contact for victims and thus have a unique opportunity to provide support and intervention. The role of health professionals includes: Screening and Identification, Providing Medical Care and Documentation, Offering Psychological Support, Referring to Support Services, and Advocacy and Education.[7] According to World Health Organization (WHO), domestic violence is a major public health issue and a violation of women's rights. The WHO emphasizes the need for a coordinated, multi-sectoral response to address this problem, including the health, legal, and social sectors. The WHO's latest declaration calls for countries to strengthen their health systems to better support victims of domestic violence, ensure access to comprehensive services, and implement prevention programs that address the root causes of violence.[8] The research conducted by the National Committee to Prevent Child Abuse elucidated the alarming prevalence of child abuse cases linked to parental substance abuse, underscoring the urgent need for targeted interventions. The symbiotic relationship between child abuse and domestic violence further underscores the systemic nature of these interrelated crises, needing comprehensive strategies to break the cycle of trauma.[9]

Need of the Study

Family, revered as a bastion of stability and support, is increasingly besieged by the scourge of substance abuse, which serves as a potent destabilizing force.[10] Substance abuse exacts a profound toll on marital relationships, introducing strains that permeate the fabric of familial bonds.[11] The repercussions extend beyond mere marital discord, casting shadows upon financial and socioeconomic stability.[12] While substance abuse engenders overt marital problems, its insidious effects extend far beyond, ensnaring women in a web of domestic violence, anxiety, depression, and stress.[13] Women, grappling with feelings of inadequacy and self-blame, confront the specter of spousal substance abuse, contending with the harrowing reality of intimate partner violence.[14] Domestic violence, a pervasive manifestation of power and control, inflicts grievous harm upon women, precipitating a cascade of ill health and psychological distress, including reproductive and sexual health issues, injuries, and suicidal ideations.[15]

The prevalence of domestic violence has appeared as a pressing societal concern, underscored by national surveys documenting alarmingly high rates of spousal violence.[16] Considering the escalating prevalence of substance abuse and domestic violence within contemporary society, there is an urgent imperative to conduct a community-based study to assess the prevalence of domestic violence among women ensnared in relationships marred by spousal substance abuse.[17] By elucidating the complex interplay between addiction, violence, and familial dynamics, this study looks to inform evidence-based interventions aimed at mitigating the pervasive harms inflicted upon vulnerable individuals and families.[18]

Material and Methods

This descriptive study utilized a quantitative non-experimental approach conducted in Narwal, Jammu. Participants were approached through local community Pradhan to gather data on the prevalence and impact of domestic violence among women affected by spousal substance abuse. Women who were married, whose spouses indulges in substance abuse, women who suffered from domestic violence and also willing to participated in the study were included, whereas women who suffered from domestic violence but other than substance abuse and given incomplete responses to modified structured questionnaire were excluded. Informed consent was taken from the participants. Quantitative data were collected through structured surveys administered to a representative sample of 50 women in the target population.

Results

The study encompassed a diverse sample, with most participants falling within the age group of 20-30 years. An outsize proportion of the subjects identified as belonging to the Hindu religion (100%). Regarding educational attainment, many participants were illiterate (92.7). Analysis of the educational status of spouses revealed a similar trend, with the majority being illiterate (80.5%). Marriage duration varied among the participants, with majority of notable percentages reporting 6-10 years (17.1%) and 11-14 years (17.1%).In terms of employment status, a considerable proportion of women identified as self-employed (63.4%). Conversely, most spouses were self-employed (85.5%). Income distribution among the participants showed that 82.8% earned less than 10,000 per month. Family structure varied, with 58.5% of participants existing in joint families. Regarding the number of children, 58.5% had more than two children. Substance abuse was prevalent among spouses, with 85.4% consuming alcohol and 14.6% smoking cigarettes or beedis. Analysis of domestic violence duration revealed that most of participants i.e. 48.8% experienced abuse for less than a year. Additionally, majority of participants i.e. 63.4% reported no thoughts of self-harm. Property ownership was limited among participants, with 53.7% lacking private property, and 46.3% owning assets. Most participants (73.2%) lacked social support, while 26.8% reported having a support system in place.

According to effects of domestic violence among the women whose spouse indulge in substance abuse, the majority of subjects experience headache (85.3%), poor appetite (82.9%), insomnia (70.7%),easily frightened (78.04%) nervousness, tension(90.2%). Also subjects feel unhappy (87.7%), trouble to think clearly (82.9%), cry more than usual (63.4%), difficulty to enjoy daily activities (82.9%). Result also showed that subjects are suffering from their daily work i.e. 82.9, 70.7% subjects also unable to play a useful part in life. Most of subjects feel that they are worthless person i.e. 56.09%, 63.4% subjects feel tired and uncomfortable all time and majority of subjects seen their spouse to take substance in past 12 months i.e. 80.4%, 30% of subjects experienced problem related to money and family. Result also revealed that 65.8% subjects spouse insulted them or made them feel bad, 51.2% subjects humiliated by their spouses in front of other people.

The results of the study also showed that most subjects experiencing moderate levels of domestic violence i.e.61.0%. This finding underscores the nuanced nature of abuse within marital relationships, highlighting the diverse spectrum of behaviors and dynamics that contribute to the overall experience of violence. **(Figure 1)**

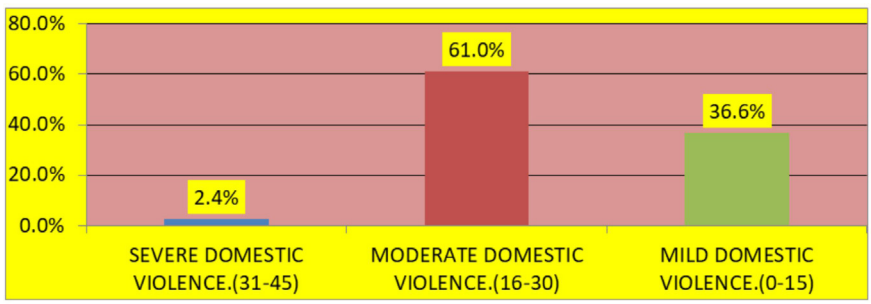


Figure 1: This figure depicts prevalence of domestic violence among women whose spouses indulges in substance abuses.

The findings of the study reveal a diverse range of responses among subjects when faced with domestic violence. Among the participants, 40% opted to seek legal help, showing a proactive approach towards addressing the abuse through legal channels. **(Table No. 1)**

ACTIONS	%
Fighting back physically	20%
Police help	20%
Legal help	40%

Table 1. Percentage distribution of subjects, whether they able to take appropriate action against their partners when they are domestically abused.

The findings of the study suggest that women's education level was not significantly associated with measures of autonomy, including social support and ownership of property. This conclusion is supported by the calculated p-values of 0.276 and 0.095 for social support and property ownership, respectively.

Discussion

The prevalence of domestic violence seen in this study aligns with findings from similar investigations conducted by Shah SH et al.[19]and Appiah Seth Christopher yaw et al.[20] reported a prevalence rate of 32.3% for any form of violence among their study participants, corroborating the notion of pervasive violence within intimate relationships. Interestingly, the present study reveals a nuanced understanding of the nature and severity of domestic violence experienced by participants. The majority of subjects were categorized as experiencing moderate domestic violence i.e., 61.0%, underscoring the nuanced spectrum of abuse within marital relationships.

The findings from the study conducted by Appiah Seth Christopher Yaw et al.[20] resonate with the results of the present study, shedding light on the multifaceted challenges faced by women in responding to domestic abuse within the context of marital relationships. The aimed to examine women's ability to take proper action, whether legal or otherwise, when confronted with domestic abuse. Appiah Seth Christopher Yaw et al. emphasize the challenges faced by women in reporting cases of domestic abuse, citing fears of marital or relationship dissolution as a significant barrier to seeking help. In terms of response mechanisms to domestic abuse, the present study echoes the diverse range of actions taken by women in response to violence. While some women opt for legal or police help, others may resort to physical self-defense or choose not to seek help at all. This diversity in response underscores the complex and individualized nature of coping strategies employed by survivors of domestic abuse.

These findings echo the observations made by Thiago Ranganathan et al.[21], who explored the association between women's autonomy and educational attainment. While the present study did not find a significant association between women's education and social support or property ownership, it elucidated the disparities in economic and social autonomy between urban and rural women.

Conclusion

In conclusion, the findings of the study shed light on the complex dynamics surrounding domestic violence within marital relationships. The prevalence of moderate levels of domestic violence among most subjects underscores the nuanced nature of abuse, emphasizing the diverse spectrum of behaviors and dynamics that contribute to the overall experience of violence. Furthermore, the study's exploration of the association between women's education level and measures of autonomy yielded noteworthy insights. Contrary to expectations, women's education level was not found to be significantly associated with social support or ownership of property. These findings underscore the need for a deeper understanding of the complex factors that influence women's autonomy beyond educational attainment. Overall, the study underscores the importance of comprehensive approaches to addressing domestic violence, including support services, legal interventions, and efforts to promote gender equality and empowerment.

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Original Article

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Randomized Control Trial to Study the Effect of Coded Unani Formulation UNIM-904 and Amlodipine on Serum Lipid Profile and Electrolyte Level in Patients with Essential Hypertension

Nirmala Devi MK[1], Mohd Adil[2], Nikhat Shaikh[3], Irfan Ahmad[4], Shah Alam[5], Piyush Yadav[6] Gazala Javed[7]

[1-5]Research Officer, Regional Research Institute of Unani Medicine (RRIUM), Mumbai, [6]Investigator (Statistics), RRIUM, Mumbai, [7]Assistant Director CCRUM.

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Abstract

Essential hypertension, is a major health problem in developed countries, affecting nearly one billion people worldwide. It has a strong association with cardiovascular disease and contributes greatly to morbidity, mortality economic burden, Accounting for about 57% of all deaths due to stroke and 24% of all deaths due to coronary heart disease in India. By 2025, the number of hypertensive individuals may rise to 213 million from 118 million in 2000. Herbal medicines origin has been extensively used in the therapeutic management of hypertension for a long time.

Aim of the study: To study the Effect of coded Unani formulation UNIM-904 on serum Lipid profile and electrolyte level with allopathic drug amlodipine before and after treatment in patients with essential Hypertension.

Materials and methods: Randomized and open-level clinical trials were conducted on UNIM-904 and amlodipine cases at the Regional Research Institute of Unani Medicine, Mumbai, from 2014-2018. The participants of the treatment group were treated with coded Unani formulation UNIM-904 5 gm BD/day) and Amlodipine 5 mg OD/day) was given to the control group for 84 days once at night daily.

Results: We observed a significant reduction (treatment group versus control group) in mean serum potassium by 4.91 versus 4.45, Calcium9.34 versus 8.52, Cholesterol 169.93 versus 198.87, HDL-Cholesterol 47.97 versus 44.29 levels was statistically significant after Treatment in both Groups. Thus, it is concluded that both the drugs do possess the anti-hypertensive activity and reduce systolic, and diastolic blood pressure respectively, there were no significant changes in liver function tests as well as kidney function tests. yet the Unani-coded drug has shown a comparatively better rate of safety and without side effects and, therefore, recommended for use in essential hypertension cases. Further studies are suggested on a larger group of essential hypertensive patients to develop safe, effective, viable, and cheap herbal drug to combat hypertension evading satisfactory cure in modern medicine.

Keywords: Essential hypertension, blood pressure, precision medicine, Lipid profile

Corresponding Author: Mohd Adil, Research Officer, Regional Research Institute of Unani Medicine (RRIUM), Mumbai.

E-mail: adiladi51@yahoo.com

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Introduction:

Hypertension or high blood pressure (BP) defined as systolic blood pressure (SBP) > 140 mmHg or diastolic blood pressure (DBP) > 90 mmHg has a significant role in developing heart, brain, kidney, and other diseases and is a significant cause of premature death around the globe.[8]High BP directly does not cause symptoms.[9] Long-term hypertension is a significant risk factor for certain health problems such as coronary artery disease, stroke, heart failure, atrial diseases, chronic kidney disease, and dementia. [10] Epidemiologically it was estimated that 1.13 billion people have hypertension worldwide.[8]According to a systemic review and meta-analysis, the prevalence of hypertension in high-income countries is higher than in low-income countries. However, awareness, treatment, and control substantially are also more in high-income countries than in LMIC.[11]As a result, now, two-thirds of hypertensive people live in the LMICs.[8]India is one of the LMICs. It is also a substantial public health problem in India.[12,13] Hypertension was responsible for 53.8%, 55.7%, and 54.3% of deaths due to heart disease, stroke, and chronic kidney disease, respectively in India in 2016.[14]In 2010, the Government of India launched a program named the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) to prevent noncommunicable disease-related deaths in India[15] to achieve the global target of reducing 25% hypertension-related premature deaths by 2025.[8]

Many variable risk factors for hypertension have been discovered, including being overweight or obese [16,17], not attending in physical activity [18, 24] and taking a poor diet [11], large amount of alcohol intake [24], use of nonnarcotic analgesics [12, 13], insulin resistance, high salt intake [26] and low folic acid intake [23, 24] have been detected as self-dependent original and changeable risk factors for developing hypertension among women.

In the Unani system of medicine, several single as well as compound drugs have been used in the therapeutic management of hypertension for centuries such as:

Dawa-us-Shifa, Habb-e-Mudirr, Sharbat-e-Buzoori Motadil, Asrol (Rauwolfia serpentine L.), Lahsan (Alium sativum Linn.), Parshi-aoshan (Adiantum capillus Linn.), Tukhm-e-Kharpaza (Cucumis melo Linn.) etc. have proven their efficacy in controlling blood pressure [25, 26, 27]. Keeping these in view the present work deals with the Effect of coded Unani formulation UNIM-904 and Amlodipine on serum Lipid profile and electrolyte leveland the safety of Unani-coded drug UNIM-904 with allopathic drug amlodipine in the treatment of essential hypertension and results are presented.

Objective:

This study aims to analyse the effect of coded Unani formulation UNIM-904 and Amlodipine on serum Lipid profile and electrolyte level in patients with essential Hypertension.

Materials and Methods

Study population

Comparative Randomized open clinical trial. The study was carried out at the Regional Research Institute of Unani Medicine (RRIUM), Mumbai. Unani-coded drug UNIM-904 and amlodipine were obtained from the Central Council for Research in Unani Medicine, New Delhi. One hundred two patients, aged 18-65 years of either sex were selected from the lot of patients attending the outpatient department (OPD) of the institute following the predesigned inclusive/exclusive criteria. General physical and clinical examination, symptoms regarding hypertension, and vital parameters like blood pressure and heart rate have also been studied. Patients were randomly divided into two treatment groups, test and control following the block randomization method. The total registered cases in the trial group were 100, with completed cases 31 and dropout cases 69. The total registered cases in the control group were 105, completed cases 41, and dropout cases 64. The Effect of coded Unani formulation UNIM-904 and Amlodipine on serum Lipid profile, electrolyte level, and safety of Unani coded drug UNIM-904 and amlodipine was evaluated based on symptomatic, vital parameters (blood pressure and pulse rate and electrocardiogram (ECG)), biochemical and hematological parameters.

Ethical consideration:

The study was approved by the RRIUM's institutional ethics committee, f.no RRIUM/MUM/2012-13/IEC/25.The Institutional Ethics Committee (IEC) approved this study's protocol, informed consent form, and case record form on **20.12.2012**. This study was, thereafter, registered in Clinical Trial Registry-India (CTRI) number: (TRI/2013/10/004091) (registered on 23/10/2013). Each participant submitted a signed written informed consent form before enrolment into the study.

Study design: A prospective, randomized, open-label, active-controlled, and parallel-group clinical trial.

Subject selection criteria:

Patients were enrolled based on the following inclusion and exclusion criteria:

Inclusion criteria:

Patients of either sex in the age group of 18-65 years, patients of hypertension with SBP 160-179 mmHg and DBP 90-100 mmHg, presence of any of the following symptoms and signs viz; Headache (suda), vertigo (duwar), palpitation (khafqan), laziness (kasal), anxiety (qalaq), breathlessness (usr al-tanaffus), diminished alertness (takaddur fi'l hawas), subconjunctival haemorrhage (jiryan al-dam zer multahima), epistaxis (ru'af), pulsus plenus (nabz mumtali), were included.

Exclusion criteria:

Patients with SBP ≥180 mmHg and diastolic BP >100 mmHg and secondary hypertension, pregnant and lactating women, females using oral contraceptive pills regularly, patients taking any other medication affecting blood pressure like NSAIDs, patients with abnormality in investigations done at baseline (SGPT >105 IU). Obese subjects – BMI >30, patients with disorders requiring long-term treatment, e.g., diabetes mellitus, drug addicts, alcoholics /malignancy /epilepsy /CAD/CKD, patients with sinus bradycardia, i.e., pulse rate less than 60/min, were excluded.

Drug, Dose, and mode of administration

The trial Unani-coded drug UNIM-904 was given orally to the patients in the form of a sachet in a dose of 5.0 gm granules twice a day before 30 minutes of lunch and dinner and the control allopathic drug amlodipine was given orally in a dose of one tablet (5 mg) once a day to the patients for a period of 12 weeks-days.

Estimation of biochemical markers:

Blood was collected from the participants after 12 hours of fasting. The collected blood was allowed to clot for 15–30 min in a yellow gel vacutainer kept at room temperature. The serum separated from the clot by Remi centrifuging at 2000–2500 rpm for 5–10 min was used for estimation of biochemical markers.

Kits purchased from Erba Mannheim manufactured by Transasia Biomedical Pvt Ltd India were used for the estimation of biochemical markers using ERBA-EM 200 Fully Automatic Biochemistry Analyzer, Electrolyte using EasyLyte Automated Electrolyte Analyzerand Haematology Analyser ERBA H360 for estimation of Haematology Profile.

Statistical analysis

The data was analyzed as per protocol (i.e., the participants who completed the trial were included in the data analysis). The continuous data were measured in mean and standard deviation. The categorical data were measured in the frequency distribution. Inferential statistics were applied using parametric student's paired t-test.

Results and Discussion

Demographic Study

Table 1: Sex-wise distribution of Group-I (n=31) and Group-II (n=41)

Sex			
UNIM-904 (T/C)		**Frequency**	**Percent**
Group-I	F	11	35.5
	M	20	64.5
	Total	31	100.0
Group-II	F	13	31.7
	M	28	68.3
	Total	41	100.0

In the trial group, out of 31 patients with essential hypertension, 20 (64.5%) were male and 11 (35.5%) female, whereas in the control group, 28 (68.3%) were male and 13 (31.7%) female, which shows that male has higher incidence as compared to female.

Table 2: Age-wise distribution of Group-I (n=31) and Group-II (n=41)

Age				
UNIM-904 (T/C)			**Frequency**	**Percent**
Group-I	Valid	(30-40) Years	5	16.1
		(40-50) Years	8	25.8
		(50-60) Years	12	38.7
		Above 60	6	19.4
		Total	31	100.0
Group-II	Valid	(30-40) Years	7	17.1
		(40-50) Years	12	29.3
		(50-60) Years	13	31.7
		Above 60	9	22.0
		Total	41	100.0

In both trials as well as the control group 50-60 years Age group 12 (38.7%) and 13 (31.7%) respectively, have higher incidence followed by age group 40-50 years 08 (25.8%) and 12 (29*.3%) respectively. Risk factors comprise family history, body mass index (BMI), smoking, tobacco chewing, and alcohol intake.

Analysis of Safety Parameters

Table 3: Effect on liver and kidney function tests in Group-I (n=31) and Group-II (n=41)

Name of Parameter	**Treatment Group Group-1**		**P-value**	**Control Group Group-2**		**P-value**
	Before Treatment	**After Treatment**		**Before Treatment**	**After Treatment**	
SGOT IU/l	20.88 ±4.69	22.58 ±6.60	0.182	22.74 ±6.10	23.39 ±6.23	0.595
SGPT IU/L	26.18 ±18.34	20.40 ±9.58	0.100	21.43 ±14.03	20.19 ±10.70	0.624
Alkaline Phosphatase IU/L	79.61 ±34.25	79.90 ±22.03	0.967	82.30 ±26.76	82.86 ±23.19	0.891
B. Ureamg%	22.28 ±8.67	19.22 ±8.60	0.038	19.30 ±8.72	19.03 ±9.82	0.844
Creatinine mg%	0.96 ±0.17	1.40 ±2.61	0.285	1.01 ±0.25	1.10 ±1.36	0.639
Uric Acid mg%	5.90 ±1.36	5.44 ±1.81	0.127	5.64 ±2.24	5.30 ±1.27	0.360

SGOT =serum glutamic oxaloacetic transaminase; SGPT =serum glutamic pyruvic transaminase; Alkaline Phosphatase (ALP)

Comparative effect of Unani coded drug UNIM-904 and amlodipine in the SGOT, SGPT, alkaline phosphatase, blood urea (BU), serum creatinine, and uric acid levels in hypertensive patients. Biochemical studies undertaken have indicated that there were no significant changes in liver function tests as well as kidney function tests. Therefore, it can be inferred that the test drug UNIM-904 did not induce any adverse reaction. Thus, the drug's safety has been complied upon.

Effect of UNIM 904 on Hemogram

Table 4: Comparative change in Hemogramin Group-I (n=31) and Group-II (n=41)

Name of Parameter	Treatment Group		P-value	Control Group		P-value
	Before Treatment	After Treatment		Before Treatment	After Treatment	
Haemoglobin (gm%)	13.25 2.69	13.17 1.66	0.849	13.30 1.55	13.20 1.58	0.595
RBC (10^6 /mm3	4.99 0.53	4.97 0.59	0.845	5.01 0.45	4.92 0.40	0.116
E.S.R. (mm /hr)	25.16 16.02	21.81 13.84	0.206	24.90 14.82	25.56 15.61	0.751
Platelet counts (lac/ mm3)	278.61 64.63	300.06 88.18	0.307	286.93 59.63	295.39 68.93	0.512

RBC= Red blood corpuscles, ESR= erythrocyte sedimentation rate

No significant changes in the level of haemoglobin, red blood corpuscles (RBC), total leucocyte count (TLC), platelets count, polymorphs, lymphocyte, eosinophils, and erythrocyte sedimentation rate (ESR) respectively had been observed in both UNIM-904 and amlodipine treated patients after 12 weeks

Assessment of the effect of UNIM 904 and Amlodipine on systolic and diastolic blood pressure.

Table 5: shows the effect of Blood Pressure in Group I (n=31) and Group II (n=41)

Group	Parameter	Baseline	After Treatment	P-value
UNIM-904	SBP n=31	162.34	144.52	0.000
Amlodipine	SBP n=41	162.95	149.71	0.000
UNIM-904	DBP n=31	97.41	88.65	0.000
Amlodipine	DBP n=41	96.39	88.37	0.000

SBP= Systolic Blood Pressure, DBP= Diastolic Blood Pressure

Effect on systolic blood pressure

A significant reduction of diastolic blood pressure after the 12th week of treatment of test drug UNIM-904 144.52 versus162.34 (P<0.000) had been observed and these were compared with the values of baseline and follow-up treatment

Effect on diastolic blood pressure

A significant reduction of diastolic blood pressure after the 12th week of treatment of test drug UNIM-904 88.65 versus97.41 (P<0.000) had been observed and these were compared with the values of baseline and follow-up treatment

Objective parameters

Effect on lipid and electrolyte profiles

Table 6: shows the Effect on lipid and electrolyte profiles in Group I (n=31) and Group II (n=41)

Name of Parameter	Treatment Group Group-I (n=31)		P-value	Control Group Group II (n=41)		P-value
	Before Treatment	After Treatment		Before Treatment	After Treatment	
T. Cholesterol	198.87 ±25.69	169.94 ±26.79	0.000	188.25 ±34.16	168.01 ±24.80	0.000
HDL-Cholesterol	44.29 ±6.58	47.97 ±7.79	0.019	43.14 ±7.67	49.90 ±9.17	0.000
Calcium	8.52 ±1.20	9.35 ±0.55	0.000	8.37 ±1.33	9.35 ±0.55	0.000
S. potassium	4.45 ±1.12	4.91 ±0.62	0.001	4.40 ±1.01	4.85 ±0.73	0.000

A significant reduction in mean serum Total cholesterol by 169.94 versus 198.87 in the treatment group and from 168.01 versus 188.01in the control group, serum HDL cholesterol was raised by 47.97 versus 44.29 in the treatment group and by 49.90 versus 43.14 in the control group, Serum Calcium was raised by 9.35 versus 8.52 in the treatment group and by 9.35 versus 8.37 in the control group, serum potassium was raised by 4.91 versus 4.45 in the treatment group and by 4.85 versus 4.40 in the control group respectively after 12 weeks of treatment.

The outcome of this study supports that UNIM-904 is a safe and effective formulation in reducing Total Cholesterol, HDL cholesterol, Serum Potassium and raising the Serum Calcium levels significantly from baseline and after 84 days of treatment. UNIM-904 did not show any adverse effects during the study. No issue of non-adherence and intolerance in the participants of the two groups was observed.

This study had certain limitations. The sample size was not very large. It had strict inclusion criteria and did not include co-morbid cases. The duration of the treatment was not long. There was no diet and lifestyle modification as part of the therapy. This study was designed to have minimum bias. Selection bias was minimized by random allocation of the participants and concealment of the computer-generated sequence of allocation of the participants. This study was an open-label study. Because masking (blinding) was not possible due to the different physical features of the test and control drugs.

Conclusion

Hypertension burdens the community with early mortality and disability. Moreover, its expensive treatment along with the side effects of drugs compels people to be irregular with their prescriptions. Hence, alternatives to cope with this problem are required. Unani system of medicine provides a full regimen for the control and prevention of hypertension. Each regimen of the Unani system of medicine has its benevolent effects. The present study concludes that Unani coded drug UNIM 904 is effective and safe in hypertensive patients as compared to the allopathic drug amlodipine. We, therefore, recommend this drug for further investigations on a larger group of patients to develop a viable herbal drug of choice to combat hypertension, a disease thus far, eluding a satisfactory cure in modern medicine.

Ethical Clearance: The study was approved by the RRIUM's institutional ethics committee, f.noRRIUM/MUM/2012-13/IEC/25**.**

Conflict of Interest: There are no conflicts of interest

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Original Article

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A Study on Utilization of Maternal Health Care Services in Urban Slums of Kurnool City, Andhra Pradesh

P. Mercy[1], P. Sudha Kumari[2], B. Renuka[3]

[1]Second Year Postgraduate Student, Department of Community Medicine, Kurnool Medical College, Kurnool, Andhra Pradesh.[2]Professor and Hod, Department of Communitymedicine, Kurnool Medical College, Kurnool, Andhra Pradesh, [3]Associate Professor, Department of Community Medicine, Kurnool Medical College, Kurnool, Andhra Pradesh.

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Abstract

Introduction: Provision of ANC services has a positive impact on pregnancy as it enables identification of risk factors, early diagnosis and treatment of complications. It is also used by primary care physicians as a means to educate women about nutrition, breastfeeding, family planning, spacing after childbirth and promote healthy lifestyle.

Objectives:

1) To assess the pattern of utilization of maternal health care services

2) To study the association between socio-demographic factors and maternal health Care service utilization.

Materials and Methods: A Community-based, Cross-sectional study was done among 320 mothers who were residing in urban slums of Kurnool, were selected by Simple Random Sampling Method, Data were collected between April 2023 to July 2023 using Semi-structured questionnaire. Data were analysed using SPSS-Version25.

Results: Majority of mothers (72.5%) had antenatal registration done in first trimester.75.9% of mothers had > 4 ANC visits, 24.1% of mothers had < 4 ANC visits. 98.4% of mothers-had received 2 TT injections.76.9% of mothers had consumed > 100 Iron and Folic acid tablets, 23.1% had consumed < 100 Iron and folic acid tablets. 91.6% of mothers-delivered in Government hospital, 8.4% delivered in Private Hospital. Statistically significant relationship was found between education and employment status of mother, economic status of family with utilization of MCH services.

Conclusion: Socioeconomic development that prioritises maternal education and women's empowerment can lead to better utilisation of MCH services, which in turn will improve and enhance the use of MCH services.

Key Words: Antenatal care, Maternal and Child health services, Urban Slums, Utilization, National Family Health Survey.

Corresponding Author: P. Mercy, Second Year Postgraduate, Room no. S13, SR/PG women's Hostel, Kurnool Medical College,Kurnool, Andhra Pradesh.

E-mail: mercyclaret5175@gmail.com

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Introduction

Antenatal care is the healthcare given to expectant mothers in order to monitor and confirm the status of their pregnancy, as well as to help them become ready for labour and potential complications so that the mother and her unborn child have the best possible delivery outcomes. The basic components of excellent ANC are early registration of pregnancy, a minimum of four prenatal consultations for each pregnancy interleaved over the three trimesters, tetanus toxoid vaccination, and iron/ folic acid supplementation[1].

One of the five areas recommended by the current WHO-positive pregnancy guidelines to improve the usage and efficacy of ANC services is increasing the recommended number of ANC visits from four to eight contacts during the duration of pregnancy[1].

Pregnancy is positively impacted by the provision of ANC services because they make it possible to identify risk factors and address pregnancy issues early on[2]. Primary care physicians also utilise it to teach women about healthy living, nutrition, breastfeeding, family planning, and spacing after childbirth. Consequently, it is thought that ANC may play a significant role in reducing the morbidities and deaths of mothers and children[3].

In 2020, pregnancy- and childbirth-related avoidable causes claimed the lives of about 800 women every day. In 2020, there was a maternal death roughly every two minutes. Maternal mortality ratios, or the number of maternal deaths per 100,000 live births, decreased by almost 34% globally between 2000 and 2020.Women's and newborns' lives can be saved by receiving care from qualified medical experts prior to, during, and after childbirth.[4]

Negative health outcomes, such as an increased chance of low birth weight, premature delivery, abortion, and perinatal mortality, are associated with insufficient antenatal care visits.[5,6]

Numerous studies carried out across different nations have demonstrated the significant correlation between the use of ANC and factors such as maternal age, parity, education, socioeconomic status, prior complex obstetrical history, support from a spouse, inadequate and poor quality of services, staff absenteeism, distance from a health care facility, and cultural beliefs and practices.[7, 8]

A comprehensive understanding of the factors that contribute to pregnant women not receiving all of the recommended antenatal care and the identification of such women is necessary for the creation of focused and efficient public health interventions. [9, 10]

Hence the present study was conducted with an aim to assess the utilization of maternal health care services and the association of socio-demographic factors on maternal health care service utilization in urban slums in Kurnool, Andhra Pradesh. The results of this study are anticipated to give policymakers information that could enhance their efforts to improve policy in the current program.

Materials and Methods

A cross-sectional community-based study was conducted over four months, from April to July 2023. The study population included women who delivered during the previous year before 4 weeks of the study starts, residing in urban-slums of Kurnool city, Andhra Pradesh. Under the municipal corporation, Kurnool city has 55 notified urban slums. These urban slums are divided into 4 sectors depending on their geographical location (North, East, West and South).From each sector one slum was selected by simple random sampling method.

The Sample size was calculated by considering 92.7% of mothers in urban slum whose last birth was protected against neonatal tetanus taken from the India key Indicators of the fifth round of National Family Health Survey(NFHS-5)[11], 2019-2020 and by using formula $(Z\boldsymbol{\alpha})^2 pq/L^2$ with the absolute error of 3% and Non response rate 10%.Sample size obtained is 320. Participants were selected and approached with the help of ASHAs from the selected four urban slums by house to house visits.

Women who had delivered during the previous year before 4 weeks of the study starts, consented to participate, could comprehend and resided in the selected urban slums for more than six months were eligible for inclusion in the study. Mothers who were not willing to participate were excluded from the study. This study has been approved by the institutional ethics committee(IEC NO.357/2023).

Each participant was clearly explained the purpose of the study, and informed consent was taken. The study was piloted on 100 participants to test the questionnaire and the methodology and necessary corrections were made. Participants were interviewed using a pretested, semi-structured questionnaire from house to house visits and information on socio-demographic data and utilization of MHC services were collected. The questionnaire was validated by faculty members. English and Telugu versions of the questionnaire were created.

We attempted to limit recall bias by selecting women who had recently delivered in the previous year. Variables such as demographic characteristics, obstetric profile and the number of ANC visits were reconfirmed from the Mother and Child Protection cards available to the participants.

Statistical Analysis was done using IBM's SPSS version 25. Descriptive data were presented as frequencies and proportions and Categorical variables were assessed using the chi-squared test. A P-value of less than 0.05 was considered statistically significant.

Results

Table 1: Distribution of mothers according to socio-demographic profile

Characteristics	N=320	%
AGE IN YEARS		
18 to 24	170	53.1%
25 to 30	134	41.9%
> 30	16	5.0%
RELIGION		
Hindu	241	75.3%
Muslim	53	16.6%
Christian	26	8.1%
Mother's education		
Illiterate	78	24.4%
Primary education	90	28.1%
Secondary education	121	37.8%
Higher education	31	9.7%
Mother's occupation		
Unemployed (Housewife)	287	89.7%
Employed	33	10.3%
Socio-Economic Status of the family (Modified Kuppuswamy Classification)		
Class 1	5	1.6%
Class 2	13	4.1%
Class 3	100	31.3%
Class 4	145	45.3%
Class 5	57	17.8%
Marital status		
Married	316	98.8%
Unmarried	3	0.9%
widowed	1	0.3%
Type of family		
Nuclear family	252	78.8%
Joint family	34	10.6%
Three generation family	34	10.6%
Occupation of head of the family		
Profession	5	1.6%
Semiprofession	10	3.1%
Clerical, Shop owner, Farmer	25	7.8%
Skilled worker	78	24.4%
Semiskilled worker	151	47.2%
Unskilled worker	50	15.6%
Unemployed	1	0.3%

Table 1 shows the socio-demographic characteristics of Mothers. In the present study, 53.1% of mothers belong to the age group between 18 to 24 years. 75.3% of mothers belong to Hindu religion. As per educational status, 37.8% of them had secondary education, 28.1% had primary education, 24.4% were illiterate and 9.7% were found

to have higher education. 89.7% were housewives & 10.3% were employed.45.3% belonged to upper lower class (Class IV) and 1.6% belonged to the upper class(Class I). 78.8%were living in nuclear family. 98.8% of participants married, while 60.3% had two children.

Table 2: Distribution of mothers according to utilization of services during ANC

Characteristics	N=320	%
ANC Registration at		
Government	301	94.1%
Private	19	5.9%
Gestational age at the time of Registration		
Within First trimester (Early)	232	72.5%
After First trimester (Late)	88	27.5%
Number of ANC visits		
Less than four	77	24.1%
More than four	243	75.9%
ANC Visits undertaken at		
Private Hospital	48	15%
Government Hospital	191	59.7%
Urban Health Training Center	81	25.3%
TT injections received		
Yes	315	98.4%
No	5	1.6%
Iron Folic Acid tablets taken		
Less than 100	74	23.1%
100 or More	246	76.9%
Mode of transport used during ANC visits		
Private vehicle	192	60%
Government vehicle	128	40%
Place of delivery		
Government	293	91.6%
Private	27	8.4%
Mode of Transport during delivery		
Private vehicle	161	50.3%
Government vehicle	159	49.7%
Type of Delivery		
Vaginal delivery	203	63.4%
Caesarean section	117	36.6%
Home visit by health worker after delivery		
Contacted within 7 days	177	55.3%
Contacted after 7 days	143	44.7%

Table 2 shows the characteristics of ANC and utilization of services by mothers during ANC visits. Out of 320 mothers, 94.1% of pregnancies were registered at Government hospitals. 72.5% of the women were registered for ANC before 12 weeks of gestation. 75.9% of the mothers had 4 and more ANC visits. 98.4% of respondents received two doses of TT and 76.9% of them consumed >100 iron and folic acid tablets. 99.4% of the respondents received nutritional advice. 92.2% of the respondents consumed food supplements provided to them during ANC visits. 98.7% of the respondents received delivery preparedness advice. 91.6% of the women delivered at government hospitals. 63.4% of the women delivered by Normal delivery.

Table 3 shows that there was no association between age of mother, birth order, employment status of mother with early registration of pregnancy while religion, educational status of the mother and Occupation of the head of the family, Socio economic status of the family was significantly associated with early registration of pregnancy and there was no association between age of mother, Religion, birth order with adequate number of ANC visits. Significant association was found between education, employment status of mother and Occupation of the head of the family, Socio economic status of the family with adequate number of ANC visits.

Table 3: Socio-demographic characteristics in relation to utilization of ANC services.

Characteristics	Registration of pregnancy		X^2	p value	Antenatal visits		X^2	p value
	Early (N=232)	Late (N=88)			<4 visits (N=77)	>4 visits (N=243)		
Age in years								
18 to 24	127(74.7)	43(25.3)			43(25.3)	127(74.7)		0.837
25 to 30	94(70.1)	40(29.9)	0.899	0.638	31(23.1)	103 (76.9)		
> 30	11(68.8)	5(31.3)			3(18.8)	13 (81.3)		
Religion								
Hindu	182(75.5)	59(24.5)			53(22.0)	188(78.0)		
Muslim	37(69.8)	16(30.2)	7.896	0.019*	16(30.2)	37(69.8)	2.294	0.318
Christian	13(50.0)	13(50.0)			8(30.8)	18(69.2)		
Mother's education								
Illiterate	66(84.6)	12(15.4)			7(9.0)	71(91.0)	13.3	0.004**
Primary education	71(78.9)	19(21.1)	15.2	0.002**	25(27.8)	65(72.2)		
Secondary education	76(62.8)	45(37.2)			37(30.6)	84(69.4)		
Higher education	19(61.3)	12(38.7)			8(25.8)	23(74.2)		
Mother's occupation								
Unemployed (Housewife)	204(71.1)	83(28.9)	2.81	0.093	75(26.1)	212(73.9)		0.009**
Employed	28(84.8)	5(15.2)			2(6.1)	31(93.9)		
Occupation of the head of the family								<0.001**
Profession	4(80.0)	1(20.0)			3(60.0)	2(40.0)		
Semi profession	6(60.0)	4(40.0)			5(50.0)	5(50.0)		
Clerical, Shop owner, Farmer	11(44.0)	14(56.0)		<0.001**	9(36.0)	16(64.0)		
Skilled worker	45(57.7)	33(42.3)			28(35.9)	50(64.1)		
Semiskilled worker	125(82.8)	26(17.2)			24(15.9)	127(84.1)		
Unskilled worker	41(82.0)	9(18.0)			7(14.0)	43(86.0)		
Unemployed	0(0.0)	1(100.0)			1(100.0)	0(0.0)		
Socio-Economic Status								
Class 1	3(60.0)	2(40.0)			0(0.0)	5(100.0)		
Class 2	11(84.6)	2(15.4)		<0.001**	2(15.4)	11(84.6)		0.021*
Class 3	81(81.0)	19(19.0)			18(18.0)	82(82.0)		
Class 4	108(74.5)	37(25.5)			34(23.4)	111(76.6)		
Class 5	29(50.9)	28(49.1)			23(40.4)	34(59.6)		

* -p value < 0.05, ** -p value< 0.01

Discussion

In the present study, 75.9% mothers had >4 ANC visits, 24.1%had < 4. According to data from the NFHS-5, 67.2% of women in Andhra Pradesh obtained full ANC (at least four ANC visits) in urban areas; in comparison, equivalent figures for Chandigarh 79.1%, Delhi 77.1%, Uttarakhand 71%[11].

Present study revealed 85% of antenatal care received from government hospitals. Similar finding was also reported by Delhi Slum Study[12] and study conducted in Uttar Pradesh region's Rohilkhand, which also revealed that majority of the women received ANC from government facilities.[13]

In present study, 98.4% of the mothers have had two TT injections. Data from NFHS-5 revealed a comparable result of 92.5%. 76.9% of the mothers reported receiving the IFA tablets, which is consistent with 76.7% reported in the NFHS-5data.[11].

The utilization of maternal health care services was inversely correlated with maternal age; these results are consistent with a research by Regassa N et al., [14].

In the present study, mothers with secondary or higher education were more likely to attend at least four ANC visits. Association between maternal education and ANC service utilization reported in this study is consistent with earlier research in India.[15]

Female literacy was found to be strongly associated with >4 ANC visits. This clearly shows that education leads to better health-related behaviour, increased comprehension, and compliance with medical recommendations. Better utilization of maternal health care services is a natural result of modest education, and additional studies support this.[16,17]

Jat et al. found that socioeconomic class and mother's education were connected with utilization of ANC[18].

Babalola and Fatusi et al. found that individual education and family socioeconomic level were the most significant predictors of service utilization[19].

In the present study, 91.6% were delivered in a government setting and 8.4% in a private setting; these findings are consistent with the study conducted by Raja Dana Sekaran et al[20]., with the difference owing primarily to the costs associated with attending private maternity facilities and transportation.[21,22]

Other studies have also found that families with >2 children are less likely to have adequate ANC visits [23-25]. Mothers with fewer children may be more cautious and apprehensive about pregnancy.[26]Another possible explanation is that when parity develops, women gain experience and knowledge of previous pregnancies and they may believe that healthcare is no longer necessary.[27]

Limitations of the study

The study results were limited to urban slums.

Conclusion

Participants who were educated, employed were more likely to make adequate use of ANC services. Mothers' educational and employment status, occupation of the head of the family, family's socioeconomic status are consistently strong predictors of all maternal health services considered in this study; however, other determinants of service utilization vary in magnitude and level of significance depending on the type of maternal service - antenatal care and postnatal care. The study found that the government sector was more heavily utilized in urban slums.

Efforts should be made to improve the utilization of antenatal care services by conducting media campaigns aimed at raising awareness, particularly among vulnerable population.

Government and other interested agencies should work to build better general community-based education programs so that women understand the importance of maternal health care services.

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Original Article

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A Cross Sectional Study on Prevalence and Risk Factors for Low Birth Weight Babies in South India

P. Sudha Kumari[1], B.Renuka[2], P. Kaavya[3]

[1]Professor & HOD, Community Medicine, Kurnool Medical College, Kurnool, [2]Associate Professor, Community Medicine, KMC, Kurnool, [3]3rd Year MBBS student, KMC, Kurnool.

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Abstract

Background: Low birth weight continues to be a significant public health problem globally and is associated with a range of both short- and long term consequences. Objectives: 1. To estimate the prevalence of low birth weight babies delivered in GGH Kurnool. 2. To find out the association of risk factors in Low birth weight babies.

Methods: An observational cross sectional study was conducted in GGH, Kurnool, Andhra Pradesh. Prevalence of Low birth weight, exposure to different risk factors was recorded using a preformed questionnaire.

Results: Low birth weight is present in 17.8% of the babies of the study group. Half of the mother's birth conception interval was less than 3 years. 99% of the mothers had >4 Ante natal visits and they are taking IFA tablets. Occupation of the mother, Height of the mother, Weight gain during pregnancy, History of Infections, Malaria, Dengue were significantly associated and important determinants of low birth weight.

Conclusion: Imparting health and nutrition education by health functionaries to antenatal mothers and early detection of high risk pregnancy and timely referral to higher institutions will reduce the LBW problem.

Key words: Cross sectional, Low birth weight Prevalence, Risk factors.

Introduction

The birth weight of the new born baby is very important for its survival and healthy growth and development. Low birth weight is defined as a weight at birth of less than 2500 g (less than 5.51 lbs), regardless of gestational age. (7) It can be due to Pre term deliveries or due to babies who were born at term but weighing less, called as Small for date which is due to Intra uterine growth retardation.

Low birth weight is defined by the World Health Organization (WHO) as weight at birth less than 2500 g (5.5 lb). Low birth weight continues to be a significant public health problem globally and is associated with a range of both short- and long term

Corresponding Author: P. Sudha Kumari, Professor& HOD, Community Medicine, Kurnool Medical College, Kurnool.

E-mail: drpsudha@yahoo.co.uk

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consequences. Overall, it is estimated that 15% to 20% of all births worldwide are low birth weight, representing more than 20 million births a year.

The goal is to achieve a 30% reduction in the number of infants born with a weight lower than 2500 g by the year 2025. This would translate into a 3% relative reduction per year between 2012 and 2025 and a reduction from approximately 20 million to about 14 million infants with low weight at birth. [5]

The burden of LBW in India in recent years has remained stable despite impressive economic growth and increased public health spending on food security and nutritional supplementation. Strengthening the quality of ANC services for pregnant women with a focus on sensitization and awareness generation for improving maternal nutrition requires high prioritization.[6]

Malnutrition including anemia is a multifaceted, multidimensional and multi-sectoral problem. Malnutrition in pregnant women is one of the underlying causes of low birth weight (LBW) babies. As per Rapid Survey on Children (RSoC), 2013-14; 18.6% new-born had weight less than 2.5 Kg (out of those weighed). [10]

The UNICEF estimates that almost 30 million children worldwide are born every year with a birth-weight of less than 2500 g. Born with a low weight may elevate subsequent adverse health consequence for the child. The immediate consequence of low birth weight is infant mortality, particularly in the first month of life. [2]

LBW is a public health indicator of maternal health, nutrition, health care delivery and poverty. The present study was conducted to know the prevalence and risk factors of LBW, so that a large number of mortality and morbidity can be prevented by addressing the factors associated with low birth weight.

Objectives:

1. To estimate the Prevalence of low birth weight babies delivered in GGH Kurnool.
2. To find out the association of Risk factors in Low birth weight babies

Methodology

An observational cross sectional study was conducted in GGH, Kurnool. All healthy term new born babies delivered in government general hospital, Kurnool during the study period were the study population. Sample size was calculated using a prevalence of 17.29 which was taken from a study conducted by Girotra S etal, with a CI of 95% and Absolute Precision 5%which is calculated as 220. Inclusion criteria are all healthy term new born babies delivered in government general hospital whose mothers gave consent to participate in study were included. Babies who are sick were excluded. Whose mothers did not give consent also was excluded. The study was conducted from July 2023 to December 2023[6].

Data about maternal exposure to different risk factors were recorded using a preformed questionnaire. The information included a socio demographic profile of the mother and her family, obstetric history of the mother especially about previous births, abortions, pre-pregnancy weight, height, weight gain during pregnancy, antenatal services obtained by the mother including antenatal visits, TT prophylaxis, Iron and Folic acid prophylaxis and presence of any systemic illness like hypertension, cardiovascular disease, chronic renal disease.

Adequate antenatal care was considered when the pregnant women were registered at any time, had at least 3 antenatal checkups, was adequately vaccinated against tetanus, had consumed at least 100 tablets of Iron and Folic acid, was not involved in hard work, and had adequate rest during pregnancy [minimum 2 hours sleep during the day and 8 hours sleep during the night]. Weight gain was calculated by subtracting the weight of the mother at 12 weeks or before from the weight of the mother at term considering negligible weight gain up to 12 weeks of gestation. All the babies were weighed within one hour after birth and birth weight was measured to the nearest 10 grams using a baby weighing scale.

Statistical analysis: The data is entered in Microsoft Excel 2010. For analysis, descriptive statistics used were percentage, mean, and standard deviation (SD). Chi-Square test is done to test the significance. A P-value of less than 0.05 was considered as statistically significant. All the analysis were carried out using SPSS 26.0 version.

Results

Table 1: Distribution of Lbw Babies According to Socio- Demographic Variable

Characteristics	Frequency	Percentage
AGE OF THE MOTHER		
<18 years	4	1.8%
19-29 years	216	96%
>30 years	5	2.2%
RELIGION		
Hindu	163	72.4%
Christian	30	13.3%
Muslim	32	14.2%
EDUCATION OF THE MOTHER		
Illiterate	24	10.7%
Below 5th Class	31	13.8%
10th class or below 10th class	80	35.6%
Inter	70	31.1%
Degree	20	8.9%
OCCUPATION OF THE MOTHER		
Daily labor	55	24.7%
House wife	119	53.4%
Non-Agricultural labor	36	16.1%
Nurse	3	1.3%
Private teacher	2	0.9%
Tailor	6	2.7%
Clerk	2	0.9%
SOCIO ECONOMIC STATUS OF THE FAMILY		
Above poverty line	92	40.9%
Below poverty line	133	59.1%
RESIDENCE		
Urban	143	64.1%
rural	80	35.9%
NUMBER OF FAMILY MEMBERS		
Small (<4)	24	10.7%
Medium(5-10)	171	76%
Large(>10)	30	13.3%
OVER CROWDING		
Yes	187	83.1%
No	38	16.9%
CROSS VENTILATION		
Yes	43	19.1%
No	182	80.9%
BIRTH WEIGHT OF THE BABY		
Normal	178	79.1%
Low birth weight	40	17.8%
Very low birth weight	3	1.3%
Big baby	4	1.8%

Majority of mothers (96%) belong to 19-29 years age group and Hindu Religion (72.4%). Education of the mothers of the study group is below 10th class (35.6%) and Inter (31.1%). Regarding occupation of mothers, house wives are 53.4% and daily laborers are 24.7%. Majority of the study group belong to below poverty line (59.1%). Most of the study participants are coming from urban area (64.1%) and Overcrowding is present in 83.1% houses and also Cross ventilation is not present in 80.9% of houses of the participants. LOW BIRTH WEIGHT is present in 17.8% of the babies of the study group. (Table 1)

Table 2: Distribution of LBW Babies According to Maternal Factors

Characteristics	Frequency	Percentage
Height of the mother		
<140 cm	6	2.7%
>140 cm	219	97.3%
Weight gain during pregnancy		
<9 kgs	103	45.8%
9 -11 kgs	108	48%
>11 kgs	14	6.2%
BOH	80	35.6%
Abortion	132	58.7%
Others Previous LBW/ Previous abortion	6	2.7%
Still birth	7	3.1%
Number of gestations		
0	2	0.9%
1	103	45.8%
2	87	38.7%
3	29	12.9%
4	4	1.8%
History of multiple pregnancy		
Yes	1	0.4%
No	224	99.6%
Birth conception interval		
< 3 years	210	93.3%
>3 years	15	6.6%
History of ante partum hemorrhage		
Yes	8	3.6%
No	217	96.4%
Any habits like Smoking/Alcohol/ Passive exposure to smoking		
Yes	4	1.8%
No	221	98.2%
Number of antenatal visits		
< 4 visits	2	0.9%
>4 visits	223	99.1%
IFA & Calcium tablets taken		
Yes	221	98.2%
No	4	1.8%
Medical disease of mother		
Anemia	1	0.4%
Diabetes	2	0.9%
Hypertension	3	1.3%
Pregnancy induced Hypertension	3	1.3%
Thyroid	9	4%
Nil	207	92%
History of cervical incompetence/ PROM		
Yes	58	25.8%
No	167	74.2%
History of Malaria/ Dengue		
Yes	2	0.9%
No	223	99.1%
History of TB/ Measles/ Mumps/ Rubella/Syphilis/ HIV/Hepatitis B/Rh Incompatibility		
Yes	1	0.4%
No	223	99.1%
others	1	0.4%

In the distribution of LBW babies according to maternal factors majority of the mothers height (Table 2) in the study group is above average, that is >140 cms. Most of the mothers weight gain during pregnancy is > 9 kgs. Half of the mothers birth conception interval was less than 3 years. 99% of the mothers had >4 Ante natal visits and they are taking IFA tablets.

Table 3: Distribution of LBW Babies According to Fetal Factors

CHARACTERISTICS	FREQUENCY	PERCENTAGE
H/O Chromosomal/Congenital abnormalities		
Yes	1	0.4%
No	224	99.6%
H/O FETAL Abnormalities		
Yes	2	0.9%
No	223	99.1%
H/o intrauterine infection		
Yes	9	4%
No	216	96%

There are negligible fetal factors responsible for Low birth weight. (Table 3)

Table 4: Distribution of LBW Babies According to Social Factors

CHARACTERISTICS	FREQUENCY	PERCENTAGE
Age at marriage		
< 18 years	9	4%
>18 years	216	96%
Age at first pregnancy		
< 18 years	9	4%
>18 years	216	96%
Registered in Anganwadi		
Yes	218	96.9%
No	7	3.1%
Pregnancy is		
Wanted	223	99.1%
unwanted	2	0.9%

It was noted that majority of the mothers age at marriage and age at first pregnancy is >18 years (96%). Most of the mothers 96.9% were registered in Anganwadi centre and 99.1 of pregnancies are wanted pregnancies.(Table 4)

Table 5: Association between Socio Demographic, Maternal Factors and Low Birth Weight

Characteristics	BIG BABY	LBW	NORMAL	VLBW	X^2	P value
AGE OF THE MOTHER						
<18 years	0	0	4	0	2.85	0.828
19-29 years	4	38	171	3		
>30 years	0	2	3	0		
OCCUPATION OF THE MOTHER						
Daily labour	2	7	44	2	67.7	<0.001**
House wife	1	21	96	1		
Non-Agricultural labour	0	9	27	0		
Nurse	0	1	2	0		
Private teacher	0	0	2	0		
Tailor	0	1	5	0		
Clerk	1	1	0	0		
Height of the mother						
<140 cm	0	2	3	1	12.5	0.006*
>140 cm	4	38	175	2		
Weight gain during pregnancy						
<9 kgs	0	26	76	1	22.5	<0.001**
9 -11 kgs	2	14	90	2		
>11 kgs	2	0	12	0		
RELIGION						
Hindu	4	27	129	3	3.38	0.760
Muslim	0	6	26	0		
Christian	0	7	23	0		
EDUCATION OF THE MOTHER						
Illiterate	1	5	17	1	9.60	0.651
Below 5th Class	0	8	23	0		
10th class or below 10th class	1	13	65	1		
Inter	1	11	58	0		
Degree	1	3	15	1		
SOCIO ECONOMIC STATUS OF THE FAMILY						
Above poverty line	1	15	74	2	1.47	0.690
Below poverty line	3	25	104	1		

Continue.....

RESIDENCE						
Urban	3	26	112	2	0.246	0.970
rural	1	14	64	1		
NUMBER OF FAMILY MEMBERS						
Small	1	4	18	1	3.90	0.691
Medium	3	32	134	2		
Large	0	4	26	0		
OVER CROWDING						
Yes	4	34	147	2	1.53	0.676
No	0	6	31	1		
CROSS VENTILATION						
Yes	0	5	37	1	2.79	0.425
No	4	35	141	2		
History of Malaria/ Dengue						
Yes	0	0	1	1	36.5	<0.001**
No	4	40	177	2		

Association of Socio demographic and other factors with Low birth weight, Occupation of the mother (p = <0.001), Height of the mother (p = <0.006), Weight gain during pregnancy (p = <0.027), History of Infections, Malaria, Dengue (p = <0.001) were significantly associated and important determinants of low birth weight. (Table5)

*Statistically significant at <0.005

**Statistically significant at <0.001

PREVALENCE OF LOW BIRTH WEIGHT- 17.8%

Discussion

Majority of mothers (96%) belong to 19-29 years age group and Hindu Religion (72.4%). Education of the mothers of the study group is below 10th class (35.6%) and Inter (31.1%). Regarding occupation of mothers, house wives are 53.4% and daily laborers are 24.7%. Majority of the study group belong to below poverty line (59.1%). Most of the study participants are coming from urban area (64.1%) and Overcrowding is present in 83.1% houses and also Cross ventilation is not present in 80.9% of houses of the participants. LOW BIRTH WEIGHT is present in 17.8% of the babies of the study group in the present study.

In a study Global nutrition targets 2025, low birth weight policy by WHO, overall it is estimated that 15% to 20% of all births are Low birth weight which is similar to the present study (17.8%).[5]

In a similar study by ministry of health and family welfare posted on 2nd Jan 2018, weight less than 2.5 kgs babies are 18.6% which is comparable to present study. [10]

A cross sectional study conducted by Dubey et al the prevalence of low birth weight was 27% in delhi which was higher than the present study. [3]

In the distribution of LBW babies according to maternal factors majority of the mothers height(Table 2) in the study group is above average, that is >140 cms. Most of the mothers weight gain during pregnancy is > 9 kgs. Half of the mothers Birth conception interval was less than 3 years. 99% of the mothers had >4 Ante natal visits and they are taking IFA tablets.

There are negligible fetal factors responsible for Low birth weight in the present study.

It was noted that majority of the mothers age at marriage and age at first pregnancy is >18 years (96%). Most of the mothers 96.9% were registered in Anganwadi centre and 99.1 of pregnancies are wanted pregnancies.

Association of Socio demographic and other factors with Low birth weight, Occupation of the mother (<0.001), Height of the mother (<0.006), Weight gain during pregnancy (<0.027), History of Infections, Malaria, Dengue (<0.001) were significantly associated and important determinants of low birth weight in the present study.

A study conducted by Tarik M et al, the strong determinants associated with low birth weight is nutrition(10) which was similar to the present study.[9]

In a study conducted by Sachiko Inoue et al that a newborn's small size was one factor in the relationship between shorter maternal height which was also seen and statistically significant association in the present study.[8]

In a study conducted by Addulai Abubakari et al that weight gain during pregnancy was strong predictor for low birth weight which is comparable to the present study where the weight gain and Low birth weight were significantly associated.[1]

In a study conducted by Amar Devaguru etal the mothers with a height of less than 145 cms and mothers who gained less than 7 Kgs during pregnancy and Lower socio economic status revealed the high prevalence of LBW which was also seen in the present study where the mothers who had less weight gain, height less than 140 cms were showing significant association with LBW babies.[4]

Conclusions

The age group of the study population ranged from 17-35 years. Majority of the study population were literate. A high proportion of the study population was housewives and daily laborers belonging to below poverty line. Occupation, Height of the mother, Weight gain during pregnancy, History of infection with Malaria/ Dengue are significantly associated with the Prevalence of Low birth weight.

Efforts should be made to strengthen the health facilities and to impart health and nutrition education by health functionaries to antenatal mothers and early detection of high risk pregnancy and timely referral to higher institutions and also to prevent preterm deliveries and anemia because these are factors which can prevent low birth weight babies.

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

Ethical clearance was obtained from IEC committee of Kurnool medical college, Kurnool, with IEC No: 391/2023

Conflict of Interest: There is no conflict of interest.

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Original Article

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Anthropometric Assessment of Children (1-6 Years) Attending Anganwadi in Rural Field Practice Area of Gulbarga Institute of Medical Sciences, Kalaburagi

Pavan S Kalasker[1], Kuldeep J Dabade[2], Dayalaxmi T Shedole[3], Shivanand[4]

[1,2,3]Assistant Professor, Department of Community Medicine, Gulbarga Institute of Medical Sciences Kalaburagi, Karnataka, India, [4]Associate Professor, Department of Community Medicine, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India.

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Abstract

Context/Background: Undernutrition is conventionally assessed by prevalence of stunting, underweight and wasting. These methods even though widely used, do not give single measure of assessment of undernutrition. CIAF (Composite measure of anthropometer failure) gives single, comprehensive figure, as it identifies all the children experiencing anthropometric failure. Stunting Index, Underweight Index and Wasting index further identifies severity of individual parameter in relation to total undernutrition.

Aims/Objectives: To estimate prevalence of undernutrition among 1–6-year children by conventional methods like stunting, underweight and wasting along with other methods like CIAF and anthropometric indices like Stunting Index (SI), Underweight Index (UI) and Wasting Index (WI).

Methodology: A community based cross-sectional study was undertaken among 206 children belonging to 5 anganwadi centres in rural field practice area of department of community Medicine, GIMS Kalaburagi Karnataka.

Results: Overall prevalence of stunting was 51.9%, underweight was 35% and wasting was 20%. CIAF (Composite Index of Anthropometric failure) was 65.5%. Stunting Index, Underweight Index and Wasting Index was 0.79, 0.53 and 0.30 respectively. Stunting was widely prevalent among boys and girls suffered more from wasting and underweight.

Conclusions: CIAF should be widely used in assessing undernutrition in community along with Anthropometric Indices.

Key-words: CIAF, Stunting Index, Underweight Index, Wasting Index, Undernutrition.

Corresponding Author: Shivanand, Associate Professor, Department of Community Medicine, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India.

E-mail: Drshivanand2u@gmail.com

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Introduction

Malnutrition, in all its forms, includes undernutrition (wasting, stunting, underweight), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non-communicable diseases. Globally in 2020, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height), and 38.9 million were overweight or obese. Around 45% of deaths among children under 5 years of age are linked to undernutrition.[1]

Childhood undernutrition is a critical public health and development challenge in many developing countries. Pre-school children are most vulnerable to the effect of protein energy malnutrition (PEM) and their nutritional status is considered to be a sensitive indicator of community health.[2] Children have the right to a caring, protective environment and to nutritious food and basic health care to protect them from illness and promote growth and development.[3]

Conventionally childhood undernutrition is assessed by anthropometric indicators like stunting, wasting and underweight. However, Svedberg et al (2000) pointed these conventional indicators do not provide single figure of overall estimate of malnutrition in children. Svedberg argues that stunting, wasting and underweight are not independent entities and there is underestimation of anthropometric failure. CIAF (Composite Indicator for Anthropometric Failure) is an indicator which identifies all the undernourished children of population by single figure.[4] However, a recent report has highlighted some shortcomings of CIAF (Bhattacharya, 2006). Although CIAF is a useful composite measure, it fails to highlight the individual contribution and importance of stunting, underweight and wasting relative to the overall prevalence of undernutrition. Bose and Mandal (2010) proposed new indices, Stunting Index (SI), Underweight Index (UI) and Wasting Index (WI) which give relative significance and severity of these measures with respect to the total prevalence of undernutrition. This is in contrast to rates of Stunting, Underweight and Wasting which are absolute measure. The CIAF on the other hand indicates total undernutrition and does not provide any information on the prevalence of ST, UW and WS relative to total undernutrition. We feel that these three new indices, SI, UI and WI provide information on the significance of the problems of ST, UW and WS with respect to and relative to total under nutrition.[5]

As malnutrition and poverty are high in Northern Karnataka region, a baseline study to assess nutritional status of young children is needed especially in rural areas by these new indicators. This study will help provide clear information and identify accurately children with malnutrition, which will contribute in better planning and policy making.

Objectives:

1. To estimate the prevalence of Stunting, Wasting and Underweight among 1-6-year children in RHTC Hire-Sawalgi.
2. To assess undernutrition among 1–6-year children using CIAF and anthropometric indices i.e., Stunting Index (SI), Underweight Index (UI) and Wasting Index (WI).

Methodology

A community based cross-sectional study was conducted in Rural Health and Training Centre, Hiresawalgi, which is the rural field practice area of Gulbarga institute of medical sciences Kalaburagi. There are five anganwadi centres in the Hiresawalgi village with population of 5641. This study was conducted from February 2022 to May 2022 for a period of 4 months. All the 292 children between age group 1 to 6 years registered in 5 Anganwadis were included in the study. All efforts were taken to cover maximum number of children and 206 were included in the study using the inclusion and exclusion criteria. Children who could not be contacted even after repeated 3 visits at the time of examination were taken as exclusion criteria for the study.

Data collection:

Parents were given prior information regarding visit by team, through ASHA worker, so that mothers bring their children to anganwadi centre and undergo examination. After explaining objectives of study, verbal consent was taken from parents. The information regarding the child's name, parents name, age, sex, date of birth was collected from the Anganwadi register. Anthropometric measurements were measured using standardised instruments.

Electronic weighing machine was used to measure the body weight of children more than 2 years of age and Salter's weighing scale was employed to record the weight of children less than 2 years of age, weight was measured nearest 500 gm. Length of children less than 2 years was measured using infantometer and height of children more than 2 years will be measured using stadiometer. Height recorded to nearest of 1 cm.

Calculation:

The measurements of study subjects will be compared to WHO Z-score simplified field charts to find the prevalence of stunting, underweight, wasting. Z score is defined as the deviation of the value of an individual from the mean of the reference population divided by the standard deviation of the reference population. Subjects with a Z score of between -2SD to -3SD for height for age, weight for height and weight for age were respectively considered to be moderately stunted, wasted and underweight. Subjects with a Z score of less than 3SD for height for age, weight for height, and weight for age were respectively considered severely stunted, severely wasted and severely underweight.[6] Svedberg Model with addition of one more group by Nandy et al, consists of one group with no anthropometric failure and six subgroups with anthropometric failure. These groups are given in greater detail in Table 1. The CIAF excludes those children not in anthropometric failure (i.e., group A) and counts all children who have wasting, stunting, or are underweight (i.e., groups B to Y). It therefore provides a single measure with which to estimate the overall prevalence of undernutrition.

Table 1: Classification of children with anthropometric failure (CIAF)

Group	Description	Wasting	Stunting	Underweight
A	No Failure	No	No	No
B	Wasting Only	YES	No	No
C	Wasting & Underweight	Yes	No	Yes
D	Wasting Stunting Underweight	Yes	Yes	Yes
E	Stunting & Underweight	No	Yes	Yes
F	Stunting Only	No	Yes	No
Y	Underweight Only	No	No	Yes

Bose and Mandal (2010) proposed Stunting Index (SI) = Stunting/CIAF, Underweight Index (UI) = Underweight/CIAF and Wasting Index (WI) = Wasting/CIAF.[5]

Statistical analysis: Data entry was done in Microsoft excel sheet Version 2019 and analysis was done using open epi software.

Ethical Committee Clearance: Reference no: GIMS/KLB/PHARMA/IEC/ 129/2022-23, dated:26-2-2022.

Results

In this study, mean age of boys were 3.41 years and girls were 3.46 years. It is observed that overall stunting is found to be 51.9% among this severe stunting was almost 20%. Stunting was higher among boys (57.4%) as compared to girls (47.3%). Underweight is more common among girls (35%) than boys (30.9%). Girl children have higher proportion of underweight compared to boys. Among girl children, wasting was higher which was statistically significant.

Out of 206 subjects, 65.5% of children experienced anthropometric failure, among this CIAF for boys and girls was 68% and 63% respectively. 34.5% of children experienced single failure and 20.9% had double anthropometric failure.10.2% of children suffered triple failure, who are greatest risk of morbidity. Stunting Index, Underweight Index and Wasting Index was found to be 0.84,0.45,0.20 for boys and 0.75.0.61,0.39 for girls respectively.

Table 2: Prevalence of Stunting, Underweight and Wasting

	Boys		Girls		Total		
	N	%	N	%	N	%	
Moderate Stunting	34	36.2	33	29.5	67	32.5	
Severe Stunting	20	21.3	20	17.9	40	19.4	
Overall Stunting	54	57.4	53	47.3	107	51.9	Chi Square=2.09
Normal	40	42.6	59	52.7	99	48.1	P=0.23
Moderate Underweight	16	17.0	28	25.0	44	21.4	
Severe Underweight	13	13.8	15	13.4	28	13.6	
Overall Underweight	29	30.9	43	38.4	72	35.0	Chi Square=1.27
Normal	65	69.1	69	61.6	134	65.0	P=0.26
Moderate Wasting	8	8.5	21	18.8	29	14.1	
Severe Wasting	5	5.3	7	6.3	12	5.8	
Overall Wasting	13	13.8	28	25.0	41	19.9	Chi Square=4
Normal	81	86.2	84	75.0	165	80.1	P=0.04*
Total	94	100	112	100	206	100	

* Statistically significant

Table 3: Groups of anthropometric failure among children

Group name	Description	Boy	Girl	Total
A	No failure	30	41	71
B	Wasting Only	3	3	6
C	Wasting and Underweight	2	12	14
D	Wasting Stunting Underweight	8	13	21
E	Stunting Underweight	14	15	29
F	Stunting Only	32	25	57
Y	Underweight Only	5	3	8
	Total	94	112	206

Table 4: Gender Wise distribution of CIAF and Anthropometric Indices

	Boys	Girls	Total
CIAF/Total	64/94=0.68	71/122=0.63	135/206=0.65
Stunting Index	54/64=0.84	53/71=0.75	107/135=0.79
Underweight Index	29/64=0.45	43/71=0.61	72/135=0.53
Wasting Index	13/64=0.20	28/71=0.39	41/135=0.30

Discussion

In this study, we have tried to assess undernutrition among children in rural areas by both conventional methods and other methods like CIAF (Composite Index of Anthropometric Failure and Anthropometric Indices like Stunting Index, Underweight Index and Wasting Index. Stunting, which is indicator of chronic malnutrition is most commonly prevalent condition in both genders (57.4% -Boys & 47.3%-Girls) and across all age groups, with more prevalence among boys. Stiller et al and Laxmaiah et al also showed stunting to be on higher side in tribal (60%) and rural (61.6%) communities in India.[7,8] 35% of children were underweight, with more prevalence among girl children. Murarkar et al also reported similar finding in rural slums of Maharashtra.[9] However, higher underweight around 50% was found by Laxmaiah et al, Biswas et al and Stiller et al.[8,10,7] A significantly

higher proportion of wasting was seen among girl children (25%) compared to boys (13.8%).

The prevalence of undernutrition in this study by CIAF is 65.5%, this figure is much higher when compared to that measured by conventional methods like stunting, underweight and wasting. CIAF is a disaggregate figure and measures total number of children affected by anthropometric failure. Conventional indicators cannot reflect the anthropometric failure rate in population because they cannot distinguish the occurrence of combined forms of undernutrition. Biswas et al, Stiller et al in Adivasi children of West Bengal also showed similar CIAF of 60.40% and 61.6% respectively.[10,7] However, high CIAF of 73.1% was reported by Bose and Mandal in West Bengal.[11] CIAF of 48.3% and 42.1% was found by Islam et al in Bangladesh and Permatasari et al in Indonesia.[12,13] CIAF unmasks hidden burden of undernutrition in community and is more sensitive indicator.

We also tried to assess undernutrition by Stunting, Index, Underweight Index and Wasting Index as suggested by Bose and Mandal et al so as to find relative severity or contribution with respect to total undernutrition. Boys were more affected by chronic malnutrition as suggested by Stunting Index (0.84) and Underweight Index (0.45). If converted to percentages, among total boys in anthropometric failure (CIAF=64), 84 % of them were suffering from stunting and 45% from underweight. Among girls in anthropometric failure (CIAF=71) ,75% of girls were stunted ,61% were underweight and 39% were wasted. Girl children suffered from both chronic and acute malnutrition. Similar results SI, UI and WI were reported by studies of datasets of Nandy et al and Seetharaman et al.[5]

Table 5: Comparison of SI, UI and WI of different studies

Reference	Sample (n)	SI	UI	WI
Nandy et al (2005)	24396	0.756	0.788	0.266
Seetharaman et al (2007)	405	0.723	0.681	0.294
Bose et al	1012	0.364	0.866	0.684
Our study	206	0.79	0.53	0.30

Conclusions

In the rural and underprivileged communities, undernutrition continues as major public health problem. CIAF needs to be used more frequently in estimating undernutrition in community, as it unmasks undernutrition and gives correct number of children suffering from anthropometric failure

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

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Original Article

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Intravenous Labetalol Usage among Hypertensive Pregnant Women Admitted to a Tertiary Care Hospital: A Prospective Observational Study

Rabinarayan Dash[1], Snehadarsini Karnath[2], Sushree Priyadarsini Satapathy[3]

[1]Assistant Professor, Dept O& G, BBMCH, Balangir, [2]Reproductive Medicine Specialist, Indira IVF, JP Nagar Bangalore, [3]Assistant Professor , Dept Community Medicine, BBMCH, Balangir.

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Abstract

Background: Hypertensive disorders complicating pregnancy are one of the deadly triad. Objectives :1) To assess the efficacy of intravenous (IV) labetalol in severe hypertension of pregnancy. 2) Determine the various adverse effects of IV labetalol on mother. 3) To find out the Foetal outcome to the use of IV Labetalol in the study group. **Materials & Methods**: It was a prospective observational study which was conducted for a period of 1 year among the Pregnant women. Total sample size was 100.

Results: The rate of fall of systolic and Diastolic blood pressure occurred during first 40 min for drug. It is apparent that the target SBP & DBP was reached by the study groups in less than 20 minutes. Out of 100 cases only 14 patients had adverse effects . 94 were live,6 stillborn. Out of 94 live born babies 5(5.3%) had asphyxia, 4(4.3%) had HIE, 2(2.1%) were IUGR and 6(6.4%) were preterm.

Conclusions: We found that labetalol regimen is highly effective & can safely be used due to its rapid onset of action, no significant adverse reaction and no adverse effects on foetus.

Keywords- Hypertension, Labetalol, Pre-Eclampsia, Pregnancy, SBP, Severe.

Introduction

Hypertensive disorders in Pregnancy represent the most common medical complications with a reported incidence between 5-10%.(1)

Globally, the incidence has increased from 16.30 million to 18.08 million from 1990 to 2019, a total increase of 10.9% over two decades. The incidence of preeclampsia in hospital practice in India varies from 5% to 15%, and that of eclampsia is about 1.5%. Every year, over 5.2 million women die from pregnancy-related complications worldwide. With an estimated 62,000–77,000 deaths each year, Hypertensive disorders in Pregnancy account for approximately 18.1% of maternal mortality.(2)

Corresponding Author: Sushree Priyadarsini Satapathy, Assistant Professor, Dept of Community Medicine, BBMCH, Balangir.

E-mail: sssatapathy22@rediffmail.com

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Hypertension is considered severe if there are sustained elevation in SBP ≥ 160 mmHg and /or DBP ≥110mmHg. [3] It requires prompt treatment as there is risk of cardio-vascular accident, to prevent intracerebral hemorrhage, hypertensive encephalopathy and other target organ damage.[4, 5] It also presents an increased risk of complication for the fetus including prematurity, low birth weight, NICU admission and even fetal death .[5]

The most commonly used antihypertensive agents for severe hypertension in pregnancy are Nifedipine, Labetalol and Hydralazine. Recent guidance from the National Institute for Health and Clinical Excellence, UK, recommends inpatient treatment of severe hypertension of pregnancy with labetalol (oral or intravenous), intravenous hydralazine or oral nifedipine as first-line alternative antihypertensives within the critical care setting.[3]

Labetalol appears to be a safe, effective alternative to hydralazine & nifedipine for treating hypertension in the peripartum period. It results in good and sustained control of BP. There is no tachycardia and BP is stabilized. Labetalol has no effect on utero-placental blood flow. Although it crosses placenta, there is no evidence of intrauterine growth retardation (IUGR), perinatal death and neonatal hypoglycemia. These additional benefits are important characteristics expected of an ideal therapeutic agent for the treatment of hypertensive emergencies complicating pregnancy to control hypertension and to prevent end organ damage.[6]

But few studies in our setup have assessed the intravenous labetalol in terms of efficacy, rapidity, tolerability and safety in the control of severe hypertension of pregnancy. So we had conducted this study with the following

Objectives: 1) To assess the efficacy of intravenous labetalol in severe hypertension of pregnancy. 2)To determine the various adverse effects of IV labetalol on mother. 3) To find out the Fetal outcome to the use of IV Labetalol in the study group.

Material and Method

It was a prospective observational study which was conducted for a period of 1 years (December 2015-December 2016) among the Pregnant women who had blood pressure ≥ 160/110 mm Hg, & was admitted to the labor room, Dept of O & G of VIMSAR(VSS Institute of Medical Sciences and Research), Burla . Total sample size was 100. We have included all the pregnant women who had came to the labor room. Universal sampling technique was used.

Inclusion criteria: Pregnant women with severe hypertension after 20weeks of gestation

Exclusion criteria: Medical disorders like- H/O Cardiac disease, Bronchial asthma, Diabetes mellitus, hematological disorder, Liver disorders, Renal disorders , allergy to drugs, Maternal heart rate <60 or >120 beats per minute and Antihypertensive treatment in the preceding 72hours

Study instrument & Data collection method: All patients with sustained systolic blood pressure of ≥160 mm Hg or diastolic blood pressure of ≥ 110 mm Hg were included in the study after satisfying inclusion and exclusion criteria. A proper history was taken from the patients and/or from the relatives after taking consent. General examination, systemic examination & obstetric examination were performed. Demographic and standard laboratory data were collected on the time of admission. The patients were randomized to receive IV labetalol after taking proper informed consent. Injection labetalol 20 mg IV bolus over 2 minutes repeated every 10 min increasing to 40, 80, 80, to a maximum of 220mg .[2] After successful blood pressure control, sustained release tablet of labetalol started 2hours after the last trial medications.

During the study period maternal vital signs were recorded. Mean arterial pressure was calculated. Treatment was considered as failure if blood pressure did not decrease even after increasing the dose to maximum. Additional antihypertensive agent was added & managed accordingly. Fetal monitoring was done by manual auscultation. After successful delivery of the baby with controlled hypertension of mother. Fetal outcomes were assessed by APGAR SCORE, morbidity (asphyxia, prematurity, IUGR, HIE), NICU admission, stillbirths etc.

Data analysis: Data was compiled & statistical analysis was done by applying paired 't' test & Repeated measures of Anova. for the differences in pre- and post treatment values using SPSS (statistical

package for social sciences) 17 statistical software. A p –value <0.05 was considered as significant with 95% confidence limits.

Results

Out of total 100 cases majority of the cases (44%) belonged to the age group 21-25years followed by 26-30years (33%). The incidence of hypertensive disorders was (57%) in primigravida and (43%) in multigravida. Majority of the patients were between 37-41 weeks of gestation that was 74%. 24 cases belonged to ≤36 weeks gestation and 2 were >41weeks. Mean gestational age was 37.85±1.92 years. 85 cases had no past history of hypertensive disorders, only 15 cases had history of hypertensive disorder, out of which 9 cases had severe Pre-eclampsia and 6 cases had h/o of eclampsia.

From **figure 1**; it was apparent that, in **gestational hypertension group** after 1st dose,2nd dose mean SBP was 149.3± 31.85, 129.2±25.23mmHg respectively .Mean difference between pre and post 1st dose, was 29.3±32.68mmHg,1st dose to 2nd dose 20.1±29.86mmHg, 2nd to 3rd dose was 4.95±14.74mm of Hg & 3rd to 4th dose was 5.95±14.22mm of Hg .This was statistically significant (p=0.01) using Repeated measures of Anova whereas **In Eclampsia Group** initial SBP was 182 ± 14.14 mmHg. Mean difference of SBP between 1st and 2nd dose was 24.8±30.92mmHg which was found to be statistically significant(p=0.03). Maximum cases controlled within 2nd dose.

Figure 2 illustrates that in case of **gestational hypertension** group initial DBP was 122.25±4.33mmHg. after 1st dose mean DBP starts to decrease and after second dose DBP reduced to 84.50±3.96mmHg. Mean difference between pre and post 1st dose and 1st dose and 2nd dose show significant decrease which was found to be significant statistically with P value=0.001. No patients in this group required more than 2 doses. In **severe Pre-eclampsia group**, mean difference of MAP between pre and post 1st dose was 23.09±25.49mmhg, 1st and 2nd dose was 16.22±23.62mmHg, 2nd-3rd dose was 3.92±11.71 and 3rd to 4th dose 4.39 ±11.37. This difference with usage of IV labetalol on DBP was found to statistically significant with P<0.05.

In case of **eclampsia** only after 2dose mean difference of MAP reduced significantly from 24.6 ± 21.64mmHg to 19.6±25.27 mmHg which found to be significant seen in **Figure 3.**

Initially mean± S.D of heart rate was 89.83±6.70 beats/min in the study group. After giving labetalol mean± S.D of heart rate was 81.12±5.92 beats/min. Statistically the difference was found to be significant as seen in **(Table 1**) but clinically it didn't reduces the heart rate much. It was observed that the *mean number of doses & mean duration in minutes* required to achieve target blood pressure was [1.38±0.51, 13.75±5.17]in gestational hypertension group,[1.79±0.93 ,17.93±9.39] in severe preeclampsia group and [1.60±0.96 , 17.93±9.39] in eclampsia group.

It was observed in**(Table 2)** that; out of 100 cases only 14 patients had adverse effects.4 (28.6%) cases had nausea and vomiting,5(35.7%) cases had headache,4(28.6%) cases had hypotension and only one(7.1%) case had sweating.

Mean APGAR score at 1 minute and 5 minute were 6.12±1.24 and 8.37±1.40 in gestational hypertension group, 6.04±2.23 and 8±2.62 in severe preeclampsia group and 7.1±1.1 and 9.5±0.84 in eclampsia group respectively as seen in **Table 3(a).**

Table 3(b) shows out of 100 babies born 94 were live,6 stillborn. Out of 94 live born babies 77(81.9%) babies were normal, 5(5.3%) had asphyxia, 4(4.3%) had HIE, 2(2.1%) were IUGR and 6(6.4%) were preterm.

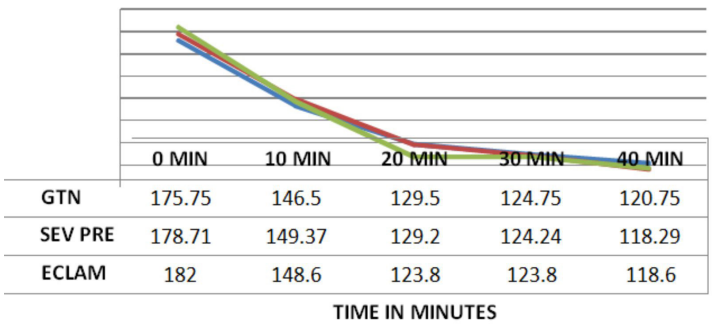
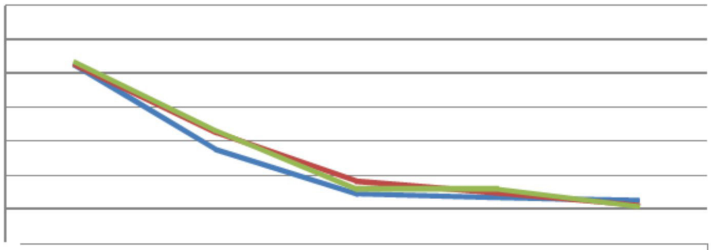


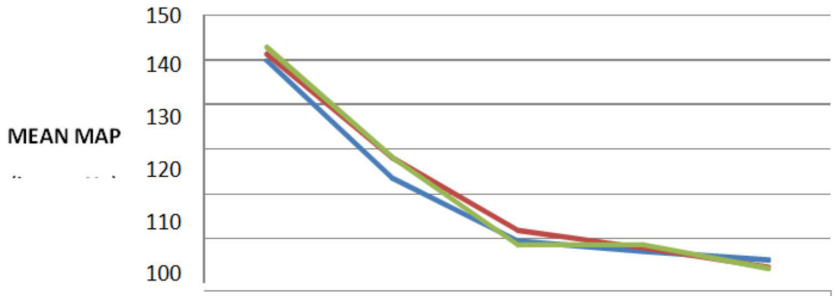
Figure 1: Effect of Labetalol on Systolic BP in patients with time (n=100)



	0 MIN	10 MIN	20 MIN	30 MIN	40 MIN
GTN	122.25	97.5	84.5	83.5	82.5
SEV PRE	122.49	102.51	88.27	84.85	81.2
ECLAM	123.2	103	86	86	80.8

TIME IN MINUTES

Figure 2: Effect of Labetalol on Diastolic BP in patients with time(n=100)



	0 MIN	10 MIN	20 MIN	30 MIN	40 MIN
GTN	139.75	113.5	99.5	97.25	95.25
SEV PRE	141.2	118.1	101.88	97.95	93.56
ECLAM	142.8	118.2	98.6	98.6	93.4

TIME IN MINUTES

Figure 3: Effect of Labetalol on Mean Arterial Pressure(MAP) in patients with time (n=100)

Table 1: Profile of Mean Heart Rate of Study Group (n=100)

Heartrate	Mean	SD	SE	Mean difference	95% CI		P value
					Lower	Upper	
Initial	89.83	6.70	0.67	8.71 ± 9.25	6.87	10.54	0.001*
After labetalol	81.12	5.92	0.59				

[*indicates p<0.05]

Table 2: Adverse Effects observed in Study Group(n=100)

Adverse Effects	Gestational Hypertension (N=8)	Severe Pre-Eclampsia (N=82)	Eclampsia (N=10)	TOTAL (n=100)
No	8(100%)	70(85.3%)	8(80%)	86
Nausea & vomiting	0	4(4.87%)	0	4
Headache	0	4 (4.8%)	1(10%)	5
Hypotension	0	3(3.6%)	1(10%)	4
Sweating	0	1(1.2%)	0	1

Table 3(a): Fetal outcomes Parameters

FETAL OUTCOMES	N	MEAN ±SD
Birth weight (in kgs)		
Gestational Hypertension	8	2.3±0.29
Severe Preeclampsia	82	2.25±0.35
Eclampsia	10	2.25±0.25
APGAR at 1 min		
Gestational Hypertension	8	6.12±1.24
Severe Preeclampsia	76	6.04±2.23
Eclampsia	10	7.1±1.1
APGAR at 5 mins		
Gestational Hypertension	8	8.37±1.40
Severe Preeclampsia	76	8±2.62
Eclampsia	10	9.5±0.84

Table 3(b) Perinatal Mortality & Morbidity among Study Group (n=100)

Perinatal Mortality	**Gestational Hypertension (N=8)**	**Severe Pre-Eclampsia (N=82)**	**Eclampsia (N=10)**	**Total (n=100)**
Live birth	8 (100%)	76 (92.6%)	10 (100%)	94
Still born	0	6 (7.31%)	0	6
Perinatal Morbidity	**Gestational Hypertension (N=8)**	**Severe Pre-Eclampsia (N=76)**	**Eclampsia (N=10)**	**Total (n=94)**
Nil	6(75%)	62(81.5%)	9(90%)	77
Asphyxia	0	5(6.5%)	0	5
HIE	1(12.5%)	3(3.9%)	0	4
IUGR	0	1(1.3%)	1(10%)	2
Pre term	1(12.5%)	5(6.5%)	0	6

Discussion

Hypertensive disorders of pregnancy remain one of the greatest unsolved mysteries in obstetrics. In this study the mean age of the cases in the study group was 25.22±4.09 years. Majority of cases (82%) belonged to the group of severe preeclampsia, only 8% of cases belonged to gestational hypertension and 10% patients to eclampsia group. Comparable to Murthy K et al[7], where 17.2% were gestational hypertension, 75.9% severe preeclampsia, 6.9% were eclampsia and 3.4% were chronic hypertension superimposed withpreeclampsia.

In the present study the mean SBP was 178.8±11.30 mm Hg for study group (175.75mm Hg in gestational hypertension, 178.71mm Hg in severe preeclampsia and 182mm Hg in eclampsia) and the mean diastolic blood pressure values for study group 122.54 ± 8.59 mmHg.(122.25mm Hg in gestational hypertension, 122.49mmHg in severe preeclampsia and 123.2mmHg in eclampsia). The rate of fall of systolic and Diastolic blood pressure occurred during first 40 min for drug. It is apparent that the target systolic blood pressure (≤150 mmof Hg) & diastolic blood pressure (≤ 100 mm of Hg) was reached by the study groups in less than 20 minutes. That mean the patients in the study group took considerably less time i.e (20 minutes) to reach the target SBP and DBP.

The mean MAP values for study group 141.24 ± 8.83 mmHg.(139.75mm Hg in gestational

hypertension, 141.2mmHg in severe preeclampsia and 142.8mmHg in eclampsia). Mean heart rate was 89.83±6.70 beats per minute in study group before intravenous labetalol. The patients in the study group showed a tendency towards bradycardia with a gradual decline of maternal heart rate from 89.83 to 81.12 beats per minute after intravenous labetalol.

Raheem et al [8] had a similar finding where the maternal heart declined in the first hour in the labetalol group. But not that much that it can affect life so clinically holds no significance.

It is apparent that 100% of total cases responded well to drug within the stipulated treatment regimen. Only 16 patients, took more than 2 doses, so drug is highly effective in controlling hypertension. There is no resistant cases, no additional antihypertensive used in our study.

In a study conducted by Ashe et al , had maximum treatment failure i.e 60%, [9], Whereas Raheem et al [8], Marbie et al[6] , Michael et al [10] had less rate of failure(20%,10% and 7% respectively) whereas in our study there was no treatment failure which was similar with the study conducted by Vermillion et al. [11]

Similarly Omkara Murthy et al[7] had 80% success rate. D.J. Cruickshank A, et al[12], Lardoux group[13] and Michael et al[10] reported satisfactory control of blood pressure within 24 hours in 88%,82%,and 92% of their cases respectively.

The mean total number of doses required for labetalol was 1.74±0.91.The average time taken for control of BP for labetalol was considerably less 17.4±9.17, this shows that labetalol controls BP more rapidly . Our study is comparable with MurthyK et al [7] , in which time taken to achieve blood pressure <150/100mm Hg was 25.17±12.76 and number of doses required to achieve target blood pressure is 2.53±0.97.

This is in contrast with the two studies. Vermillion et al [11] in their trial found that to achieve target blood pressure the labetalol regimen took 43.6±25.4minutes. Raheem et al[8] conducted a similar trial and found that the time taken for intravenous labetalol was 45 minutes and doses required were 3 doses. However in the present study, we found that labetalol required lesser number of doses (statistically significant) and has more rapid onset of action (statistically significant).

Of the 100 patients ;86 cases had no adverse reactions. Only 14 cases had adverse reactions. Naden and Redman[14] also reported that labetalol either parenterally or orally appears to be an effective and safe antihypertensive. Verma et al reported 4% cases with headache, nasal congestion and drowsiness.[15] Qarmalawi et al[16] reported 6% cases with dyspnea. Lamming et al [17] also reported in a series of 19 patients of severe preeclampsia that labetalol had no apparent detrimental effect on fetus antenatally during labor or post partum.

In our present study we found out that out of 100 cases live births were 94 & 6 were stillborn. Mean APGAR score at 1minute was 6.16±2.09 and APGAR score at 5 minute was 8.24±2.45. Maximum babies had APGAR score between 7 -10. This shows a better standard of health care and proper neonatal resuscitation facilities in the hospital. Out of 94 live births only 17 had perinatal morbidity (like birth asphyxia, HIE, prematurity, IUGR etc). In a study conducted by Michael et al[10] concluded that ,BP is better controlled which may influence perinatal outcome. Mabie et al[6] found no significant fetal and neonatal problems ascribed to labetalol. Ashe et al[9] concluded there are no harmful effects on fetus/ neonate. .Thus from the adverse effect profile it is quite apparent that the drug are quite safe for both mother and fetus in hypertensive emergencies of pregnancy.

Conclusion

In this study the time taken to reach the target blood pressure was less (17.4 minutes) with the mean dose of 1.74. The mean heart rate of patients showed a gradual decline though it's statistically significant but clinically not found to be significant. Similarly regarding adverse reactions, nausea & vomiting, headache and hypotension were more common in the study group. But the overall perinatal outcome was good by the usage of the drug. So drug was found to be effective.

Limitation: This study was a small study taking 100 patients for the drug. Large multicentric trials are required to highlight & prove the superiority of Labetolol.

Conflict of interest: No

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Ethical Clearance no: Virec No.2015/P-1-RP/124.date 31.10.15

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Original Article

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A Study to Assess the Perception, Acceptance and Satisfaction Regarding Postpartum Intra Uterine Contraceptive Device Services in a Tertiary Care Hospital in a Coastal District of Karnataka

Rachana A R[1], Malatesh Undi[2], Latha K G[3], Swetha K[4]

[1,2]Assistant Professor, Department of Community medicine, Karwar Institute of Medical Sciences, Karwar, Uttara Kannada, Karnataka, [3]MBBS student, Karwar Institute of Medical Sciences, Karwar, Uttara Kannada, Karnataka, [4]Assistant Professor, Department of Pharmacology, Karwar Institute of Medical Sciences, Karwar, Uttara Kannada, Karnataka.

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Abstract

Introduction: Unintended pregnancy is an important public health issue in developing countries like India because of its association with adverse social and health outcomes. Family planning enables women to achieve healthy spacing between births and reduces maternal and child mortality by 10%. Intra Uterine Contraceptive Device (IUCD) is effective immediately after insertion and provides very effective, safe and long-term –yet reversible protection from pregnancy. Postpartum IUCD insertion has a higher rate of retention.

Objective: To assess the perception, acceptance and satisfaction regarding postpartum IUCD services among the women delivering in a tertiary care hospital in the coastal district of Karnataka.

Materials and Methods: An observational cross-sectional study with a consecutive sampling method was conducted in the coastal district of Karnataka for a period of 2 months with a pretested semi-structured questionnaire by interview technique. Data was compiled in Microsoft Excel, validated and analysed using statistical software: Statistical Package for the Social Sciences (SPSS) version 16.0.

Results: 198 women were counselled for PPIUCD insertion, only 38.39% gave consent and 26.76% actually got inserted PPIUCD. The reasons for non-acceptance were fear of complications (11.98%), no familial support (9.15%) and using other contraceptive methods (35.85%). Factors like education status, Socio-Economic Status (SES), parity and previous use were positively correlated with acceptance of PPIUCD. No immediate complications were reported.

Conclusion: The PPIUCD has proven to be a useful long-term contraceptive method that is safe, effective, and useful for decreasing family size and spacing out births. Even though they are well aware of PPIUCD, they are hesitant to adopt it. Effective counselling can tackle these issues by clearing all the confusion.

Keywords: PPIUCD, complications, unintended pregnancy, contraceptive, family planning.

Corresponding Author: Swetha K, Assistant Professor, Department of Pharmacology, Karwar Institute of Medical Sciences, Karwar, Uttara Kannada, Karnataka.

E-mail: drswethak27@gmail.com

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Introduction

Unintended pregnancy is an important public health issue in developing countries like India because of its association with adverse social and health outcomes. Studies conducted in various developed and developing countries confirm the same.[1] In India approximately 27% of births occur in less than 24 months after a previous birth, another 34% of births occur between 24 and 35 months; 61% of births occur at intervals that are shorter than the recommended birth-to-birth interval of approximately 36 months and 65% of women in the first year postpartum have an unmet need for family planning.[2] Family planning enables women to achieve healthy spacing between births and reduces 25% to 40% of maternal death and child mortality by 10%.[3-5]

Among women during their first year postpartum in India, 91% of women want to avoid another pregnancy but only 26% are using any method of family planning. As mentioned above, 65% have an unmet need for family planning.[3] Intrauterine Contraceptive Devices (IUCDs) have been used by women in India for decades for spacing pregnancies and it is the most commonly used reversible method of contraception worldwide with about 127 million current users.[6]

The rise in institutional deliveries in recent times provides opportunities for healthcare providers to motivate postnatal mothers to adopt contraception. The postpartum period is potentially an ideal time to begin contraception as women are more strongly motivated to do so at this time, which also has the advantage of being convenient for both patients and healthcare providers.[3]

According to the World Health Organization Medical Eligibility Criteria, an IUCD can be inserted in the 48 hours postpartum, referred to here as a postpartum IUCD (PPIUCD), or after four weeks following a birth.[7] A 2010 Cochrane review concluded that PPIUCDs were a safe and effective contraceptive method.

IUCD is effective immediately after insertion and provides very effective, safe and long-term –yet reversible protection from pregnancy. It's a cost-effective method that can be used for many years (10 years for Cu T380A and 5 years for Cu T375). It is also convenient because it doesn't require daily action or repeated clinic visits for supplies. It doesn't affect lactation and hence can be used by lactating women.[8]

Inserting IUCD in the postpartum period saves time for both women and providers. Postpartum IUCD insertion has a higher rate of retention and a lower rate of uterine perforation possibility because the wall of the uterus is thicker just after pregnancy hence PPIUCD is preferred over IUCD. An increase in the amount and duration of menstrual bleeding, infection, IUD string problems and partial or complete expulsion are a few known complications of the IUCD.[3]

Various studies which are conducted across the country show acceptance rate of PPIUCD ranges from 34 -66%. Factors like educational status, prior knowledge about PPIUCD and socio-economic status were positively correlated with acceptance of PPIUCD.[9]

An extensive review of the literature revealed that, though studies across the globe exist to understand the factors that motivate women to accept PPIUCD there are only a few studies done for the same in our state and none in our district to assess the region-specific factors (coastal city). This arouses the need for the present study to look into the myths and barriers to acceptance and their perceptions that prevent them from using PPIUCD among coastal populations attending tertiary care hospitals so that focused counselling can be done to overcome those barriers. There is also a need to study the complications and satisfaction following PPIUCD insertion among the accepted women if all negative feedback from these women hinders the acceptance of the same.

Materials and Methods

After obtaining Institutional Ethics Review Board approval, this observational cross-sectional study

with a consecutive sampling method was conducted at a government tertiary care hospital attached to a medical college in a coastal district of Karnataka for a period of 2 months from 1st May 2018 to 30th June 2018 enrolling all the antenatal women who delivered and provided consent to participate in the study with a pretested semi-structured questionnaire by interview technique.

Inclusion criteria:

Antenatal women who got delivered in the study setting.

Exclusion criteria:

1. Women who underwent permanent method of sterilization following delivery
2. Women who had contraindications to PPIUCD insertion.
3. Who has not given the consent

The data regarding socio-demographic profile, perception regarding postpartum IUCD and their willingness to accept postpartum IUCD following delivery was collected using a pretested semi-structured questionnaire. The reasons for not accepting were also documented.

They were followed up for 2 days for immediate complications. After six weeks, they were again interviewed by telephone to collect information about the client's and husband's overall satisfaction with the method, problems or complications related to the method, and retention of the PPIUCD.

Statistical analysis: The data obtained was compiled in Microsoft Excel, validated and analysed using statistical software: SPSS version 16.0. The data was presented in mean, standard deviation and proportions. p-value <0.05 was considered statistically significant.

Results

Out of 330 women who delivered during the study period, only 198 women were enrolled in the study who satisfied the inclusion and exclusion criteria and consented to the study. The majority of the study subjects were in the age group of 20-30 years 162 (81.8%). Nearly half of the patients were studied minimum till high school (Table 1).

Table 1: Socio-demographic profile of the participants

Parameters		**Frequency**	**Percentage**
Age group (in years)	20- 30	162	81.8
	31-40	36	18.2
Education	Illiterate	7	3.5
	Primary school	29	14.6
	Middle school	44	22.2
	High school	60	30.3
	Intermediate	24	12.1
	Graduate/Postgraduate Professional degree	34	17.2
Socio-economic status(Modified BG Prasad classification)	Class I	31	15.7
	Class II	49	24.7
	Class III	55	27.8
	Class IV	42	21.2
	Class V	21	10.4

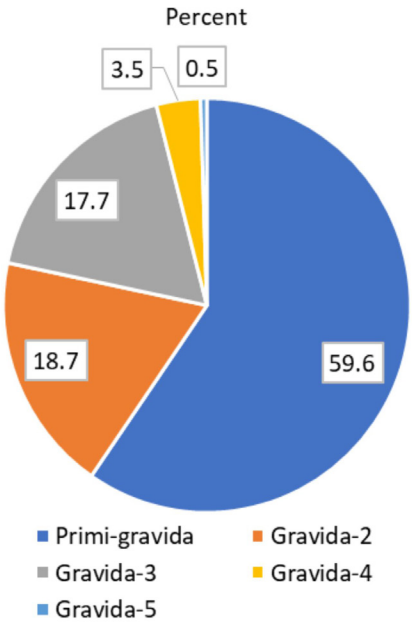


Figure 1: Distribution of study subjects according to obstetric score.

Among the 198 study subjects, 171 (86.4%) were aware of other contraceptives and only 53% of the women were following any of the contraception methods. Approximately 90% of them followed either the physical barrier method or oral contraceptive pills.

Table 2: Distribution of study subjects based on previous knowledge, usage and counselling regarding PPIUCD.

Details on PPIUCD	Yes	Percentage	No	Percentage
Previous knowledge about PPIUCD	164	82.8	34	17.2
Previous Usage of PPIUCD	15	7.6	183	92.4
Counselled for PPIUCD	198	100	0	00
Counselled during the antenatal period.	148	74.7	50	25.3

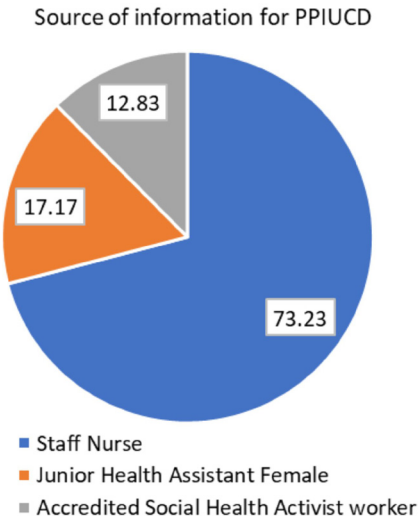


Figure 2: Distribution of study subjects according to source of information for PPIUCD.

Among 198 study subjects, 72(36.4%) accepted PPIUCD and 53(26.8%) got PPIUCD inserted.

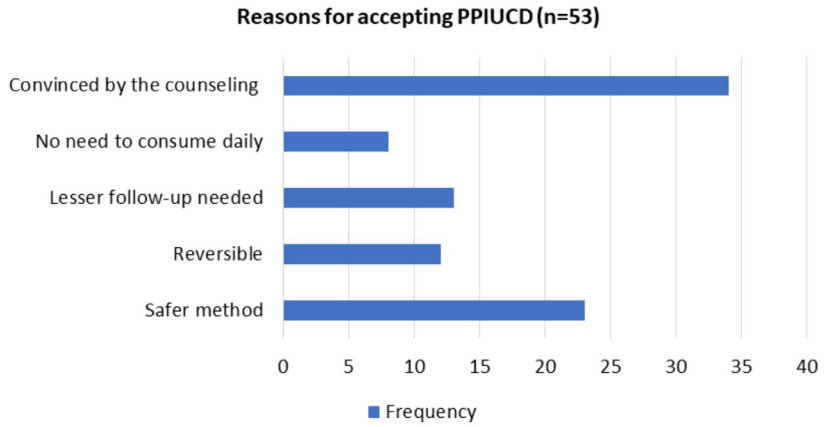


Figure 3: Reasons for accepting PPIUCD.*Multiple responses.

Table 3: Reasons for not accepting PPIUCD (n=145).

Reasons for non-acceptance	Frequency	Percentage
No support from the family	49	33.79
Scared of complications	43	29.66
Use of other methods of contraception.	79	54.48
Aware of Locational amenorrhea	23	15.86
It increases bleeding	28	19.31
Don't want to use any method now	17	11.72
Expulsion	22	15.17

*Multiple responses.

Table 4: Complications following PPIUCD insertion (n=53)

Complications	Frequency	Percentage
Pain	11	20.75
Increased bleeding	3	11.32
Expulsion of IUCD	5	9.43
Got removed IUCD because of pain	2	3.77
Total	21	39.62

When the subjects were enquired about complications, none of them had immediate complications but 21(39.62%) had delayed complications (Table 4).

Table 5: Distribution of study subjects based on satisfaction and follow up following PPIUCD.

Characteristics.	Frequency	Percentage
Satisfaction following PPIUCD insertion among women.	42	79.24
Husband's Satisfaction following PPIUCD insertion.	42	79.24
Checking the tail of IUCD regularly.	45	84.90
Consulted doctor following complications.	21	39.62

42(79.24%) women and their husbands were satisfied with PPIUCD. 45 (84.90) of them were checking for IUCD tail regularly and (39.62%) consulted a doctor following complications.

Table 6: Factors influencing PPIUCD insertion among the study subjects (n=198).

Factors	Odds ratio	95.0% C. If or odds ratio		p-value
		Lower	Upper	
Age	0.591	0.043	8.073	0.694
Education	4.324	1.556	12.017	0.005

Continue.....

Occupation	0.228	0.045	1.152	0.074
Age of the husbands	2.099	0.472	9.328	0.33
Education of the husband	0.787	0.351	1.76	0.559
Occupation of the husband	0.373	0.153	0.91	0.03
Religion	0.077	0.002	2.491	0.148
Type of family	0.503	0.12	2.102	0.346
Total monthly income	6.183	1.841	20.759	0.003
Socio-economic Status	7.7	2.02	29.346	0.003
Obstetricscore	0.032	0.003	0.359	0.049
Number of antenatal visits	1.272	0.688	2.352	0.443
Aware of PPIUCD	0.035	0.001	2.139	0.11
Source of information	1.731	0.071	42.186	0.736
Period of counselling	4.814	0.151	153.261	0.373
PPIUCD usage in past	290.941	2.376	35630	0.021
Mode of delivery	1.523	0.056	41.348	0.803
Timing of insertion	17570	41.907	7364000	0.002

To assess the overall effect of various variables on the acceptance of PPIUCD, the Multiple Logistic Regression Model was applied. A statistically significant association was observed between the education of the women, occupation of the husband, socio-economic status, obstetric score, PPIUCD usage in the past and timing of insertion with the acceptance rate of PPIUCD.

Discussion

Research and program experience worldwide indicates that the adoption of family planning for spacing the subsequent pregnancies contributes significantly to reducing maternal morbidity and improving the health of both mother and child. The postpartum period is a very crucial time in the lifecycle of reproductive women as they have a high unmet need for family planning and limited options for family planning methods. The family planning method used during this period should be safe for both mother and breastfeeding baby, should be reversible, highly effective, should not interfere with lactation and free from systemic side effects. IUCD qualify all these criteria and also have the additional advantage of being consumed daily.

As a result of the Ministry of Health and Family Welfare, the Government of India's commitment towards 100% institutional delivery, institutional deliveries have drastically improved over the period. This gives an excellent opportunity for the health care providers to counsel the mother for acceptance of the family planning mothers.

In the present study, the acceptance rate was 26.80% and the highest acceptance was seen in age groups ranging from 20-30 years, those with high school education, Hindus and those with middle socio-economic status. A higher acceptance rate was observed among primi-gravida. Similar findings were seen study conducted by Sharma A et al.[10]revealed that the highest acceptance was seen in women of age group 21-30 years (82.96%), those with secondary school of education (56.95%), Hindus (55.67%),those with middle socioeconomic status and among multipara (69.59%).

A retrospective study on the acceptability and complication of PPIUCD insertion done by Doley et al.[11] also found a higher acceptability rate in multipara (39.32%), whereas a study done by Jayraj et al.[12] found higher acceptance among primi-gravida (25.9%).

59.1% were from the nuclear family and the acceptance rate was also higher in the women from the nuclear family. This is contrary to the study done by Rati et al.[13], it was seen that there was a higher incidence in joint family which is 83.7%.[14] One of the reasons quoted by the women for non-acceptance of PPIUCD was no support from the family members.

In our study, 43% of the women had less than 4 Antenatal visits (less than the minimum recommended visits) and 6% of them had not gone for any antenatal check-ups. It is a missed opportunity for health care workers to counsel the antenatal mother. However, all 198 mothers were counselled regarding PPIUCD after admission. Effective counselling is a tool that empowers people to seek what is best for them.

In our study, 64.15% were convinced by the counsellor to accept PPIUCD and the safer method (44.0%) and reversible method (24.53%)were the major reasons for acceptance because they needed lesser follow-up. Sharma A et al.[10] and Jayraj et al.[12] found that the reversible method as a significant reason for acceptance i.e. 73.62% and 67.12% respectively.

In our study, the most common reason for rejecting PPIUCD was the use of other contraceptive methods (54.48%) and the same finding was reported in a study done by Jayrajet al.[12], 33.79% had a lack of support from the family. 29.66% were scared of complications, and 15.86% were aware of lactational amenorrhea. Partner and family refusal was found to be the significant cause in the study done by Sharma et al.[10] Effective counselling of the family members along with the antenatal mother and providing sufficient information regarding merits and demerits of the PPIUCD gaining the confidence of the family members, and addressing the myths about the PPIUCD among the mother go a long way in convincing the mother and the family members in accepting PPIUCD.

Among the delayed complications encountered, lower abdominal pain was the major complication (20.75%) followed by expulsion of PPIUCD(11.32%) and increased menstrual bleeding (9.43%). The missing thread was the complaint observed by Doley et al.[11] Pain was reported by Pradhan et al.[14]In our study, the most common reason for removal of IUCD was pain abdomen (3.77%). Doley et al.[11] reported bleeding (42.11%) as a major reason for removal.

The study by Doleyet al.[11] and Mishra[15] revealed that missing thread (15.12% and 11.29%) and irregular bleeding (12.35% and 23.50%) were significant complications. Irregular menstrual bleeding (17.15%), pain abdomen (17.15%) and expulsion (14.28%) were reported as major complications by Jayraj et al.[12]and these were the reasons for the removal of PPIUCD.

Gupta et al.[16] in her study, reported about perforation and expulsion. An increase in expulsion rates occurred with delayed postpartum insertion when compared to immediate insertion. Expulsion rates were more when compared to interval IUCD insertion. Post-caesarean insertions were associated with a lower expulsion rate when compared to post-vaginal delivery insertion. During counselling, mothers should be educated and well-informed regarding possible complications of PPIUCD and the importance of further follow-up after PPIUCD insertion. Mothers should be assured about the continued care and follow-up after PPIUCD insertion.

42(79.24%) women and their spouses were satisfied with PPIUCD. 45 (84.90) of them were checking for IUCD tail regularly and (39.62%) consulted a doctor following complications.

Conclusion

The PPIUCD has proven to be a useful long-term contraceptive method that is safe, effective, and useful for decreasing family size and spacing out births. Even though they are well aware of PPIUCD, they are hesitant to adopt it for fear of complications and no support from the family. Effective counselling can tackle these issues by clearing all the confusion. Antenatal counselling can also enhance the possibility of accepting PPIUCD implantation.

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Original Article

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Sleep Quality Among Interns in a Tertiary Care Centre in Kanyakumari District: A Cross Sectional Study

Renju Y[1], Jayasree C.S[2], Vishnu G Ashok[3], Vaisakh G.T[4], Sakthi Priya[5] Vyshali[6], Liji Anna Varghese[7].

[1]Post Graduate Student, [2]Professor, [3]Professor, [4]Senior Resident, [5]Post Graduate Student, [6]Post Graduate Student, [7]Assistant Professor, Department of Community Medicine, Sree Mookambika Institute of Medical Sciences, Kulasekaram, Kanyakumari, Tamilnadu. India.

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Abstract

Background: Good quality sleep is important in order to have better cognitive performance and to avoid health problems. OBJECTIVES:_1. To assess the Sleep quality among M.B.B.S interns in a tertiary care centre.2. To find the Correlation between Body Mass Index and Sleep quality.

Methodology: A Cross sectional study was conducted among Interns of a tertiary care centre southern Tamilnadu in the month of August 2023 and the sleep quality was assessed using Sleep Quality Scale. Date were collected after getting consent and entered in MS Excel and analysed using SPSS. The Correlation between BMI and Sleep quality were analysed. RESULTS**:** Mean age of the participants was 24.03 among them 34.8% were males and 65.2% were females. Mean BMI of the participants was 22 with the minimum BMI of 17 and the maximum BMI of 35. Mean total score was 34.93 with the minimum score of 8 and the maximum score of 64. There is weak correlation between BMI and Sleep quality.

Conclusion: Optimal level of balance between training and adequate sleep is important in residency programs. Our study indicates that there is no relationship between BMI and sleep quality among M.B.B.S interns in Kanyakumari district.

Key Words: Age, BMI, Sleep quality.

Introduction

Getting enough good-quality sleep is essential for both maintaining good health and improving cognitive function. Its quality is closely linked to various measures of well-being, including physical and psychological[1]. Lack of sleep and the signs of

Corresponding Author: Renju Y, Post Graduate Student, Department of Community Medicine, Sree Mookambika Institute of Medical Sciences, Kulasekaram, Kanyakumari, Tamilnadu. India.

E-mail: renjuyohijini@gmail.com

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sleep disorders have long been disregarded and poorly understood considering the high incidence of sleep disorders in the general population and the possible effects of these disorders on quality of life, morbidity, and mortality[2, 3].

Individual pattern of wakefulness and sleep are known to differ depending on a number of factors, including age, occupation, working environment, physiological and psychosocial traits, psychiatric disorders, and other physical illnesses[4]. Problems relating to sleep and insomnia have received more attention in the past few years. It is gaining more attention primarily because it is acknowledged that weariness and sleepiness are becoming endemic in the populace[5]. In terms of sleep, young doctors get less sleep in their early years because they study late at night for medical college exams, which is followed by long shifts and night work at the hospital[6].

It is commonly acknowledged that lack of sleep may play a role in adolescent obesity.The dietary and lifestyle choices of residents in medical hospitals have an impact on sleep quality. For the majority of interns in residency and throughout their careers, long work hours, night shifts, modified schedules, and on-call periods are standard practices. About how sleepiness affects a doctor's performance, there is ongoing discussion in the medical literature, in residency training programs, in medical schools, and in clinical practice[7, 8].

Being a complex disorder, obesity is caused by both genetic relationships and risk factors that may be changed. In the early stages of childhood and adolescence, lifestyle modification and human behaviour are major risk factors for the development of obesity. Teenagers are particularly prone to forming behaviours that encourage weight gain. Thus, in addition to maintaining a healthy diet and adequate physical activity, recent research shows that there is a link between inadequate sleep and increased risk of obesity, particularly in children and adolescents[9].

There is inadequate evidence in the emerging field of relationship between Body mass index and sleep quality[10]. Over the last ten years, a number of studies have examined the detrimental effects of sleep deprivation on medical professionals across a range of surgical and medical specialties.

Hence, this study intends to explore the assessment of sleep quality and its relationship with BMI among medical interns of Sree Mookambika Institute of Medical Sciences (Dr. MGR University), Kanyakumari district, Tamil Nadu, India.

RESEARCH QUESTION:

- What is the sleep quality among Medical interns of Kanyakumari district.

HYPOTHESIS:

- Null hypothesis,

  H_0: There is no relation between Sleep quality score and BMI.

- Alternative hypothesis,

  H_1: There is relation between Sleep quality score and BMI

DESIGN: Cross Sectional Study

AIM AND OBJECTIVES:

1. To assess the Sleep quality among M.B.B.S interns in a tertiary care centre.
2. To find the Correlation between Body Mass Index and Sleep quality.

Materials and Methods

STUDY DESIGN: A Cross sectional study.

STUDY SETTING: Sree Mookambika Institute of Medical Sciences.

APPROXIMATE TOTAL DURATION OF STUDY: (August-2023 to September-2023) 2 months

NUMBER OF GROUPS TO BE STUDIED: One

DETAILED DESCRIPTION OF THE GROUPS: One group of 112 interns of Sree Mookambika Institute Of Medical Sciences, Kanyakumari District, Tamil Nadu.

TOTAL SAMPLE SIZE OF THE STUDY: 112

SCIENTIFIC BASIS OF THE SAMPLE SIZE USED IN THE STUDY: Based on the research article published by Ashita Maria Paul et al[11].

SAMPLING TECHNIQUE USED IN THE STUDY : Convenient sampling.

STUDY SETTING: Sree Mookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari district, Tamil nadu.

SAMPLE SIZE CALCULATION:

$$n = \frac{(Z_{1-\alpha/2})^2 pq}{d^2}$$

p= Proportion of poor sleep quality among interns

=77.4%

q=1-p

=22.6%

d=10 % of p

=10/100 x 77.4

=7.74%

$Z_{1-\alpha/2}$ =1.96, for α=5 %

Applying in the formula

$$\frac{1.96^2 \times 77.4 \times 22.6}{7.74^2}$$

n=112

INCLUSION CRITERIA:

- M.B.B.S interns posted in various departments of Sree Mookambika Institute of Medical Sciences during the study period.
- Willing to participate in the study.

EXCLUSION CRITERIA:

- Interns who were on treatment for any psychiatric illness.

PROCEDURE IN DETAIL:

After getting informed consent from the participants and ensuring privacy, details were assessed using a pre-structured questionnaire (Sleep quality scale).

STATISTICAL METHOD OF ANALYSIS: Significance level was prefixed and other appropriate statistical test were used.

DATA COLLECTION:

- The data was collected using a Self administered Questionnaire (Sleep Quality Scale) which is added in the appendix 1 and the data was in the custody of the investigator.
- The data collected was anonymized and there were no personal identifiers and only a unique id no was there.
- The data was confidential and stored in the investigators PC, it is not shared to anyone and it is deleted.

SOFTWARE USED FOR DATA ENTRY: Study parameters were entered in Microsoft Office Excel 2010.

SOFTWARE USED FOR STATISTICAL ANALYSIS: SPSS version 20.0

Results and Discussion

Table 1. Gender wise Distribution of participants

Gender	Frequency	Percentage %
Male	39	34.8
Female	73	65.2
Total	112	100

- Of the 112 participants 39 (34.8%) were Male and 73 (65.2%) were Female.
- Mean age of the participants was 24.03 and the Std. Deviation was 1.881 with the minimum age of 22 and the maximum age of 30.

Frequency calculated for total score

- The mean was 34.93, the median was 34 and the mode was 31 with the Std. Deviation of 10.446 with the Minimum score of 8 and the Maximum score of 64.
- Mean BMI of the participants was 22 and the Std. Deviation was 3.266 with the minimum BMI of 17 and the maximum BMI of 35

Table 2. Correlation between BMI and Total score

		BMI	Total score
BMI	Pearson Correlation	1	.165
	Sig. (2-tailed)		.082
	N	112	112
Total score	Pearson Correlation	.165	1
	Sig. (2-tailed)	.082	
	N	112	112

- 0.165 indicates weak correlation between BMI and Sleep quality (No statistical significance)

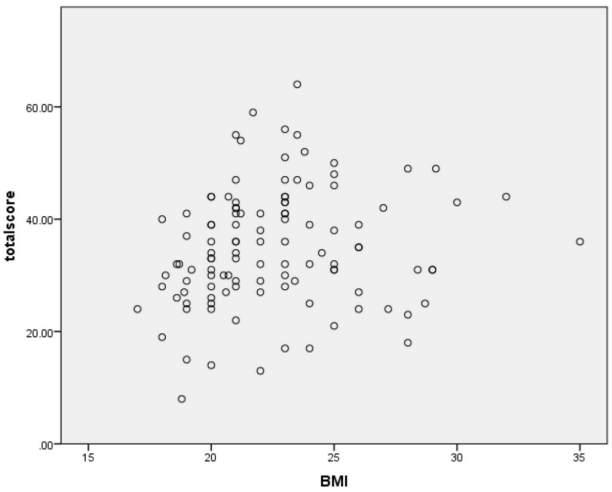


Figure 1. Correlation between BMI and Sleep quality scores among study participants

- The Scatter Graph indicates that there is no correlation between BMI and Sleep quality.

Sleep is a physiological process essential to life. The increasing level of sleeplessness, stress as well as the hectic schedule result in sleep loss, disruption of circadian rhythm, change in dietary habits and fatigue for medical personnel who provide around-the-clock health care. The role of sleep is not only to rest the body but also the suppression of blood pressure and glucose tolerance by decreasing the secretion of catecholamine and cortisol, which will leads to prevention of metabolic syndrome and other obesity-related diseases.

Based on the study done by Paul AM et al[11] on Sleep pattern and life style habits in medical students and interns male were 31.4% and females were 68.6% compared to our study were the males were 34.8% and females were 65.2%

The study done by Anam MR et al [9] on Association of sleep duration and sleep quality with overweight and obesity among adolescents there is more than 15% of the students have sleep disturbance.

Reports have been made were the quality of sleep have been associated with obesity, fatigue, poor decision making, diabetes mellitus, hypertension, atherosclerosis and cardiovascular diseases. Individuals who have slept an average of 7 to 8 hours per night have had the lowest morbidity of metabolic syndrome, and those who have slept longer and shorter have shown an increase risk of metabolic syndrome.

Conclusion

Sleep is an essential component of healthy behavior. Achieving the optimal level of balance between training and adequate sleep is important in residency programs. In our study most of the participants were females (Table 1. Gender wise Distribution of participants). It indicates that there is no relationship between Body Mass Index and sleep quality among M.B.B.S interns in Kanyakumari district (Figure 1. Correlation between BMI and Sleep quality scores among study participants).

Further large-scale studies are needed to assess all sleep dimensions and confirm the present findings. In the future Sleep disturbance will be a major concern in academic as well as professional development. Sleep disturbance is a modifiable risk factor and if this concern is addressed early in their life with proper knowledge and precautions it can lead to healthy life.

ACKNOWLEDGEMENT:

I would like to express my special thanks of gratitude to my Community Medicine Dept for their able guidance and support in completing my study.

BIAS: Recall bias may be present.

GENERALISABILITY: Not Generalisable.

LIMITATIONS: Low sample size.

FUNDING: Not funded.

CONFLICTS OF INTEREST: Nil

Ethical clearance: Signed copy of Declaration of Helsinki was submitted by all authors.

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Original Article

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Impact of Classical Yoga Therapy and Naturopathy Neutraceutical Functional Supplementary Food on Cortisol and Pittsburg Sleep Quality Index among Middle-Aged Men with Insomnia: Randomized Control Trial

S.Muthukrishnan[1], K.V.Rajasekar[2], V.Parthiban[3]

[1]Ph. D Scholar, Faculty of Yoga Sciences and Therapy, Meenakshi Academy of Higher Education and Research (Deemed to be University), No.12, Vembuliamman Koil Street, West K.K.Nagar, Chennai, Tamil Nadu, India, [2]Professor & Dean, Meenakshi Medical College Hospital and Research Institute, Enathur, Kanchipuram, [3]Assistant professor. Center For Yoga.CET SRMIST, Kattankulathur, Chennai.

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Abstract

To fulfill the objectives of the Random Group Experimental Design, 120 adults experiencing insomnia issues volunteered from Chennai city. Among them, 90 individuals underwent screening, from which 30 were randomly selected using the Random Sampling technique, falling within the age range of 35 to 50 years. These participants were then divided into two groups: an Experimental Group and a Control Group, each comprising 15 subjects. Over a period of 12 weeks, the Experimental Group received training sessions six days a week, lasting up to an hour each morning, while the Control Group engaged in active rest. Both groups underwent pre-test and post-test evaluations before and after the training sessions, during which their scores on the Pittsburgh Sleep Quality Index (PSQI) and cortisol levels were measured. The significance of differences among the groups was determined using the 't' test. Results indicated a decrease in both PSQI scores and cortisol levels among participants in the Experimental Group, who engaged in Classical Yoga therapy practices and consumed Naturopathy supplementary food. Consequently, the hypothesis was accepted with a confidence level of 0.05. The study concludes that Classical Yoga therapy practices along with Naturopathy supplementary food contribute to reducing PSQI scores and cortisol levels in adults suffering from insomnia.

Keywords: Yoga therapy, Naturopathy food, Nutraceutical Functional Supplementary Diet, cortisol, Pittsburgh Sleep Quality Index (PSQI).

Introduction

Classical Yoga therapy and Naturopathy Nutraceutical Supplementary food offer numerous benefits to individuals grappling with trauma and insomnia[1]. These modalities encompass various yoga

Corresponding Author: S.Muthukrishnan, Ph. D Scholar, Faculty of Yoga Sciences and Therapy, Meenakshi Academy of Higher Education and Research (Deemed to be University), No.12, Vembuliamman Koil Street, West K.K.Nagar, Chennai-78, Tamil Nadu, India.

E-mail: krishsaayyoga@gmail.com

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techniques and the consumption of Nutraceutical Supplementary food derived from Naturopathy principles. Through classical yoga therapy, patients experience profound relaxation and a surge of positivity[2]. While sleeping tablets may aid in inducing sleep, they carry potential risks of side effects and merely address the symptoms rather than the root cause. Conversely, yoga boasts solely positive effects and has no associated side effects[3]. Moreover, it facilitates lifestyle changes that can be transformative. By consistently practicing yoga and integrating Naturopathy Nutraceutical Supplementary food, individuals can address the underlying causes of insomnia[1]. Insomnia, a prevalent sleep disorder, manifests as difficulty falling asleep, staying asleep, or waking up prematurely and struggling to return to sleep. It can drain one's energy and diminish overall well-being[4].

Objectives of the Study

The aim of the study was to determine there would be any significant difference on cortisol and Pittsburgh Sleep Quality Index among adults with insomnia due to classical Yoga Therapy as well as classical yoga therapy with naturopathy neutraceutical functional supplementary diet.

Statement of the Problem

The prevalence of insomnia worldwide is 33% with increasing age and diseases in the body. In India, 18.6% of healthy adults are suffering from insomnia.[5]. Additionally among the corporate employees, the prevalence rate of insomnia is 13.8%.[6] Various research studies iterates that insomnia can lead to many psychiatric disorders and can develop anxiety, depression and suicidal thoughts.[7].

Hypothesis

- It was hypothesized that there would be significant differences due to Classical Yoga therapy on Cortisol and Pittsburgh Sleep Quality Index among middle aged men with insomnia
- It was hypothesized that there would be significant differences due to Classical Yoga therapy and naturopathy neutraceutical functional supplementary diet on Cortisol and Pittsburgh Sleep Quality Index among middle-aged men with insomnia
- It was hypothesized that there would be significant differences between Classical Yoga therapy group as well as Classical Yoga Therapy with naturopathy neutraceutical functional supplementary diet group on Cortisol and Pittsburgh Sleep Quality Index among middle aged men with insomnia

Delimitations

- The study was delimited to adults suffering from insomnia living in Chennai only
- The age group of subjects was ranged from 35 to 50 years only.
- The selected dependent variables were cortisol and Pittsburgh Sleep Quality Index.
- The selected independent variables were Classical Yoga Therapy and Naturopathy Nutraceutical Supplementary diet.

Methodology

In order to fulfill the study's objectives, I invited subjects through the news paper advertisement and notice papers and all multimedia and banners etc .120 middle aged men experiencing insomnia from Chennai city volunteered, out of which 120 underwent screening, and 30 were randomly selected using a randomized control sampling method within the age range of 35 to 50 years. Duly consent form was signed by the participants. Under supervision of Registered MBBS doctors team with Registered laboratory team presentation data taken on 19th February 2023 and after 12 weeks.

These participants were divided into an experimental group and a control group, each comprising 15 subjects. The Experimental Group underwent training for 12 weeks, six days a week, with sessions lasting up to an hour in the morning, while the control group engaged in active rest. Yoga therapy treatment post data taken That all programs conducted private Higher secondary school campus including 12 weeks morning yoga therapy treatment itself.

Pre-test and post-test assessments were conducted before and after the training for both groups, measuring scores on the Pittsburgh Sleep Quality Index (PSQI) and cortisol levels. The 't' test was utilized to determine significant differences among the groups.

The Classical Yoga therapy practices included Sukshma Vyayama (Subtle Exercises), Suryanamakar, Uttanasana (Squat pose), supta baddha konasana (reclining butterfly pose), Sashankasana (moon pose), Viparita karani (inverted pose), Halasana (Plough pose), and Shavasana(Corpse Pose). Pranayamas such as Bhramari-Humming Bee Breath, Ujjayi-Psychic Breath, Nadi Shodhana-Psychic Network, and Yoga Nidra (Psychic Sleep) were also taught. Additionally, Naturopathy Nutraceutical Supplementary Food incorporating antioxidant-rich foods like berries, leafy greens, nuts, chia seeds, along with ingredients like turmeric, ginger, and garlic for potential anti-inflammatory properties, and sleep-promoting nutrients found in grains like oatmeal, were recommended. The importance of minimizing sweeteners, which can disrupt sleep, was also emphasized.

The data concerning the variables gathered from both groups before and after the training period were subjected to statistical analysis using the 't' test to ascertain any significant differences. This analysis was conducted with a significance level of 0.05.

Naturopathy Neutraceutical Funtional Supplementary Diet Chart

Table I: Break Fast Menu

Day	Breakfast
Monday	Kichadi / Pongal +Chutney
Tuesday	Kichadi /Uppuma with Vegetables + Mint Chutney
Wednesday	Kichadi /Ragi Dosa+ Chutney
Thurusday	Kichadi /Poha
Friday	Kichadi / Beaten Rice
Saturday	Kichadi /Dosa (Vegatables) +Sambar
Sunday	Kichadi /Rava Idli (Vegetables)+Corriander Leaves Chutney+Sambar

Table II: Lunch Menu

Day	Main Menu	Raitha	Sabji	Soup	Fruit
Monday	Palak Rice/Chapathi	Cucumber Tomato Raitha	Cho-Cho Sabji	Tomato Soup	Papaya
Tuesday	Rice+Dhal+Rasam Sambar+Buttermilk+ Chapathi	----------	Cabbage Sabji	---------	Orange
Wednesday	Veg Pulao/Curd Rice +Chapathi	Beetroot Raitha	Channa Gravy	Palak Soup	Apple
Thrusuday	Corriander Rice+Chapathi	Carrot Raitha	Tomato Sabji	Dhal Soup	Watermelon
Friday	Rice+Dhal+Rasam+ Sambar+Buttermilk+ Chapathi	----------	Ash Gourd Sabji	----------	Guava
Saturday	Tomato Rice+Chapathi	Cucumber Tomato Raitha	Dhal Sabji	Carrot Soup	Musambi
Sunday	Bisebelabath	Mixture	---------	Beetroot Soup/ Mixed Vegetable Soup	Banana/ Papaya

Table III: Dinner Menu

Day	Main Menu	Vegetable Sabji	Chutney	Salad
Monday	Chapathi+Rice+Rasam+ Sambar+ Buttermilk	Carrot Beans Sabji	Corriander	Cucumber Crimson
Tuesday	-Do-	Drumstick Leaves/ Ladies Finger	Mint	Raw Papaya
Wednesday	-Do-	Knol Khol	Curry Leaves	Tri-Colored Salad
Thursday	-Do-	Bottle Gourd	Tomato	Summer Retreat
Friday	-Do-	Palak	Groundnut	Guava Delight
Saturday	-Do-	Bitter Gourd Chips	Methi	Grated Salad
Sunday	-Do-	Cho-Cho Sabji	Ginger	Cabbage Kosambari

Review of Related Literature

Thirthalli et al. (2013) studied at a tertiary care psychiatry hospital and investigated the effectiveness of yoga as an antidepressant and its impact on reducing serum cortisol levels. The study involved 54 patients with depression, who were offered yoga as a potential therapy. A validated yoga program was administered over a month, and patients were free to choose medication under their psychiatrist's guidance. Depressive patients exhibited higher serum cortisol levels compared to controls, but after treatment, there was a significant decrease in cortisol levels. More patients in the yoga group experienced a reduction in cortisol levels compared to those in the medication-only group. The findings suggest yoga may alleviate depression by exerting "anti-stress" effects at the hypothalamic level.[8]

Zhai et al. (2021) studied involving 6973 Chinese college students found that perceived stress mediates the relationship between physical activity and sleep quality. The study used the International Physical Activity Questionnaire—Short Form (IPAQ-SF), Perceived Stress Scale—10 Items (PSS-10), and Pittsburgh Sleep Quality Index (PSQI). The results showed that perceived stress mediated the relationship between physical activity and sleep quality in both males and females, with 42.4% partial mediation and 306.3% complete mediation, respectively. This suggests that physical activity can improve sleep quality by managing stress.[9]

Results and Discussions

The information concerns the analysis of data collected from two groups before and after a training period, using a t-test to find out any significant differences. This test was conducted at a significance level of 0.05.

Table IV: Independent T Test for Yoga Group and Yoga with Diet Group

		Yoga group (n=15)	Yoga with diet (n=15)	t - Value and p - value
Pre-test cortisol	Mean	268.60	266.67	t= 0.443
	Std. Dev	10.84	12.98	p= 0.661 (N.S)
Post test cortisol	Mean	213.53	259.80	t= -5.711
	Std. Dev	29.69	10.16	p= 0.000 ***
Pre-test PSQI	Mean	18.67	2.440	t= -0.383
	Std. Dev	2.44	2.33	p= 0.705 (NS)
Post test PSQI	Mean	11.60	17.80	t= -5.889
	Std. Dev	3.46	2.15	p= 0.000 ***

Note: ***- Significant at p<0.001 level, NS- Not significant

In above statistical table, the outocme of independent t test computation states that there is no statistically significant difference in the pre test values of cortisol and Pittsburgh Sleep Quality Index between Yoga group and Yoga with diet group. Additionally, statistically significant difference ($p < 0.001$) was found in the post-test values of cortisol and the Pittsburgh Sleep Quality Index between the Yoga group and the Yoga with diet group.

Table V: Computation of Paired T Test for Yoga Group and Yoga with Diet Group on Cortisol

Group	Pretest		Post Test		Difference Mean (S.D)	Paired 't' Test and p value
	Mean	S.D	Mean	S.D		
Yoga group	266.67	12.98	259.80	10.15	6.86 (4.121)	t= 6.454 p=0.000 ***
Yoga with diet	268.60	10.84	213.53	29.68	55.067(26.1680	t= 8.150 p=0.000 ***

Note: ***- Significant at p<0.001 level

In the table V, There is significant effectiveness ($p<0.001$) present between the pre test and post test values of cortisol in both yoga group and yoga with diet group. The figure 1 elucidates the mean difference evident between pre and post test values of cortisol in yoga group and yoga with diet group.

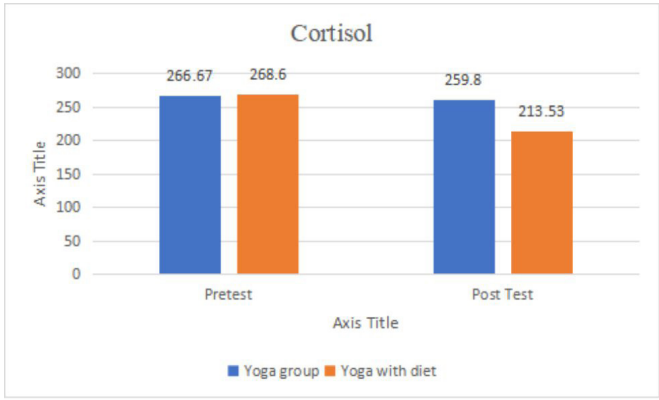


Figure 1. Bar Diagram Showing the Mean Difference Among Yoga Group and Yoga with Diet Group on Cortisol

Table VI: Computation of Paired T Test for Yoga Group and Yoga with Diet Group on PSQI

Group	Pretest		Post Test		Difference Mean (S.D)	Paired 't' Test and p value
	Mean	S.D	Mean	S.D		
Yoga group	19	2.33	17.80	2.145	1.20(0.676)	t= 6.874 p=0.000 ***
Yoga with diet	18.67	2.44	11.60	3.46	7.067(1.750	t= 15.629 p=0.000 ***

Note: ***- Significant at p<0.001 level

In the table VI, There is significant effectiveness ($p<0.001$) present between the pre test and post test values of PSQI in both yoga group and yoga with diet group. The figure 2 expound on the mean difference present between pre and post test values of cortisol in yoga group and yoga with diet group.

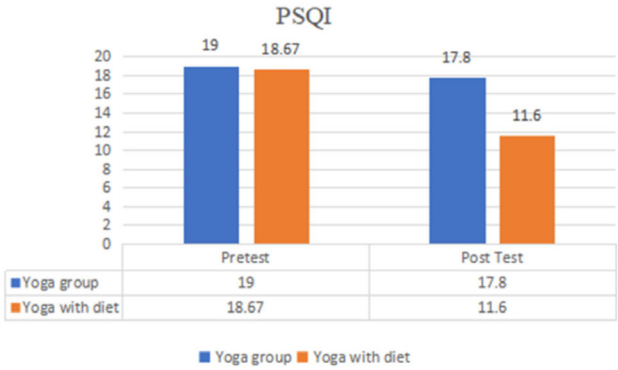


Figure 2. Bar Diagram Showing the Mean Difference Among Yoga Group and Yoga with Diet Group on PSQI

Discussion on Hypothesis

The results of first hypothesis proved that there were significant effectiveness ($p<0.001$) between the pre and post test values of Cortisol (Decreased) and PSQI (improved) due to Classical yoga therapy among middle aged men with insomnia.

Second hypothesis of the study proved there were significant effectiveness ($p<0.001$) between the pre and post test values of Cortisol (Decreased) and PSQI (improved) due to Classical yoga therapy and naturopathy neutraceutical functional supplementary diet among middle aged men with insomnia.

Third Hypothesis of the study proved there were significant effectiveness ($p<0.001$) in the post test values of Cortisol (Decreased) and PSQI (improved) between Classical yoga therapy and naturopathy neutraceutical functional supplementary diet among middle aged men with insomnia[8,9]. The above results are in line with the study conducted by Thirthalli et al. (2013) and Zhai et al. (2021).

Limitations:

- Several factors say personal life style habits, body frame, and social background were not taken in to consideration for this study.
- The factors say genetics and motivational factors were not accounted for this study.
- Certain factors like environmental and climatic conditions, economical background and also day to day work were not factored in.

Conclusion

The efficacy of yoga in alleviating insomnia appears to be linked to its ability to mitigate stress effects, particularly by reducing cortisol levels, possibly acting at the hypothalamic level. Elevated stress levels trigger physiological and psychological changes, activating the Hypothalamic-Pituitary-Adrenal (HPA) axis, which can lead to insomnia. Various coping mechanisms, including yoga therapy and naturopathy supplementary food, play crucial roles in managing stress. Yoga therapy, in particular, has been shown to reverse HPA axis activation, lower cortisol levels, and regulate sleep cycles. When combined with naturopathy supplementary food, yoga therapy becomes an effective adjunct in reducing stress and anxiety, thereby promoting normal homeostasis and improving sleep quality for individuals suffering from insomnia.

Ethical Clearance: The study was approved by Institutional Human Ethics Committee of Meenakshi Medical College Hospital and Research Institute with study reference number MMCH&RI IEC/PhD/09/June/22

Funding: The study was self-funded.

Conflict of Interest: The authors declare no conflict of interest

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Original Article

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Attitude of Volunteers in a Community-Based Palliative Care Program in Puducherry: A Cross-sectional Descriptive Study

Sadhana Subramanian[1], Sarkar Sonali[2], Mathavaswami Vijayageetha[3], Kothari Ashutosh[4], S Adinarayanan[5]

[1]Department of Preventive and Social Medicine, JIPMER, Puducherry, India, [2]Professor, Department of Preventive and Social Medicine, JIPMER, Puducherry, India, [3]Department of Community Medicine, AIIMS Nagpur, India, [4]Health Systems Transformation Platform, New Delhi, India, [5]Department of Anesthesiology and Critical Care, JIPMER, Puducherry, India.

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Abstract

Objectives: Since 2015, volunteers are being trained in Palliative care at Puducherry to meet the increasing demand. Hence, this study aimed in assessing volunteer's attitude towards palliative care which will help in promoting the quality of services.

Methods: A cross-sectional descriptive study was done among volunteers working for palliative care in and around Puducherry. All the 60 volunteers who were available during September-October 2018 were included in the study. A pre-tested, semi-structured questionnaire was administered to capture the socio-demography and attitude. Continuous variables were summarized as median (IQR) and categorical variables were expressed as frequency and percentages.

Results: The study found 36.7 % of the volunteers were in the age group of 31-40 years, 76.7% were females and 78.3% married. About 10% were illiterate, and 35% were daily wage workers. In the domain, attitude towards the patient and the services provided, depression and grief in patients were the two areas that had unfavourable attitude. About 75% positive attitude toward self, however, majority felt caring for a dying person is depressing. The domain on communication with the patient revealed, though 91% felt they have an obligation to tell patients and family members when death is imminent, 78% felt it is discouraging to talk about death to a dying person.

Conclusions: Presently volunteers are coming from only lower socio-economic strata of the society. There's a need to have greater representation of all sections among volunteers. Enhanced training covering mental health aspects of self and patients needs to be provided. There is a need to advocate for providing more emphasis on community-based services than relying on hospital settings, including enhancing caregivers/family members' capacities in delivering the care.

Key Words: social care, terminal care, supportive care, home care, bereavement

Corresponding Author: Sonali Sarkar, Professor, Department of Preventive and Social Medicine, JIPMER international school of public health, JIPMER, Dhanvantri Nagar, Gorimedu, Puducherry.

E-mail: sarkarsonaligh@gmail.com

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Introduction

The WHO report (2018) states, at least 40 million people need palliative care each year and only 14% of them are currently receivingit.[1,2] Need for end-of-life care is increasing all over the world with lots of people dying every year without proper care with a predicted rise from 14% in 2002 to 42%by 2030.[3] The Palliative care is well integrated into their health-care systems only in 20 countries. Most palliative care services are provided in high-income countries, whereas almost 80% of the need is in low and middle-income countries.[4] This creates an alarming increase in demand for palliative health care in these settings. In India, less than 1% of its 1.2 billion population have access to palliative care. Kerala, a state in South India, having 3% of India's general population, excels interms of achieving coverage of palliative care.[5] Presently, there are 908 palliative care service providers (home care/ outpatient basis/ inpatient service) in India. Around 840 of these centres are present in Kerala which indicates that palliative care services are virtually non-existent in the rest of India.[5,6]

Palliative care volunteers, are the heart of home-based care, making services accessible to patients in need of palliative care but not able to visit palliative care clinics in hospitals, thus improving their quality of life and finally helping them die with dignity. [6] Despite its benefits, home-based palliative care has not been adopted in most parts of the world. Adequate focus on health at the end of life is also required to accomplish the goal of universal health coverage. As the need for palliative care is not yet met in resource constrained countries like India, volunteers can play an important role in expanding these services to those in need. The implementation of a palliative care programme through volunteers is in place and training has been started in Puducherry, since 2015. An intensive literature search revealed that there are limited studies done on volunteers working for palliative care in India and no such studies are done yet in Puducherry. Addressing the experiences and attitude of the volunteers is important in improving their work experience to keep them motivated and thus improving the quality of care provided by them. Hence, this study aimed at knowing their profile, experiences and attitude towards palliative care.

Methodology

A descriptive cross-sectional study was conducted in Puducherry, a Union Territory (UT) in South India. This UT has nine medical colleges in its vicinity, of which three are providing home based palliative care. Also, there are two Non-Governmental Organizations (NGOs) Sanjeevan and SCOPE providing the same. Volunteers are part of the care provided by these NGOs only. Most of these volunteers worked without any remuneration, six only were receiving some payment for this service. We included all the 60 palliative care volunteers working in these two organisations at the time this study was conducted. Together they cater to around 2000 patients in need of palliative care. A team comprising of a doctor, a nurse and a social worker along with a volunteer visit the patients once in every 2 months. Volunteers make regular visits at least once a week to ensure their wellness and in case of emergencies, the palliative care team is informed and immediate attention is given.

As the number of volunteers working for palliative care is minimal, we included all the volunteers who were available during the study period (September-October 2018). After explaining the purpose of the study and obtaining an informed consent in the local language of the participants, a total of 60 volunteers were administered a pre tested, semi-structured questionnaire which was framed in English and translated to the native language (Tamil) with validation for language and face validation for the content by experts in the field of palliative care. Questionnaire attempted to capture their socio-demography and attitude towards palliative care. Items assessing attitude were under three domains; attitude of the volunteers towards patients and the services provided with nine items, attitude towards their own self while providing care with 12 items, and attitude towards communication

with the patients with four items. This questionnaire was adopted from the available literature with modifications done by experts providing palliative care services and training.[7-9] Attitude was captured using statements on the subject under the domain with responses in a five-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree) which was later transformed into a three-point Likert scale (agree, neutral and disagree) during the time of analysis.

The data was captured using a mobile application EpiCollect5 Version 1.1.4 and exported as Comma Separated Value (CSV) file and imported to Statistical Package of Social Sciences (SPSS) Version 17.0 for analysis. Continuous variables like years of experience as palliative care volunteers and duration since they were aware of palliative care was summarized as median and inter quartile range. Categorical variables like age group, gender, education, occupation, Socio-economic status were summarized as frequencies and percentages. Attitude was summarized as favourable, neutral and unfavourable for each item individually. For the positive worded statements, agree and strongly agree responses were considered favourable and for the negatively worded statements, disagree and strongly disagree were considered favourable.

Results

A total of 60 volunteers were found eligible during the study period and all were approached for the study. There was no refusal and all 60 patients were included in the study. The median (IQR) age of participants was 36 (28 - 48) years.

Demographic characteristics of registered volunteers under a home-based palliative care programme in Puducherry (**Table 1**) shows, 36.7% of the population were in the age group of 31-40 years and more than three fourth (76.7%) of them were female. Majority (78.3%) of them were married with equal proportions (50%) from urban and rural areas. One out of ten did not have any formal education and about one third (35%) of them were daily wage labourers. The median (IQR) family income in INR of the volunteers was 12000/ month (10000 - 15000) and the median (IQR) number of members in their families and children were 4 (4-5) and 2 (1-2) respectively; majority belonging to a nuclear family. About 40% of the families belong to class II category of BG Prasad scale 2018 of socio-economic status.

Median (IQR) duration of experience as palliative care volunteers under a home-based palliative care programme in Puducherry **(Table 2)** was 3 (2-4) years; however, the median (IQR) period since they were aware of palliative care was 2 (1-3) years. More than half (58%) of the participants reported having heard about it for the first time from doctors. One-fourth of the participants had someone in the family or friends working as a volunteer.

For seven out of the nine statements on patients and palliative care services, 70% - 90% of the participants had the favourable attitude. The two areas where lower proportion of volunteers had favourable attitude were depression and grief in patients; 85% felt that *"depression is not treatable in patients at the end of life" and* 90% perceived that *"there is little that can be done to ease the grief of the patient"*. (**Table 3)**

Regarding their own self while providing care, 60-90% of the participants had favourable attitude for nine out of the twelve statements. Among the aspects with unfavourable attitude, about 40% of the volunteers felt that *"caring for patients who are dying is depressing"*; 16.6% said *"I would be uncomfortable if I entered the room of a terminally ill person and found him/ her crying"* and 45% said, *"I feel guilty after the death of a patient"*. **(Table 4)**

In the domain on communication, more than 50% of the participants had favourable attitude for two out of the four statements. Unfavorable attitude was found in higher proportion of participants for statements like *"Talking about death tends to make patients at the end of life more discouraged"* with 78% agreeing and though lesser, still 28.3% felt that *"It is easier to talk about death and dying with someone of my own cultural or religious group than with someone who is not"*. **(Table 5)**

Table 1: Socio-demographic characteristics of registered volunteers under a home-based palliative care programme in Puducherry. (N = 60)

Variable	Category	Frequency	Percentage
Age group (in years)	18-30	18	30.0
	31-40	22	36.7
	41-50	10	16.7
	More than 50	10	16.7
Gender	Male	14	23.3
	Female	46	76.7
Residence	Urban	30	50.0
	Rural	30	50.0
Marital status	Married	47	78.3
	Unmarried	10	16.7
	Widowed	03	05.0
Educational status	Illiterate	6	10.0
	Primary	13	21.7
	Middle	9	15.0
	High	9	15.0
	Higher secondary	12	20.0
	Graduate	11	18.3
Occupational status	Unemployed	9	15.0
	Daily waged	21	35.0
	Government sector	2	3.0
	Private sector	17	28.0
	Business	10	17.0
	Student	1	2.0
Socio-Economic Status (in INR[#])[*]	Class I (≤ 6574)	02	3.3
	Class II (387- 6573)	24	40.0
	Class III (1972- 3286)	18	30.0
	Class IV (986 - 1971)	13	21.7
	Class V (≥985)	03	05.0
Family type	Nuclear	48	80.0
	Joint	12	20.0

[*] *BG Prasad scale 2018*
[#] *INR – Indian Rupees*

Table 2: Distribution of participants in regards to the duration since they were aware of Palliative care and experience as a palliative care volunteer under a home-based palliative care programme in Puducherry. (N = 60)

Variable	Median (inyears)	Inter-Quartile Range (inyears)
Duration since aware of palliative care	3	2 – 4
Duration of experience as palliative care volunteers	2	1 – 3

Source of first information about palliative care*	Frequency	Percentage
Doctor	35	58
NGO	12	20
Nurse	4	7
Volunteers	7	12
Teachers	2	3

**Multiple options are possible*

Table 3: Attitude of volunteers towards the patient and services they provide in a home-based palliative care programme in Puducherry. (N=60)

S.no	Statement*	Attitude of volunteers		
		Favourable n (%)	Neutral n (%)	Unfavourable n (%)
1	Palliative care team brings real benefits to patients at the end of life	54 (90.0)	4 (6.7)	2 (3.3)
2	Psychological suffering can be as severe as physical suffering	55 (91.7)	3 (5.0)	2 (3.3)
3	Depression is normal in patients at the end of life	53 (88.3)	5 (8.3)	2 (3.3)
4	Depression is not treatable in patients at the end of life	9 (15.0)	14 (23.3)	37 (61.7)
5	The palliative care team has a responsibility to help patients prepare for death	56 (93.3)	1 (1.7)	3 (5.0)
6	There is little that can be done to ease the grief of the patient	6 (10.0)	10 (16.7)	44 (73.3)
7	We have a responsibility to provide bereavement care to the patient's family after the death of the patient	57 (95.0)	1 (1.7)	2 (3.3)
8	I feel helpless when I cannot assist in the families, I visit because of limited resources	50 (83.3)	7 (11.7)	3 (5.0)
9	Death is not the worst thing that can happen to a person	43 (71.7)	7 (11.7)	10 (16.7)

**Statement number 4 and 6 are negatively worded and options disagree and strongly disagree are considered to be a favourable response while agree and strongly agree are considered favourable for other statements.*

Table 4: Attitude of volunteers towards their own self while providing home-based palliative care in Puducherry. (N=60)

S.no	Statemen t*	Attitude of Volunteers		
		Favourable n (%)	Neutral n (%)	Unfavourable n (%)
1	Caring for patients who are dying is depressing	24 (40.0)	8 (13.3)	28 (46.7)
2	I feel guilty after the death of a patient	27 (45.0)	11 (18.3)	22 (36.7)

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3	I dread having to deal with the emotional distress of family members	38 (63.3)	7 (11.7)	15 (25.0)
4	My social life has suffered because of volunteering	46 (76.6)	1 (1.7)	13 (21.7)
5	I cannot do what I want because of volunteering	51 (85.0)	7 (11.7)	2 (3.3)
6	I feel mentally exhausted as a result of volunteering for the terminally ill	45 (75.0)	4 (6.7)	11 (18.3)
7	I feel physically exhausted as a result of volunteering for the terminally ill	49 (81.7)	6 (10.0)	5 (8.3)
8	I worry about getting an infection from my patient.	51 (85.0)	6 (10.0)	3 (5.0)
9	I feel like giving up this role of volunteering	58 (96.7)	0 (0.0)	2 (3.3)
10	I am afraid to become friends with chronically sick and dying patients	42 (70.0)	4 (6.7)	14 (23.3)
11	I would be uncomfortable if I entered the room of a terminally ill person and found him/her crying.	10 (16.6)	13 (21.7)	37 (61.7)
12	I feel comfortable to share the difficulties faced by a patient at the end of life or their family members with my colleagues or documenting discussion them in the record	42 (70.0)	11 (18.3)	7 (11.7)

**Statement number12 is positively worded and options agree and strongly agree are considered to be a favourable response while disagree and strongly disagree are considered favourable for other statements.*

Table 5: Attitude of volunteers on communicating with the patients receiving home-based palliative care in Puducherry. (N=60)

S.no	Statement*	Attitude of Volunteers		
		Favourable n (%)	Neutral n (%)	Unfavourable n (%)
1	The Palliative care team has an obligation to tell patients and family members when death is imminent	55 (91.7)	2 (3.3)	3 (5.0)
2	Talking about death tends to make patients at the end of life more discouraged	12 (20.0)	1 (1.7)	47 (78.3)
3	It is easier to talk about death and dying with someone of my own cultural or religious group than with someone who is not	17 (28.3)	8 (13.3)	35 (58.4)
4	Suggested procedures or treatments sometimes give patients/family false hope	31 (51.6)	4 (6.7)	25 (41.7)

**Statement number1and 3are positively worded and options agree and strongly agree are considered to be a favourable response while disagree and strongly disagree are considered favourable for other statements*

Discussion

This study was first to explore the socio-demography and attitude of palliative care volunteers in an Indian setting. The median age (IQR) of the study participants was 36 (28-48) years with 36.7% of them in the category of 31- 40 years of age, similar to other studies conducted by Goss, Hayghe, Freeman, and others where majority of the people were in the age group of 35-54 years.[10] Middle aged people are more likely to be caregivers in their own families and understand the importance of palliative care, thus willing to take up the role of volunteers. Few had taken up this as a profession for an earning, many of the volunteers belonging to the lower socio-economic classes. Whereas the survey conducted by Victoria's health department showed that the average age of the volunteers was 64 years.[11]The younger age group of volunteers in India may be due to the lower life expectancy in India of 69 years. So, people in that age group seem more likely to seek care rather than being a volunteer.

Majority of our study participants were females (76.6%), married (83.3%) and living in a nuclear family (80%) which is similar to the findings reported in other studies as well.[10,11] Nearly 10% of the study participants were illiterate, more than one-third (35%) were daily wage workers and belonged to class II category (40%) of modified BG Prasad scale 2018. This shows that volunteering for palliative care is not considered important by people in upper socio-economic classes in our society even though the need for palliative care is pervasive across all sections of the society. People from the lower strata are more empathetic and for some it is also an avenue for some income. This was very different from the studies conducted in other countries where those with higher education, employment and income were more likely to volunteer.

Overall, about two-third of the participants had a favourable attitude towards patients and the services provided; and also, towards what they felt while providing services. However, there was a mixed opinion for the attitude towards communication.

Attitude of the volunteers towards patients and the services provided

Among the participants only 10% felt that depression can be treated at the end of life and only 15% felt that anything can be done to ease the grief of the patients which means that majority were not trained adequately to consider depression as a treatable condition at the end of life. This would have led them to ignore depression in such patients. For the statements related to depression only 10%-15% of the participants had a favourable attitude, unlike other study that was done in Canada.[7] Ideally, palliative care aims at increasing the quality of mental health at the end of life which these volunteers may not have been able to do. Training of volunteers in mental health aspects of patients in need of palliative care is tougher, so also provision of mental health services to the patients, requiring more dedicated time and efforts both in training and service.

Our study had 83.3% of the participants accepting *"I feel helpless when I cannot assist in the families I visit because of limited resources"*, indicating that the volunteers are not provided with adequate resources to support the families of patients in need of palliative care. This could be one of the obstacles in rendering quality care to the patients which in-turn have had led to discontentment among the service receivers. In a study *Mashau et al.* from South Africa reported that only 29% of the participants agreed to the same, which is a huge difference from our setting and could be attributed to the integration of palliative care with the health system and the educational system in South Africa, which is still at infancy in India. It may also be due to the limited resources provided for palliative care in our setting.[9]

About 71.1% of the study participants agreed to the statement *"death is not the worst thing that can happen to a person"*. This gives us an idea that the volunteers consider that everyone has to experience this phase and death is a natural phenomenon and people tend to suffer when they live with the disease. Thereby, reducing the suffering and agony of patients at the end stages of life striving to give a peaceful and dignified death. Studies conducted in Ethiopia and Lubumbashi among palliative care nurses found around 33% of the nurses agreed to the above-mentioned statement. The contrasting results from our study may be due to the greater acceptance of death among the volunteers here, which may be due to the witnessing of suffering in these patients and considering death a release or a more spiritual inclination.[8,11]

Domain 2: Attitude towards their own self while providing care

This domain had 12 statements. The study result showed a mixed response to the statements "*I feel guilty after the death of a patient"* and "*Caring for patients who are dying is depressing"*. About 62% agreed to the statement *"I would be uncomfortable if I entered the room of a terminally ill person and found him/her crying"*. The reason could be the emotional attachment of the volunteers towards the patients or lack of resilience required to provide care for terminally ill people. Since they are uncomfortable or feel depressed on seeing patients crying, they might tend to reduce the number of volunteering hours for the patient with terminal illness thus compromising with the services provided. Other studiesshowed that nearly 93% of the participants disagreed for the first statement, which ensued due to the higher field exposure and better experience. Nearly 71% agreed to the second and 56.5% to the latter statement which is more or less similar to our study results where a higher proportion of the participants gave an unfavourable response.[7,8]

This study showed a better attitude for some of the other statements like *"I feel physically/ mentally exhausted as a result of volunteering for the terminally ill"*, "*I worry about getting infection from my patient"* and *"I feel like giving up this role of volunteering"* with 81.7%, 75%, 85%, and 96.7% disagreeing, meaning a favourable attitude towards providing palliative care. This clearly shows their willingness to volunteer for the needy in-spite of the obstacles they come across. Hence, with adequate training and constant support, they would be able to serve in a better way. Other similar study from South Africa had only 14.1%, 33%, 23.2%, and 58% volunteers with favourable attitude in these areas respectively.[9] This variance may have occurred because majority of their study participants had to travel more than 20 kilometers a day and there are higher chances of them getting exhausted while the volunteers in our study cater to the nearby population which is comparatively much lesser distance. It can also be due to the severity and the type of patients they see.

For all the other statements, our study results are similar to all other studieswith higher proportion of people having a favourable response.[7-9,13]

Domain 3: Attitude towards communicating with the patients

The domain constituted of four statements. Our study shows that 91.7% of the volunteers thought *"The Palliative care team has an obligation to tell patients and family members when death is imminent"*. This implies that the volunteers are clear about their roles and responsibilities and hence, can prepare the patient for dignified death and the family, for the death of the resident. Most of the participants from a study in Canada also had similarly high proportion of volunteers, 82% agreeing to the statement.[7]

In our study 20% and 28.3 % volunteers agreed that *"Talking about death tends to make patients at the end of life more discouraged"*, *"It is easier to talk about death and dying with someone of my own cultural or religious group than with someone who is not" respectively*. A discussion regarding end-of-life or death is still considered as taboo in India and most of the people do not ponder about this issue. But studies from other setting have shown that 47.3% and 60.8% had disagreed for the same.[7]This may be because of the cultural differences that exist between countries regarding discussion on matters related to death.

There was a mixed response to the statement *"Suggested procedures or treatments sometimes give patients/family false hope"* which had a more or less similar finding with other studies.[9] Probably, this can be as a result of the communication gap between the health care providers and the patient.

Strengths and limitations:

Our study had certain strengths as we covered all the volunteers available during the study period without any sampling, thus removing selection bias. As no standard questionnaire is available to assess the attitude of the palliative care volunteers, we tailored a questionnaire to suit the Indian population taking references from the existing literature. There is however, a limitation as there could have been social desirability bias with participants responding what they ought to say rather than what they actually felt. Self-administered questionnaire could have led to desirability bias which is a limitation.

Conclusion

Presently volunteers are coming from only lower socio-economic strata of the society. There's a need to have greater representation of all sections while enrolment of new volunteers as the need for palliative care is pervasive across the society. Identifying volunteers from general population and student communities would help us strengthen community-based palliative care services through volunteers. Enhanced training with regards to the factors that have been identified with poor attitude like "treating depression at the end-of-life" and "considering death as a taboo" will enable us in provision of quality care.

To improve palliative care services in India, palliative care should be integrated at all levels of healthcare, with a particular emphasis on primary care. Provide outpatient clinics for specialized care without hospital admission, hospice or hospital inpatient care for intense assistance, and home-based care with trained family caregivers and routine professional visits. Prioritise community-based services by strengthening the capacity of caregivers via training, creating community support networks, and expanding accessibility, especially in rural regions. Create mobile clinics and use telemedicine to conduct consultations from a distance. These steps will ensure palliative care, which is compassionate, all-inclusive, and easily accessible throughout the country.

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Conflict of Interest: The authors have no conflicts of interest to declare.

Key Message box		
Questions	**Clinical**	**Research**
What was already known?	NA	Volunteers bridge the health system and patients
	NA	Palliative care volunteers helpto expand services in resource-limited settings
What are the new findings?	NA	The majorityare female, middle-aged,daily-wagelabourers
	NA	Two-thirds of the participants hada favourable attitude
What is their significance?	NA	Training in handling the depression and grief of patients is required
	NA	Target young adults to volunteer to meet increasing demands

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Original Article

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Assessment of the Living Conditions in a Rural Setting through Cross Sectional Study

Safia Nimrah[1], Shaik Sadiya Rahmath[2], Sai Krishna Madhipati[3], Sultan Rizwan Ahmad[4]

[1]MBBS Final Part-1, Student, Deccan College of Medical Sciences, [2]MBBS Final Part-[1], Student, Deccan College of Medical Sciences, [3]Statistician, Department of Community Medicine, [4]Professor & HOD, Department of Community Medicine, Department of Community Medicine, Deccan College of Medical Sciences, Hyderabad, TS, India.

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Abstract

Background: An important part of a healthy community comprises healthy families. Living conditions play a crucial role in defining the well-being of the family. The quality of housing, access to basic amenities, environmental factors and the overall socio-economic status of the families have a direct impact on the family health.

Methodology: This is a cross sectional study done based on the survey of 200 families based in Hasan Nagar, conducted by the students of Deccan College of Medical Sciences under the guidance of the department of community medicine. The families were surveyed based on a pre-formed questionnaire and the data was analysed using descriptive analysis.

Conclusion: In this study of 200 families, 77% were nuclear families, 69.5% had pucca houses. Majority of the families 26.5% had 5 family members. In 45% of the families overcrowding was present. All of the houses had electricity supply. Separate kitchen was present in 77% of the houses. In 85% of families rice was the staple food. 88.5% used public refuse bins for disposal of solid waste and 96% used sewerage systems for liquid waste disposal. Latrine was present in 94% of the houses.

Key words: Environment, Living condition, Rural Survey

Introduction

A country is made by its geography as well as by its population. Family is the unit of the population. The government of the country takes care of the needs of its population. Population is divided based on geography, those living in the cities and those living in villages. And based on some scale into various levels of socioeconomic status. Although the

Corresponding Author: Shaik Sadiya Rahmath, MBBS Final Part-1, Student, Deccan College of Medical Sciences, Department of Community Medicine, Deccan College of Medical Sciences, Hyderabad, TS, India.

E-mail: sadiyashaik1216@gmail.com

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government tries to take on the population as a whole, some sectors or regions get left out or the efforts are not provided on time. And majority of the time these regions belong to the rural sector. The country of focus in this paper is India, the most populous country of the world. 70% of its population belong to the rural sector. India as a developing country has limited resources and takes enormous measures and coordination to provide the required resources to the needed population at the appropriate time. It is to be noted that the problem of providing the rural sector with resources doesn't rely solely on the government. Their literacy status, their income and their willingness to get help plays a major role.

Community diagnosis is crucial for effective public health planning and ensures that the policies that are formulated are tailored to the specific needs of the community, promoting better health outcomes and overall well-being. Community diagnosis deals with demography and planning, initiating, implementation, monitoring and evaluating various schemes and programs for the betterment of the population. It focuses on finding out the problems in a population and how to tackle them. It relates the health problems with agent, host and environmental factors. It helps the government in prioritizing the problems, locate the weaker population and draft measures to address them. After a program is initiated and implemented, it helps in monitoring its progress and evaluating its effect on the people. It has a role in research of the origin of the problem, its progress, its effect and its causing factors. One factor that came to notice when talking with the residents was overcrowding. With increasing population this factor is increasingly proving itself to be a problem.

This article deals with the various living conditions of the unit of population living in a community and the source of their information. The factors included in the noting of the living conditions of populations were number of living rooms, type of family, latrine, presence of overcrowding, separate kitchen, separate latrine. These could be potential indicators of the developing progress of the locality and could be further compared with previous such data to evaluate the progress of the programmes being executed in the locality for its betterment. This data could be used as the basis to plan the further course of action and the new programmes that need to be introduced in the area.

In this survey, Hasan Nagar a rural area of Hyderabad, Telangana was explored by the professors and students of Deccan College of Medical Sciences with the help of the residents of the area and was compared to the relevant research papers to gauge the living conditions of the residents of the area. Aim of the study was to assess the living and housing conditions of the rural field practice area of Deccan College of Medical Sciences, Hyderabad.

Material & Methods

This is a community-based study, in which 200 families were surveyed in Hasan Nagar a rural area of Hyderabad. A cross sectional survey carried out by MBBS Final year part I students of Deccan College Of Medical Sciences under the guidance of the department of community medicine. The students were trained before the survey and were guided by the RHTC staff. The data collection in the survey was based on the predesigned pretested questionnaire Performa in the personal interviews. Information was collected regarding the housing conditions, usage of mass media, sanitation, waste disposal among various other factors.

The families were selected randomly and the information was collected and taken into consideration after taking their consent. The families that were visiting the area were excluded from the study. The study was conducted for over a period of 3 months from July 2022 to September 2022. The data collected was analysed and consolidated using MS Excel. The analysis was done using SPSS version 20. The analysis included frequency and chi square test. The P value < 0.05 was used as statistically significant at 5% level of significance.

Results

In this cross-sectional study, a total of 200 families were surveyed and the majority of them had a family size of 5 [26.5%] [Figure no:2] and most of them being nuclear families [77%] and 23% of them lived in joint families. [Table no-1] Among the total families 139 families [69.5%] lived in a pucca house with the majority having 2 living rooms [37.5%] and most of them owned the house [56.5%] with all of the

families having the supply of electricity. 60.5% of the houses had natural lighting and 39.5% had artificial source. 41.5% of the houses had RCC type of roof and 43% had tin roof. [Table no-1] Overcrowding was absent in most of the families [55%] [Figure no-1] and majority belonging to class IV socio-economic status [Figure: 3].

About 77% of the families had a separate kitchen present and 93.7% of the families used LPG gas as the source of energy while the rest resorted to electricity [3.5%], coal [1%] and firewood [2%]. Latrine was present in 94% of the houses. Liquid waste was disposed of in the sewerage system by the majority of families [96%]. 88.5% of the families used public refuse bins for the disposal of solid waste while the rest threw the waste on open streets [11.5%]. Majority of the families had mixed means of storing water. [Table no:2]

Majority of the families had mixed diets. 96% of the families were non-vegetarians and 4% are vegetarians. Rice was the staple food in 85% of the families. Whereas the others preferred Bajra and Jowar. 74% of the families used television as the source of information. Other most commonly used mass media was Radio [1.5%] and Newspaper [3%] while 21.5% had no mass media present. Overcrowding is present in joint families and lower socioeconomic class. [Table: 3]. We did not get significant association between water supply and type of family and socioeconomic class. [Table: 4]

Discussion

A cross sectional survey has been conducted by MBBS final Part-I students during their clinical posting. The survey covered 200 families in a rural area of Hyderabad. In this most had nuclear families similar to a study conducted by Aravind Gandhi.[1] We found that majority lived in pucca house similar to a study by Suman Chatterjee et al[2] with 9.5% of families living in house with 1 living room which was found to be similar to the study done by Mizba et al. [3] Many of the families lived in houses owned by them which was also found in a study done by Abhishek Gupta et al. [4]

Overcrowding is absent in most families similar to a study done by Ahmed et al. [5] when open space was enquired 57.5% of families had it similar to a study done by Mizba et al.[3] In this study majority belonged to class IV socio-economic status which was found similar to a study in Mumbai.[6] Majority used gas as a source of energy similar to the study of Arvind Gandhi and Abhishek Gupta et al. [1,4] Taking solid waste disposal into account, majority had access to public sewerage system similar to the study done by Mizba et al.[3] This Study found overcrowding commonly present in joint families belong to lower socio economic class which is an important determinant of health.

Table No 1: Housing Conditions

FACTORS	FREQUENCY	PERCENTAGE
Type of house		
Pucca	139	69.5
Katcha	28	14
Mixed	33	16.5
Number of living rooms		
1	19	9.5
2	75	37.5
3	68	34
4	29	14.5
5	8	4
6	1	0.5
Type of roof		
RCC	83	41.5
Asbestos	25	12.5
Tin	86	43
Tiles	3	1.5
Mixed	3	1.5
Open space		
present	115	57.5
absent	85	42.5
Ownership of house		
Own	113	56.5
Rented	87	43.5
Lighting		
Natural	121	60.5
Artificial	79	39.5
Separate kitchen		
Present	154	77
Not Present	46	23

Table No 2: Living Conditions

FACTORS	FREQUENCY	PERCENTAGE
Source of energy		
Fire wood	4	2
Coal	2	1
Gas	187	93.5
Electricity	7	3.5
Storage of drinking water		
Earthen pot	98	49
Plastic pot	24	12
Stainless steel	67	33
others	16	8
Water supply		
Own	128	64
Public	72	36
Source of water		
Tap water	157	78.5
Borewell	42	21
Unprotected water	1	0.5
Liquid waste disposal		
Sewerage system	192	96
Open drain	7	3.5
Kitchen garden	1	0.5
Extra waste disposal		
Sewerage system	197	98.5
Open drain	2	1
Open filled	1	0.5
Latrine		
Present	188	94
Absent	12	6

Table No 3: Overcrowding Cross tabulation

		overcrowding		Chi square	P-Value
		Not present	Present		
Socio Economic Status	> 4520	46	19	12.018	0.017
	2260-4519	52	51		
	1356-2259	7	10		
	679-1355	5	9		
	<678	0	1		
Type of family	Nuclear	90	64	3.204	0.05
	Joint	20	26		

Table No 4: Water supply Cross tabulation

		water supply		Chi square	P-Value
		Own	Public		
Type of family	Nuclear	94	60	2.548	0.076
	Joint	34	12		
Socio Economic Status	> 4520	42	23	2.127	0.712
	2260-4519	67	36		
	1356-2259	11	6		
	679-1355	8	6		
	<678	0	1		

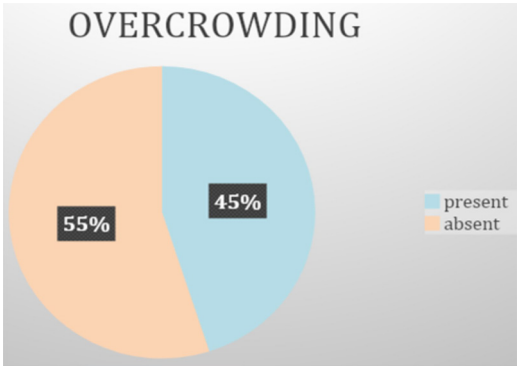


Figure No 1: Pie Chart Showing Overcrowding

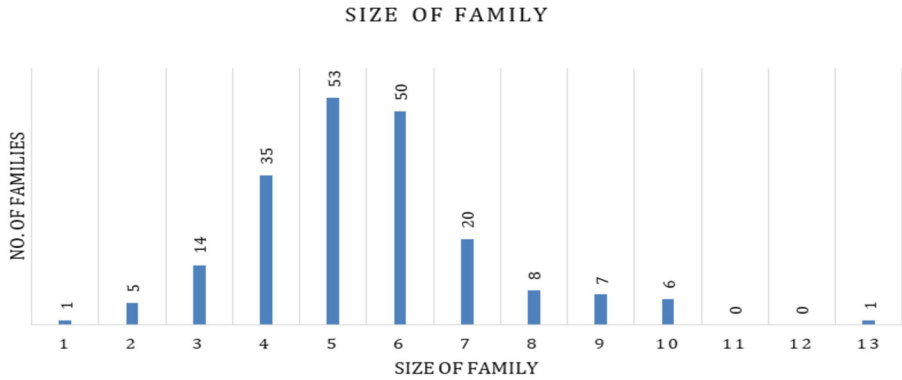


Figure No 2: Size of family

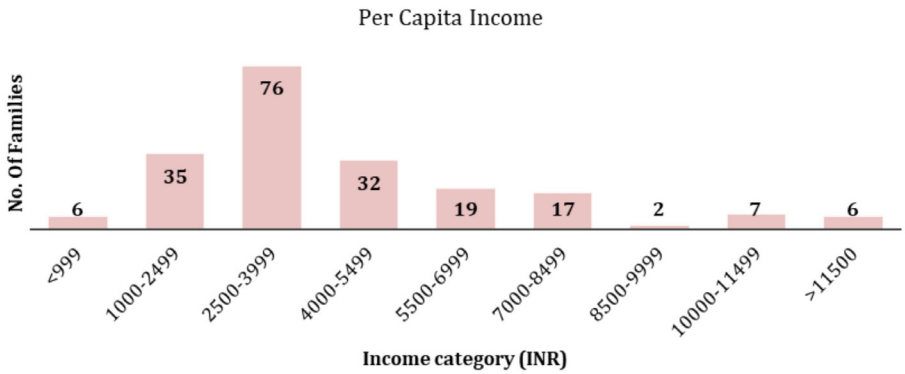


Figure No 3: Per Capita Income

Conclusion

Promoting the wellbeing of the families by ensuring proper living conditions, environmental conditions and housing conditions ensures not only the welfare of the overall community but also prevents many communicable and non-communicable diseases.

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Conflict of interest: Nil

Ethical approval: The study was approved Institutional Review Board Reference number: 2024/45/001

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Original Article

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Assessment of Selected Cardiac Enzymes to Find out Cardiac Damage in Admitted COVID 19 Patients in Tertiary Care Hospital, Kolkata

Samarpita Mukherjee[1], Sanchayan Sinha[2], Sisir Chakraborty[3], Indranil Chakraborty[4]

[1,2]Demonstrator, department of Biochemistry, College of Medicine & Sagore Dutta Hospital, Kolkata, Orchid ID: https://orchid.org/0000_0001_9061_9824, [3]Associate Professor, department of Medicine, College of Medicine &Sagore Dutta Hospital, Kolkata, [4]Professor & HOD, department of Biochemistry, College of Medicine &Sagore Dutta Hospital, Kolkata.

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Abstract

Introduction: The systemic inflammatory response of SARS COV2 virus affects cardiovascular system too along with the respiratory system. The prediction of prognosis & though unclear still it can be assessed by CRP level. The cardioselective biomarkers of LDH & CPK (CKMB & LDH1) has been seen to be elevated in covid infection which is more profound in severity of infection

The study was done to find any association of cardioselectiveisoenzyemes of LDH & CPK with the inflammatory marker (CRP) in admitted covid patients

Materials & methods: 88 admitted covid patients in CMSDH having LDH 663 U/L to 955 U/L (as 95% CI) were assessed for LDH1 by heat inactivation method at 65^0C & total CPK, CKMB & CRP were measured using standardized kits.

Result: LDH1: LDH is significantly correlated with total CPK (r=0.387 & P<0.05) & CKMB (r=0.55 & p<0.05) in covid patients. By Chi- square test significant association has been found between CRP withLDH1: total LDH ratio2 value= 5.934 & p=0.03) and between CRP with CK-MB (2 value= 11.37 & p<0.001).

Conclusion: in our study there was significant myocardial involvement indicated by increased cardioselective biomarkers (LDH1 & CKMB) which threaten the possibility of adverse cardiovascular complications in patients suffering & recovered from covid infection.

Key words: Lactate dehydrogense, Creatine phosphokinase, Covid 19.

Introduction

COVID-19 infection has been a global pandemic for 2 years, affecting more than a million patients worldwide. Though it is very much evident from 2 years' statistics that SARS COV-2 virus mainly affects

Corresponding Author: Sanchayan Sinha, Demonstrator, department of Biochemistry, College of Medicine &Sagore Dutta Hospital, Kolkata.

E-mail: Sanchayan.sinha82@gmail.com

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the lung tissue but we cannot ignore the involvement of cardiovascular system.

The affection of myocardium in covid infection is still unclear. the widespread systemic inflammation, can directly affect the myocardium leading to weakening the cardiacmuscles, which affects the heart rhythm, disturbance in the contraction & clot formation in blood vessels. The virus may also invade ACE2 receptors over myocardium, cause myocardial damage.[1] According to the researchers, the amount of damage inflicted on the heart depends on the amount of viral inoculum, a person's immune response, and the presence of comorbidities.[2] Though the risk is higher in people with underlying heart conditions, even healthy people have reported heart damage after beating COVID-19.

Various biomarkers have been currently under investigation for their role in determination of prognosis in patients with COVID-19. Lactate dehydrogenase (LDH), C- reactive Protein(CRP) are such biomarker of interest, especially elevated LDH levels have been associated with worse outcomes in patients with other viral infections in the past. [3,4,5] Early data in COVID-19 patients have also been suggested significant differences in LDH levels between patients with and without severe disease.[6]

The cardioselective isoenzyme of LDH is LDH1 which is also the most heat stable & it is increased myocardial damage & LDH1: total LDH ratio is also increasd.[7]

Creatine kinase is another biomarker which is seen to be increased in covid. CPK is seen inthe muscles (striated, cardiac & smooth muscles) and the brain, and it is important regulation of high-energy phosphate production and utilization within the contractile tissues. CK-MB is the cardio specific isoenzyme which increasesin any damage of the myocardium[8,9]

CRP is a positive acute phase reactant synthesized by liver which is increased following interleukin-6 secretion by macrophages and T cells.[10] Recent research suggests that patients with elevated basal levels of CRP are at an increased riskof diabetes, hypertension and cardiovascular disease.[11]

Objectives: the study was doneto find any association of cardioselectiveisoenzyemes of LDH (LDH1) & CPK (CKMB) and the inflammatory marker (CPK) in admitted covid patients

Materials and Methods

This observational cross-sectional descriptive study was conducted at college of Medicine and Sagore Dutta hospital (CMSDH), KOLKATA, West Bengal involving COVID ward and department of Biochemistry from August 2021 to February 2022 after obtaining approval of Institutional Ethics Committee (Memo No. COMSDH/IEC/2021/069 dated 6/7/2021).

All the patients admitted in COVID ward having total LDH value within 663 U/l -955 U/l considering 95% confidence interval were included in the study after obtaining the written consent. (200 total LDH values were taken for determining the 95% CI.).[7]

Patient with history of microvascular complications, recent myocardial infarction, acute coronary syndrome, cancer, renalfailure, known liver disease, viral hepatitis, and any type of hemolytic diseases were excluded

The serum of patients included in the study were further analysed for heat stable LDH fraction, CPK, CPK MB utilizing Standard reagent kits supplied by Transasia Biomed in Autoanalyser (XL640). All kits are approved by CMS bearing CAT No.

LDH 1 estimation was done after incubating the patients' serum at 65^0C for 30 minutes &using same kit & method as for total LDH estimation.

Result

A total number of 88 admitted Covid patients befitted with inclusion and exclusion criteria were included in this study. Descriptive details of study variables are expressed in tabular format. (Table -1).

Table 1: Descriptive statistics of Study Variables.

Study Variables	Mean±SD
CRP	51.89±35.80
Total LDH	870.07±91.70
LDH-1	667.22±134.62
TOTAL CK	416.88±46.61
CK-MB	58.54±17.67
LDH1: total LDH	0.63±0.24

Table 2: Correlation between LDH-1: total LDH ratio with Total CK and CK-MB in admitted patient.

	R_s value	P value
LDH1: total LDH & total CK	0.387	0.04
LDH1: total LDH & CKMB	0.557	0.009

*significant at the level p =/< 0.05 &**significant at the level p =/< 0.01.

Table 3: Showing association of inflammatory markers (CRP) with independent markers CK-MB and LDH1: Total LDH ratio in admitted covid patients.

C-Reactive protein	Independent paramters	Categories	No of patients in defined categoried	Chi- square value (2) (Table probability)	P value (2- tailed)
	LDH1: total LDH ratio	>0.5	54	2 value(DF)= 5.934(1)	0.03*
		</=0.5	34		
	CK-MB	>24 U/lt	50	2 value(DF)= 11.37(1)	0.001**
		< 24 U/lt	38		

* Significant at the level p =/< 0.05.&** Significant at the level p =/<0.01

Discussion

The worldwide pandemic covid 19 infection is considered to involve almost all organs of the body. The cardiac involvement is not very uncommon. The extent & severity of involvement depends upon the severity of infection. The cardiac damage often remains undetected or it is detected in advanced stage of disease which frequently causes a poor outcome. There is also possibility of permanent cardiac damage even if the patient recovers from the covid. So early detection & treatment of the cardiac involvement is very important to prevent the mortality & morbidity in covid 19 infection.

In our study, serum CRP, LDH, LDH1, CPK & CKMB level had been measured in patients suffering from covid infection. Serum CRP & LDH level had been increased as predicted & as like all other acute infections. (table 1)

The cardio selective isoenzyme of LDH, LDH-1 had also been found to be in higher level in covid 19 infection. The cardio selective isoenzyme of CPK (CKMB) had been found to be increased in covid infection.

The spearman correlation coefficient (R_s) between LDH1: total LDH & CKMB was 0.557. it was also statistically significant (p<0.05) (table 2)

Statistically significant associations were found of both LDH-1: LDH ratio & CKMB with the inflammatory marker CRP. Which had been indicative of the degree of cardiac damage corresponding to these verity of infection. (table 3)

Multiple studies have been done to establish the association of cardiovascular risk factors with COVID-19 mortality& morbidity till date. The initial large studies were done inChina and later in Italy and USA. Those studies confirmed the association of COVID-19 mortality with cardiovascular risk factors.

In a recent series of 5700 patients of COVID-19 in the New York City, USA, the most common cardiovascular disease was hypertension in 56.6 per cent of patients, coronary artery disease (CAD) in 11.1 per cent of patients, congestive heart failure in 6.9 per cent, obesity in 41.7 per cent of patients and diabetes in 33.8 percent of patients. [12]

Another study done in China analyzed the demographic profile of 44,672 confirmed cases of COVID-19 and showed that 4.2 per cent patients had cardiovascular diseases &12.8 per cent had hypertension. [13]

In other two small single-centered studies on COVID-19, the cardiovascular disease was present in 15 and 14.5 per cent of patients respectively.[14, 15].

The study of 144 patients with COVID-19 from India reported diabetes mellitus in 11.1 per cent, hypertension in 2.1 per cent and CAD in 0.7 per cent patients [16].

The spectrum of cardiovascular manifestations of COVID-19 had been highly variable from asymptomatic myocardial injury to out-of-hospital cardiac arrest. In the COVID-19 pandemic, the cumulative incidence of out-of-hospital cardiac arrest has increased significantly in Italy [17].

According to the study done by Lui Y et al SARS-CoV-2 affects not only the respiratory system but also the myocardium & cause acute myocarditis& ischemia. There is infiltration of mononuclear inflammatory cells which causes fulminant myocarditis which leaves permanent myocardial damage of covid survivors which can often be detrimental in future.[18]

Cardiovascular complications apart from myocarditis are myocardial infraction, arrhythmia, hypertension & congestive cardiac failure. [19]

In the study done by Chen CY et al it was seen that inflammatory markers like CRP &CPK were increased in all acute severe infections as in covid. The increase of cardioselective isoenzymes (LDH1 & CKMB) also increased in covid infection which was due to the effect of cytokine strome, myocarditis, pulmonary & coronary embolism which ultimately lead to myocardial ischemia. [3]

In the study done by Tao R.J. et al the inflammatory marker CRP was positively correlated with CPK in severe systemic infection as seen in covid. In our study also, there was significant associations of CRP& CKMB and CRP & LDH1: LDH ratio. The severity of cardiac damage varies with severity of disease process as more severe myocardial involvement causes more damage.[5]

Conclusion

Our study showed significant myocardial involvement indicated by increased cardioselective biomarkers (LDH1 & CKMB) which can be threatening of adverse cardiovascular complications in patients suffering & recovered from covid infection.

Limitation: due to time constrains & difficulty to follow up of the patients survived from covid infections, long term complications of cardiac damage were not observed.

Sources of funding: self

Conflict of interest: Nil

Ethical clearance: taken from Institutional ethics committee of College of Medicine and Sagore Dutta Hospital vide memo no COMSDH/IEC/2021/069 dated 6/7/2021

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Original Article

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Assessment of Patient's Feedback Regarding Services Provided in Healthcare in Uttar Pradesh: An Observational Study

Santosh Kumar Barman[1], Samarjeet Kaur[2], Sonam[3], Navin Kumar[4], Aradhna Yadav[5], Seema Barman[6]

[1]Professor & HOD, [2]Associate Professor, [3]PG Junior Resident, Department of Community Medicine, GSVM Medical College, Kanpur, Uttar Pradesh, [4]Statistician Cum Assistant Professor, Department of Community Medicine, UNS ASMC, Jaunpur, Uttar Pradesh, [5]Senior Resident, Department of Community Medicine, GSVM Medical College, Kanpur, Uttar Pradesh, [6]Assistant Professor, Department of Forensic Medicine, Government Medical College, Kannauj, Uttar Pradesh.

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Abstract

Background: Patients have certain expectations provision of healthcare delivery when they approach a healthcare facility. It has been observed that satisfied patients are more likely to follow medical advice and comply with treatment recommendation.

Objective: Assessment of patient's feedback regarding services provided in healthcare facility.

Methods: This was a descriptive cross sectional study. It was conducted in a healthcare institute situated in Kanpur district. The study was conducted from January 2024 to March 2024. Purposive sampling technique was used for data collection. Likert scale items.

Results: Overall 92.1% of the patient rated care received during the visit as either fair, good, very good or excellent with the services given by the care providers. Similarly, majority (99%) of the participants reported satisfaction with the Attitude & communication of doctors.

Conclusion: Majority of participants, both OPD and IPD, agreed that behaviour of hospital staff was good, doctors and nurses spent adequate time with patients, and detailed information about illness and treatment was provided to them by doctors. Finally, a system for patients' feedback may be institutionalized at all health facilities to improve quality of healthcare.

Keywords: Patients' feedback, Communication, Outpatient and inpatient department, Healthcare

Introduction

Patient's satisfaction with health care is an integral component of quality monitoring in health care systems. Patient satisfaction is defined as "the extent to which a patient is content with the healthcare provided"[(1)]. Donabedian defined patient

Corresponding Author: Navin Kumar, Statistician cum Assistant Professor, Department of Community Medicine, Uma Nath Singh Autonomous State Medical College, Jaunpur.

E-mail: navin.bhu2016@gmail.com

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satisfaction as patient-reported outcome measure while the structures and processes of care can be measured by patient-reported experiences[2]. It has been observed that satisfied patients are more likely to follow medical advice and comply with treatment recommendation, thereby improve the outcome of care [3]. Healthcare services have become more patient-centric in today's era and measuring patient satisfaction level has become an objective criterion for defining the effectiveness of these services.

Service providers get first-hand information from their patients, which should help them to reorient their services by adopting a more patient centred approach, transforming their attitude and introducing a convivial ambience at health service outlets based on feedback[4].

Quality of health services has been traditionally based on professional practice standards. However, in recent times, patient's perception about health care has been increasingly accepted as an important measure of quality of health care and a critical component of performance improvement and clinical effectiveness[5].

Patient satisfaction is simultaneously multidimensional and subjective. It is influenced by a number of factors such as the quality of clinical services delivered, maintenance of cleanliness, hospital infrastructure, supply and availability of medicines, behaviour of doctors and other healthcare professionals, emotionally and physically comfortable environment, and cost of services provided [6][7]. Studies have shown that there is a direct association between quality of care and patient satisfaction levels [8]. Patient satisfaction is not only a significant, effective, and widely used indicator for quality measurement in health care but also measures the performance of physicians and hospitals [9].

Patient's evaluation of care is a realistic tool to provide opportunity for improvement of care, enhancing strategic decision making, reducing cost, meeting patients' expectations, framing strategies for effective management, monitoring performance of health plans, and provide benchmarking across health care institutions [10-12]. There is a significant correlation between measuring patient satisfaction and patients' compliance to treatment and continuity with health care providers [13-15]. Most research done on patient satisfaction with health services in India has been confined to family planning services. In this background, this study was conducted to measure the patient's feedback with outpatient and inpatient services of health care facility in Uttar Pradesh.

Objective: Assessment of patient's feedback regarding services provided in healthcare facility.

Material and Methods:

Study design: This was a descriptive cross sectional study.

Study Area: It was conducted in a healthcare institute situated in Kanpur district.

Study Period: The study was conducted from January 2024 to March 2024.

Inclusion criteria: Those participants who gave consent to be parts of the study were included in this study.

Exclusion criteria: Severely ill; incubate patients, who neither able to participate in the study nor give consent.

Sample size:

$$\frac{(Z\ \alpha/2)^2 \times p(1-p)}{e^2}$$

The reported patient satisfaction was 87.8%, study conducted by in the health facilities in Northern India[23]. Considering this proportion, with 5% absolute precision and at 95% confidence interval, the calculated sample size was 187 which were rounded off to 200. A final sample size of 214 from OPD and 200 from IPD. Total 414 samples were taken for the study.

Sampling technique: Purposive sampling technique was used for data collection. A pre-designed and semi-structured questionnaire was used to examine several aspect of hospital care. In this study we use 2 separate questioners, one for OPD and another for IPD. OPD Questionnaire consist of total 10 questions are close ended while IPD Questionnaire consist of total 20 questions are close ended. Questionnaires were taken from authentic site [24]. The questionnaire consisted of five points Likert scale

items, with 1 to 5 indicating the lowest and highest levels of satisfaction, respectively. The questionnaire was administered by trained interns students to individuals after obtaining informed written consent. Outpatients were interviewed during their exit from the clinics while inpatients were interviewed in the wards. The study was approved by ethics committee, Ref No. EC / 311/ Nov./2023

Statistical Analysis: The data was entered and analyzed using MS-Excel. Descriptive analysis was performed to calculate frequency and percentage. For categorical data chi-square test was used to see association between the variables respectively with significance level at $p < 0.05$.

Results

Socio-demographic Characteristics:

A total of 214 patients or their caregivers from OPD and 200 from IPD were interviewed. Majority of patients belonged to rural areas. Overall female participants were 36.5%. Majority of participants were in the age group of 20- 40 years (45.9%). 32.1 % participants were graduate, 30.2 % had education upto 12th while only 1.2 % were postgraduate. House maker were the largest occupational group amongst the patients (26.8%) followed by labourers (16.4%) and farmers (12.5 %) (Table 1.)

Outpatient Department:

Mean score of OPD participants was 28.1. Overall Score for 80th percentile was 34 while 30 for 60th percentile (Table 2). Feedback score for 'fair' category was 23.4% while 18.7% participants graded as 'excellent' category and 20.6 % rated as 'Poor'(Table 3). Almost similar proportion of male and female, married and unmarried participants rated overall 'poor' category. Around 18 % Hindus and 25% Muslim patients rated overall performance as 'excellent' (Table 4). Majority were also satisfied with other domains like Behaviour and attitude of hospital staff, Availability of Lab comfort and radiology investigation facilities within the hospital and Promptness at Medicine distribution counter.

Inpatient Department

Mean score of IPD participants was 65.01. Overall Score for 80th percentile was 71 while 69 for 60th percentile (Table 2). Feedback score for 'fair' category was 22.5% while 18 % participants graded as 'excellent' category and 25.5 % rated as 'Good'(Table 3). Association of category with the variables i.e. age group <40 & >40 years, marital status, education status and religion were found statistically significant (table 5).

Majority (97.5%) of participants reported to be satisfied with overall hospital care received with 2.5% being unsatisfied (table 7).Similarly, majority (99%) of the participants reported satisfaction with the Attitude & communication of doctors with 1% being unsatisfied.

Table 1: Distribution of demographic characteristics of study subjects (N=414)

Characteristics	Frequency (N)	Percentage (%)
Age (in years)		
<20	16	3.9
20-40	190	45.9
40-60	168	40.6
60 &above	40	9.7
Gender		
Male	263	63.5
Female	151	36.5
Education		
Below 10th	61	14.7
10th	90	21.7
12th	125	30.2
Graduate	133	32.1
Post graduate	5	1.2
Occupation		
Student	58	14.0
Labour	68	16.4
Farmer	52	12.5
Business	41	9.9
Government Job	12	3.0
Private Job	19	4.6
House maker	111	26.8
others	53	12.8
Marital status		
Unmarried	66	15.9
Married	348	84.1
Religion		
Hindu	349	84.3
Muslim	65	15.7

Table 2: Descriptive statistics of OPD's and IPD's patients feedback

Descriptive Statistics	Score (OPD)	Score (IPD)
Mean	28.81	65.01
Median	28.00	68.00
Mode	30.00	69.00
Standard Deviation	7.15	10.15
Minimum	13	35.00
Maximum	47	90.00
Precentile		
20th	22.00	59.20
40th	27.00	66.00
60th	30.00	69.00
80th	34.00	71.00
100th	74.00	90.00

Table 3: OPD's and IPD's patients feedback score distribution

Score	OPD		IPD	
	Frequency	Percentage	Frequency	Percentage
Poor	44	20.6	40	20.0
Fair	50	23.4	45	22.5
Good	43	20.1	51	25.5
Very good	37	17.3	28	14.0
Excellent	40	18.7	36	18.0

Table 4: OPD's patients feedback score distribution with their demographic characteristics (N=214)

Characteristics	Poor	Fair	Good	Very good	Excellent	Total
Age group (in yrs)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**N (%)**
≤40	25 (21.0)	31 (26.1)	20 (16.8)	21 (17.6)	22 (18.5)	119 (100.0)
>40	19 (20.0)	19 (20.0)	23 (24.2)	16 (16.8)	18 (18.9)	95 (100.0)
Gender						
Male	27 (20.5)	29 (22.0)	25 (18.9)	26 (19.7)	25 (18.9)	132 (100.0)
Female	17 (20.7)	21 (25.6)	18 (2.0)	11 (13.4)	15 (18.3)	82 (100.0)
Marital status						
Unmarried	8 (21.6)	8 (21.6)	6 (16.2)	5 (13.5)	10 (27.0)	37 (100.0)
Married	36 (20.3)	42 (23.7)	37 (20.9)	32 (18.1)	30 (16.9)	177 (100.0)
Educational status						
Upto 10th	9 (13.0)	16 (23.2)	14 (20.3)	17 (24.6)	13 (18.8)	69 (100.0)
12th & above	35 (24.1)	34 (23.4)	29 (20.0)	20 (13.8)	27 (18.6)	145 (100.0)
Religion						
Hindu	36 (18.9)	49 (25.8)	39 (20.5)	32 (16.8)	34 (17.9)	190 (100.0)
Muslim	8 (33.3)	1 (4.2)	4 (16.7)	5 (20.8)	6 (25.0)	24 (100.0)

Table 5: IPD's patients feedback score distribution with their demographic characteristics N=(200)

Characteristics	Poor	Fair	Good	Very good	Excellent	Total	Chi-square	P-value
Age group (in yrs)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**N (%)**		
≤40	13 (12.5)	25 (24.0)	28 (26.9)	19 (18.3)	19 (18.3)	104 (100.0)	9.32	0.049
>40	27 (28.1)	20 (20.8)	23 (24.0)	9 (9.4)	17 (17.7)	96 (100.0)		
Gender								
Male	25 (19.1)	29 (22.1)	33 (25.2)	20 (15.3)	24 (18.3)	131 (100.0)	0.65	0.952
Female	15 (21.7)	16 (23.2)	18 (26.1)	8 (11.6)	12 (17.4)	69 (100.0)		
Marital status								
Unmarried	3 (10.3)	3 (10.3)	6 (20.7)	7 (24.1)	10 (34.5)	29 (100.0)	11.73	0.020
Married	37 (21.6)	42 (24.6)	45 (26.3)	21 (12.3)	26 (15.2)	171 (100.0)		
Educational status								
Upto 10th	20 (24.1)	12 (14.5)	25 (30.1)	8 (9.6)	18(21.7)	83 (100.0)	9.45	0.049
12th & above	20 (17.1)	33 (28.2)	26 (22.2)	20 (17.1)	18 (15.4)	117 (100.0)		
Religion								
Hindu	37 (23.3)	33 (20.8)	45 (28.3)	14 (8.8)	30 (18.9)	159 (100.0)	22.86	0.000
Muslim	3 (7.3)	12 (29.3)	6 (14.6)	14 (34.1)	6 (14.6)	41 (100.0)		

Table 6: Rating of the respondent who visited OPD's of tertiary care hospital

Variables	Mean (S.D.)	Poor n(%)	Fair n(%)	Good n(%)	Very good n(%)	Excellent n(%)
Availability of sufficient information in hospital	2.89 (0.88)	8 (3.7)	67 (31.3)	84 (39.3)	50 (23.4)	5 (2.3)
Waiting time at the registration counter	2.39 (1.19)	54 (25.2)	78 (36.4)	45 (21.0)	19 (8.9)	18 (8.4)
Behaviour and attitude of hospital staff	2.79 (1.02)	19 (8.9)	72 (33.6)	68 (31.8)	45 (21.0)	10 (4.7)
Amenities in waiting area	2.79 (1.09)	18 (8.4)	76 (35.5)	76 (35.5)	20 (9.3)	24 (11.2)
Attitude & communication of doctors	3.35 (1.03)	7(3.3)	37 (17.3)	76 (35.5)	62 (29.0)	32 (15)
Time spent on consulting, examination and counseling	3.19 (1.04)	5 (2.3)	59 (27.6)	66 (30.8)	59 (27.6)	25 (11.7)
Availability of Lab and radiology investigation facilities within the hospital	3.01 (1.06)	12 (5.6)	62 (29.0)	72 (33.6)	47 (22.0)	21 (9.8)
Promptness at Medicine distribution counter	2.86 (1.08)	21 (9.8)	61 (28.5)	76 (35.5)	38 (17.8)	18 (8.4)
Availability of prescribed drugs at the hospital dispensary	2.67 (1.14)	32 (15.0)	75 (35.0)	55 (25.7)	36 (16.8)	16 (7.5)
Your overall satisfaction during the visit to the hospital	2.86 (1.07)	17 (7.9)	70 (32.7)	71 (33.2)	38 (17.8)	18 (8.4)

Table 7: Rating of the respondent who visited IPD's of tertiary care hospital

Variables	Mean (S.D.)	Poor n(%)	Fair n(%)	Good n(%)	V. good n(%)	Excellent n(%)
Sufficient information at Registration counter	3.22 (0.84)	2(1.0)	36 (18.0)	89 (44.5)	61 (30.5)	12 (6.0)
Waiting time at the registration/ admission counter	3.21 (1.32)	29 (14.5)	34 (17.0)	39 (19.5)	62 (31.0)	36 (18.0)
Behaviour and attitude of hospital staff at the admission	3.28 (0.96)	6 (3.0)	34 (17.0)	76 (38.0)	65 (32.5)	19 (9.5)
Your feedback on discharge process	3.33 (0.93)	4 (2.0)	34 (17.0)	72 (36.0)	72 (36.0)	18 (9.0)
Cleanliness of the ward	3.35 (0.90)	2 (1.0)	29 (14.5)	89 (44.5)	57 (28.5)	23 (11.5)
Cleanliness of bathroom & toilets	3.07 (1.08)	19 (9.5)	42 (21.0)	55 (27.5)	73 (36.5)	11 (5.5)
Cleanliness of bed sheets, pillow-covers etc.	3.28 (1.01)	4 (2.0)	40 (20.0)	80 (40.0)	47 (23.5)	29 (14.5)
Cleanliness of surroundings and campus drains	3.10 (0.93)	12 (6.0)	35 (17.5)	78 (39.0)	70 (35.0)	5 (2.5)
Regularity of Doctor's attention	3.35 (0.85)	4 (2.0)	21 (10.5)	91 (45.5)	68 (34.0)	16 (8.0)
Attitude and communication of Doctors	3.46 (0.83)	2 (1.0)	19 (9.5)	82 (41.0)	78 (39.0)	19 (9.5)
Time spent for examination of patient and counseling	3.34 (0.86)	2 (1.0)	29 (14.5)	83 (41.5)	70 (35.0)	16 (8.0)
Promptness in response by Nurses in the ward	3.29 (0.96)	5 (2.5)	34 (17.0)	81 (40.5)	58 (29.0)	22 (11.0)
Round the clock availability of nurses in the ward	3.08 (0.91)	10 (5.0)	44 (22.0)	68 (34.0)	76 (38.0)	2 (1.0)
Attitude and communication of nurses	3.01 (0.89)	12 (6.0)	38 (19.0)	90 (45.0)	56 (28.0)	4 (2.0)
Availability, attitude & promptness of ward boys/girls	3.07 (0.89)	10 (5.0)	39 (19.5)	80 (40.0)	68 (34.0)	3 (1.5)
All prescribed drugs were made available from hospital supply	3.20 (0.88)	9 (4.5)	21 (10.5)	104 (52.0)	53 (26.5)	13 (6.5)
Your perception of doctor's knowledge	3.54 (0.82)	3 (1.5)	14 (7.0)	73 (36.5)	91 (45.5)	19 (9.5)
Diagnostics services were provided within the hospital	3.13 (0.88)	3 (1.5)	48 (24.0)	78 (39.0)	62 (31.0)	9 (4.5)
Timeliness of supply of the diet and its quality	3.21 (0.82)	4 (2.0)	28 (14.0)	100 (50.0)	57 (28.5)	11 (5.5)
Your over-all satisfaction during the treatment as an in-patient	3.43 (0.79)	5 (2.5)	16 (8.0)	73 (36.5)	99 (49.5)	7 (3.5)

Discussion

Measurement of patients' satisfaction is important for improving services and strategising goals for all health care organizations[16] In our study, majority (92.1%) of OPD participants were satisfied with overall care received. This is much higher than found in some of the other studies from developing countries[17].

Previous studies from India have reported patient satisfaction score ranging from 60% to 88%[18].

In another study to assess degree of patients' feedback among patients attending government health facilities in rural Bangladesh, only 68.9% of the participants expressed satisfaction with the provider's usual behaviour. Around 7.5% of OPD participants were dissatisfied with long waiting time for consultation.

In our study, majority (94.8%) of participants were satisfied with overall care received from care provider and majority (98%) were also satisfied with time the care providers spent with patients.

In the study by Rajkumari and Nula [19] done in a tertiary care health facility from North East India and by Malangu and Westhuisen[20] done in a DH of South Africa, 32.5% and 50% of the patients, respectively, were satisfied with the overall inpatient care which is lower than seen in our study. In another study by Mishra and Mishra (21) conducted in a tertiary care private hospital of North India, the nursing services satisfied 80% of the participants while 92% were satisfied with explanation about disease and treatment by doctors. However, in the same study, behaviour of nurses, doctors, and orderlies satisfied 92%, 92%, and 83% of people, respectively[21].

Another study done among patients admitted to obstetrics and gynaecology wards of public hospitals of Ethiopia reported overall satisfaction rate of 79.7% [22]. Describing possible side effects of the medications in ways patient could understand, and cleanliness of toilet and washroom were the areas in which clients were dissatisfied in the study similar to our findings.[22]

With respect to hospital environment, around 6% of participants were satisfied with hospital campus and drain, with 9.5% reported problem with cleanliness of toilets and bathrooms. The results of this study confirm that opinions and judgement of quality are highly individualistic, vibrant and consequently patients feedback has an important indication on the quality of health care services.

Conclusions

Majority of patients using outdoor and indoor services were satisfied with the care received and the behaviour of the received and behaviour of hospital staffs. Registration process needs to be streamlined to reduce waiting time and delays. Majority of participants, both OPD and IPD, agreed that behaviour of hospital staff was good, doctors and nurses spent adequate time with patients, and detailed information about illness and treatment was provided to them by doctors. Attention should be given to the cleanliness at health facilities. Finally, a system for patients' feedback may be institutionalised at all health facilities to improve quality of healthcare.

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Original Article

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Clinical and Socio-Demographic Profile of Chidren Aged 6-59 Month with Severe Acute Malnutrition Presenting in a Tertiary Care Hospital in Nuh, Haryana

Meetu Yadav[1], Pawan Yadav[2], Maha Singh[3], Suraj Chawla, Priyanka Tank[5]

[1]Associate Professor Department of pediatrics SHKMGMC Nalhar, Nuh, [2]Secondary DNB Resident, Department of Pediatrics SHKMGMC, Nalhar, Nuh, [3]Professor Department of Pediatrics, SHKMGMC Nalhar, Nuh, [4]Associate Professor, Department of Community Medicine SHKMGMC Nalhar, Nuh, [5]Assistant professor, Department of pediatrics SHKM GMC Nuh.

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Abstract

Background: Malnutrition adversely affects achievement of all the milestones namely motor, sensory, cognitive and social.

Methods: The records of 150 patients with severe acute malnutrition over a period of one year (July 2022-July 2023) were reviewed, and a statistical comparison of various variables were made.

Results: As per study, mean weight(kg) 7.48 ± 2.02, mostly i.e., 78.67% were having weight <-3 SD. Mean height or length(cm) was 77.5 ± 11.14, majority was in between 2SD to -3SD i.e., 48.00%, MUAC was < 11.5 among 123 (82%), 11.6-12.5 among 10 (6.67%), 12.6-13.5 among 17 (11.33%). There were 41.33% males and 58.67% females. Of study population, Birth order was 1st among 9 (6.0%), 2nd among 11 (7.33%), 3rd among 38 (25.33%) and 4th and above among 92 (61.34%) subjects with a mean of 4.05± 1.52. Among my study most of children were mixed Feeding 53.34%, while only 13.33% were Exclusive breast feed while 33.33% were Top feed. Immunization was Complete among 10.67%, Incomplete among 62.67% and Unimmunized among 26.67% subjects. Pedal Edema was present among 44 (29.33%) subjects and absent in 106(70.67%). The presenting complaint reported were anemia (38.67%), pneumonia (26.67%), acute gastroenteritis (12.67%), hypoglycemia (10.00%), Dehydration (8.0%) and UTI (4.00%) and most common presenting complication wasanemia (80%), followed by pneumonia (52%), acute gastroenteritis (34.00%), dehydration (29.67%), Lethargy/hypoglycaemia (30%), meningitis (8.00%), tuberculosis(5.33%) and UTI (4.00%) As per my study, complication are more severe unvaccinated children, however effect is statistically insignificant (p> 0.05)

Conclusion: SAM was most common in 13-24 months age group and with increasing age, a lesser proportion of children were affected with SAM. There was a strong correlation between adverse outcomes and dietary risk factors such as the length of time spent nursing exclusively, using a bottle, and delaying the introduction of supplementary foods. Most common co-morbidities were anaemia and pneumonia.

Keywords: Malnutrition, Anthropometry, Socio-Demographic Profile.

Corresponding Author: Meetu Yadav, Associate Professor Department of pediatrics SHKMGMC Nalhar, Nuh.

E-mail: raomeetu26@gmai.com

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Introduction

Approximately 11 million children under the age of five succumb to preventable causes of mortality each year. According to UNICEF statistics, 46% of children under the age of 5 are underweight[1] UNICEF, WHO and World Bank Group Joint Malnutrition Estimates May 2023, estimated that global prevalence of malnutrition was 6.85% (45 millions)[2]. Prevalence of infectious diseases increase by manifold with malnourishment (e.g. pneumonia by 10.94%, septicaemia by 7.8%, UTI by 6.8%, tuberculosis (TB) by 1.5%)[3]. It is distressing to note that prevalence of SAM has gradually increased from 6.6% in 2005-06 to 7.4% in 2015-16 and 7.7% in 2019-20 as per National Family Health Survey 5(NFHS-5)[6]. The prevalence of SAM in Haryana is at 4.4%, and it increased to 7.1% in Mewat(Nuh) district (NFHS-5)[7]. In India, undernutrition plays a significant role in over 50% of all deaths of children under the age of five. The 2030 Sustainable Development Agenda's Goal 2 calls for the eradication of all kinds of hunger and undernourishment.[6,7] For assessment of nutritional status of child, anthropometric parameters such as height or length, weight and MUAC are recorded accurately and these parameter are used to derive anthropometric indices such as height-for-age, weight-for-age, and weight-for-length.[8,9] Children who are suffering from severe acute malnutrition should be managed as "inpatients," ideally in a Nutrition Rehabilitation Centre where standard protocols laid down by WHO, are followed for the management of such patients.[10] Aim of this study is to describe clinical and sociodemographic profile and co morbidities of children aged 6-59 months with severe acute malnutrition presenting in Department Of Paediatrics.

Methods

A total of 150 patients with severe acute malnutrition were included after approval of Institutional ethical committee and after obtaining written informed consent from parents. A detailed history was elicited from parents (usually mother) and was recorded on Performa which include the patient personal details like age, birth order, sex, socioeconomicstatus (following modified Kuppuswamy scale), parental education (both mother and father), immunisation status. In addition, information regarding feeding details-breastfeeding/ top feeding (method of feeding, dilution, container used for feeding), the recent introduction of animal milk was elicited and documented on Performa. Associated complication like anaemia, pneumonia, acute gastroenteritis, presence of dehydration, hypoglycemia and fever were noted.A thorough physical examination from head to toe emphasizing on sign of malnutrition [like loss of fat, dermatosis, sparse hair, bilateral pedal Pitting Oedema] done. Weight (digital weighing machine by Omron), Length (upto 2 years by Infantometer by MCP , Height (> 2 years to 5 years) by stadiometer by MCP analog measuring tape, Mid upper-arm circumference (MUAC) midway between tip of acromian process of scapula and olecranon of ulna by fibre tape, head circumference(by measuring tape) was noted as described in NRC manual. Baseline investigations, Complete blood count, ESR, Urine and stool examination, Mantoux Test, HIV ELISA, Chest X-Ray, Liver Function Test, Electrolyte & Kidney Function Test, Random blood sugar, Blood culture & sensitivity were done in institution. Added investigations were individualized based on clinical status and examination. The indices of nutritional status weight for age, height/length for age was plotted and compared with the WHO age and sex specific growth Multicentre Growth Reference Study (MGRS) WHO standards and then classified according to WHO classification.

Statistical Analysis

The presentation of the Categorical variables was done in the form of number and percentage (%). On the other hand, the quantitative data were presented as the means ± SD and as median with 25th and 75th percentiles (interquartile range). The association of the variables which were qualitative in nature were analyzed using Chi-Square test. If any cell had an expected value of less than 5 then Fisher's exact test was used. The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 25.0. For statistical significance, p value of less than 0.05 was considered statistically significant.

Results

A total of 150 cases of severe acute malnutrition were analyzed.

Table 1: Age (months) distribution.

Age (months)	Frequency	Percentage
6 to 12 months	47	31.33%
13 to 24 months	50	33.33%
25 to 36 months	22	14.67%
37 to 48 months	20	13.33%
49 to 59 months	11	7.33%
Mean ± SD	24.73 ± 15	
Median(25th-75th percentile)	21(12-36)	
Range	6-59	

Of study population, 31.33% belonged to age group 6-12 months, 33.33% belonged to 13-24 months, 14.67% belonged to 25-36 months age group, 13.33% belonged to 37-48 months and 7.33% belonged to 49-59 months with a mean of 24.73 ± 15 (table 1). As per study, there were 41.33% males and 58.67% females.Of study population, Birth order was 1st among 9 (6.0%), 2nd among 11 (7.33%), 3rd among 38 (25.33%) and 4th and above among 92 (61.34%) subjects with a mean of 4.05± 1.52. As per study, 64.00% belongs to Lower socioeconomic status, 31.33% belongs to lower middle, 3.33% of Upper Middle and 1.33% belongs to Upper class status. As per study, majority of them will Read + Write only among 71.34%, Primary school among 24.66%, Pre-primary school among 2.67%, Secondary school among 1.33% while no one graduated. As per study, mostly were illiterate and can Read + Write only, 65.33%, Primary school among 24.00%, Pre-primary school among 9.33%, Secondary school among 1.34%. Among my study most of children were mixed Feeding 53.34%,while only 13.33% were Exclusive breast feed while 33.33% were Top feed. As per study, Immunization was Complete among 10.67%, Incomplete among 62.67% Unimmunized among 26.67% subjects(figure 1). As per study, Pedal Edema was present among 44 (29.33%) subjects and absent in 106(70.67%).

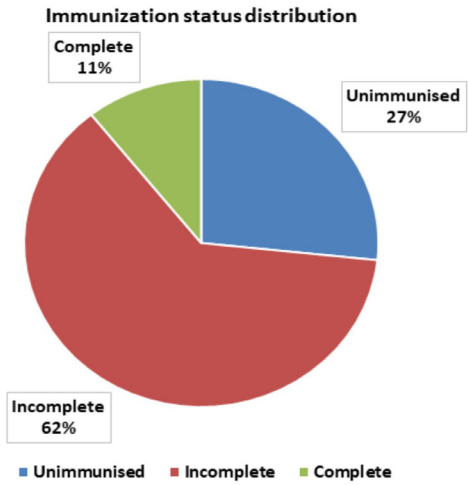


Figure 1: Immunization status distribution.

Table 2: Anthropometric parameters distribution.

Anthropometric parameters	Frequency	Percentage
Weight(interpretation)		
Between -1SD to -2SD	1	0.67%
Between -2SD to -3SD	31	20.67%
<-3SD	118	78.67%
Weight(kg)		
Mean ± SD	7.48 ± 2.02	
Median(25th-75th percentile)	7.1(6-9)	
Range	3.4-12.2	
Height or length(interpretation)		
Between median to -1SD	2	1.33%
Between -1SD to -2SD	27	18.00%
Between -2SD to -3SD	72	48.00%
<-3SD	49	32.67%
Height or length(cm)		
Mean ± SD	77.5 ± 11.14	
Median(25th-75th percentile)	76(70-86)	
Range	56-106	
MUAC(cm)	**Frequency**	**Percentage**
< 11.5	123	82.00%
11.6-12.5	10	6.67%
12.6-13.5	17	11.33%
Mean ± SD	10.96 ± 1.07	
Median(25th-75th percentile)	10.9(10.2-11.5)	
Range	9-13.6	

As per study, mean weight(kg) 7.48 ± 2.02, mostly i.e.78.67% were having weight <-3 SD. Mean height or length(cm) was 77.5 ± 11.14 ,majority was in between 2SD to -3SD i.e. 48.00%, MUAC was < 11.5 among 123 (82%), 11.6-12.5 among 10 (6.67%), 12.6-13.5 among 17 (11.33%) (table 2). The presenting complaint reported were anaemia (38.67%), pneumonia (26.67%), acute gastroenteritis (12.67%), hypoglycemia (10.00%), Dehydration (8.0%) and UTI (4.00%)(figure 2).

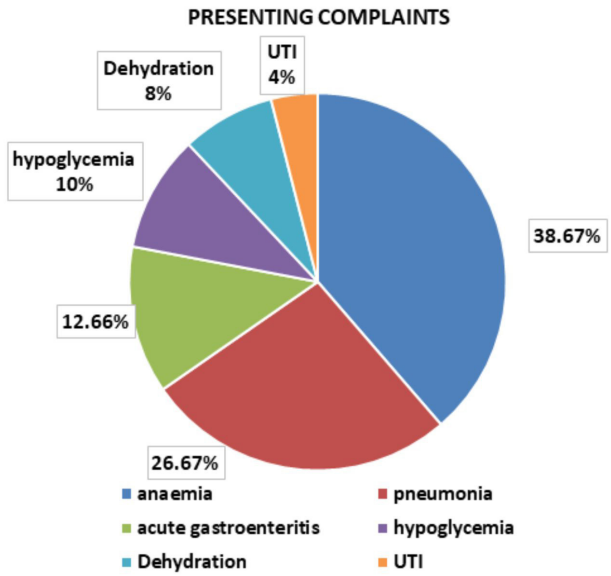


Figure 2: Presenting complaint distribution.

Table 3: Complications distribution.

Complications	Frequency	Percentage
Anaemia		
No anaemia	30	20.00%
Mild anaemia	62	41.33%
Severe anaemia	58	38.67%
Blood transfusion		
Not required	62	51.67%
Required	58	48.33%
Pneumonia		
No pneumonia	72	48.00%
Mild pneumonia	38	25.33%
Severe pneumonia	40	26.67%
AGE		
No AGE	99	66.00%
AGE without dehydration	32	21.33%
AGE with dehydration	19	12.67%
Hypoglycemia		
No hypoglycemia	105	70.00%
Hypoglycemia	45	30.00%
Meningitis	12	8.00%
Tuberculosis	8	5.33%
UTI	6	4.00%

As per my study most common presenting complication was anaemia (80%), followed by pneumonia (52%), acute gastroenteritis (34.00%), dehydration (29.67%), Lethargy/hypoglycemia (30%), meningitis (8.00%), tuberculosis(5.33%) and UTI (4.00%)(table 3).As per my study, mostly malnutrition presenting age group between 6 to 24 months accounting 64.66% while age group does not have any significance with age of presentation (P> 0.05).

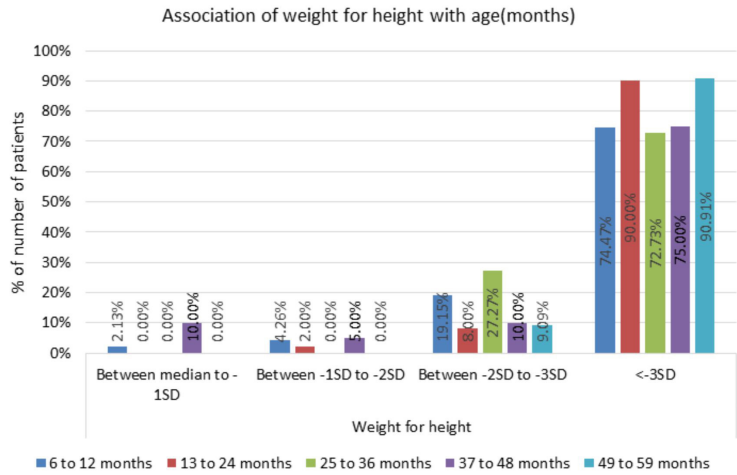


Figure 3: Association of weight for height with age (months).

Table 4: Association of complications with age (months).

Complications	6 to 12 months	13 to 24 months	25 to 36 months	37 to 48 months	49 to 59 months	Total	P value
Anaemia							
No anaemia	10 (21.28%)	14 (28%)	3 (13.64%)	3 (15%)	0 (0%)	30 (20%)	0.254*
Mild anaemia	20 (42.55%)	20 (40%)	9 (40.91%)	6 (30%)	7 (63.64%)	62 (41.33%)	0.515*
Severe anaemia	17 (36.17%)	16 (32%)	10 (45.45%)	11 (55%)	4 (36.36%)	58 (38.67%)	0.442*
Blood transfusion							
Not required	20 (54.05%)	20 (55.56%)	9 (47.37%)	6 (35.29%)	7 (63.64%)	62 (51.67%)	0.575†
Required	17 (45.95%)	16 (44.44%)	10 (52.63%)	11 (64.71%)	4 (36.36%)	58 (48.33%)	
Pneumonia							
No pneumonia	22 (46.81%)	24 (48%)	10 (45.45%)	11 (55%)	5 (45.45%)	72 (48%)	0.973†
Mild pneumonia	9 (19.15%)	14 (28%)	7 (31.82%)	7 (35%)	1 (9.09%)	38 (25.33%)	0.396*
Severe pneumonia	16 (34.04%)	12 (24%)	5 (22.73%)	2 (10%)	5 (45.45%)	40 (26.67%)	0.162*
AGE							
No AGE	55(82.00%)	20(76.92%)	15 (45.45%)	10(58.82%%)	4(33.33%)	99(66.00%)	0.595*
AGE without dehydration	2(2.98%)	3(11.54%)	16(48.48%)	5(29.42%%)	6(50%)	32(21.33%)	0.456*
AGE with dehydration	10(14.92%)	3(11.54%)	2(6.07%)	2(11.76%)	2(16.17%)	19(12.67%)	0.377*
Hypoglycemia							
No hypoglycemia	30 (63.83%)	39 (78%)	15 (68.18%)	11 (55%)	10 (90.91%)	105 (70%)	0.15*
Hypoglycemia	17(37.37%)	11(22%)	7(31.72%)	9(45%)	1 (9.1%)	45(30.00%)	0.071*
Meningitis	3 (6.38%)	4 (8%)	3 (13.64%)	2 (10%)	0 (0%)	12 (8%)	0.778*
Tuberculosis	3 (6.38%)	2 (4%)	3 (13.64%)	0 (0%)	0 (0%)	8 (5.33%)	0.365*
UTI	1 (2.13%)	4 (8%)	1 (4.55%)	0 (0%)	0 (0%)	6 (4%)	0.573*

* Fisher's exact test, † Chi square test

The incidence of complication with malnutrition does not have any relationship with age of children. Its value is statistically insignificant with age of children(table. 4). As per my study, complication are more severe in top feed children also more complication occurring in top feed children, however effect is statistically insignificant (p> 0.05). As per my study, complication are more severe unvaccinated children, however effect is statistically insignificant (p> 0.05)

Discussion

Malnutrition is a condition that can be caused by a number of different factors, such as an inadequate intake of protein, calories, vitamins, and minerals, as well as recurrent illnesses. Malnutrition leads to lost opportunities in life as well as economic growth. SAM can lead to mortality directly or it can act as indirect cause by significantly increasing the case fatality rate in children suffering from other common childhood illness such as diarrhea and pneumonia. In current study, 31.3% belonged to age group of 6-12 months, 33.3% belonged to 13-24 months, 14.6% belonged to 25-36 months age group, 13.3% belonged to 37-48 months and 7.3% belonged to 49-60 months. Similar to our study, Chaurasia et al.[11] included 152 individuals with 76.97 percent of the patients being younger than 24 months old. In the study conducted by Aguayo et al.,[12] 77.7 percent of the children were younger than 24 months old. It was found in the current study that

there were 41.3% male and 58.7% female children. In similarity with our findings, In our study, it was found that increasing birth order was associated with higher prevalence of SAM. Birth order was 1st among 9 (6.0%), 2nd among 11 (7.3%), 3rd among 38 (25.3%) and 4th and above among 92 (61.3%) subjects. Ahmad et al.[13] reported that Birth order was First among 36.1%, Second among 21.7%, Third among 13.0% and Fourth or above among 29.2% subjects.In the study carried out by us, 64.0% of children belongs to lower socioeconomic status, 31.3% were among lower middle class, 3.33% were from Upper Middle class and 1.33% were from upper socioeconomic class. Chaurasia et al.[11] stated that 83.55% children belonged to lower socioeconomic status followed by Upper lower (7.89%), Upper middle (5.92%) and Lower middle (2.63%). In current investigation, Maternal Education was Read + Write only among 71.33%, Pre primary school among 2.67%, primary school among 24.67% and 1.3% were educated till Secondary school . Reddy et al.[14] have shown that lack of education among mothers is a significant risk factor for malnutrition in their offspring. Joshi S et al. and Sharma LM et al. both reported that were quite similar to ours.[15,16] According to the findings of Devi et al.,[17] an independent predictor of malnutrition among hospitalised children is the level of education attained by the mother. Insufficient vaccination and a lower level of mat. In the study by us, feeding was Exclusive breastfeeding among 13.3%, partial breast feeding among 33.3% and mixed among 53.34% subjects. Reddy et al.[14] stated that proper feeding procedures, especially breast feeding methods, were of an extremely low standard. Mathew et al.[19] found that only 26% of children were offered exclusive breast feeding (EBF) up to the age of six months. Forty percent were nursed exclusively during the first three months of their lives. Only 28 percent of these infants started receiving supplemental feed between the ages of six and eight months. In current study work, Immunization was Complete among 10.67%, Incomplete among 62.7% and Unimmunized among 26.67% subjects. Similar to our research work, Mathew et al.[19] showed that 17% of the children had not received their vaccinations, while 58% of the youngsters had only had some of their vaccinations. In our investigation, Pedal edema was present among 44 (29.33%) subjects and absent in 106(70.67%). This was in similar to the work done by Abate et al.,[20] edema was reported among 11% subjects. In current research work, MUAC was < 11.5 among 123 (82%), 11.6-12.5 among 10 (6.67%), 12.6-13.5 among 17 (11.33%). Abate et al.,[20] stated that MUAC <11.5 cms was found among 69% subjects. We found that in the current study Weight for Height was Median to -1SD among 3 (2.0%),B/w -1SD to -2 SD among 4 (2.67%), B/w -2SD to -3SD among 22 (14.67%) and < -3 SD among 121(80.66%) subjects. Similar result were found in other studies. According to Aguayo et al.,[12] 97.4 percent of children had severe wasting, however Kumar et al.,[23] stated that 24.03 percent of children had severe visual wasting. In present research work, the complications reported were Anaemia (80.0%), Pneumonia (52%), Acute gastroenteritis (34%), Hypoglycaemia (30%), Dehydration (29.0%) and UTI (4.0%) and Meningitis (8%) including Tubercular Meningitis (5.33%). Panigrahi et al.[21] found that Anemia was the most common finding in SAM patients(94%) followed by anorexia(33.6%), pneumonia(28%), diarrhoea (9.8%), fever (5.6%), and hypoglycaemia (2.6 Limitation-This observational research study was conducted in a tertiary health care institute. So, the sample may not represent the community as a whole and the result may not be extrapolated to the general population due to selection bias. There was not a consistent documentation of the patients' follow-ups. Though most common factors, but not all the factors affecting malnutrition in children were evaluated in the study. No follow up was done.

Conclusion

On the basis of this study, we conclude that the problem of severe malnutrition is multi-dimensional and inter-generational in nature. SAM was most common in 13-24 months age group and with increasing age, a lesser proportion of children were affected with SAM. Sociodemographic factors such as sex of the child, lesser educational level of parents, occupational level of parents, rural background, households having more than 2 under-five children was the profile of the majority of children. There was a strong correlation between adverse outcomes and dietary risk factors such as the length of time spent nursing exclusively, using a bottle, and delaying the introduction of supplementary foods. Most common co-morbidities were anaemia and pneumonia.

Ethics clearance: Institutional Ethical Committee, SHKM GMC;No. SHKM/Acad/2024/2404, dated April 21,2023.

Contributors: AD, SD, MY: conceptualized the study, collected and interpreted the data and prepared the initial manuscript; SD, DM supervised the study, revived literature and revised the initial manuscript. All authors approved the final version of the manuscript and are accountable for all.

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Original Article

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Disability in Pelvic Girdle Pain in Relation to Dynamic Balance a Functional Performance

Shilpi Jindal[1], Meenakshi Jindal[2]

[1]Head of Department and Associate Professor, Department of Physical medicine and rehabilitation, Muzaffarnagar Medical College, Muzaffarnagar, [2]Professor, Department of Pharmacology Muzaffarnagar Medical College Muzaffarnagar.

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Abstract

Pelvic girdle pain is a common musculoskeletal condition in the community. According to fear-avoidance beliefs model, the anticipation of increased pain or further evokes thee avoidance behaviour causing disability.

Aim: The study aimed to correlate fear-avoidance beliefs with dynamic balance functional performance, Disability in Pelvic Girdle pain patients. Settings and design: A cross-sectional study was conducted in 75 chronic pelvic girdle pain patients in tertiary care hospital.

Subject and methods: pain fear-avoidance beliefs, dynamic balance, and disability were assessed in chronic pain patients. Pain was evaluated using the numerical pain rating scale, fear avoidance using the fear-avoidance belief questionnaire (FABQ), disability using the roland morris disability questionnaire, dynamic balance using the minibest test, and functional performance using the back performance scale. Statistical analysis used: statistical measures such as median and interquartile ranges were calculated. The spearmen's correlation test was used.

Result: there was a low correlation between FABQ and pain (r=0.431,=0.000), dynamic balance (r=-0.425, p=0.000) and functional performance (r=0.482, p=0.000) and moderate positive correlation with disability (r,=0.538, P=0.000) in chronic pelvic pain patients.

Conclusions: fear-avoidance beliefs are significantly associated with pain, dynamic balance, functional performance, and disability in chronic low back pain patient.

Keywords: chronic pelvic girdle pain, disability, dynamic balance, fear-avoidance belief.

Introduction

The lifetime prevalence of Pelvic Girdle pain was found to be 57% in India wherein prevalence in females (65%) was higher than the prevalence in males (47)[1]. PELVIC Girdle pain persistent for more than 3 months is termed Chronic Pelvic Girdle pain

Corresponding Author: Shilpi Jindal, HOD & Associate professor P.M.R Department Muzaffarnagar medical college Muzaffarnagar.

E-mail: raomeetu26@gmai.com

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and is the leading cause of disability worldwide. Recently, the authors have started focusing on contribution of psychosocial factors and their effect on individuals suffering from chronic Pelvic Girdle PAIN[2]. The presence of psychosocial factors such as fear of pain, catastrophization and depression after experiencing pain, results in fear of movement, thus leading to disuse and causing disability.[3] Fear-avoidance beliefs are considered an important psychosocial factor in predicting patient's avoidance of work and physical activity as well as disability.[4] It can lead to negative consequences such as disuse syndrome further causing physical deconditioning , sick role behavior, psychosocial withdrawal, and negative affect corresponding to a high level of disability.[5] Long-term avoidance behavior also detrimentally affects muscle strength, coordination, and physical fitness.[6] Further evidence also suggest that patients with Pelvic Girdle pain have impaired dynamic balance [7]. It was proposed that the balance impairment in Pelvic Girdle pain patients is associated with deficits in the musculoskeletal and neural systems.[8] Multiple studies have reported that chronic Pelvic Girdle pain may lead to difficulty or inability in performing functional tasks which further results in reduced mobility. Movements such as lumbar flexion, extension, and rotation have been recognized as common movements which elevate or aggravate the pain and elicit fear and avoidance behavior in individuals[9]. Limitations and avoidance of physical activities due to fear of pain can contribute to physiological changes in motor patterns, thus reducing the performance overall[7]. Previous studies done on Pelvic Girdle pain focused on pain, physical performance, and disability individually. Hence, making it imperative to check if these factors have an impact in chronic Pelvic Girdle pain patients. Thus, our study aimed to correlate fear-avoidance beliefs with dynamic balance functional performance and disability in chronic Pelvic Girdle pain patients. It is necessary to check the prevalence to understand how vast the occurrence is and accordingly build up on the treatment option for them. In India, there has been only one study documented in Karnataka, it showed a prevalence rate of 65% in posterior pelvic pain and 15% in anterior pelvic pain. Urban population showed a higher percentage of 75% as compared to 25% in the rural population.[27] In a random sample of 780 Australian women, the point prevalence of PPGP was 44%. In late pregnancy, the prevalence of self-reported PGP was at its peak at 7.3%.[28] It has been seen that one out of seven women suffer at 36 weeks' gestation with PGP, and almost half of the women suffering in the postpartum three months after delivery[28] Geographically, increased awareness regarding PGP has a higher rate accredited to health-care providers and the public. However, PGP cases are reported from many countries and across all continents, indicating that PGP in pregnancy is a globalproblem.[29] PGP decreases endurance in standing, walking, and sitting. It also interferes with lifting, getting up from chairs, turning over in bed, getting out of a vehicle, and changing body position. Toilet activities are difficult, especially in pregnancy with the increased body mass index and the pain not allowing the spread of legs. This pain affects the delivery stage too. Studies have shown that postpartum anxiety and depression have a major precursor with pelvic girdle dysfunction. There is now a study titled 'Mortality and Morbidity in Pelvic Girdle Pain' which examines the prevalence of pelvic girdle pain globally. Cultural practices and lifestyles vary widely across geographical areas, and these may have their impact on the reaction to pelvic girdle pain. Studies have shown, it may lead to prolonged suffering, marital and family problems, loss of employment or disability, and various adverse medical reactions from lifelong therapy. As such in chronic pelvic pain patients have no mortality in chronic pelvic pain unless it is cancer.

Material and Methods

A prospective, cross-sectional study was conducted in the physical medicine & rehabilitation outpatient department Muzaffarnagar medical college A total of 75 chronic low back pain patients were recruited after the approval from the ethics committee of the institution. Written informed consent was obtained from the participants. The study period was 8 months from May 2023 to December 2023. The inclusion criteria were participants having low back pain for more than 3 months, both males and females and between 41 and 59 years of age. Exclusion criteria were history of the upper limb, lower limb, or back surgeries, any neurological or cardiovascular conditions, any trunk, upper limb

or lower limb deformities, history of radiculopathy, spinal fractures, malignancy or congenital conditions. Considering the confidence interval as 0.05, power as 80%, and correlation coefficient as 0.3225 from a previously published study, 10 the sample size was determined as 74. The basic demographic data (age, height, weight, body mass index, marital status, education, occupation, and comorbidities) were recorded. Socioeconomic status was noted using the modified Kuppuswamy scale.[11] The intensity of the pain was measured using the numerical pain rating scale (NPRS) ranging from 0 to 10. Greater the score indicates the greater intensity of pain (0 = no pain, 10 = worst imaginable pain). It has high reliability and validity (Intraclass co-efficient (ICC) = 0.95)[12]. Patients' fear of pain and avoidance of physical activities were assessed using the fear-avoidance beliefs questionnaire (FABQ), a self-report health questionnaire. It consists of two subscales, FABQ-physical activity (PA), and FABQ-work. The reliability of FABQ is 0.98 (ICC = 0.98) and is valid to use.[13] The sample size was calculated using G*Power, Heinrich- Heine Dusseldorf, Germany. Dynamic balance was assessed using the Minibest test, a 14-item performance test with a total score of 28 points. It comprises four subscales anticipatory postural adjustments, reactive postural control, sensory orientation, and dynamic gait. It has reliability of 0.98 and 0.96, respectively, and high content validity[14]. Functional performance was assessed using a battery test called the Back Performance Scale (BPS) to evaluate activity limitation. It is a 16-point scale ranging from 0 to 15. The

Statistical analysis: The data was analyzed using (IBM SPSS Chicago, IL, USA) (Statistical Package for the Social Sciences) software version 24. The normality testing was done using the Kolmogorov–Smirnov test which showed that the data were not distributed normally. Hence, the nonparametric Spearman correlation test was used to evaluate the correlation between the variables. P <0.05 was considered statistically significant performance of each component is assessed using a 4-point ordinal scale. It has reliability of 0.98 (ICC = 0.98) and good validity.[15] Roland–Morris Disability Questionnaire was used to assess the disability which helps to evaluate the difficulty to perform physical activity and is a self-administered measure. It is a measure of disability where greater levels of disability are reflected by higher numbers on a 24-point scale.

Results

A total of 75 participants of age 41–59 years were recruited in the study wherein the majoritywas females (74.3%) Table 1. The median andinterquartile range for age, NPRS, RMDQ, FABQ-total score, FABQ-PA, FABQ-W, Minibest test, and BPS is represented in Table 2. There was a low positive correlation of FABQ total score with pain (r = 0.432, P = 0.000),functional performance (r = 0.483, P = 0.000), and low negati ve correlation with dynamic balance (r = −0.424, P = 0.000). The FABQ-totalscore showed a moderate positive correlation withdisability (r = 0.537, P = 0.000) in chronic Pelvic Girdle pain patients Table 3 .Further analysis revealed that there was a moderate correlation of FABQ-PA with pain (r =0.538, P = 0.000), dynamic balance (r = −0.514, P = 0.000), disability (r = 0.574, P = 0.000), and low correlation with functional performance (r = 0.495, P = 0.000). A low correlation of FABQ-W with functional performance (r = 0.413, P = 0.000) and disability (r = 0.442, P = 0.000) was observed Table 3.

Discussion

The results of the present study revealed a positive correlation of FABQ with pain and functional performance and a negative correlationwith dynamic balance. Nava– Bringa Pelvic Girdle s *et al*. in their study stated that there is astrong positive relationship between pain severity and high beliefs score and functional disability in chronic pain patients[17]. A similar cross-sectional study by Lee and Park reported that there was a significant correlation between the measures of physical capacity and FABQ-W and in addition, they reported an increase in pain is related to higher scores on the FABQ-P, thus leading to less activity, which further contributed to the severity of pain.[18] A study done in 2020 by Salama *et al*. aimed to determine the predictors of beliefs, pain, and disability indices in chronic Pelvic Girdle pain In Pelvic Girdle pain patients, the equilibrium of patients. They reported a strong correlation between FABQ-total score, pain (r = 0.52, P < 0.01) and disability (r = 0.70, P < 0.01) and stated that the patients a high level of fear of movement are more likely to have intense pain

and disability[19]. Thus, causing delayed contraction of trunk muscles, resulting in reduced stiffness of the spineat the time of initiation of movement and giving rise to instability another study reported that during quiet standing postural sway decreases because of trunk stiffening strategy or ankle strategyand postural stability decreases during standing on foam in chronic Pelvic Girdle pain patients when compared to healthy individuals.[21] *ET al*. in 2015 reported that the subjects with low back pain (LBP) had increased sway pattern when compared to healthy individuals. When balance is challenged, the Pelvic Girdle pain patients use more contraction and less cognitive control compared to healthy individuals[22]. In the current study, a moderate correlation was found between fear avoidance beliefs and BPS. A study by Panhale *et al*. in 2017 reported a significant association between elevated beliefs questionnaire (FABQ) and activity limitation BPS in patients with chronic Pelvic Girdle pain. It was observed that the performance was specifically affected in roll-up, fingertip to floor, and lift test[10]. This observed functional limitation could be because of fear of provoking pain during activity which may affect components of motor processing thus inhibiting the muscle activity[23]. Another study from 2013 reported that the level of performance shown by elders with Pelvic Girdle pain was worse than elders without low back pain, especially in the sock test and the pickup test ($P < 0.05$)[24] reason for impairment observed in pickup test and elevated pain could be because of over activation of trunk muscles while performing the activity as there is an abnormal adaptation of these muscles to guard limbs Furthermore, the present study revealed that avoidance behavior leads to limitation of functional performance resulting in disability in chronic Pelvic Girdle pain patients. Crombez *et al*. reported that a moderately significant relation was found between physical and work fear-avoidance behavior and disability[25]. Fear related to pain is associated with the impairment of physical performance and has been reported to increase self-reported disability[26,27]. The study had certain limitations such as small sample size. Furthermore, the study has been conducted in chronic low back pain patients and the findings cannot be generalized for patients the spine is disturbed by rapid movements of the upper or lower with acute low back pain. In the future, studies can be conducted in larger sample size to obtain results that can be generalized to the whole population. Furthermore, correlation can be studied in other lumbar spine conditions.

Table 1: Demographic characteristics of participants

Variables	Frequency (%)
Gender	
Female	56(73.4)
Male	19(26.6)
Marital	1.6
Status Education	
Primary	18 (24.0)
Secondary	22 (29.3)
Graduate	26 (36.0)
Postgraduate	2 (1.3)
Unemployed	28 (37.3)
Employed	46 (61.3)
On leave	1 (1.3)
Socioeconomic status	2 (2.7)
Upper middle	28 (37.3)
Lower middle	11 (14.7)
Upper lower	34 (45.3)

Table 2: Descriptive analysis of variables in pelvic girdle pain patients (n=75)

Variable	Median	IQR
Age	48	41–59
NPRS	6	5–8
FABQ-PA	19	18–24
FABQ-W	33	29–39
FABQ - total	54	45–63
RMDQ	15	12–22
Minibest test score	20	16-20
BPS		

NPRS: Numerical Pain Rating Scale, RMDQ: Roland–Morris Disability Questionnaire, FABQ-PA: Fear-avoidance Beliefs Questionnaire - physical activity, FABQ-W: Fear-avoidance Beliefs

Questionnaire work, FABQ-total: Fear-avoidance Beliefs Questionnaire total, IQR: Interquartile range, BPS: Back Performance Scale.

Table 3: Correlation of Fear-avoidance Beliefs Questionnaire, Beliefs Questionnaire - work and Beliefs Questionnaire total with Numerical Pain Rating Scale, MiniBest test, Back Performance Scale, and Roland–Morris Disability Questionnaire using Spearman's correlation test

Variable	FABQ-PA		FABQ-W		FABQ-total	
	R.	P	R	P	R	P
NPRS	0.538	0.00	0.319	0.005	0.431	0.00
Minibest test score	-0.515	0.00	0.322	0.005	-0.425	0.00
Back performance test	0.495	0.00	0.411	0.00	0.482	0.00
RMDQ	0.576	0.00	0.444	0.00	0.538	0.00

*Level of significance P≤0.05, r: Spearman correlation coefficient.

NPRS: Numerical Pain Rating Scale, RMDQ: Roland–Morris Disability

Questionnaire, FABQ-PA: Beliefs Questionnaire - physical activity,

FABQ-W: Beliefs Questionnaire work,

FABQ-total: Beliefs Questionnaire

Conclusions

This study concludes that beliefs are significantly associated with pain, dynamic balance, functional performance, and disability in chronic Pelvic Girdle pain patients. A multidisciplinary approach is required to plan individualized rehabilitation program for these patients.

Ethical clearance: Taken from institutional human ethical committee MMC/IEC/2021/228,9/3/2021

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Original Article

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Clinical and Haematological Evaluation of Nutritional Anemias in Pediatric Age Group (1–14 years) in Correlation with Biochemical Studies

Sravani Ramaa Modey[1], Lavanya Kanigiri[2], Venkatesh Pettem[3]

[1,2,3]Assistant Professor, Dept of Pathology, Chalmeda Anand Rao Institute of Medical Sciences, Telangana, India.

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Abstract

Introduction: Anemia is a major health problem worldwide more importantly in India, mostly in rural areas. It is one of the leading causes of morbidity and mortality in pediatric age group. The term 'Nutritional anaemia" encompasses all pathological conditions in which the blood haemoglobin concentration drops to an abnormally low level, due to deficiency in one or several nutrients. Iron deficiency is the most common cause of nutritional anaemia worldwide. Folic acid deficiency and vitamin B_{12} deficiency are less widespread. It is important to know the clinical manifestations andhaematological changes in children with nutritional anaemia to define the correct management approach.

Aims and objectives: 1)To study the causes of nutritional anaemia in children

2) Clinical & haematological evaluation of nutritional anaemia in correlation with biochemical studies in children.

Materials and Methods: A 2 years prospective study was done on 100 children with anemia in the department of pathology, Chalmeda Anand Rao Institute of Medical Sciences for a period of 2years from January 2022 to December 2023.

Key words: Hemoglobin, nutritional anemia, Iron deficiency anemia, megaloblastic anemia

Introduction

Anemia is a major public health problem, mostly affecting young children, pregnant and lactating women.[1,2] It is affecting both developing and developed countries with major consequences for human health as well as social and economic development.[3] According to World Health Organization (WHO), globally, the highest prevalence of Anemia is in preschool children (47.4%). In India, 89 million preschool age children are suffering from Anemia.[4] Predominantly affected children are of under 5years age group.[5,6] Thus, India is the highest contributor to child anemia among the developing countries.[7]

Corresponding Author: Lavanya Kanigiri, Assistant Professor, Dept of Pathology, Chalmeda Anand Rao Institute of Medical Sciences, Telangana, India.

E-mail: lavanyakanigiri22@gmail.com

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The most common cause of anemia in developing countries is nutritional.[4] The term 'Nutritional anemia' encompasses all pathological conditions in which the blood hemoglobin concentration is abnormally low, due to a deficiency in one or several nutrients. The main nutrients involved in the synthesis of hemoglobin are iron, folic acid, and vitamin B12.[8] Besides these, other nutrients such as B2 (riboflavin), B6 (pyridoxine), vitamins A, E, D and C also play key role in formation and protection of red blood cell (RBC) by stimulating stem cells as well as by activating a number of antioxidant enzymes. Copper, Cobalt and nickel are essential trace elements with significant impact on the processes of haematopoiesis—stimulation of erythropoietin production and haemoglobin synthesis[9] and all these deficiencies are associated with childhood anemia. Longitudinal studies consistently indicate that anemic children in infancy continue to have poorer cognition, school achievement and more behavior problems into middle childhood.[10]

This study was conducted as effective control of this problem can be achieved by health care providers who should have a comprehensive understanding of the etiologic factors associated with nutritional anemia, clinical presentation and biochemical studies.

Aims and Objectives: 1) To study the causes of nutritional anaemia in children

2) Clinical & haematological evaluation of nutritional anaemia in correlation with biochemical studies in children.

Materials and Methods

The present study was conducted in the department of pathology, Chalmeda Anand Rao Institute of Medical Sciences for a period of 2 years from January 2022 to December 2023 on 100 subjects in the age group of 1 – 14 years with anemia and also those who presented with other complaints but were incidentally found to have anemia. Informed consent was taken from all the parents of patients.

A detailed clinical history of each patient was recorded and a thorough clinical examination was performed. Venous blood was collected with aseptic precautions in EDTA anticoagulant for hematological investigations. Separate blood sample was collected for biochemical investigations. Serum was separated on the same day of blood collection and stored in refrigerator between 2 to 8 degree centigrade. Biochemical study was carried out within three days of blood collection.

The hematological investigations were performed on Sysmex-XN 1000 with standard calibration using fresh whole blood. As a part of CBC, red blood cell indices (MCV, MCH, MCHC), PCV, RDW, white blood cell count and platelet count were obtained.

Peripheral blood smear study was performed on each of these patients. A good peripheral smear was made and the blood film was stained by Leishman's stain.

Among microcytic hypochromic anemias, iron deficiency anemia was diagnosed by serum iron, serum ferritin and TIBC estimation. Serum iron and TIBC were estimated by established method. Serum ferritin was determined by Chemiluminiscent immune assay (CIA). Vitamin B12 and folate assays were done in the patients with peripheral blood picture of macrocytic anemia or dimorphic anemia.

Results

Of the 100 children, females were found to be more anemic compared to male children. Maximum number of patients belong to age group of 1 – 5yrs and least were found in 12- 14yrs. There is no significant association between sex and age Table 1 shows age and gender distribution of cases.

In the present study of 100 children, 18 children had mild anemia, 45 children had moderate anemia, 37 children had severe anemia. Figure 1 shows distribution of cases according to severity of anemia.

Most of the patients presented with complaints of fever (61%), followed by weakness (48%), cough (34%), diarrhea (16%), SOB (12%), H/O pica (9%), vomitings (7%) and knuckle pigmentation (3%). Table 2 shows clinical presentation of cases.

The peripheral smear pattern in this study showed that maximum patients were having microcytic hypochromic anemia (71%), followed by dimorphic anemia (15%), macrocytic anemia (9%) and least patients were having normocytic normochromic anemia (5%)

The most common underlying cause of nutritional anemia in the study sample found to be due to iron deficiency (76%), followed by mixed deficiency (15%), vitaminB12 deficiency (6%) and folic acid deficiency (3%).Table 3 shows spectrum of nutritional anemias.

Biochemical studies of serum iron, ferritin and TIBC were performed in children with microcytic anemia and dimorphic anemia. Serum iron and TIBC were found to be normal in 8 cases of iron deficiency anemia out of 76 children. Mean serum iron and ferritin values were found to be decreasing in children with mild, moderate and severe anemia. Mean TIBC value was found to be increasing with severity of anemia.There is significant association between severity and serum iron studies with a p value <0.05 15 children with dimorphic anemia were having low levels of both serum iron studies and vitamin B12 with normal folic acid levels.

Vitamin B12 and folic acid assays were done in children with macrocytic anemia. Only 3 of them were having folic acid deficiency with a mean of 2.26ng/ml and 6 children have vitamin B12 deficiency. The mean vitamin B12 value was found to be decreasing with severity of anemia Table 4 shows mean values of serum iron, ferritin, TIBC, Vitamin B12 in relation to severity of anemia.

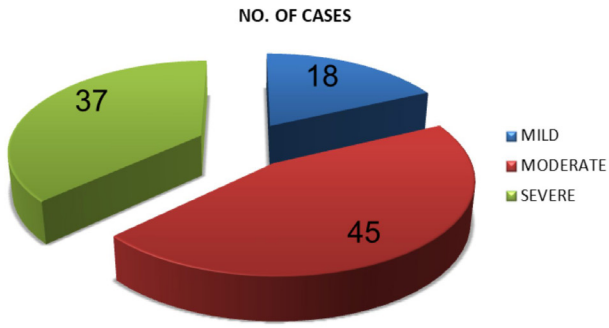


Figure 1: The pie diagram for distribution of cases according to severity of anemia

Table 1: Age and Gender Distribution of Cases

AGE(in years)	MALES (%)	FEMALES (%)	TOTAL	P value
1 – 5	33 (70.21)	29 (54.71)	62	0.259
6 – 11	9 (19.14)	17 (32.07)	26	
12 – 14	5 (10.6)	7 (13.2)	12	
TOTAL	47(100.00)	53 (100.00)	100	

Table 2: Clinical Presentation of Cases

Clinical findings	Total number of study Subjects	Number of patients (%)
Fever	100	61 (61.00)
Weakness	100	48 (48.00)
Cough	100	34 (34.00)
Diarrhoea	100	16 (16.00)
SOB	100	12 (12.00)
H/O pica	100	9 (9.00)
Vomitings	100	7 (7.00)
Knuckle pigmentation	100	3 (3.00)

Table 3: Spectrum of Nutritional Anemias

Type of Nutritional anemia	No. of. cases (%)
Iron deficiency anemia	76 (76%)
Megaloblastic anemia (vitamin B12 deficiency)	6 (6%)
Megaloblastic anemia (folic acid deficiency)	3 (3%)
Mixed deficiency(iron and vitamin B12)	15 (15%)
Total	100 (100.00)

Table 4: Mean values of serum iron, ferritin, TIBC, Vitamin B12 in relation to severity of anemia

SEVERITY	S. iron	TIBC	S.ferritin	Vit.B12
Mild	44.06	407.24	12.52	NA
Moderate	24.76	429.85	11.37	96.5
Severe	18.92	482.76	5.60	91.75

Discussion

Anemia is considered the most prevalent nutritional deficiency globally, affecting about a quarter of the world population, especially children.

Nutritional anemia is a big problem in India with major consequences not only on the morbidity and mortality in children but also affects their growth and intellectual development. The present study is a prospective study done over a period of 2 years.

I00 children of age group 1 – 14 yrs were studied and divided into 3 groups,1- 5yrs, 6 – 11yrs, 12 – 14yrs of age. Maximum number of patients belong to age group of 1 – 5 years and least were found in age group of 12 – 14years.Female children were more affected compared to males. Our study was close to studies of Nasera Bhatti et al [11,] Venkatesh G et al [12,] Reddy BA et al [13.]

In the present study, maximum patients on eliciting the clinical presentation were found to be having fever, followed by weakness. In contrast, maximum patients in the study carried out by Ramana Sastry[14], presented by weakness (81.8%), followed by fever (40.9%). Pallor can be a helpful diagnostic clue.

Peripheral smear examination showed microcytic hypochromic anemia(figure 2) in 71% children, dimorphic anemia blood picture(figure3) in 15%, macrocytic anemia blood picture(figure4) in 9%. Least number of patients was having normocytic normochromic anemia (5%).

The present study was in similarity with the study done by Ramana sastry[14] who found microcytic hypochromic anemia(81.8%) as more common in children followed by dimorphic anemia (9.09%) and normocytic normochromic anemia (9.09%).

The similar study was also shown by Venkatesh G et al[12] which showed that maximum children were having microcytic hypochromic anemia (54.4%), followed by dimorphic anemia(33.6%), and macrocytic anemia blood picture (9%).

In contrast, another study conducted by Deeksha Kapoor et al[15] found maximum number of children had dimorphic anemia blood picture (37.1%) followed by microcytic hypochromic anemia blood picture (33.9%)

The most common cause of anemia in this study is iron deficiency followed by mixed deficiency, vitamin B12 and folic acid deficiency.

Similar study conducted by Ramana sastry[14] found maximum cases of irn deficiency anemia (72.7%) followed by megaloblastic anemia(18.1%).

The studies of Nasera Bhatti et al[11] and Venkatesh G et al [12] were in accordance with our study. Globally, 50% of all anemias can be attributed to iron deficiency. It is the most common type seen in children below 2 years of age. Late weaning was the most important predictor of iron deficiency anemia in these children.

In this study of 100 children with nutritional anemia, the final diagnosis was made mainly by biochemical studies.

76 children were having pure iron deficiency anemia with mean values of serum iron, TIBC, serum ferritin as 27.15 µg/dl, 442.2 µg/dl, and 9.71ng/ml respectively. Similar observations have been in the study of Abdus Sattar Khan et al[16] with mean values 46 µg/dl, 453.5µg/dl and 8.5 ng/ml respectively.

Serum ferritin was the only reliable and sensitive haematological parameter for diagnosis of iron deficiency anaemia. It was more precise and sensitive as compared to serum iron, TIBC for detection of iron stores.

15 children with dimorphic anemia were having mixed deficiency with decreased serum ferritin and vitamin B12 levels 6 children were having vitamin B12 deficiency with mean vitamin B12 value of 93.33pg/ml and 3 were having folic acid deficiency with a mean value of 2.26ng/ml.

The study conducted by Mustafa Taskesen et al[17] on 134 children showed that the mean value of vitamin B12 was 69.4pg/ml and that of serum folate was 2.3ng/ml.

These observations are in accordance with present study.

In patients with megaloblastic anemia (figure 5), bone marrow aspiration shows megaloblastic changes in the erythroid and myeloid cell lines, asynchronous nuclear-cytoplasmic maturation, and giant metamyelocytes.In our study, 2 patients underwent bone marrow aspiration and in all of these cases megaloblastic changes and hyperplasia in the erythroid line were observed.

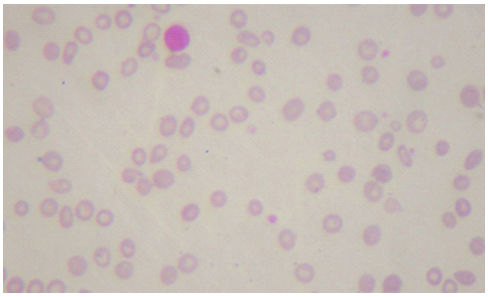


Figure 2: Microcytic hypochromic blood picture leishman stain (100x)

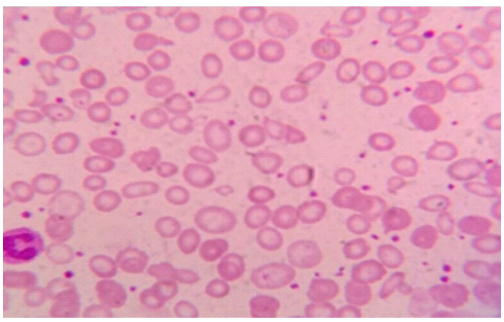


Figure 3: Dimorphic blood picture leishman stain (100x)

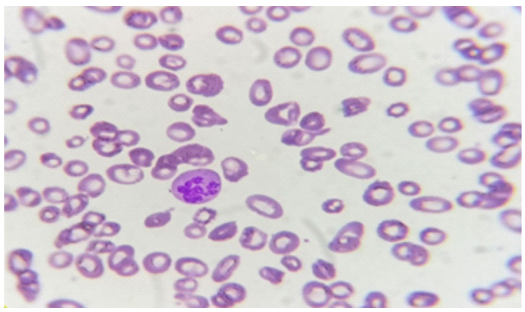


Figure 4: Macrocytic blood picture leishman stain (100x)

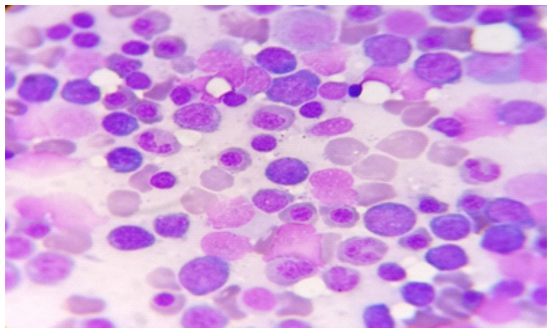


Figure 5: Bonemarrow picture of megaloblastic anemia leishman stain (40x)

Conclusion

Despite the modern diagnostic advances, pediatric anemia still remain under-reported and inadequately investigated, especially when mild, thereby necessitating evaluation of even mild anemias in this population. Estimation of serum Iron, Ferritin, TIBC levels, Vitamin B12 and Folic acid are very important in diagnosing the cause of nutritional anemia and also in differential diagnosis. Confirming the type of nutritional anemia is critical to direct the investigation for profiling the etiology since it is well known that the treatment of anemia goes a long way in improving the overall outcome and quality of life.

Ethical Clearance: This study was reviewed and approved by Institute Ethics committee, CAIMS, Karimnagar (Ref.No: IEC/CAIMS/2022/012 and Dated 03/01/2022)

Conflict of Interest: Nil

Source of funding: Self

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Original Article

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Inflammatory Markers in Expectant COVID-19 Positive Patients: A Relationship with Clinical Severity in a Tertiary Care Referral Facility

Sumangali Thirunavukkarasu[1], Poornima Chinnapa[2], Lathamaheswari Subbaiyan[3], Murali Alagesan,[4] Karthikeyan Shanmugam[5]

[1]Associate Professor, Department of Obstetrics and Gynecology, [2]Associate Professor, Department of Obstetrics and Gynecology, [3]Professor and Head, Department of Obstetrics and Gynecology, [4]Professor, Department of General Medicine and Head of Infectious Diseases, [5]Professor, Department of Social and Preventive Medicine, PSG Institute of medical sciences and research, Peelamedu, Coimbatore, Tamilnadu, India.

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Abstract

Background: SARS-Co-V2 infection which was declared as a pandemic by the WHO has caused significant impact on morbidity and mortality to the mother and the fetus, especially the delta variant of the COVID-19. Hence it is important to identify the subgroup of women who are prone to adverse complications and prevent maternal and perinatal mortality. Inflammatory biomarker is one such tool to identify the high-risk expectant mothers.

Methods and Results: A total of 158 patients were identified in this retrospective study and they were classified based on the clinical signs and symptoms as per the society of maternal fetal medicine. 96.2% belonged to the non-severe group and 3.8% belonged to the severe infection group. Cough and fever were the most common symptoms. Inflammatory markers which were done on admission were correlated with the clinical disease severity. The difference in mean values of CRP, LDH and ferritin between the severe and non-severe group was significant statistically. The markers IL-6 and d-dimer were raised but did not correlate with disease severity. Neutrophil lymphocyte ratio (NLR) calculated from the blood counts was abnormal in all the patients in the severe group and statistically significant. Overall, the maternal outcome was good and maternal mortality rate was 1.89% (3/158). Neonatal outcome was good with stillbirth rate of 3.16% which was higher when compared to non-covid stillbirth rates (0.5%).

Conclusion: inflammatory biomarkers like CRP and LDH are sensitive in predicting the adverse maternal fetal outcome. NLR is a simple ratio that has a good positive predictive value in identifying the need for more vigilant monitoring in expectant COVID-19 positive patients.

Keywords: COVID-19 in pregnancy, inflammatory markers, C-reactive protein, Neutrophil Lymphocyte ratio(NLR), Stillbirth.

Corresponding Author: Sumangali Thirunavukkarasu, Associate Professor, Department of Obstetrics and Gynecology, PSG Institute of Medical Sciences and Research, Coimbatore.

E-mail: drsumangali@hotmail.com

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Introduction

SARS-CoV2 which causes coronavirus disease (covid-19), a respiratory infectious disease is a novel coronavirus discovered in 2019. It was first reported in December 2019 in Wuhan: China[1]. The disease soon spread globally and was declared as a pandemic by the WHO.[2] Pregnancy is regarded as a high-risk state in the context of infectious diseases, as the immunological changes in pregnancy may increase the susceptibility to infection. The novel coronavirus did not cause much impact on pregnancy during the first wave , whereas the second wave with a predominant delta variant has caused a significant impact on pregnant women leading to increased mortality and morbidity to both mother and the fetus. Hence identifying the disease severity and its correlation with the blood markers will help us deal with COVID-19 patients and improve our treatment methods in the future.

Aims and objectives:

1. Identification and classification of pregnant COVID-19-positive patients according to the disease severity based on the symptoms and signs.
2. Correlation of the clinical severity of the disease with relation to the rise in inflammatory markers.

Materials and Methodology

The study was a retrospective observational study and included all pregnant women who were tested COVID-19 positive by RT-PCR and admitted to our hospital which is a tertiary care center and a district referral center for COVID-19 patients. The study included the patients admitted between the period of March 2021 and August 2021. Ethical committee approval to carry out the study was obtained from the institutional ethics committee. (21/253).

The patients were listed from the hospital information system and the patient details such as name, age, parity, gestational age, symptoms if present on admission, and examination findings at admission were collected from the patient information system in the hospital database. The patients were classified according to disease severity based on admission findings into asymptomatic, mild, moderate, severe, and critical as per Society of maternal-fetal Medicine (SMFM)guidelines.[3]

- Asymptomatic disease or presumptive infection is defined as a positive COVID-19 test result with no symptoms.
- Mild disease is defined as flu-like symptoms, such as fever, cough, myalgias, and anosmia without dyspnea, shortness of breath, or abnormal chest imaging.
- Moderate disease is defined by evidence of lower respiratory tract disease with clinical assessment (dyspnea, pneumonia on imaging, abnormal blood gas results, refractory fever of 39.0 C /102.2 F or greater not alleviated with acetaminophen while maintaining an oxygen saturation of greater than or equal to 94% on room air at sea level.
- Severe disease is defined by a respiratory rate greater than 30 breaths per minute (bpm), hypoxia with oxygen saturation less than 94%, a ratio of arterial partial pressure of oxygen to a fraction of inspired oxygen of less than 300, or greater than 50% lung involvement on imaging.
- Critical disease is defined as multi-organ failure or dysfunction, shock, or respiratory failure requiring mechanical ventilation or high-flow nasal cannula.

Inflammatory markers like ferritin, CRP, LDH, and IL-6 which were sent on the day of admission were noted. NLR (neutrophil-lymphocyte ratio) which is easily available from the complete hemogram by dividing the absolute neutrophil count and the absolute lymphocyte count was also included as a biomarker in the study. Blood collection was performed by peripheral venipuncture, in which 10 mL of blood was collected for analysis. D-dimer was measured using the Enzyme-Linked Fluorescent Assay (ELFA) technique, while CRP was measured by turbidimetry. Ferritin was measured using the electro-chemiluminescence technique. The normal values for these biomarkers were taken as per the reference range given by our NABL-accredited laboratory. The patients were followed up till discharge and the maternal outcomes were tabulated in the Excel sheet. If the pregnancy was terminated, then the mode of delivery and fetal outcomes were included in the study.

The correlation between the rise in inflammatory markers and the disease severity was analyzed. Statistical analysis was done using the chi-square test and t-test and a P value of < 0.05 was considered significant.

Results

A total of 158 patients were included in the study who were tested positive for COVID-19 and admitted to the obstetrics and gynecology department between March 2021 and August 2021. The patients were in the age group ranging from 20 and 38 years with a mean age of 27.7 (SD 4.26). Primigravida constituted 56.3% whereas multigravida was 43.6% of the total. The gestational age of these women ranged between 6 weeks to 40 weeks with a mean gestational age of 30 weeks (SD - 8.61). Of them, 65.8% of women were in the third trimester 25.3% were in the second trimester of pregnancy. 8 patients were in the first trimester and two were ectopic pregnancies (Table 1) On analysis of the symptoms present at admission, the most common symptoms present were cough (48.7%) followed by fever (41.8%) and others as shown in Fig 1

Patients were classified according to SMFM guidelines according to the symptoms and signs present at admission. The classification and number of patients in each group are shown in Table 2. Asymptomatic, mild, and moderate were regrouped into the non-severe infection group (96.2%), and severe and critical were grouped into the severe infection group (3.8%). High-resolution Computerized tomography (HRCT) was done in 21(13.3%) of the patients. It was done only in patients who had saturation falls or required ICU admission as per hospital protocol. A total of 10 (6.32%) patients were admitted to ICU and intubation was needed for 4 of them. 17(10.7%) patients required oxygen support via mask or NIV, 35(22.2%) received steroids and remdesivir was given to 18 (11.4%) of the patients as per hospital protocol.

Inflammatory markers which were sent on the day of admission were collected and analyzed. The mean value of C Reactive protein which is one of the important acute phase inflammatory markers was compared between the severe infection group and non-severe infection group. The mean CRP in the severe group was 11.2 with an SD of 8.77 and the mean value in the non-severe group was 1.65 with an SD of 2.75 and the difference was statistically significant. (P < 0.001). table 3

Ferritin level which is also an acute phase reactant was analyzed and the mean value among the non-severe group was 86.3 and among the severe group was 208.6 and the difference in mean values is statistically significant. (P = 0.006). The values of LDH among the severe group were raised significantly, the mean being 483.2 and the mean LDH among the non-severe group was 244.3 and the difference is statistically significant (<0.01).

The difference in mean values of Interleukin-6 and d-dimer was not statistically significant between the two groups. The mean values of all the inflammatory markers in severe and non-severe groups along with standard deviation and P values are shown in Table 3.

The neutrophil-lymphocyte ratio, which was calculated from the complete hemogram, was abnormal in all the patients in the severe group. The mean neutrophil-lymphocyte ratio (NLR) in the non-severe group was 4.35 and in the severe group, it was 10.41. Considering the normal NLR in pregnancy as </=3, normal and abnormal NLR was tabulated in a 2x2 table between the severe and non-severe group, and it was found that all the patients in the severe group had abnormal NLR as shown in Table 4.and the difference was statistically significant (P - 0.014)

Regarding the pregnancy outcome 76 patients out of the 158 delivered during the admission period. 64 patients had cesarean section and 12 patients delivered vaginally. Intrauterine fetal demise was seen in 5 cases (3.16%). There were no associated comorbidities in all these cases. Neonatal outcome was good in the rest of the cases.

Overall Maternal outcome was good with a mortality rate of 1.89%. There was no mortality in the non-severe group and three out of six patients had mortality in the severe group as shown in table 5. The other three patients in the severe group had a good outcome (recovered) after a prolonged stay in the ICU and all required steroids, remdesivir, oxygen, and ventilator support.

Table1: Characteristic distribution of pregnancy with COVID-19

		N	Percentage %
Maternal age	< or = 20	6	3.79%
	21 to 25	42	26.58%
	26 to 30	72	45.56%
	31 to 35	26	16.45%
	36 to 38	12	7.59%
Mean age	27.7	4.263(SD)	
Parity	Primigravida	89	56..35
	Multigravida	69	43.65
Gestational age	First trimester	8	5.06%
	Second trimester	40	25.3%
	Third trimester	110	69.6%
Maternal co-morbidities	Preeclampsia &hypertension	7	
	Anemia	12	
	Diabetes	24	
	APLA	2	
	Heart disease	2	
	Hypothyroid	13	
	Bronchial asthma	2	
	Obesity	2	
	Twins	3	
	Ectopic	2	

Table 2: Classification of COVID-19 patients as per society of maternal fetal medicine guidelines

Classification	SMFM classification	N	Percent%
Non severe	Asymptomatic	47	29.7
	Mild	87	55.1
	Moderate	18	11.4
		152	96.2
severe	Severe	4	2.5
	Critical	2	1.3
		6	3.8
	Total	158	100.0

Table 3: Inflammatory markers in severe and non-severe group

Inflammatory marker	Mean value in non-severe group(152)	Standard deviation	Mean value in Severe group(6)	St.andard deviation	P Value
CRP	1.656	2.75	11.23	8.77	<0.001 *
Ferritin	86.27	100.53	208.6	197.26	0.006 *
LDH	244.32	122.27	483.17	178.97	<0.001*
IL-6	43.48	243.58	83.71	91.71	0.688
D DIMER	1.93	1.77	2.50	1.20	0.439

Table 4: Neutrophil lymphocyte ratio (NLR) in severe and non-severe covid-19 pregnant women

Classification	Normal NLR (</= 3)	Abnormal NLR(>3)
Severe group (N=6)	0	6(100%)
Non-severe group (N=152)	78(51.3%)	74 (48.6%)

P = 0.014*

Table 5: Maternal and fetal outcome

Classification	No complication	Complication requiring ICU	Maternal death	Intrauterine fetal death	Neonatal death
Non-severe	147	5	0	4	nil
Severe	0	6	3	1	nil

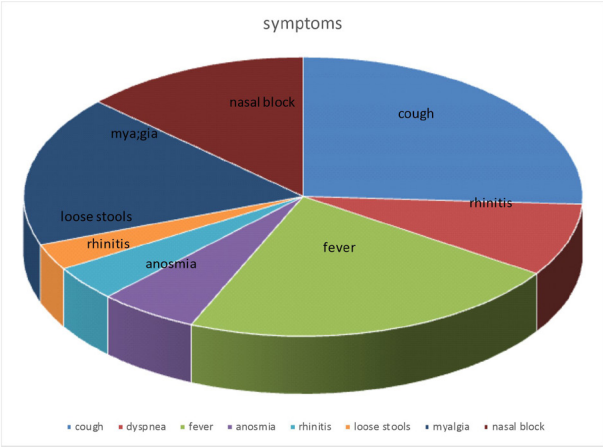


Figure 1: symptoms present on admission.

Discussion

Pregnant patients are more vulnerable to all kinds of infection just like elderly, immunocompromised, and cancer patients. Immunological changes in pregnancy may increase the susceptibility to infections and their associated complications.[4] The management of COVID-19-infected pregnant women has been a challenge for the treating obstetricians. Pregnant women infected with COVID-19 are more prone to develop respiratory failure and obstetric complications like miscarriage, preterm delivery, fetal growth restriction, and intrauterine death.

It is important to identify the women who are likely to develop such complications. During the pandemic, certain inflammatory biomarkers in addition to clinical assessment helped for risk stratification.

C Reactive protein is an acute phase serum reactant and its concentration rapidly increases in response to tissue trauma and inflammation.[8].In the present study, among the inflammatory biomarkers CRP, LDH showed a statistically highly significant P value ($p<0.001$) in correlating the severity of the disease which was similar to the study done by Andrea et al,[9] which concluded that C Reactive protein is the inflammatory biomarker that better mirrors the course of the disease whereas d-dimer and ferritin are not reliable predictors of the poor outcome. Similarly in the study done by Lili et al,[10] various biomarkers were compared between asymptomatic, mild, and severe groups. The only variable that had significant differences between the groups was C-reactive protein. In the study done by Kim et al,[6] among the tests performed immediately after hospitalization, the maternal serum ferritin and CRP levels showed statistically significant differences between the two groups with higher levels in the group with adverse outcomes. They concluded that an increase in CRP or ferritin levels indicates a high possibility of adverse outcomes and therefore an active treatment plan should be established in such cases.[6,10]

Ferritin is an intracellular protein, that has a pivotal role in immune dysregulation. Hyperferritinemia has been associated with higher disease severity and adverse clinical outcomes in COVID-19, including mortality. In a cross-sectional study done in northern Brazil, the concentrations of D-dimer ($p = 0.0122$) and ferritin ($p \leq 0.0001$) were significantly higher among pregnant women with COVID-19, especially among those hospitalized in the ICU.11 Similar to this finding we had a mean ferritin level of 86.2 in the non-severe group whereas the mean ferritin in the severe group was 208.6 p value - 0.006. This was supported by the research done by Lili et al and

Kim et al 6,10 which concluded that ferritin and CRP levels are associated with poor prognosis and can predict adverse outcomes in women with COVID-19.

D dimer acts as a global indicator of coagulation and activation of the fibrinolytic process. As the activity of plasmin increases in the blood, an increase in d-dimer levels is observed.[12,13]In a systematic review done by Mehrdad Rostami et al, they concluded that D-dimer concentration in the early stages of COVID-19 disease in the general population, a 3 to 4-fold increase is linked to poor prognosis.[14] Another meta-analysis and systematic review done by Muhammad et al showed pooled results of all studies revealed that D-dimer concentrations were significantly higher in patients with more severe COVID-19 disease.[15] Although few studies found a positive correlation between increased d dimer with poor prognosis for the patients, most of the studies show that d dimer is not reliable, as the specificity of D dimer is significantly reduced during pregnancy.[13,16], which is evidenced by the study done by Merve et al [12] where there was no significant difference in D-dimer levels when it was compared with pregnant patients with covid-19 and those without the disease. Similarly, a study done by Andrea et al [9] concluded that d-dimer and ferritin are not reliable predictors of poor outcomes. Hence D-dimer cannot be used as a poor prognostic criterion in pregnant women with COVID-19 infection. Similarly, in our study, the mean D-dimer values between the severe and non-severe groups were almost similar and the P value was not statistically significant.

COVID-19 infection seems to have an impact on the cytokine profile of pregnant women varying according to pregnancy trimesters and cytokine levels seem to be correlated with disease severity. Atakanel al[17] in a prospective study found Statistically significant positive correlations for IFN γ and IL-6 with disease severity ($r = 0.41$ and $p < 0.001$ for IFN γ and $r = 0.58$ and $p < 0.001$ for IL-6). In our study, though there is a significant rise in the levels of IL-6 in COVID-19 pregnant women, there is no statistically significant difference between the increase in severe and non-severe groups. (p-value - 0.688)

The neutrophil-to-lymphocyte ratio, calculated as a simple ratio between the neutrophil and the lymphocyte counts measured in the peripheral blood, is a biomarker that conjugated two faces of the immune system. It is a marker of inflammation that predicts the severity and mortality due to disease at hospital admission. It has also been suggested that it can predict endothelial damage associated with inflammation.[18] NLR is the most significant factor in the incidence of disease severity and has a significant predictive value. In a study done by Dorina Supak et al,[19] statistical analysis showed that NLR values were significantly higher in patients with fatal COVID-19 compared to those who survived the disease. The advantage of the usage of the NLR as a marker of COVID-19 severity is that it can be easily applied in low-resource settings.

In our study, we found that NLR levels of all the patients in the severe group who were critically ill were abnormal and the values were significantly higher than the patients in the non-severe group. These findings were similar to the study done by Xu et al[20] who concluded that NLR and procalcitonin levels in severe and critically ill patients were significantly higher in patients with moderate symptoms. A study conducted by Eke et al[21] found that an increase in NLR was an independent risk factor for the need for ICU care. The study obtained a cut-off value of >5.3 in predicting the need for ICU care (with 72.7% sensitivity and 91.1% specificity). They concluded that NLR in COVID-19 patients is a cheap, fast, easy, and very reliable test in determining the severity of SARS-CoV and predicting the need for ICU care.[21,22]

In our study though the rate of ICU admission was higher (6.35%) when compared to the literature, the maternal mortality rate was almost similar (1.89%) In a large comprehensive literature review by Ernesto Antonio et al(8 studies including 10966 cases) maternal ICU admission was 3.7%, respiratory support was required in 5.25%, and 1.13% maternal mortality rate overall.[23] Overall covid 19 infections during pregnancy does not seem to be worse than in the general population but the rate of ICU admission was slightly higher (1.5% vs 0.9%) The need for mechanical ventilation was not higher as compared to non-pregnant women.

Stillbirth is a recognized complication of COVID-19 in pregnant women that has recently been demonstrated to be caused by SARS-CoV-2 infection of the placenta. Multiple global studies have

found that massive perivillous fibrin deposition, chronic histiocytic intervillositis, and trophoblast necrosis,collectively termed SARS-CoV-2 placentitis, can cause severe and diffuse placental parenchymal destruction that can affect >75% of the placenta, effectively rendering it incapable of performing its function of oxygenating the fetus and leading to stillbirth and neonatal death via malperfusion and placental insufficiency.

In the study done by Carla L. DeSisto et al,[24] in the United States, women with COVID-19 were at increased risk for stillbirth compared with women without COVID-19 (adjusted relative risk [aRR] = 1.90; 95% CI = 1.69–2.15). The magnitude of association was higher during the period of SARS-CoV-2 B.1.617.2 (Delta) variant predominance than during the pre-Delta period. The rates of stillbirth in women without COVID-19 at delivery in this analysis (0.64% overall) were similar to the known pre-pandemic stillbirth rate of 0.59%.[25] However, 0.98% of COVID–19 affected deliveries pre-Delta and 2.70% during the Delta period resulted in stillbirth. The rate of stillbirth or intrauterine demise in the present study is 3.18%. Analysis of the placenta of these fetuses shows extensive maternal vascular malperfusion in all cases and acute deciduitis and intervillous thrombus in two of the five cases. It shows the thromboembolic enhancing effect of covid 19 as the cause of intrauterine demise in such cases. In a large study done in Belgium the stillbirth rate was 9.5%. among them, 17.4%(4/23) were certainly attributable to SARS-CoV infection.[26]There is now mounting evidence that SARS-CoV-2 infection and adverse fetal events are associated.[24,26]

Conclusion

To conclude, in our study significant elevation of CRP, LDH, and ferritin was seen in both groups with high significance in the severe group. The results imply that even in the non-severe group elevation of these markers indicates a high probability of adverse outcomes irrespective of the symptoms. Hence it is prudent to be more vigilant in monitoring and treatment of these patients. Also, there is enough evidence that SARS-CoV causes perinatal mortality, hence it is prudent to monitor and treat the pregnant patients with this infection more closely.

Conflict of interest: none

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Ethical clearance: obtained from the institutional ethics committee PSG Institute of medical sciences and research, (ethical approval number 21/253)

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Original Article

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A Retrospective Analysis of Assault Admissions at a Regional Medical College in Jharkhand: Examining Factors that Impact Patient Outcome

Sumegha Rana[1], Vivek Bhasker[2], Rishabh Kr Rana[3], AK Choudhary[4], Dharmendra Kumar[5]

[1]Assistant Professor Department of Surgery, S.B.M.C.H., Hazaribag, [2]Assistant Professor Department of Surgery, S.B.M.C.H., Hazaribag, [3]Assistant Professor Department of community medicine, SNMMCH, Dhanbad, [4]Associate Professor Department of Surgery, S.B.M.C.H., Hazaribag, [5]Assistant Professor, Dept of Physiology, LCMCH, Palamu.

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Abstract

Background: Assault admissions pose a significant burden on healthcare systems worldwide. Understanding factors influencing surgical intervention for assault victims can improve resource allocation and patient care. This study aims to analyze a large dataset of assault admissions at a regional medical college to identify factors associated with surgical management.

Methods: We conducted a retrospective analysis of admissions at Sheikh Bhikhari Medical College (SBMCH), Hazaribag, Jharkhand India, between Jan 2023 and December 2023. We reviewed data for over 4,000 admissions and identified 1,339 cases admitted due to assault-related injuries. Logistic regression analysis was used to investigate the association between potential predictors (age category, length of stay, time of admission, and gender) and the likelihood of requiring surgical intervention.SPSS v29.0 was used while a p value of <0.05 was considered as of statistical significance.

Result: Assault admissions constituted approximately 30% of the total admissions during the study period. Time of admission significantly impacted the need for surgery. Patients admitted later (off-hours/) had slightly higher odds of requiring referrals. Gender also emerged as a significant predictor. Age category and length of stay did not show statistically significant associations with surgical intervention.

Conclusion: This study highlights the high prevalence of assault admissions and the potential influence of time of admission and gender on surgical management. Additionally, the high referral rate to higher centers suggests a need for increased access to neurosurgical services within the region. The challenge of patients leaving against medical advice (LAMA) warrants further investigation. Future research should explore specific injury types requiring surgery and potential gender differences in assault injuries.

Key words: Hazaribag, Jharkhand, Surgery Admissions, Assault Cases, Regional Medical College.

Corresponding Author: Sumegha Rana, Assistant Professor Department of Surgery, S.B.M.C.H., Hazaribag, Jharkhand.

E-mail: rana.sumegha@gmail.com

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Introduction

Assault, encompassing various forms of interpersonal violence, remains a significant public health concern in India, impacting individuals and communities across diverse demographics. While the national crime rate for assault has shown a slight decrease in recent years, Jharkhand continues to face a concerning prevalence with a 2022 rate of 6.0% [1]. This issue extends beyond individual suffering, contributing to the broader burden of injury and mortality in the state.

Globally, the World Health Organization estimates that 3.2% of homicides per 100,000 population occur in India[2]. Though assault differs from homicide in severity, it often serves as a precursor to more serious violence. Additionally, assault, particularly intimate partner violence (IPV), has been linked to significant psychological and physical health consequences for victims[3].

Global Burden of Disease (GBD) evidence indicates that assault-related injuries contribute to 0.44% of all-cause mortality in India, with a decadal annual change of 1.48%[4]. This highlights the increasing burden of assault-related health issues within the country. Further categorizing assault cases reveals a complex landscape. Research by Khurana et al. identifies various types, including interpersonal violence, sexual assault, robbery, IPV, other specified assaults, and even unknown assault types. Understanding this spectrum is crucial for developing comprehensive interventions [5].

Despite the alarming statistics, data on the specific burden of assault patients seeking treatment in government-run medical colleges in India remains limited. This study aims to address this gap by investigating the burden of assault cases at Sheikh Bhikhari Medical College (SBMCH) in Hazaribag, Jharkhand.

The primary objective of this study is to achieve the following

- To measure the extent of assault, we will analyze the frequency of admissions related to assault at SBMCH during a specific timeframe. We will classify these admissions based on the specific type of attack, such as physical or sexual.
- The objective of this study is to provide a comprehensive analysis of the assault population by examining their demographic characteristics, clinical manifestations, and the effectiveness of the treatments they get while being treated for assault-related injuries.
- Assess institutional capability: We will examine the current infrastructure and resources at SBMCH to efficiently handle assault patients. This will involve evaluating any constraints in resources, infrastructure, or psychosocial support services, specifically for individuals who have experienced intimate partner violence (IPV).

Methods

Study Design: This study was a retrospective cohort study conducted at the Department of Surgery, SBMCH, Hazaribag.

Setting: Sheikh Bhikhari Medical College (SBMCH) was established in 2019.It is a full-fledged government medical college affiliated with Vinoba Bhave University, Hazaribag, Jharkhand and recognized by the National Medical Commission (NMC).The college offers a comprehensive Bachelor of Medicine, Bachelor of Surgery (MBBS) program. SBMCH is associated with a 500-bed teaching hospital that provides quality healthcare services to the community.

Participants: All admissions in the surgery ward with a history of assault fulfilling the inclusion criterion . Eligibility/Case definition of study sample. Any case admitted in the surgery ward with assault related injuries mentioned in records.

Inclusion criteria: We retrospectively reviewed manual health records (HRs) of patients admitted to the Department of Surgery at Sheikh Bhikhari Medical College (SBMCH), Hazaribag, India, between January 2023 and December 2023.Wefocussed on patients admitted for assault-related injuries, identified through a thorough review of admission diagnoses and medical history documented in the health records.

Exclusion criteria: Patients admitted to the ortho and gynae ward.

Patients with trauma other than assault.

Data Sources/Measurements:

We accessed the indoor admission registers medical records, to access the data points collected for each patient (e.g., demographics, clinical characteristics, treatment details, outcomes in terms of referral, treatment completed and length of stay.).

Bias: Incomplete data will be left out from the analysis, to ensure chart review bias, we imparted capacity building sessions and pilot the project for testing the internal and external validity of the data collection tool. Once the data was collected before analysis the data was re-identified.

Study Size: We examined 4320 records of admission of which 20 records were not complete. So we had 4300 records identified for analysis.

Quantitative Variables: Age: Measures of central tendency (mean, median) and dispersion (standard deviation) were calculated to describe the age distribution of assault patients.

Length of Stay: Measures of central tendency (mean, median) and dispersion (standard deviation) were used to analyze the duration of hospitalization for assault patients.

Time of Admission: Descriptive statistics were used to describe the temporal distribution of assault admissions by analyzing the time of admission (e.g., daily, hourly). Correlations were checked for using the test of association like Chi Square test.

Result

The total number of admissions included in the analysis was 4300 in the general surgery ward, out of which 59.3% were male patients and 40.7% were females. Among these patients, total cases of assault were 1339, out of which approx 60% were males . Table 1 depicts the result clearly.

Table 1: Details of the Admissions in Surgery Ward (Assault cases Vs Non Assault Cases)

	Gender		Total Admissions	p value
	Female	Male		
Other Admissions	1247	1714	2961	<0.00*
	71.20%	67.20%	68.90%	
Admission with Assault	504	835	1339	
	28.78%	32.76%	100%	
Total	1751	2549	4300	
Percentage out of Total	40.7%	59.3%	100.0%	

Table 2: Various traits of the assault cases like nature of injury, length of stay in hospital, discharge, age cat etc.

		Gender		Total	p value
		Female	Male		
Nature of Injury	Interpersonal assault	104	221	325	<0.01
		20.70%	26.50%	24.30%	
	Robbery	329	525	854	
		65.40%	63.00%	63.90%	
	Others	70	87	157	
		13.90%	10.40%	11.80%	
Outcome	Discharge After Treatment	289	298	487	<0.00
		57.34%	35.70%	36.40%	
	Referred to Higher Centre	147	247	394	
		29.17%	29.60%	29.40%	
	Left Against Medical Advice	68	290	358	
		13.49%	34.70%	34.20%	

Continue.....

Length of Stay in Days	>72 hours	83	128	211	>0.05
		16.50%	15.30%	15.80%	
	>24-<48 hours	96	141	237	
		19.00%	16.90%	17.70%	
	>48 hours <72 hours	87	130	217	
		17.30%	15.60%	16.20%	
	<24 hours	238	436	674	
		47.20%	52.20%	50.30%	
Age Cat	(0-10) Years	58	102	160	<0.05
		11.50%	12.20%	11.90%	
	(11-18) Years	30	55	85	
		6.00%	6.60%	6.30%	
	(19-35) Years	88	131	219	
		17.50%	15.70%	16.40%	
	(36-50) Years	68	107	175	
		13.50%	12.80%	13.10%	
	(51-65) Years	77	114	191	
		15.30%	13.70%	14.30%	
	(>65) Years	183	326	509	
		36.30%	39.00%	38.00%	
Time of Admission (in 24 hours format)	(00-08) hours, Early Morning	192	321	513	<0.05
		38.10%	38.40%	38.30%	
	(09-14) hours , Day time	111	176	287	
		22.00%	21.10%	21.40%	
	(15-20) hours, Evening time	129	198	327	
		25.60%	23.70%	24.40%	
	(21-23.59) hours, Late night time	72	140	212	
		14.30%	16.80%	15.80%	
	Total	504	835	1339	
		37.65%	62.35%	100%	

Males outnumber females in all assault cases and various categories as per above table.

The majority of instances are associated with robbery, with interpersonal violence and other related offenses following suit.

A considerable number of cases led to release following treatment, with a noteworthy component being left without medical guidance. It is worth mentioning that the majority of female patients were released following treatment, whereas male patients were either referred to higher centers or left without medical advice. A smaller number of cases were referred to a more advanced medical facility. Most instances had a duration of stay of less than 24 hours, with comparable proportions observed across various time intervals. The age category with the biggest number of instances is individuals aged 65 years and above, followed by those aged 24 years and 19-35 years.

The periods of early morning and evening exhibit the highest volume of admissions, with midday and late-night periods following suit. (Table 2)

Table 3. A binary logistic regression analysis looking for significant predictors for knowing various traits which might predict the admission as having assault.

	B	p	Unadjusted Odds Ratio	95% C.I. for Odds ratio	
				Lower	Upper
Age Cat	0.021	0.266	1.021	0.984	1.06
Length of Stay in days	0	0.999	1	0.903	1.108
Time_Of_Admission*	0.004	0.005	0.996	1.987	2.005
Gender*	0.186	0.006	1.205	1.055	1.376
Constant	-1.073	<.001	0.342		

A logistic regression analysis examined the probability of being admitted to the surgery ward for assault cases. Predictors were variables such as Age, Category, Length of Stay in days, Time of Admission, and Gender.

Age category plays a significant role in determining the likelihood of admission to the surgery ward for assault cases. With each increase in age category, there is a corresponding increase in the odds of admission. However this was not statistically significant as p >0.05.

The odds ratio (1) suggests that there is no significant alteration in the odds of admission when the length of stay increases, as indicated by a confidence interval ranging from 0.903 to 1.108.

Upon admission, the p-value of 0.004 reveals a significant effect. With each additional unit of time of admission, there is a slight increase in the odds of admission. The confidence interval suggests that this increase could range from 1.987 to 2.005.

Gender does have the likelihood of admission to the surgery ward for assault cases. p-value suggests that this effect is of high statistical significance. (Table 3)

Discussion

Our study delved into the various factors that impact admission to the surgery ward for victims of assault. We employed logistic regression analysis to gain insights into this matter. Although age category and length of stay did not demonstrate any statistically significant associations with admission, it was found that time of admission and gender played crucial roles as predictors. A first of its kind, this study is indigenous and novel in these parts of the country. The study highlights the various facets and resource limitations existing in our teaching hospital. Good number of referral cases does raise some concern regarding the resource crunch and need of trauma centers in this area of Jharkhand.

Admission Time and Surgical Admissions:

It is consistent with prior research that the likelihood of surgical admission increased when patients are admitted later in the day. Research conducted by Bonatti et al 2008 and Barbara's et al 2010 has revealed that trauma admissions are more likely to occur during off-hours and weekends.[6,7] One possible reason for this could be the presence of experienced surgical staff during regular working hours, which may result in more cautious treatment approaches for less severe injuries outside of these hours. In addition, the nature of assault injuries may necessitate additional evaluation and consultations with specialists, which may be less accessible outside of normal working hours.

Gender based outcomes and Surgical Admissions in Assault Cases:

The significant effect of gender on admission warrants further investigation. While the specific direction of the effect (i.e., which gender has higher odds) wasn't mentioned in the current analysis, exploring this aspect could provide valuable insights. Existing literature offers mixed findings on gender differences in assault-related injuries. Studies like Gannon et al 2002 suggest that males are more likely to sustain severe injuries requiring surgery, while others like Joestl et al 2019 report no significant gender differences in terms of admissions but do say likelihood of death and poor outcomes are more with male being the patients.[8,9] Future studies with larger sample sizes and detailed injury data could shed light on these discrepancies and provide a clearer picture of gender disparities in surgical admissions for assault victims. Extensive reviews by Adil et al

2013 have demonstrated gender and racial parity to play an important roles in trauma cases. In depth studies done in Indian scenario are far and few.[10] More exhaustive studies can shed better light on resource settings allocation and devise better policies for better management.

Strengths: With a focus on a large regional sample, this study examines over 4,000 cases, offering a comprehensive dataset that is specific to the region. By focusing on a regional population, the findings of this study can be more easily applied to other individuals within the same region.

Thorough Examination of Assault Admissions: This study surpasses surface-level admission data and explores the intricacies surrounding assault admissions. By conducting thorough research, a deeper understanding of the factors linked to these admissions can be achieved.

Limitations: Without patient follow-up data, it becomes challenging to evaluate long-term outcomes or recovery trends. Details regarding post-discharge complications or support needs may not be included in the data. There is a possibility of incomplete data due to the reliance on manual data collection, which can result in missing entries or incomplete information. Such factors can introduce bias and restrict the accuracy of analysis.

Conclusion

The study uncovered a disturbingly high rate of admissions resulting from assault, with around 30% of patients being admitted due to injuries sustained from acts of violence. In addition, there was a greater number of male assault victims compared to females. There appears to be a possible requirement for specific interventions to address the susceptibility of males to assault in this particular area.

Rising Demand for Neurosurgical Services: The significant number of referrals to higher centers, possibly due to intracranial injuries, emphasizes the crucial need for easily accessible neurosurgical expertise. Equipping medical colleges with neurosurgeons could enhance access to critical care for these patients.

Conflict of Interest: Nil

Source of funding: Self

Ethical clearance: Taken from IEC, SBMCH, Hazaribag Ref no IEC/16/2024 Dated 06/03/2024.

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Original Article

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Period Poverty among Females in Reproductive Age Group of Lucknow: Cross-Sectional Study

Swati Singh[1], Rajesh Kunwar[2], Meghna Athwani[3]

[1]Associate Professor, Department of Community Medicine, T.S. Misra Medical College and Hospital, Lucknow, UP., [2]Professor, Department of Community Medicine, T.S. Misra Medical College and Hospital, Lucknow, UP., [3]Assistant Professor (Statistician), Department of Community Medicine, T.S. Misra Medical College and Hospital, Lucknow, UP

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Abstract

Background: Period poverty or inadequate access of menstrual hygiene and education can be debilitating to women of reproductive age. The objective of present study was to have an insight into period poverty as well as determine association between last-year period poverty, menstrual knowledge and menstrual hygiene management (MHM) with socio-demographic variables.

Methods: This analytical study was cross-sectional in design included females of reproductive age (20-49 years). Study was carried at a primary health centre in urban Lucknow. Data was collected on a pre-validated semi-structured questionnaire. The data was collected and entered in M.S Excel. Chi-square was applied for analysis.

Results: Prevalence of last year period poverty, poor menstrual knowledge and poor menstrual hygiene management was 29.7%, 17.7% and 42.3%, respectively. Significant association exists between period poverty and socio-demographic variables.

Conclusion: Period poverty continues to be a challenging issue among females of reproductive age group. Increasing awareness about menstrual hygiene and MHM practices, and taking action to ensure adequate supply of period product is need of the hour.

Keywords: menstrual knowledge, menstrual hygiene management, period poverty, reproductive age

Introduction

Period poverty means not only inadequate access of safe and hygienic menstrual materials and education, but also inaccessibility to menstrual hygiene management.1-3 It is a neglected public health problem.

According to a report, 500 million females suffer from inadequate access to menstrual materials and

Corresponding Author: Swati Singh, Associate Professor, Department of Community Medicine, T.S. Misra Medical College and Hospital, Lucknow, UP.

E-mail: swati.singh678@gmail.com

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MHM facilities.4 In India, as reported by National Family Health Survey- 5, only 77.3% females between ages 15 to 24 have adequate access to hygienic methods for protection at time of their menstruation period; that is 22.7% females suffer from period poverty.5 Inadequate access to menstrual materials can lead to adverse physical health and emotional wellbeing in females. Many less well-described economic, socio-cultural, and political issues exist in our country that reduce accessibility of menstrual materials.6 In present study, we therefore tried to have an insight into period poverty and determine the association between last-year period poverty, menstrual knowledge, and MHM practice with socio-demographic variables.

Materials and Methods

The present cross-sectional analytical study was under aegis of Community Medicine Department at an affiliated urban primary health centre Saadatganj, Lucknow. The study period was from 2022 November till July 23.

Study population consisted of all the females of reproductive age group between 20-49 years, who came as attendant or patient other than those having any gynaecological ailments. Those who refused to give consent for study and pregnant females were excluded.

Data collection: A semi-structured, pre-validated questionnaire was applied for interview of study participants. Information about socio-demographic determinants, last one-year period poverty, knowledge on menstrual and menstrual hygiene management were covered in the questionnaire. Data included in study comprised of-

Socio-demographic determinants such as the age, religion, area of residence, participant's education, parent's education, participant's occupation and family income.

Last year period poverty considered as inability to afford menstrual products in past one year.7

Menstrual knowledge including knowledge on menstruation before the menarche, age at which menstruation commence, reason for menstruation, menstrual blood source, duration of menstruation, menstrual cycle length, unhygienic nature of menstrual blood and foods that can be avoided during menstruation.8

MHM techniques such as regular genital cleaning after pad change, cleaner applied during menstruation, regular bathing, material that was used, number of times sanitary material was changed per day, menstrual hygiene material was properly disposed and hand washing practise during menstruation.9

Menstrual knowledge and MHM practices were scored on a scale of zero to eight and zero to seven respectively. Subject having menstrual knowledge score of not more than 4 was grouped as poor in menstrual knowledge. Similarly, subject having MHM practices score not more than 4 was grouped into having MHM practice poor.

In present study multi-stage sampling method was used. Of the four health care centres – Chinhat, Malihabad, Kakori and Saadatganj - affiliated for internship training programme, Saadatganj was chosen for the purpose of study, by applying simple random technique of sampling. Study population, that is, females of reproductive age who attended health care centre, were chosen by census method.

For the purpose of study, sample size was estimated using the formula:

$n = 4pq/L2, 10$ where

n= sample size,

p= proportion of population possessing characteristic of interest,

L=absolute error and

$q = (1-p)$

95% confidence interval was considered. Prevalence of period poverty as 27.4%. 5 Taking "L", absolute error in the estimate of "p" 5%, the sample size calculated was 308. Hence, total of 310 females of reproductive age were in the study.

Statistical analysis: The data was collected, entered in Microsoft Excel 2013 and was analysed using version 17.0 of STATA. Categorical variables

presented as frequency and percentage. Association was determined by Chi-square test. P-values < 0.05 were considered statistically significant.

Ethical approval: Study was carried after the approval of Institute ethical committee (Letter no. TSMMC&H/ IEC/ NOV22/61)

Results

The present study revealed that period poverty in last year was present in 29.7 % of participants, 17.7% participants had poor knowledge on menstruation, MHM practice score was poor in 42.3% of participants.

Demographic factor association with last year period poverty, knowledge on menstruation and MHM practice:

In present study most of the participants were in less than 30 years age group. There existed statistically significant association between participants age group with last year period poverty (P- value= 0.000) and poor menstrual knowledge (P- value= 0.032). Last year period poverty and poor menstrual knowledge were significantly higher in Muslim and other religion. Caste had no association with last year period poverty, menstrual knowledge and MHM practices. Last year period poverty was more in married females (P- value= 0.001) and females living in joint family. Last year period poverty and menstrual knowledge were associated with rural residence. (Table 1)

Socio-economic determinants associated with last year period poverty, menstrual knowledge and MHM practice:

Education of participants was associated with all the three variables, period poverty (P- value= 0.000), poor menstrual knowledge (P- value= 0.000) and poor MHM practice (P- value= 0.024). Statistically significant association was observed between participants occupation and last year period poverty (P= 0.020) and poor menstrual knowledge (P- value= 0.008). Education of father was associated with last year period poverty (P- value= 0.000), poor menstrual knowledge (P- value= 0.006) and poor MHM practice (P- value= 0.009). Occupation of father had significant association with period poverty and poor menstrual knowledge. Mother's education had significant association with last year period poverty (P- value= 0.000) and poor menstrual knowledge (P- value= 0.000). Socio-economic status had association with last year period poverty (P- value= 0.047), poor menstrual knowledge (P- value= 0.012) and poor MHM practice (P- value= 0.003). (Table 2 and 3)

Table 1: Association between last year period poverty, menstrual knowledge and MHM with demographic variables

Demographic determinants	Sample N (%)	Last year period poverty n=92 (29.7)	Chi-square, df, P-value	Menstrual knowledge Poor n=55 (17.7)	Chi-square, df, P-value	MHM Poor n=131 (42.3)	Chi-square, df, P-value
Age							
20-29 years	207 (66.8)	47 (22.7)	15.231, 2, 0.000	29 (14.0)	6.902, 2, 0.032	78 (37.7)	5.762, 2, 0.056
30-39 years	81 (26.1)	37 (45.7)		22 (27.2)		43 (53.1)	
40-49 years	22 (7.1)	8 (36.4)		4 (18.2)		10 (45.5)	
Religion							
Hindu	256 (82.6)	67 (26.2)	8.654, 1, 0.003	36 (14.1)	13.633, 1, 0.000	102 (39.8)	3.511, 1, .061
Muslim and others	54 (17.4)	25 (46.3)		19 (35.2)		29 (53.7)	
Caste							
General	169 (54.5)	55 (32.5)	2.648, 2, 0.266	29 (17.2)	0.858, 2, 0.651	75 (44.4)	0.849, 2, 0.654
OBC	76 (24.5)	17 (22.4)		16 (21.1)		29 (38.2)	
SC/ST	65 (21.0)	20 (30.8)		10 (15.4)		27 (41.5)	

Continue.....

Place of residence							
Rural	171 (55.2)	59 (34.5)	4.255, 1, 0.039	38 (22.2)	5.245, 1, 0.022	71 (41.5)	0.085, 1, 0.771
Urban	139 (44.8)	33 (23.7)		17 (12.2)		60 (43.2)	
Type of family							
Nuclear	183 (59.0)	41 (22.4)	11.322, 1, 0.001	29 (15.8)	1.099, 1, 0.294	71 (38.8)	2.192, 1, 0.139
Joint	127 (41.0)	51 (40.2)		26 (20.5)		60 (47.2)	
Marital status							
Married	173 (55.8)	72 (41.6)	26.746, 1, 0.000	34 (19.7)	0.980, 1, 0.322	84 (48.6)	6.361, 1, 0.012
Unmarried	137 (44.2)	20 (14.6)		21 (15.3)		47 (34.3)	

Table 2: Association of last year period poverty, menstrual knowledge and MHM with Socio-economic status of participants

Socio-economic factors	Sample n=310 N (%)	Last year period poverty n=92 (29.7)	Chi-square, df, P-value	Menstrual Knowledge Poor n=55 (17.7)	Chi-square, df, P-value	MHM Poor n=131(42.3)	Chi-square, df, P-value
Participants education							
Graduation and above	87 (28.1)	8 (9.2)	52.657, 5, 0.000	4 (4.6)	44.330, 5, 0.000	24 (27.6)	12.911, 5, 0.024
Intermediate	93 (30.0)	21 (22.6)		17 (18.3)		44 (47.3)	
High school	43 (13.9)	13 (30.2)		2 (4.7)		19 (44.2)	
Middle school	29 (9.3)	15 (51.7)		8 (27.6)		12 (41.4)	
Primary school	22 (7.1)	13 (59.1)		6 (27.3)		13 (59.1)	
Illiterate	36 (11.6)	22 (61.1)		18 (50.0)		19 (52.8)	
Occupation of participants							
Working	104 (33.5)	22 (21.2)	5.448, 1, 0.020	10 (9.6)	7.082, 1, 0.008	38 (36.5)	2.098, 1, 0.147
Not working/ housewife	206 (66.5)	70 (34.0)		45 (21.8)		93 (45.1)	
Socio-economic status							
Upper	30 (9.7)	2 (6.7)	9.641, 4, 0.047	1 (3.3)	12.854, 4, 0.012	8 (26.7)	16.197, 4, 0.003
Upper-middle	40 (12.9)	12 (30.0)		2 (5.0)		27 (67.5)	
Lower-middle	86 (27.7)	27 (31.4)		18 (20.9)		39 (45.3)	
Upper-lower	96 (31.0)	29 (30.2)		26 (27.1)		38 (39.6)	
Lower	58 (18.7)	22 (37.9)		8 (13.8)		19(32.8)	

Table 3: Association of last year period poverty, menstrual knowledge and MHM with education and occupation of parents

Socio-economic factors	Sample n=310 N (%)	Last year period poverty n=92 (29.7)	Chi-square, df, P-value	Menstrual Knowledge Poor n=55 (17.7)	Chi-square, df, P-value	MHM Poor n=131(42.3)	Chi-square, df, P-value
Father Education							
Intermediate and above	178 (57.4)	28 (15.7)	50.822, 3, 0.000	21 (11.8)	12.375, 3, 0.006	66 (37.1)	11.603, 3, 0.009
High school	41 (13.2)	14 (34.1)		8 (19.5)		21 (51.2)	
Middle school	33 (10.6)	13 (39.4)		8 (24.2)		10 (30.3)	
Primary school and below	58 (18.8)	37 (63.8)		18 (31.0)		34 (58.6)	

Continue.....

Occupation of father							
Clerical and above	100 (32.3)	18 (18.0)	18.454, 3, 0.000	3 (3.0)	35.194, 3, 0.000	41 (41.0)	5.536, 3, 0.136
Skilled	70 (22.6)	16 (22.9)		8 (11.4)		26 (37.1)	
Semi-skilled	49 (15.7)	23 (46.9%)		14 (28.6)		28 (57.1)	
Unskilled	91 (29.4)	35 (38.5%)		30 (33.0)		36 (39.6)	
Education status of mother							
Intermediate and above	101 (32.6)	11 (10.9)	27.952, 3, 0.000	5 (5.0)	32.319, 3, 0.000	34 (33.7)	7.087, 3, 0.069
High school	44 (14.2)	13 (29.5)		2 (4.5)		25 (56.8)	
Middle school	35 (11.3)	13 (37.1)		8 (22.9)		16 (45.7)	
Primary school and below	130 (41.9)	55 (42.3)		40 (30.8)		56 (43.1)	
Occupation of mother							
Working	32 (10.3)	6 (18.8)	2.042, 1, 0.153	2 (6.3)	2.411, 1, 0.121	8 (25.0)	4.356, 1, 0.037
Housewife	278 (89.7)	86 (30.9)		53 (19.1)		123 (44.2)	

Discussion

Information on menstruation and MHM is very important for females to manage their periods with veneration. Menstrual insecurity can lead to school absenteeism, workplace leave and inability of females to perform household duties. Literacy of participants and parents plays major role in period poverty and MHM practices. In the present study last year period poverty was present in 29.7% of study participants, 17.7% had inadequate menstrual knowledge and 42.3% had poor MHM practices. In a study from Bhutan menstrual knowledge was found to be low in 35.5 % of participants. 11 Period poverty in our study was more than that found in a study conducted in United States by Cardoso et al., where 14.2% females suffered from last one year period poverty. 7 High period poverty could be attributed to fact that India is lower-middle income country and, hence, purchasing sanitary products can cause financial strain on females.

Females in higher age group had significant association with last year period poverty and poor menstrual knowledge. In study of Cardoso et al. there was no association of period poverty with age. 7 Last year period poverty and menstrual knowledge was poor in females from rural area. Females residing in rural area could suffer from inadequate accessibility and availability of sanitary materials which can be linked as a cause of period poverty. Females in rural area also have low literacy which could be the cause of poor knowledge on menstruation.

Education of both participant and mother was associated with last year period poverty, poor menstrual knowledge and inadequate menstrual hygiene management practices. Mother is first source of information to daughter, and daughter also feel more secure in discussing physical and physiological health with her. Study conducted by Mohammed S. et al. mothers' education was associated ($p = 0.023$) with poor menstrual knowledge of daughter. 8 In a study of Kumar G et al. participants' education was associated with poor MHM practice. 12 Lack of knowledge creates a gap, leading to poor menstrual hygiene management practices, which can lead to period poverty.

Low income menstruating females had association with last year period poverty, menstrual knowledge and MHM practice. Socio-economic status not only creates difficulty in accessing sanitary products, but also produces dearth of soap and other materials needed for basic hygiene. In a study by Rossouw L et al. it was observed females of age more than 35 years, lower socio-economic status and poor education and belonging to rural background persistently suffered inadequate accessibility of sanitary pads. 13 In study by Kumar, et al. economic status had association that was statistically significant with poor practice of menstrual hygiene. 12 Because of period poverty women find themselves unable to participate in economic activities, are uncomfortable, absent more often from workplace and face embarrassment.14

Conclusion: For women to have menstrual period with veneration, it is important to overcome period poverty. The present study revealed that both demographic and social factors play a very important role in menstrual knowledge, MHM practices and last year period poverty. Of these, education and income plays the most crucial role. Findings of present study, however, may be verified by a larger multi-centric study.

Ethical approval: Study was carried after the approval of Institute ethical committee (Letter no. TSMMC&H/ IEC/ NOV22/61)

Conflicts of interest: Nil

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Original Article

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Clinical Study of Lipid Profile in Intracerebral Haemorrhage in Tertiary Care Center

Thimmineni Haritha[1], Sanjay kumar Kaminwar[2], Anish Reddy P[3], Eshwaraiah Vanaparthy[4], Sunil Chowdary M[5]

[1]Assistant Professor, [2]Associate Professor, Department of Neurology Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, Telangana, India, [3]Associate Professor, Department of General Medicine Chalmeda Anand Rao Institute of Medical Sciences Karimnagar, Telangana, India, [4,5]Residents, Department of Neurology Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, Telangana, India.

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Abstract

Background: Stroke caused by Intracerebral haemorrhage (ICH) has high mortality rate. Among various risk factors for ICH, hypertension is the most important factor. Certain population studies have reported a paradox of inverse association between serum cholesterol and risk of ICH.

Aims and objectives: The study aim was to evaluate the serum lipid profile total cholesterol (TC), triglycerides (TGL), high density cholesterol (HDL-C), very low density cholesterol (VLDL-C) and low density cholesterol (LDL-C) in intracerebral haemorrhage patients and look for correlation.

Methods: 50 patients with ICH admitted in Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar who fulfilled the inclusion and exclusion criteria were selected. The study design was a hospital based observational clinical study. History, clinical examination and investigations (CT & MRI Brain and basic blood biochemistry with serum lipid profile) were collected and the data were analysed statistically.

Results: Majority of the ICH patients in our study were >55 years and were males. The total serum cholesterol was < 200mg/dl in 72 % of our patients, with a mean of 168.09 ±43.74mg%. Serum triglyceride level was patients, with mean of 108.26±43.31mg%. HDL-C was < 40 mg/dl in 76% of patients and VLDL-C was < 30mg/dl in 72% patients. The various lipid fractions observed were found to be low in majority of our ICH patients (p value < 0.05), suggesting a negative association between the two. The results obtained were comparable to other similar studies.

Conclusion: Majority of intracerebral haemorrhage patients in our study had lower levels of total cholesterol, triglyceride, HDL-C, LDL-C and VLDL-C. Whether the inverse association between serum lipid levels and ICH is a true causal association or only by chance due to other common confounding factors needs to be evaluated with large scale studies.

Keywords: Intracerebral haemorrhage, lipid profile, serum cholesterol, triglyceride, HDL-C, LDL-C, VLDL-C.

Corresponding Author: Sanjay Kumar Kaminwar, Associate Professor, Department of Neurology Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar-505001 Telangana, India.

E-mail: kaminwar@gmail.com

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Introduction

Intracerebral hemorrhage (ICH) is the second most common subtype of stroke after ischemic stroke and accounts for approximately 10 % to 20 % of all strokes. [1] Intracerebral hemorrhage occurs when a blood vessel within the brain parenchyma ruptures. Intracerebral hemorrhage can occur as a complication of a pre-existing lesion, such as vascular malformation or tumor, which is then referred to as secondary intracerebral hemorrhage.

Globally, higher stroke incidence and poor outcomes have been found in rural residents as compared to urban residents. This is linked to higher prevalence of stroke risk factors in rural areas. [2] Literature on stroke incidence, its subtypes, mortality and access to stroke services in rural India is limited. [3] In 2016, the Global Burden of Disease project estimated the number of incident cases of stroke in India to be 1,175,778. [4] In a recent systematic review, consisting mainly of cross-sectional studies, the incidence of stroke in India was estimated to be between 105 and 152/100,000 people per year. [5]

The incidence of stroke, both ischemic and hemorrhagic, in 2010 was approximately 33 million worldwide, with hemorrhagic strokes accounting for nearly a third of cases and over half of all the deaths. [6] Though the worldwide incidence sits at nearly 20 cases per 100,000 people every year, the occurrence of ICH in low/middle-income regions is double compared to the rates in more economically developed countries. [7] Fortunately, however, the mortality from such strokes has decreased worldwide. [6]

Intracerebral hemorrhage can be divided into primary and secondary, where primary bleeds account for 85% of all ICH and are related to chronic hypertension or amyloid angiopathy. Secondary hemorrhage is considered to be related but not limited to bleeding diathesis (iatrogenic, congenital, acquired), vascular malformations, neoplasms, hemorrhagic conversion of an ischaemic stroke, and drug abuse. [8]

Many of the previous clinical investigations have suggested that increased serum cholesterol is a risk factor for ischemic stroke. Its role in Intracerebral hemorrhage (ICH), however, is not clear. Few studies have indicated hypercholesterolemia as a risk factor for ICH. [9]

The present study aim was evaluate the serum lipid profile total cholesterol (TC), triglycerides (TGL), high density cholesterol (HDL-C), very low density cholesterol (VLDL-C) and low density cholesterol (LDL-C) in intracerebral haemorrhage patients and look for correlation.

Materials and Methods

Study Design

The study design was a hospital based observational clinical study. A total number of 50 patients who presented with Intracerebral Haemorrhage during the study period from January 2022 to July 2023 in Department of Neurology, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar and who fulfilled the inclusion criteria were taken for the study.

Inclusion criteria

- Patients admitted with Intracerebral Haemorrhage (ICH)
- Age 40 years to 80 years
- Gender

Exclusion criteria

- Traumatic Intracerebral Haemorrhage
- Subarachnoid haemorrhage
- CNS Tumors
- Intracranial Aneurysm
- Vascular malformations
- Sympathomimetics abuse
- History of bleeding diathesis
- Patients with thrombocytopenia

After obtaining informed consent, history, clinical examination and investigations were done. Diagnosis of Intracerebral haemorrhage was made in patients based on history, clinical features and plain non contrast CT scan of Brain.

Lipid profile estimation

Blood was collected for lipid profile estimation from the ICH patients within 24 to 48 hours of onset

of disease. The sample was collected after 9 to 12 hours of fasting. The serum was separated and was subjected to centrifugation .The supernatant was taken out and subjected for analysis.

Statistical Analysis:

The statistical analysis of the data collected from the patient was done using Statistical Package for Social Sciences software (SPSS).

Results

Out of 50 patients, 15 patients were females and 35 were males. The mean age group of this study is 59.1(± 12.61) years. In this study among the 50 patients of Intracerebral Haemorrhage, 48% belong to age group of 60-79 years 40% belong to age group of 40-59 years. 8% belong to above 80 years. 4% belong to below 40 years.

Table 1: Age and sex distribution of ICH

Age	Males	Females
Below 40 years	2	0
40-59 years	15	5
60-79 years	16	8
Above 80 years	2	2

The mean age group among the male patients with ICH was 58 years. The mean age group among the female patients with ICH was 62 years (Table 1).

Table 2: Site of ICH distribution

Site of ICH	No.of Patient (N=50)	Percentage (100%)
Basal Ganglia	28	56.0
Lobar	11	22.0
Thalamus	7	14.0
Cerebellum	3	6.0
Pons	1	2.0

Table 2 shows that Basal ganglia constitutes the most common site of ICH in our study, contributing to 56% of cases. Lobar ICH is the second most common site accounting for 22% of patients. Thalamic haemorrhage contributes to about 14% of patients. Cerebellar bleeds were 6% of the total cases. Pons was the site of ICH only in 2 % of study group.

Table 3: Outcome of ICH Patients

Outcome	No. of Patient (N=50)	Percentage (100%)
Alive	19	38.0
Dead	31	62.0

Table 3 shows among our ICH patients about 62% died. Remaining 38% are alive in our study.

Table 4: Total Cholesterol in Patients

Total Cholesterol (mg/dl)	No.of Patient (N=50)	Percentage (100%)
< 200	36	72.0
200 - 239	11	22.0
>240	3	6.0

A clear majority of patients around 72% in our study group had serum total cholesterol < 200mg/dl. 22% of patients had their serum total cholesterol within range of 200-239 mg/dl. Only 6 % of patients in our study had their serum cholesterol ≥ 240 mg/dl.

The mean total serum cholesterol of this study group was 168.09±43.74 mg/dl. To test the statistical significance of this relation we did a t-Test taking 200mg/dl as a normal total cholesterol for normal population. The study population was partitioned into two groups with this cut off.

Table 5: T-Test for Triglycerides

TGL IN mg/dl	Mean	S.D	Statistical Inference
< 150 (n=37)	100.757	29.009	T=-8.763
> 150 (n=13)	190.615	39.010	Df=48
			P value= <0.05
			Statistically Significant

37 ICH patients in our study had their serum triglyceride < 150 mg/dl and their mean triglyceride was 100.76 mg/dl. 13 ICH patients in our study had their serum triglyceride ≥ 150 mg/dl and their mean triglyceride was 190.62 mg/dl. Using t- test, there is statistically significant difference between the two means (P value <0.05) (table 5).

Table 6: HDL Cholesterol in Patients

HDL Cholesterol in mg/dl	No.of Patient (N=50)	Percentage (100%)
<40	38	76.0
40-59	9	18.0
>60	3	6.0

76% of patients in our study had their serum HDL-C < 40 mg/dl. 18% of patients had levels from 40-59 mg/dl. 6% of patients had levels ≥ 60 mg/dl (table 6). The mean HDL-Cholesterol level in the study population is 32.45± 15.30 mg/dl. To test the statistical significance of this relation we did a t-Test taking 40 mg/dl as a normal HDL cholesterol for normal population. The study population was partitioned into two groups with this cut off.

Table 7: T-test for VLDL Cholesterol

VLDL-C in mg/dl	Mean	S.D	Statistical Inference
< 30 (n=36)	20.408	5.977	T=-8.471 Df=48 P value=<0.05 ■ Statistically Significant

36 ICH patients in our study had their serum VLDL < 30 mg/dl and their mean VLDL was 20.41 mg/dl. 14 ICH patients in our study had their serum VLDL ≥ 30 mg/dl and their mean VLDL was 37.71 mg/dl. Using t- test, there is statistically significant difference between the two means (P value <0.05).

Discussion

The mean age group of ICH patients in our study was 59.1 (± 12.61) years. In comparison with Iribarren et al [10] where the mean age was 54.2 years and Broderick et al [3] where the mean age was 64.8± 16.1 years.

Majority of the patients (48%) belonged to age group of 60-79 years in our study. This observation was similar to that in a study Sunil KN et al [12] where about 46 % of patients were in 60-79 years group. In sex distribution, 70% of ICH patients in our study are males; 30 % of ICH patients are females in our study. The male: female ratio in our study is 2.3: 1.

Table 8: T-test for LDL Cholesterol

LDL-C	Mean	S.D	Statistical Inference
<130 (n=34)	84.6876	26.70511	T=-9.281 Df=48 P value= <0.05 Statistically
> 130(n=16)	158.3375	24.97174	Significant

34 ICH patients in our study had their serum LDL cholesterol < 130 mg/dl and their mean LDL cholesterol was 84.69 mg/dl. 16 ICH patients in our study had their serum LDL cholesterol ≥ 130mg/dl and their mean LDL cholesterol was 158.34 mg/dl. Using t- test, there is statistically significant difference between the two means (P value <0.05) (table-8).

Site of ICH

Basal ganglia is the common site of ICH in our study contributing to 56% of cases. This is in accordance with Amanda G. Thrift et al [13] in which basal ganglia is the most common site of ICH. This is also in concordance with Indian studies, Ashraf V. Valappil et al [14] and Suni KN et al [12] where basal ganglia was the most common site but the percentages were slightly lower 49% and 45% respectively.

Lipid Profile and ICH

Serum Total Cholesterol and ICH

A clear majority of patients around 72% in our study group, had serum total cholesterol < 200 mg/dl. Around 54% of our patients had their serum cholesterol values <160 mg %. The mean total serum cholesterol level of this study group was 168.09± 43.74 mg/dl. Comparing with international studies,

Multiple risk factor intervention trial (MRFIT) study [15] showed clear association between low serum cholesterol levels especially below 160 mg% with risk of ICH. The mean cholesterol levels in ICH patients in MRFIT study was 211.4 ± 43.9 mg/dl. The Honolulu Heart Program Yano et al study showed increased risk of ICH in those with serum cholesterol <189 mg%. [16]

In Konishi et al [17] study shows that the mean serum total cholesterol in ICH patients was 164± 2mg%. Comparing with Indian studies, [10] Ashraf V. Valappil et al study, [14] 43% of ICH patients had serum cholesterol <160 mg%. The mean serum total cholesterol in this study was 177 ± 39 mg%.

TGL and ICH

74% of patients in this study had their serum triglycerides level <150 mg/dl. The mean serum triglyceride among our study population was 124.12± 50.76 mg/dl. This is in concordance with Jared D. Sturgeon et al [18] where 81.48% of ICH patients had their serum triglyceride concentration <158 mg%. There was in discordance with Ashraf V.Valappil etal [14] where mean triglyceride concentration in was 84 ± 35.5 mg%.

HDL -C and ICH

76% of patients in our study had their serum HDL-C <40 mg/dl. The mean HDL-Cholesterol level in the study population is 32.45 ± 15.30 mg/dl. The mean HDL-C in Ashraf V. Valappil et al [14] was 42± 12 mg%

LDL-C AND ICH

In our study the serum LDL-cholesterol was <130mg /dl in 68 % of the ICH patients. The mean LDL-Cholesterol level in our study population was 108.26± 43.31mg/dl. Comparing with Izumi et al [19] 59.84% of ICH patients had LDL-C less than120 mg%.

VLDL-C and ICH

72% of ICH patients in our study had VLDL <30mg/dl. The mean VLDL-Cholesterol in our study population was 25.25± 10.14 mg/dl.

LIMITATIONS OF THE STUDY

- This study has included patients with intracerebral haemorrhage excluding the secondary causes of ICH. Though many foreign studies and some Indian studies have been conducted in studying lipid profile in ICH, only few studies are available in south India especially Telangana.
- The limitation of our study was that the dietary habits and physical activities of patients could not be explored.
- This study was based on a single center and hospital based, hence the results obtained may not reveal the true burden of the disease in the community taken as a whole.

Conclusion

Majority of intracerebral haemorrhage patients in our study had lower levels of total cholesterol, triglyceride, high density lipoprotein, low density lipoprotein and very low density lipoprotein. The following mechanism is proposed for inverse association of serum lipids and ICH. Cholesterol and triglycerides form an integral part of cell membrane of vascular endothelium and erythrocytes. When their levels are low, weakening of endothelium and increased erythrocyte fragility occurs, more significantly in the presence of hypertension which predispose to micro aneurysms and later on ICH. Whether the inverse association of serum cholesterol and ICH is a true causal association or only by chance due to some other common confounding factor needs to be evaluated with large scale studies. Further studies with larger sample size concentrating on the pathophysiological effects of serum lipids and ICH are very much essential.

Ethics Approval: This study was approved by the Institute Ethics committee, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar (IEC/CAIMS/2022/013) and informed consent was obtained.

Conflict of Interest: Nil

Funding: Nil

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Original Article

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Knowledge, Attitude and Practice of Blood Donation among Adult Population in an Urban Field Practice Area of a Tertiary Care Hospital

Vijaykumar Powar[1], Surendra Kulkarni[2], Sanjeev Chincholikar[3]

[1]Assistant Professor, Department of Pathology, MIMER Medical College, Talegaon Dabhade, Pune, [2]Associate Professor, Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Pune, [3]Professor and HOD Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Pune.

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Abstract

Background: Human blood is basically a vital and essentially lifesaving component. Blood scarcity is frequently observed in health care settings. Voluntary donation is the proper method for blood collection. Understanding the knowledge, attitudes of potential donors are important to improve blood donation practices.

Aims and Objectives: To study the knowledge, attitude and practice towards blood donation among adult population.

Materials and Methods: A cross sectional observational study was carried out among adult population in the urban field practice area of a tertiary care hospital. Adult participants were selected from registered families. A semi structured questionnaire was used for data collection.

Results: 220 adults participated in the study. Average age of the participants was 39.79 years with SD 12.50. A majority of the participants were workers by occupation. 72.77 % of the participants were aware about their own blood group. Knowledge was found significantly associated with education status of the respondents. Almost all the participants had a positive attitude towards blood donation. However, only 20% of the participants had donated blood any time before. Fear of weakness, fear of blood, needles were the main reasons for not donating the blood**.**

Conclusion: Present study shows a good knowledge about own blood group but poor knowledge about other technical aspects of blood donation.

Key Words: Attitude, Blood, Blood Donation, Knowledge, Occupation.

Introduction

Human blood is basically a vital and essentially lifesaving component. It is capable of saving millions of lives if ready availability can be ensured[1]. Blood transfusion is a crucial part of any healthcare system and it is a lifesaving measure in several

Corresponding Author: Surendra Kulkarni, Associate Professor, Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Pune.

E-mail: dr.sjkulkarni@gmail.com

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critical conditions such as malignancies and bleeding disorders[2]. Availability of safe blood is highly essential for proper medical care and it is important for preventing the spread of infectious diseases at a global level[3]. Evidence-based strategies for blood safety and availability have been successfully implemented by most developed nations. In contrast, despite tangible progress, many developing and transitional countries are unable to always meet their national requirements for blood and blood products.[4]

Blood scarcity is frequently observed in health care settings. An imbalance between increasing demand for safe blood and blood products on the one hand and failure to organize regular blood supply on the other hand appear to be important reasons. To name a few misconceptions, perceived harms and risks of blood donations and lack of motivation among potential donors are the reasons for the same[1].The average number of blood donations per thousand population is 10 times higher in high-income countries than in low-income countries. It is generally recommended that the equivalent of 1-3% of the population should donate blood to meet needs of a country.[4]

Voluntary non-remunerated donation is the proper method for blood donations.[3] Thus regular donations by voluntary unpaid blood donors are essential for adequate supply of safe blood. Understanding the motivations, knowledge and attitudes of potential donors are crucial to improve the effectiveness of donor recruitment and retention programmes[5]. Assessment of knowledge, attitude and practice towards blood donation among people will definitely aid in preparing effective health education strategy to enhance blood donation practices among potential donor and will reduce the incidences of scarcity of blood in the hospitals.

The present study is an attempt to assess the knowledge, attitudes and practice towards blood donation in an urban community.

Aims and Objectives:

1. To assess the knowledge of blood donation among adult population
2. To study the attitude towards blood donation.
3. To find out the practices of blood donation.
4. To identify sociodemographic factors associated with blood donation.

Material and Methods

A cross sectional observational study was carried out in the urban field practice area of a tertiary care hospital after getting approval of Institutional Ethical Committee. The approval letter from Institutional Ethical Committee has reference number and date as follows: MIMER/ IEC/ 643/2019 dated 11/11/2019. The study population consisted of adults from families registered in Urban Health Centre. Individuals in the age group 18 to 65 years were included in the study as per the guidelines mentioned in Standards for Blood Bank and Blood Transfusion Services, Government of India[6].

Sample size:

It was reported in one of the previous studies that 45% of the participants had good knowledge about blood donation[5]. With 95% confidence interval (alpha=0.05) and allowable error of 15%, the calculated sample size was 209. Considering non responsive error of 5%, the final sample size was rounded up to 220.

Sampling type:

The families were selected randomly from the register in Urban Health Centre. Adult participants were selected from registered families[6]. One adult person was selected from each family randomly

Study Tool:

A semi structured questionnaire was used as study tool. The questionnaire was in two parts. First part had questions about sociodemographic information while second part consisted of questions related to knowledge, attitude and practices regarding blood donation.

Data Collection:

The approval of Institutional Ethical Committee was obtained before starting the study. Data was collected by personal interview method. Prior written consent was obtained from the individuals who were willing to participate in the study. The nature and purpose of the study was explained to the participants and an informed consent was taken. The data was entered in MS excel sheet and analysed using appropriate statistical tests.

Results

The responses were collected from all participants. Proportion of males and females was almost equal. Average age of the participants was 40 years.

Table 1: Demographic Profile of the participants As mentioned in materials and methods the age group of 18 to 65 years was divided as follows.

Particulars	Total Number (N=220)	Percentage (rounded up)
Age Group (Years) :		
18 – 25	30	14%
26 to 35	62	28%
36 to 45	63	29%
45 and above	65	29%
Education Status:		
Below Graduate	153	69.55%
Graduate and above	67	30.45%
Occupation:		
Clerical	10	4%
Worker	175	80%
Professional	18	8%
Unemployed	17	8%

From Table1 it is evident that most of the respondents were above the age of 25 years. All the participants were educated though majority were below graduate. Most of the participants were workers in nearby industries while very few were unemployed.

Table 2: Knowledge of the participants about blood donation and their educational status:

Knowledge about blood donation	Number of participants Below Graduate (Percentage)	Number of participants Graduate and above (Percentage)
	Yes	Yes
Universal donor	64 (42%)	53(79%)
Universal recipient	13(9%)	23(34%)
Blood tests for diseases	59(39%)	52(78%)

It was observed that majority of the participants (72%) were aware of their own blood group while almost half of the participants knew about the types of blood groups.

It can be observed from the Table 2 that majority of the participants had the exact knowledge about universal donor irrespective of educational status. However, knowledge was more in participants having education status graduates and above. The difference between knowledge and education status was found highly statistically significant($p < 0.05$).

Surprisingly very few participants had exact knowledge about universal recipient and there was an increasing trend as the education status increased. The difference was also found statistically significant ($p < 0.05$).

Less than half of the participants were having the knowledge about the blood tests carried out before transfusion. However, knowledge was more in participants having education status graduates and above. There was statistically significant difference between educational status and knowledge about blood tests for diseases ($p < 0.05$).

Table 3: Attitude of the participants towards blood donation:

Sr No	Attitude towards blood donation:	Positive response	Percentage
1	blood donation saves the life.	220	100%
2	Whether a person should donate the blood?	220	100%
3	blood donation causes disease to the donor.	13	5.91%
4	Remuneration after blood donation.	30	13.64%

It is observed from the Table 3 that all the participants were of the view that blood donation can save the life and a person should donate the blood. Very few participants were of the opinion that blood donation can cause disease.

Association of attitude of the participants towards blood donation was tested against education level of the participants, but it was not found statistically significant.

Table 4: Blood donation practices among participants:

Sr No	Blood donation practices	Positive Response	Percentage
1	If the person has donated blood any time before?	44	20.0%
2	Discomfort after blood donation	4	1.82%
3	If ready to do blood donation in future	211	95.91%
4	If motivated other people to donate the blood.	25	11.36%
5	Organisation of blood donation camp any time before	6	2.73%

It is evident from Table 4 that only one fifth of the participants have donated blood at any time before. Very few of them have noticed some discomfort. Few participants have motivated other people for blood donation and while hardly few have organised camp.

Table 5: Association between practice of blood donation and occupation of participants:

Occupation	Donated blood any time before	
	Yes	No
Clerical	3 (30.0%)	7(70.0%)
Workers	28(16.0%)	147(84.0%)
Professional	9(50.0%)	9(50.0%)
Unemployed	4(23.53%)	13(76.47%)
Total	44(20.0%)	176(80.0%)

It is observed from Table 5 that majority of unemployed persons and workers have not donated blood earlier. Half of the professionals have donated blood earlier. There was a strong association between occupation and practice of blood donation. ($\chi 2$= 12.63, p <0.05)

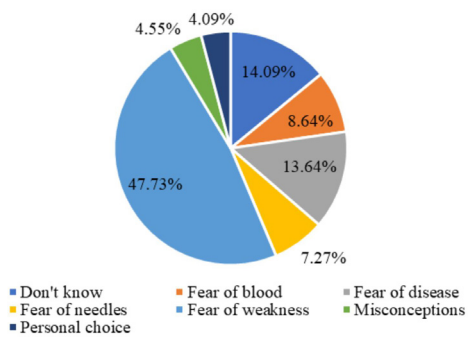


Figure 1: Pie Diagram showing reasons for not donating blood.

From the above pie diagram, it is evident that half of the participants had not donated blood in view of fear of weakness. Other reasons for not donating blood were fear of disease, fear of needles, fear of blood and misconceptions.

Discussion

The present study was a cross sectional study conducted in the urban field practice area of a tertiary care hospital to assess the knowledge, attitude and practice of adults about blood donation. The data was collected from 220 participants.

As mentioned in Table 2, it was observed that majority of the participants were aware of their own blood group. Similar observation was found in a study conducted by Dr Anand et al [5]. In another study conducted by Nazuk Razdan, the percentage was little higher (86%)[7]. The difference may be due to differences in socioeconomic status of study population. However, in a study carried out among medical students by Renu Chauhan et al [1] fairly large number of was found high (95.7%) These differences in responses may be because of higher professional knowledge of medical students and Health Care Workers.

Awareness about age limit of blood donation was found in very few participants (13%). Awareness was lower than the results of study conducted by Dr Anand et al (26.3%) [5]and Nazuk Razdan (37.1%)[7]. Differences in socio-economic status and in educational status of the participants may be the reason.

Knowledge about Universal donor was on higher side (53.18%) while that for universal recipient was quiet less (16.36%). Dr Anand et al[5] reported that the knowledge about universal donor was quite low (29%) however knowledge regarding blood donation by diabetic persons was found at higher level 78.6%.

In our study, knowledge about universal recipient was found 16% while it was 98% in the study conducted by Renu Chauhan et al [1] and 78.20% in a study conducted by Mishra et al [8]. The difference may be attributed to occupation and education status of participants. In both studies participants were medical students.

The present study reported that knowledge regarding blood donation was found significantly higher in graduate and above education groups. Similar findings were reported in the study conducted by Dr Anand et al [5] and Amit Agarwal etal [9].

It was observed from the study that almost all the respondents were of the view that blood donation can save the life of a patient. More than 90% of respondents in the study conducted by Dr Anand et al [5] were of this opinion. Very few respondents in present study thought blood donation may cause disease while in a similar study conducted by Dr Anand et al [5] 23.6% respondents thought blood donation may have harmful effects. Most of the respondents in the study conducted by Nazuk Razdan[7] have shown positive attitude towards blood donation. Very few participants in our study were of opinion that there should be remuneration for blood donation. Similar findings were observed from study conducted by Dr Anand et al[5].

Though, almost all the respondents displayed good attitude towards blood donation in our study, only 20% of the participants have donated blood any time before. It was found that there was strong association between occupational status and practice of blood donation.

These findings are in consistent with findings reported in a similar study conducted by Dewit et al(21.6%)[10]. In a similar study conducted by Verma S. et al [11]it was reported that only 12.1% of respondents had donated blood before.

In our study, participants of professional and clerical occupation have high percentage of blood donation practices.(almost 80%) and percentage of blood donation was found 16% among workers however it was quite high (73%) in a similar study conducted by Dr Anand et al [5]. This may be attributed to difference in socioeconomic status of the participants.

It was evident from Figure 1 that the most common reason for not donating blood was fear of weakness. (47.73%) Dr Anand et al [5] also reported fear of health problem as cause for not donating the blood (38.5%). While in a similar study by Dewit et al [10]68.3% participants reported that something harmful can happen to a blood donor during or after blood donation.

In a study conducted by Sonika Kumari et al [12]among hospital visitors, the most common reason for not donating blood was nobody approached them to realize the need of blood donation.

Conclusion

From the above study it can be concluded that majority of the participants were aware of their own blood group. It was also observed that the fairly large number participants knew about the types of blood groups whilemore than fifty percent of the participants were aware about universal donor. Surprisingly very few were aware about universal recipient. All the participants were of the view that blood donation can save the life and a person should donate the blood. Very few participants were of the opinion that blood donation can cause disease. Thus, most of the participants had a positive attitude towards blood donation. Attitude towards voluntary blood donation was also good. Fear of weakness was one of the most frequently reported reason for not donating the blood. Association between education status of participants and attitude towards blood donation was not found statistically significant. It was observed that only 20% of the participants have donated blood any time before, though they were aware of the fact that blood donation can save the life and a person should donate the blood.

Recommendations:

Based on study results following recommendation may become useful regarding the practice of blood donation. Regular awareness campaigns may be arranged at community level to increase the practice

of voluntary blood donation. Use of mass media on a larger scale can be a important strategy to increase the awareness towards blood donation as it is a fact that blood donation can save life which is precious.

Limitations of the study: Similar studies may be carried out in rural areas to get a wider view of this subject.

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Interest of Conflict: There is no interest of conflict.

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Original Article

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Morbidity Profile of Workers in a Sponge Iron Industry in Goa: A Retrospective Record-based Study

Vishal K.K.[1], Nadia Nirmala De St Roque Godinho[2], Jagadish A. Cacodcar[3], Dhanya Jose[4],

[1]Junior Resident, Department of Community Medicine, Goa Medical College, https://orcid.org/0009_0005_9136_1948, [2]Junior Resident, Department of Community Medicine, Goa Medical College, https://orcid.org/0009_0000_2796_0704, [3]Professor and HOD, Department of Community Medicine, Goa Medical College, [4]Senior Resident, Department of Community Medicine, Goa Medical College.

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Abstract

Introduction: The Sponge iron industries are categorized as red industries (i.e. highly polluted industries) with the major pollutants including particulate matter and gaseous pollutants, the toxic effects of which are often rapid. Prolonged exposure to such pollutants leads to obstructive lung diseases such as asthma or chronic obstructive respiratory disease. The current study aims to assess the morbidities prevalent among the workers in the Sponge iron industry in Goa and help them minimize those with suitable measures.

Objective: To study the morbidity profile of workers in a Sponge iron industry in Goa.

Materials and Methods: A retrospective record-based study was conducted on 217 workers. Selected health parameters were studied: socio-demographic details, anthropometry, blood pressure, serum Creatinine, Total cholesterol, vision tests, ECG, Spirometry, urine microscopy, and audiometry readings.

Results: Among the 217 workers that were studied, 8% had Hypertension, 40% workers had a refractive error, 31% had Dyslipidemia, 14.7% had mild restriction, 0.9% had moderate restriction and 1.3% had a severe restriction in Spirometry testing, 10.1% had elevated Creatinine, 2.7% had mild to moderate hearing loss, 0.9% had changes in ECG and was referred to do echo.

Conclusion: The study revealed that the conditions of employment have caused numerous comorbidities among the sponge iron industry workers, several of which had spirometry restrictions suggesting pulmonary changes which may lead to eventual respiratory deterioration and the advent of diseases such as COPD. The study revealed issues about overall health parameters including but not limited to other intricate issues. Consequently, further tests will have to be conducted along with the use of protective equipment to reduce and limit the effects of such occupational outcomes.

Keywords: Goa, sponge-iron, industry, morbidity, occupational health.

Corresponding Author: Dhanya Jose, Senior Resident, Department of Community Medicine, Goa Medical College, Bambolim.

E-mail: drdhanya13@gmail.com

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Introduction

Sponge iron is a transitional material used in the production of steel and is manufactured either from coal or natural gas.[1] India is the largest producer of sponge iron, producing 30% of all sponge iron around the world.[2] Globally Sponge Iron is being manufactured using natural gas which is a cleaner and more efficient resource, while in India sponge iron is produced using coal which is highly polluting. [3] The Sponge iron industries are categorized as red industries (i.e. highly polluted industries) with the major pollutants including particulate matter and gaseous pollutants, the toxic effects of which are often rapid.[1][4][4] Prolonged exposure to such pollutants leads to obstructive lung disease such as asthma or chronic obstructive respiratory disease.[4]

While the industry plays a vital role in generating employment, the occupational health and well-being of its workforce is of paramount importance. Understanding the health challenges faced by these workers is imperative for designing effective preventive and intervention strategies.

Objective

To assess selected morbidities among workers from a Sponge iron industry in Goa.

Materials and Methods

A retrospective record-based cross-sectional study was conducted over a period of two months i.e. November-December 2022. The records of 217 workers from a Sponge iron industry in Goa who were directly involved in handling machineries and manufacturing and who have been working for at least 2 years in the industry were included. A universal sampling method was used after all necessary permissions were obtained. Those patients whose records were incomplete were excluded.

The records were obtained from the Occupational Health and Safety (OHS) centers, which conduct periodic medical check-ups of the industry workers. The records maintained by the OHS centers serve as a reliable source of epidemiological data.

The data included socio-demographic details, periodic health check-up records including anthropometry (height, weight), blood pressure measurements, routine blood investigations (Total cholesterol, Triglyceride, Blood urea, Creatinine, Urine), Vision testing, ECG, Spirometry, and Audiometry readings. Blood samples were processed using standard assays in the laboratories attached to the OHS centers.

The ethical clearance for this study was obtained from the IEC of Goa Medical College under the reference code.

The confidentiality and privacy of the industry workers obtained from the records were strictly maintained.

Statistical Analysis

The data was entered and analyzed in SPSS version 24. The results are given as frequencies and percentages.

Study Variables

Hypertension: Workers with a systolic Bp ≥ 140 mm Hg or Diastolic Bp ≥ 90 mm Hg were considered as being hypertensive. [5]

Dyslipidemia: A finding of serum triglycerides > 150 mg/dl or total cholesterol> 200 mg/dl was taken as the diagnostic criteria for dyslipidemia.[6] Blood tests were done using standard assay techniques at the laboratories attached to the OHA's.

Audiometry: audiometry results were interpreted as follows, based on WHO grades of hearing impairment. Hearing levels of 26-40 dB as mild,41-60 dB as moderate, 61-80 dB as severe, and > 80 dB as profound hearing impairment.[7]

Near vision: Roman type chart was used to assess near vision. The following values were considered, Normal ≥ N6, Satisfactory N8-N12, Poor <N12

Far vision: Far vision was tested using Snellen's chart. Normal vision was considered as 6/6 in both eyes, satisfactory vision was taken as 6/9-6/12 in the worse eye, and vision was considered as poor if the vision was <6/12 in the worse eye.

Body Mass Index (BMI): The BMI was calculated using the formula weight in kilograms divided by the square of height in meters. [8]

The BMI of the workers was categorized as follows, underweight (<18.5), normal (18.5-22.9), overweight (23-24.9), and obese (≥25) [9]

Results

In our study, all 217 workers who were included were male. The age of the workers ranged between 22-58 years, with most of the workers belonging to the 30-39 age group i.e. 120 (55.25%).

The BMI of each of the workers was calculated and it was found that the majority of the workers had a normal BMI i.e. 138 (64%). The distribution of the workers according to BMI is given in Figure 1.

Table 1: Distribution of workers according to age

Age (in years)	Frequency	Percentage (%)
20-29	49	22.5%
30-39	120	55.29%
40-49	34	15.6%
50-59	14	6.4%

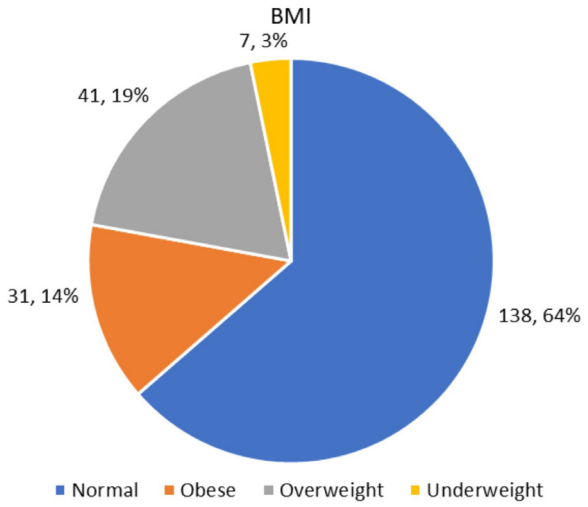


Figure 1: Distribution of workers based on BMI

Regular BP checks revealed that 18 (8%) of the workers were found to be hypertensive. A little over a quarter of the workers were found to have dyslipidemia i.e. 67 (31%), while 22 (10.1%) were found to have an elevated serum creatinine level.

The workers were assessed for both far and near vision defects, along with color vision and it was found that 87 (40%) of the workers had some form of refractive error. Out of these workers, only 3 (1.3%) had a corrected refractive error. None of the workers were detected with color blindness.

A 12 lead ECG was done for each of the workers and it was found that 2(0.9%) workers had changes in their ECG for which they were advised to get a 2D ECHO done.

Audiometry findings revealed that 6 (2.7%) of the workers had mild-moderate hearing loss in either one or both ears. There were no cases of severe hearing loss in any of the workers.

Table 2: Distribution of workers based on selected morbidities

Morbidity	Frequency (N=217)	Percentage (%)
Hypertension	18	8%
Elevated serum creatinine	22	10.1%
Dyslipidemia	67	31%
Refractive errors	87	40%
Mild-moderate hearing loss	6	2.7%
ECG changes	2	0.9%

Spirometry was done to assess the pulmonary functions of the workers. This test revealed that 32 (14.7%) of the workers had restriction, 2 (0.9%) had moderate restriction and 3 (1.3%) had severe restriction.

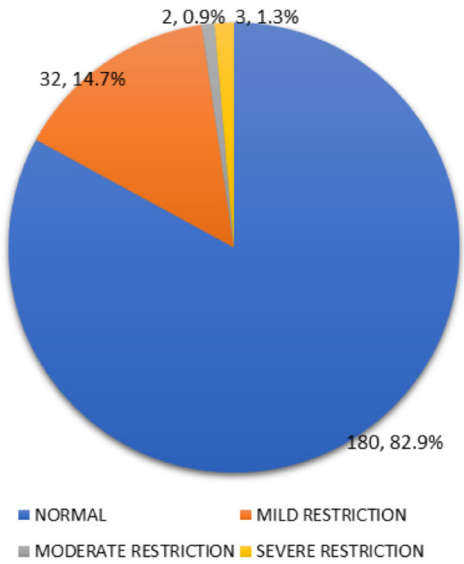


Figure 2: Distribution of workers based on spirometry readings

Discussion

Our research offers insights, into the health status of workers in the iron industry. Most workers have a body mass index (BMI) suggesting a normal distribution of weight among the group. However, a notable percentage of workers are Overweight (19%) or obese (14%) though these figures are lower than those reported in other studies.[10] This points to improvements in health habits or workplace interventions are needed.

The occurrence of high blood pressure among workers (8%) is lower than the rates observed in Goa indicating cardiovascular health outcomes within this group. Nevertheless, concerns arise from creatinine levels in 10% of workers hinting at kidney issues likely influenced by heat stress from machinery exposure – a trend consistent with earlier research findings.[11]

A significant portion of workers (40%) experience refractory errors which can be due to heat stress or age-related factors.[12] It is crucial to emphasize the use of gear like goggles to reduce these risks and maintain eye health. Moreover, slight hearing impairment (2.7%) might be linked to noise pollution from machinery underscoring the necessity for noise control measures at work.[13]

A worrying finding is that 18% of workers exhibit spirometry restriction, which could lead to problems. which shows pulmonary changes are likely taking place in their bodies already. The thought behind mentioning spirometry limits implies that these employees might have respiratory problems now that could worsen into Chronic Obstructive Pulmonary Disease (COPD) with time.[14] This issue frequently arises in the iron industry because of workers being exposed to dust and other contaminants from the industry.

The identification of health hazards has highlighted the desperate requirement for immediate action that targets the safety of iron industry employees. Recommendations are as follows:

Heat Stress Management: Heat stress management protocols should be put in place such as hydration, rest breaks, and engineering controls to lower ambient temperature.

Personal Protective Equipment (PPE): Adherence to the usage of personal protective equipment must be ensured especially goggles and ear protection to reduce the risk for ocular and auditory problems.

Noise Control Measures: Workers' noise-induced hearing loss can be reduced through implementation of measures like soundproofing and regular maintenance on equipments that generate high levels of noise.

Respiratory Protection: To prevent respiratory diseases caused by dust or impurities inhaled while working in the iron industry, it is important to improve respiratory protection methods including appropriate masks and ventilation systems.

Conclusion

To end, our examination underscores the multifaceted connection between work-related exposures and workers' health in businesses that deal with iron. The engagement of all concerned parties in targeting interventions designed to control these risks as well as enhancing safety within working environments can help prevent occupational sicknesses while safeguarding employee welfare thus leading to increased productivity gains coupled with reduced morbidity burden from such ailments. Additionally, there should be further studies carried out continuously for monitoring purposes which will aid in evaluating how effective these measures have been so far towards managing occupational health within this sector.

Limitation of the study

The study's concentration on a solitary sponge iron factory restricts the broader relevance of its conclusions to analogous contexts. Moreover, the exclusive inclusion of male participants, attributed to the predominantly male workforce in this particular industry, potentially obscures any gender-specific nuances in the findings. This limitation suggests caution in extrapolating the study's outcomes to settings with different industrial dynamics or gender compositions.

Declarations

Ethical clearance was obtained from Institutional ethical committee of Goa medical College dated

7/12/2022 with reference number GMCIEC/ 2022/ 291.

Data was collected from the occpational health officer after the permission from the industry

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Conflict of interest: Nil

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