A National Journal of Indian Association of Preventive and Social Medicine

HEALTHLINE

pISSN 2229-337X / eISSN 2320-1525

VOLUME : 16 ISSUE : 3 JULY - SEPTEMBER 2025

For more details visit : www.healthlinejournal.org

HEALTHLINE JOURNAL

A National Journal of

Indian Association of Preventive and Social Medicine managed by IAPSM-GC

Volume : 16 Issue : 3 (July-September 2025)

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HEALTHLINE JOURNAL

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Volume : 16 Issue : 3 (July-September 2025)

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Integrity in Research – The Cornerstone of Trust in Science

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In recent years, the credibility of research has come under intense scrutiny. Scientific inquiry is built on curiosity, rigor, and honesty – yet, the very foundations are sometimes shaken by instances of misconduct, ranging from data fabrication and plagiarism to questionable authorship practices. Retractions of published papers, once considered rare and exceptional, have now become a regular feature in scholarly communication. Each retraction represents not just a blemish on the record of an individual or institution, but also an erosion of public trust in science. Institutions play an important role in upholding the values and integrity of research and science.

The Emerging Challenge:

The pressure to publish, mandatory norms by regulatory bodies, heightened competition for grants, ranking agencies and institutional expectations often drive researchers toward a "publish or perish" mindset. This, unfortunately, creates fertile ground for shortcuts and malpractice. Research misconduct does not merely distort the academic record; it can misguide policy, waste resources, and especially in health sciences endanger lives.

Globally, there is a growing call to move beyond individual blame and toward systemic solutions. Integrity in research must be cultivated as much at the institutional level as at the individual. After all, the research ecosystem is only as strong as its weakest link.

A recent study examined 3,244 retracted papers linked to Indian institutions.[1] The analysis revealed a steady increase in retractions over the years. About 60% came from private institutions, with fake peer review being the most common reason. Retractions in public and medical institutions were largely tied to data integrity issues, while plagiarism was more frequently seen in non-Scopus indexed journals and conference proceedings. Around 80% of retractions arose from collaborations within India, compared to about 20% from international partnerships. Notably, many of these retractions involved journals in the higher quartiles (Q1–Q2).

Complementing these findings, an article in *Nature* highlighted that India's growing research output has been accompanied by widening lapses in compliance, especially regarding ethical approvals, institutional oversight, and peer review mechanisms.[2]

These trends illustrate that misconduct is not merely a matter of individual failings; it reflects structural issues – pressures to publish, inadequate oversight, unequal capacity among institutions, and perhaps incentive systems that reward quantity over quality.

Recently there have been newer developments and an index is being considered and discussed in scholarly circles. The **Research Integrity Risk Index (RI^2)** developed by Lokman I. Meho and colleagues, is a composite metric intended to assess integrity risks at the institutional level.[3] It combines indicators such as *retraction rate* (R-Rate), *proportion of publications in delisted journals* (D-Rate), and *institutional self-citation rate* (S-Rate).

Thirty-two Indian universities have been flagged up as being among the most 'at risk' worldwide by Research

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Jain A. Integrity in Research – The Cornerstone of Trust in Science. Healthline. 2025;16(3): 163-164
	DOI : 10.51957/Healthline_795_2025	

Received : 28-09-2025 **Accepted** : 29-09-2025 **Published :** 30-09-2025

Integrity Risk Index (RI^2).[4] Further to this, the National Institutional Ranking Framework (NIRF) will now count retractions from Scopus and Web of Science over a three-year window. Institutions with persistent integrity issues may even be barred from future rankings, while Institutions with higher retraction counts will face steeper penalties according to Anil Sahasrabudhe, who chairs the National Board of Accreditation.[5]

Points to ponder and the Way forward:

Of late, there has also been an increase in the use of Artificial Intelligence (AI). While there is no denying the fact that AI is here to stay, and the best way is to adapt and adopt, what is needed is to inculcate ethical and judicious use of AI while retaining human supremacy. Technology can be harnessed and rather not be allowed to be a master or supersede human intelligence.

Integrity in research is not an abstract ideal; it is a daily practice. Institutions and researchers must recognize that credibility, once lost, is difficult to regain. As custodians of public health knowledge, we bear a special responsibility to uphold standards that inspire confidence among policymakers, practitioners, and the community at large. If ethical issues, authorship disputes or retractions are the symptom, systemic reforms are the cure. The future of research lies not in avoiding scrutiny, but in embracing transparency. Only then can science retain its rightful place as society's most trusted guide.

Building a culture of research integrity requires several key steps: integrating ethics into training and workshops; encouraging transparency through open data and ethical peer review; and creating safe systems for confidential reporting. Institutions should also reward the quality and impact of research rather than sheer output, while regular audits of research practices help identify gaps and drive continuous improvement. To strengthen research integrity, institutions can adopt dual monitoring systems that combine external signals like retractions with internal audits to guide capacity building. Ethics committees and scientific review boards should be trained, independent, and well-documented. Clear, transparent procedures for handling misconduct with protections for whistleblowers and publicly shared findings are essential. Finally, promotion and funding criteria should shift from publication counts to valuing rigor, reproducibility, openness, and societal impact.

Regional and institutional journals should adopt clear AI disclosure and authorship policies in line with global standards, strengthen peer review by verifying reviewer identities and detecting manipulation, and ensure retraction or correction notices are issued quickly and transparently to maintain academic integrity.

In the race to add numbers, have a higher h-index and citations, or probably a better ranking, individuals and institutions sometimes end up in a rat race without being mindful of the purpose. I am of firm belief that it would rather be prudent to do meaningful work which transforms lives and changes situation on the ground, than to have high impact publications or unethical and dubious practices. Once a good work is done and gets published, it will automatically yield results. There is no short cut to it.

Conclusion:

Integrity in research is not an optional add-on; it is foundational. Without trust, the discoveries, policies, and health interventions we aim to deliver are vulnerable to doubt and misuse. The rising number of retractions, the complexities of misconduct, and the uneven institutional landscape present a clarion call: we must build robust integrity systems at every level – from individual researchers up to national policy.

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Risk of Rabies and the Traveller's Health

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Abstract:

Rabies is one of the deadliest infectious diseases. It is prevalent all over the world. As it is spread to humans and some animals by bite, scratch or direct contact with the mucous membrane of the infected animal. Most of the people coming to the African and Asian countries are exposed to rabies, special people coming from where the elimination of canine rabies has been achieved. Most of the travellers are aware of the rabies infection. Travellers know that animals, especially dogs, are the most common source of rabies infection. Most of the travellers don't have the seriousness of the infection. They don't find themselves as a potential source of the spread of the rabies infection. The vaccine against rabies infection is the main key to stopping the spread of the disease. Travel clinics are one of the platforms from which people can get all the information regarding infectious diseases occurring in the visiting area. The role of healthcare professionals in recommending rabies vaccination prior to travel to endemic areas is extremely important. The lack of knowledge and awareness of rabies exposure results in a variety of opinions on which travellers should receive pre-exposure prophylaxis (PrEP). It directly influences the recommendation and decision-making as it is based on individual perspective and interpretation rather than statistical data on rabies infection in each country.

Keywords: Endemic, Pre-exposure prophylaxis, Rabies, Traveller, Vaccination

Rabies: A Fatal but Preventable Disease

Rabies is a 100% fatal but preventable disease. It is a zoonotic, viral disease. It is spread to humans and some animals by bite, scratch or direct contact with the mucous membrane of the infected animal. In up to 99% rabies disease spreads to humans through dogs in children between 5 to 14 years is most prevalent.[1] Rabies primarily affect the central nervous system, which leads to extremally brain disease and ultimately leads to death if medical care and vaccination are not received before appearing the system. The medical care regarding the wound and the pre- and post-exposure vaccination plays a very important role in preventing rabies among humans as well as animals.[1,2]

Rabies is one of the deadliest infectious diseases. It is prevalent all over the world except Antarctica. In Africa, Asia, and some areas of North and South America spread of rabies because of infected dogs very a major issue. Worldwide, more than 59,000 human deaths occur each year. In India, approximately 25,000 to 30,000

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Katole A, Giri P. Risk of Rabies and the Traveller's Health. Healthline. 2025;16(3): 165-168
	DOI : 10.51957/Healthline_752_2025	

Received : 23-06-2025 **Accepted** : 07-08-2025 **Published :** 30-09-2025

human deaths occur because of it. Most death occurs in rural Africa and Asia because of poor knowledge regarding rabies, lack of health facilities and poor availability of the post-exposure prophylaxis (PEP).[1,3,4]

Traveller's exposure to Rabies:

Travel is essential for work as well as to explore the world. As the facilities regarding international travel continue to increase and all continents are coming closer. Travel within the country as well as among countries is so common. As people come and go outside their countries, they are more exposed to certain diseases of that particular country. Rabies is one of the most common infectious diseases, which is 100% fatal, but at the same time 100% preventable. Most of the people coming to the African and Asian countries are exposed to rabies, special people coming from where the elimination of canine rabies has been achieved.

In developed countries, rabies is often imported from travellers, mainly from those who have travelled to African and Asian countries. Among Western European countries, rabies infections are infrequent.[5] Since the 20th century, European countries have been following very strict rules and regulations regarding mass vaccinations of all animals that are imported as well as domestic animals like dogs. They are following measures such as quarantine regulations for imported pets. However, people from Europe can still get rabies infection after travelling in rabies-endemic countries. As intercontinental travel is returning to pre-pandemic levels, more people are at risk of exposure to a potentially rabid animal while travelling in rabies-endemic countries.[6] As per the estimation that 1 in 300 travellers per month of stay in rabies-endemic areas come across an animal-related injuries with an indication for treatment with rabies Post Exposure Prophylaxis.[7,8]

Rabies is a very rare infectious disease among travellers, with only five reported cases in the past 50 years. However, three cases were treated in the hospital in the past few years. The three patients seen most recently had acquired rabies infection in Kenya and Haiti. The other two are in Indonesia and Morocco.[7-9] All cases of rabies died very tragically despite knowing the fact that rabies is vaccine preventable disease. It is very common for travellers to experience a bite or scratch from a potentially rabid animal.[10,11] According to a recent studies, a one-month stay in Southern Asia, Southeast Asia, Central America, South America or Africa is associated with a 0.4% chance of experiencing an animal-associated incident (AAI).[12]

Awareness of Rabies infection among the travellers:

As per the research on most of the travellers are aware of the rabies infection. Travellers know that animals, especially dogs are the most common source of the rabies infection. Most of the tourists feel that, along with the dogs, cats also have the potential to spread the infection. The awareness about bats and other wild animals that can spread the rabies infection is very less. Most of the tourists know about the pre-exposure and post-exposure prophylaxis vaccination, but the health sicking behaviour towards the vaccination is very poor.[8,12,13]

Most of the travellers dont have the seriousness of the infection. They dont find themselves as a potential source of the spread of the rabies infection. As per the studies done all over the world, travellers are not well known of the fact that every time touching to the animal can expose them to rabies infection. Many people dont know what to do after getting bitten, as well as if a scratch happens from a strange animal. Most people dont know how to go for the primary care to the patients of dog bites or animal bites as well which health facility they should visit for treatment.[3] The awareness regarding vaccination among travellers is there, but how many doses, what if complete schedules are not followed, what are the fatal effects once the symptoms of rabies develop, travellers are unaware of the many things related to rabies. This is the main reason for getting more and more rabies infections among travellers.

Awareness of rabies disease engages most of the communities and empowers people. It will help to save

themselves by taking care of and health facilities they need. This includes an understanding of how to prevent rabies in animals, when to suspect rabies, and what to do in case of a bite. Public education for both children and adults on dog behaviour and bite prevention, what to do if bitten or scratched by a potentially rabid animal, and responsible pet ownership are essential extensions of rabies vaccination programmes.[12,14,15]

Role of the health sector / Travel clinic to control rabies infection among the travellers:

As per the considerable amount of rabies infection risk among travellers, seek pre-travel health advice before intercontinental or inter-countries travel. This pre-travel consultation gives an opportunity to educate travellers about the prevalence of rabies at their destination and to administer vaccination against rabies. Administration of pre-exposure prophylaxis (PrEP) in order to obtain long-term immunity for future travels. As the shortage of time regarding discussion about the rabies infection, information, education and communication material can be provided to the travellers so that they can get awareness about it. Taking PEP after possible exposure to rabies must be done responsibly and quickly, and it is important that travellers are aware when and where to seek medical help.[16,17]

Travel clinics are one of the platforms from which people can get all the information regarding infectious diseases occurring in the visiting area. The Department of Community and Family Medicine, AIIMS, Bhubaneswar is running Travellers Health Clinic. It can make people aware of the diseases as well as how to prevent them in the visiting destination. It can provide information about the infection as well as diseases, and where to seek health care if exposure happens. Travel Medicine can help in providing information, education and communication facilities to the tourist. They are providing vaccinations that are essential for travel to certain countries, like the Yellow Fever Vaccination. Inclusion of the pre-exposure vaccination for rabies also be included in certain endemic countries for rabies essential vaccination.[18]

The role of healthcare professionals in recommending rabies vaccination prior to travel to endemic areas is extremely important. In the previous research, it was found that health Care facilities are more likely to prioritise hepatitis A, B and yellow fever over pre-exposure rabies vaccination to travellers.[17] The studies have shown that the lack of knowledge and awareness of rabies exposure results in a variety of opinions on which travellers should receive PrEP. It directly influences the recommendation and decision-making as it is based on individual perspective and interpretation rather than the statistical data of rabies infection in each country.[1]

Rabies Vaccination:

Active immunisation with rabies vaccine can be administered among travellers as pre- and post-exposure prophylaxis (PrEP and PEP, respectively). Effective vaccines are available to travellers both before and after potential exposures.[18]

Pre-exposure prophylaxis (PrEP) is recommended before recreation or travel in some areas and for people living in remote, highly rabies-endemic areas with limited local access to rabies biologicals. It should be clear that PrEP does not replace the need for Post-Exposure Prophylaxis. Any person exposed to a suspected rabid animal should still seek post-exposure care. Post-exposure prophylaxis (PEP) is the emergency response to a rabies exposure.[1,2,18] This prevents the virus from entering the central nervous system. A well-performed wound risk assessment and PEP protocol consists of:

- Extensive wound washing with water and soap for at least 15 minutes soon after an exposure;
- A course of rabies vaccine; and
- Administration of rabies immunoglobulin or monoclonal antibodies into the wound, if indicated.

The cost of the rabies vaccination is also one of the reasons for people are not very comfortable taking all doses of the vaccination. As the one health approach,

stepping forward toward the elimination of rabies, the cost of the vaccination should be pocket-friendly so that more and more travellers should take it and complete the schedule.

Conclusion and Recommendations:

Rabies is 100% preventable disease, despite the known fact that rabies continues to pose a fatal risk for travellers. The travellers who were all eligible for rabies PrEP and travelled to high-risk destinations or endemic countries, the majority did not consult with the health care facilities prior to travelling, and thus were not protected from rabies. Additionally, many health care facilities are not raising the need for PrEP with their patients who present for advice on travel vaccines. There should be increased awareness and a demonstrated need for increased education on the risk of rabies for travellers. The importance of rabies PrEP with all travelling patients to protect themselves from this disease. The compulsory PrEP schedule should be followed to control the disease. The cost of the vaccine should be pocket-friendly so that it would be beneficial to all the stakeholders.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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Barriers and Enablers in Implementing Tele-Counselling for Postnatal Care of Low-Birth-Weight Infants in Rural India: A Qualitative Study

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Abstract:

Introduction: Tele-counselling may emerge as a promising strategy for improving neonatal outcomes in low-birthweight (LBW) babies especially in resource-constrained settings. **Objective:** To explore barriers and enablers in implementing tele-counselling for caregivers of LBW infants in a rural Indian setting drawing insights from a community based interventional study. **Methods:** This qualitative study was nested within a larger community based interventional study, conducted in Agra, Uttar Pradesh, the qualitative component is presented. Tele-counselling was provided to caregivers of 40 LBW infants over eight weeks selected consecutively. Data related to challenges were collected through in-depth interviews and analysed by thematic analysis, supplemented with qualitative reflections and case narratives. **Results:** Key barriers included poor network coverage (35%), lack of willingness to talk (35%), time constraints (25%) and comprehension difficulties (7.5%). Enablers included ASHA worker involvement, flexible scheduling and personalized support. Six themes emerged: technological barriers, communication and comprehension gaps, trust and reluctance, time constraints and competing priorities, role of Community Health Workers, and personalization and case-based support. **Conclusion:** Despite technological and behavioural barriers, tele-counselling can serve as an effective postnatal intervention tool when combined with trust-building, flexible timing and collaboration with frontline workers. Tailored counselling, regular follow-up and community integration are critical for success.

Keywords: Communication barriers, Counselling, Low birth weight, Neonatal care

Introduction:

Low birth weight (LBW) defined as birth weight less than 2500 grams by World Health Organisation (WHO), remains a significant public health concern.[1] Globally, one in seven infants born is LBW infant.[2] Despite progress in neonatal care, India continues to report a high prevalence of LBW, with rate remaining stagnant at approximately 18% according to both NFHS-4 and NFHS-5 data.[3]

Because of their higher risk of death and long-term developmental issues, LBW babies require specialised care and postnatal monitoring. However, access to quality postnatal care in India, particularly in rural and underserved areas is often limited due to geographic, infrastructural and workforce related barriers. This creates a critical gap in early neonatal support, particularly vulnerable infants requiring consistent follow up. The practice of tele-counselling is widely

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Agrawal S, Agrawal R, Kumar P. Barriers and Enablers in Implementing Tele-Counselling for Postnatal Care of Low-Birth-Weight Infants in Rural India: A Qualitative Study. Healthline. 2025;16(3): 169-174
	DOI : 10.51957/Healthline_733_2025	

Received : 20-05-2025 **Accepted** : 22-08-2025 **Published :** 30-09-2025

used and accepted globally, commonly utilized by mental health professionals worldwide, has significant potential in this realm. By leveraging telecommunications technology, healthcare provider can offer guidance, support and monitoring to caregivers remotely, thereby overcoming geographical and logistical barriers. Synchronous video tele-consultations may increase the postnatal follow up of low-risk neonates, addressing common concerns like lactation and skincare.[4]

The adoption of tele-counselling faces several operational and technological challenges.[5] Understanding these challenges to enhance tele-counselling interventions is essential for developing effective and sustainable models of care. Hence, this study was conducted to explore barriers and enablers in implementing tele-counselling for caregivers of LBW infants in a rural Indian setting drawing insights from a community based interventional study.

Methods:

This qualitative study was nested within a community based interventional study conducted in a selected block of Agra district, Uttar Pradesh, India. The broader intervention aimed to assess the impact of tele-counselling on postnatal care practices among caregivers of LBW neonates. The qualitative component focussed on identifying implementation barriers and facilitators through descriptive and thematic analysis.

The study included caregivers of all neonates with a birth weight less than 2500 grams born between 15th March 2024 to 15th June 2024 at the selected Community Health Centre and discharged for home care. Neonates who were severely ill at birth or who could not be followed up were excluded. Of the 87 eligible LBW neonates enrolled consecutively in the larger study, 44 LBW neonates were assigned to the intervention group using alternate allocation. After accounting for four losses to follow up, 40 caregivers in the intervention arm completed the tele-counselling and were included in the qualitative analysis.

Participants in the intervention group received structured tele-counselling focussed on key newborn care practices: exclusive breastfeeding, thermal protection, hygiene practice, timely vaccination and identification of early danger signs. Counselling was delivered by a trained investigator over a two-month period. Each caregiver received two calls per week during the first month and one call per week during the second month. Calls were scheduled flexibly and where appropriate, ASHA workers provided additional multimedia support.

Data on implementation challenges were collected through structured checklists completed after each call, as well as open ended notes and reflections maintained by the investigator. Call metrics including timing, duration and frequency were also recorded. Case narratives were developed for caregivers who experienced notable difficulties or required individualized support. These case studies highlighted contextual challenges and adaptations made during the intervention.

The qualitative data were analysed using Braun and Clarkes reflexive thematic analysis framework.[6] Study notes and narratives were reviewed manually to generate initial codes, which were then grouped into subthemes and refined into overarching themes. Patterns were identified inductively with attention to both barriers and facilitating factors. Triangulation was achieved through investigator observations, ASHA feedback and caregiver interviews to ensure data credibility and depth.

Written informed consent was obtained from all participants prior to enrolment. The study received ethical clearance from Institutional Ethical Committee of a tertiary care institute (Reg no. ECR/1409/Inst/UP/2020) through Letter number SNMC/IEC/2024/203 dated 02/02/2024.

Results:

The table 1 summarises the sociodemographic details of LBW neonates (N=40). Among the 40 caregivers in the intervention group, the most frequently reported challenges were lack of network coverage and unwillingness to talk. The Table 2 gives the detailed list of challenges faced during tele-counselling sessions.

The calls were most successful during the evening hours (6:00 PM to 8:00 PM) as this was the time when all the family members were at home, the working members

Table 1: Sociodemographic details of study participants (N=40)

Variables	No of participants (%)
Age of mother (Years)	
< 20	2 (5.0)
20-24	19 (47.5)
25-29	18 (45.0)
≥ 30	1 (2.5)
Educational Qualification	
Illiterate	10 (25.0)
Primary, Middle or High School	18 (45.0)
Intermediate or above	12 (30.0)
Occupation	
Clerical/ shop	1 (2.5)
Unskilled worker	1 (2.5)
Housewife	38 (95.0)
Socioeconomic Status*	
Upper Class	1 (2.5)
Upper Middle Class	2 (5.0)
Middle Class	11 (27.5)
Lower Middle Class	26 (65.0)
Lower Class	0 (0.0)
Gender of neonate	
Male	21 (52.5)
Female	19 (47.5)

*As per modified prasad classification

Table 2: Challenges faced in providing tele-counselling to the Intervention group (N=40)

Challenges faced	No. of participants (%)
Lack of access to phone	2 (5.0)
Lack of network coverage	14 (35.0)
Lack of willingness to talk	14 (35.0)
Lack of trust	2 (5.0)
Lack of comprehension over phone	3 (7.5)
Lack of time	10 (25.0)
Lack of family participation/ family support	1 (2.5)
Lack of compliance	10 (25.0)
None	5 (12.5)

Table 3: Tele-call metrics over 8 weeks intervention

Metric	Value
Mean duration of call	11.8 minutes
Maximum duration	23 minutes
Minimum duration	6 minutes
Mean number of calls per day	6.62
Minimum number of calls per day	1
Maximum number of calls per day	8
Total number of effective calls	480
Total number of dialed calls	1135

of the family has returned by this time and thus families were equipped with the mobile phone. Also, the ASHAs of the respective area were also comfortable to answer the call during this period. Regular follow ups helped in building rapport and trust. The Table 3 provides details of calls for providing tele-counselling to the intervention group. To make 480 effective calls, 1135 calls were dialled, indicating 42.3% effectiveness rate.

Six major themes emerged from the inductive thematic analysis using Braun and Clarkes framework.

1. Technological barriers: issues like poor network coverage, lack of access to phones and inconsistent signal reception were prominent.

   1.1. Inconsistent mobile network coverage

   "Madam, your voice cuts in between, I had to go out of my house to hear you" -Mother 3

   1.2. Limited access to personal phones

   "I am at work now; my wife doesnt have a phone. Call us in the evening" -Father 5

   These barriers disrupted call continuity and flow of counselling, requiring flexible scheduling and repeated attempts to establish contact.

2. Communication and comprehension gaps: Some caregivers, particularly with low literacy faced difficulty in understanding medical instructions over phone. Audio-only communication limited the ability to explain complex topics.

   2.1. Limitation of audio-only communication: the most common response was difficulty in understanding instructions over phone.

   "You told me about danger signs, but I cant understand all. Can you tell again slowly." Mother 13 (23 years, primary school education, housewife)

   2.2. Low health literacy among caregivers: the least common response pertained to specific misconceptions or hesitancy regarding vaccination.

   "Hmm… I did not understand the need for vaccine….it is painful for my child" -Mother 34 (21 years, illiterate, housewife)

This highlights the need for simplified messaging and where possible, multimedia reinforcement through ASHAs.

3. Trust and reluctance: Initial hesitancy and distrust toward telephonic health advice were common. However persistent efforts and respectful communication helped build rapport and trust over time.

   3.1. Initial distrust towards telephonic counselling

   "I know what is right and what is wrong for my baby, we dont need anyone to explain her needs."- Mother 9

   3.2. Building rapport through consistent, respectful communication

   "We are trying to help you and your child."- Investigator

4. Time constraints and competing priorities: Many caregivers found it challenging to prioritize counselling sessions. Flexibility in timing played a crucial role in addressing this challenge.

   4.1. Household responsibilities

   "I have to cook food for my family, I cannot talk to you now" - Mother 23

   4.2. Flexible call timing and investigator patience as enabler

   "No problem, I can call you whenever you are free"- Investigator

5. Role of Community Health Workers (ASHAs and ANMs): The involvement of ASHA workers significantly enhanced the reach and credibility of tele-counselling. Their physical presence complemented the remote guidance provided by the investigator.

   5.1. ASHA as a trusted link between system and household

   "You can ask for any assistance regarding you and your child, the doctor has called to ensure that you and your baby is healthy" - ASHA 1

   5.2. Support in explaining complex concept visually

   "I can help by showing the videos and images on the tablet provided by the government for feeding data"- ASHA 4

6. Personalization and case-based support: Caregivers appreciated when the counselling was adapted to their specific concerns. Tailored advice addressing individual concerns like feeding challenges, or minor medical conditions helped to build trust and improved satisfaction of the caregivers.

   6.1. Customized advice for individual health needs

   "Continue breastfeeding and feed frequently from the affected side, it would help to reduce soreness" -Investigator

   6.2. Perceived satisfaction by caregivers

   "Your advise helped to reduce the soreness"- Mother 6

Case Narratives:

Case 1: Tailored advice for maternal health:

One of the caregivers, a young mother reported symptoms suggestive of uterine prolapse during the tele-counselling sessions. Recognizing her discomfort, the investigator provided the tailored advice that included Kegels exercises. A video demonstrating the technique was shared with the help of her local ASHA. Over a course of a month, her symptoms significantly improved without requiring any medical intervention.

Case 2: Eye care for the newborn

A mother expressed concern regarding her infants decreased lacrimation. Upon further probing, it was found that the infants eyes were being treated with kajal, a common traditional practice. The investigator advised discontinuing kajal application, advised Crigler massage (lacrimal sac massage) during a phone call, shared a video of same with the help of ASHA worker and coordinated with her to arrange a visit to nearest healthcare centre for appropriate treatment by ophthalmologist. This case emphasizes the role of tele-counselling in correcting harmful practices and facilitating access to specialist care.

Case 3: Survival of high-risk LBW neonate at home

A particularly inspiring case was that of a female LBW neonate with a birth weight of approximately

1500g, who, despite not being taken to any healthcare facility, survived with the combined efforts of her family, ASHA, and the tele-counselling support provided. The family was initially hesitant about hospital visits due to logistical and financial constraints, and the infant was managed at home. Through tele-counselling, the family was continuously guided for essential care such as optimal breastfeeding practices, thermal protection to prevent hypothermia, skin-to-skin contact, and to identify warning signs requiring immediate medical attention. The ASHA worker played a crucial role in bridging the gap by making home visits, monitoring the baby's weight, and reassuring the family about the recommended care. Over time, the combined efforts of tele-counselling, ASHA intervention, and the family's dedication ensured that the neonate not only survived but gradually gained weight and showed positive growth indicators.

Discussion:

This qualitative study explored the implementation challenges of tele-counselling intervention designed to support caregivers of LBW neonates in rural India. Our findings highlight that while tele-counselling holds significant promise for strengthening postnatal care delivery, its effectiveness is shaped by contextual barriers. Technological constraints were the major challenges, and this aligns with the findings of a similar study by Cox V et al.[7] in rural Northern India, where limited internet connectivity hindered effectiveness of mobile health interventions. Lack of access to personal mobile devices further complicated communication, also noted in a study focussing on tele-medicine in resource limited setting by Haffner DN et al.[8]

Communication barriers further impeded the effectiveness of tele-counselling. Audio only interactions restricted the ability to convey complex health messages, especially in the absence of visual or in person cues. This is consistent with global telemedicine experience by Kruse CS et al.[9] that highlight the limitations of unidimensional communication modalities in conveying nuanced care instructions. Providing multimedia support through ASHAs such as short video demonstrations, helped address this issue in our setting and may be considered essential in similar interventions elsewhere.

Building trust was another crucial factor. Some caregivers initially showed reluctance or resistance to receiving health advice via phone, especially from unfamiliar voices. Establishing rapport required repeated contact, respectful engagement and reinforcement through trusted local health workers. Similar findings have been reported in other mHealth study by Mehl G et al.[10] where credibility and local buy in were key to user adherence.

Time constraints and competing household priorities also affected caregiver availability for counselling sessions. This challenge was mitigated by offering flexible call timings, particularly during evening hours when families were more likely to be at home. Flexibility has been recognised in implementation literature as an important adaptive strategy for demand side engagement in telehealth models in a study by Wootton R.[11]

Importantly, the integration of frontline health workers was consistent enabler of tele-counselling success. ASHAs and ANMs not only facilitated mobile contact but also enhanced the interventions credibility, provided on ground reinforcement and enabled multimedia sharing to complement verbal instructions. This hybrid model of combining remote and community-based support represents a scalable systems level strategy to strengthen postnatal care outreach. The personalised and case specific counselling as illustrated through caregiver narratives fostered greater acceptance and practical application of health advice. Tailoring support to specific needs enhanced caregivers satisfaction and may contribute to improved health outcomes.

Together these findings reinforce the potential for tele-counselling to serve as a valuable tool for existing postnatal care in resource limited settings. However, for such interventions to be effective and sustainable, they must be embedded within broader health system infrastructure, supported by reliable technology, trained personnel and community engagement mechanisms.

Conclusion and Recommendations:

This study highlights that while tele-counselling holds significant potential as a postnatal support tool for caregivers of LBW neonates in rural India, its effectiveness is shaped by multiple implementation challenges. Technological barriers, communication limitations and trust deficits emerged as key obstacles. However, these can be mitigated through flexible call scheduling, involvement of community health workers and personalised counselling approaches. Integrating tele-counselling into existing community health systems, particularly through ASHAs, can enhance its reach, credibility and impact. Policymakers may strengthen rural digital infrastructure, incorporate tele-counselling training in ASHA and ANM curriculum and promote use of simplified communication tools that include audio-visual aids. As health systems increasingly explore digital strategies to bridge service gaps, particularly in resource-limited settings, our findings emphasize the importance of designing interventions that are context sensitive, community-integrated and responsive to user needs.

Acknowledgements:

We would like to express our heartfelt gratitude to all those who contributed to the successful completion of this study. We acknowledge the contributions of the Auxiliary Nurse Midwives (ANMs), Accredited Social Health Activists (ASHAs), and healthcare staff at the Community Health Centre (CHC) block, whose cooperation made data collection and participant follow-up possible. We extend our heartfelt thanks to the mothers and families of the participating infants for their willingness to be part of the study and for their valuable time and trust.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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Consumption of High-Fat, Salt, and Sugar Foods and its Determinants Among Medical Undergraduates in North Kerala: A Cross-Sectional Study

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Abstract:

Introduction: Rising HFSS food intake among young medical undergraduates contributes to early NCD risk among them**. Objectives:** To assess the consumption pattern of HFSS foods and the factors determining its choice among medical undergraduates in North Kerala. **Methods:** A cross-sectional study was done among medical undergraduates of a private medical college in North Kerala during 2024. Stratified random sampling were done and 202 participants were selected. A self-administered questionnaire was distributed to study participants and anthropometric assessments such as height, weight, and BMI was assessed. Data was entered in MS Excel and analysed using SPSS. **Results:** A significant proportion (51.5%) of participants regularly consumed HFSS foods, with taste (82%) being a primary motivator for their choices. Awareness levels regarding the health risks associated with HFSS foods varied among participants. Varying degrees of malnutrition such as Underweight (13.5%), Overweight (26.9 %) and Obesity (26%) were more among those who had high HFSS consumption. Those who perceived a negative impact of HFSS foods on their health was 1.4 times higher HFSS consumers than others and was an independent predictor (p 0.037) **Conclusion:** The study reveals critical insights into the dietary behaviours of young adults. More than half of the medical undergraduates reported high consumption of HFSS foods, correlating with rising obesity rates in this population. The study identifies key factors influencing their dietary choices, including convenience, affordability, and social influences such as peer pressure and marketing tactics.

Keywords: Fast foods, Feeding behaviours, Noncommunicable diseases, Obesity, Processed

Introduction:

Dietary practices and lifestyle are increasingly linked to NCDs like diabetes, obesity, cardiovascular disease, and some types of cancer.[1] According to the World Health Organization (WHO), NCDs account for over 71% of fatalities worldwide, with a significant share of these deaths happening in younger populations, specifically those between the ages of 15 and 29 years.[2] The increasing consumption of foods rich in High Fat, Salt, and Sugars (HFSS) among children and young people, is highlighted by the demographic shift towards rising NCDs in this age group.

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Gangadharan N, Nair MS, Noonhiyil Kaitheri N, Thandayan Lakshmanan M, Lakshmanan A. Consumption of High-Fat, Salt, and Sugar Foods and its Determinants Among Medical Undergraduates in North Kerala: A Cross-Sectional Study. Healthline. 2025;16(3): 175-182
	DOI : 10.51957/Healthline_727_2025	

Received : 21-05-2025 **Accepted** : 21-07-2025 **Published :** 30-09-2025

The growth of processed food industry in the past decade as a vital sector for reducing food loss and increasing the shelf-life of agricultural produce has emerged as an important sector for sustainable growth and development.[3] Thus, as this sector grows, there is an increase in Ultra processed foods also in market. The Foods processed with high amounts of total fat, saturated fats, trans fat, added sugar, and/or added salt & which contain low amounts of proteins, vitamins, photochemical, minerals and dietary fibre known to have negative impact on health if consumed regularly or in high amounts are referred to as HFSS foods.[3,4] Consuming them on a daily basis can cause obesity and lead to increased chance of developing NCDs including Diabetes, hypertension, coronary artery disease, etc.[1] Approximately 70% of individuals who are overweight or obese reside in low- and middle-income nations, such as India.[5] India consumes one of the largest amounts of salt and sugar per day in the world.[6] From 2011 to 2021, the retail sales value of ultra-processed food industry has increased at a compound annual growth rate of 13.37% overall and is projected to increase to 39% by 2032.[3]

The recent National Family Health Survey (2019-20) highlights the increasing trends of Obesity among children as well as adults in both rural and Urban settings.[7] The low cost, attractive packaging and commercial strategies of promotion has influenced the choice of consumers.[8] The global burden of diseases study shows that annually, 1.2 million deaths in India can be attributed to dietary risks alone.[5]

In this background this study aimed, to assess the consumption of HFSS foods and to determine the factors associated with its consumption among young medical undergraduate adults in North Kerala.

Methods:

A cross- sectional study was done during April to September 2024, among 202 Medical undergraduate students of a private medical college in North Kerala. Sample size estimation was done using the formula $\mathbf{N = Z_{(1-\alpha/2)}^2 \times P \times Q / d^2}$, In a study conducted by Motta L et al[9] among young adults in Gujarat, the average consumption of HFSS foods was estimated to be 43.2%.[9] Considering P as 43.2%, the calculated sample size was 168. However, 202 medical students were included in the study.

The participants were enrolled to study through stratified random sampling. The medical students were stratified according to their batches and 60 students were selected from each batch by lottery method using their Roll number register. After getting informed consent, a Self-administered questionnaire distributed which collected data about sociodemographic details, HFSS consumption patterns and awareness following which anthropometric assessments of Height and weight was done by investigators using calibrated stadiometer and analogue weighing machine.

A person who consumed daily/ 2-3 times a week of any kind of HFSS foods was classified as High HFSS consumer and a person who never consumed/ rarely consumed/ consumed once a week of any kind of HFSS foods was classified as Low HFSS consumer.

Data analysis: The data was collected using Online platform (Google forms) and converted into MS Excel and was analyzed using SPSS version 23 software (IBM Corp. Armonk, NY).[10] The quantitative variables were expressed as Mean ± SD and qualitative variables as frequency and percentage. The association between categorical variables was tested by Chi-square test or Fischer Exact test. A p value of <0.05 was considered as significant.

Ethical approval was obtained from the Institutional ethical Committee no: IECKMCT/57/2024 dated 16.05.2024.

Results:

A total of 202 students participated in the study. The mean ± SD age of participants were 21.7 ± 1.3 years with a range of 19-27 years. Majority of the participants were females (78.7%). Majority of them resided at Hostel (80.2%). About two-thirds of participants had an average monthly family income of Rs.10,001- 1,00,000. (Table 1)

Table 1: Socio-demographic profile of participants (N=202)

Variable	n	%
Gender		
Female	159	78.7
Male	42	20.8
Others	01	0.5
Current place of stay		
Home with family	38	18.8
Hostel	162	80.2
Alone as paying guest	02	1.0
Monthly Family Income in Rs (N=182)*		
Less than 10,000	26	14.3
10,001-50,000	60	33.0
50,001-1,00,000	58	31.9
1,00,001-5,00,00	28	15.4
> 5,00,000	10	5.4

Note. *20 participants were not aware of their family income

All the participants were aware about the HFSS foods with 60% (n=122) of participants were somewhat aware, followed by 32% (n=65) who were Very well aware whereas 7.4% (n=15) of them were not very aware. More than half of participants perceived that HFSS foods had a Negative effect on their health (52%) whereas 44% had no particular opinion. Although 3% perceived a positive impact for HFSS foods on their health.

The most regularly consumed HFSS foods were Confectioneries (54.5%), followed by fast food (53%) & sugary drinks (45%). Majority were buying the HFSS foods from college canteens (64.9%), followed by Supermarkets (48.5%) and from Restaurants (35.6%). About 45% of participants consumed fast foods such as Burgers, pizzas, French fries etc once in a week. About 30% consumed sugary beverages like soft drinks, packaged fruit juices etc at least 2-3 times a week. About 25% consumed salty snacks like salted chips/peanuts/ cashews etc once a week. One fourth of participants (24.3%) consumed sugary bakery items like confectioneries, croissants, peda etc. 2-3 times a week and 4% consumed daily. (Table 2)

Table 2: Distribution of HFSS food consumption among participants (N=202)

Variable	n	%
Type of food*		
Salted Chips	76	37.6
Sugary drinks	91	45
Fast foods	107	53
Confectionery	110	54.5
Packaged snacks	82	40.6
Regularly bought from*		
College canteens	131	64.9
Supermarkets	98	48.5
Shopping malls	35	17.3
Restaurants	72	35.6
Online food delivery	64	31.7
Bakery shops	1	0.50
Consumption of fast foods (Burgers, pizzas etc)		
Daily	1	0.5
2-3 times/week	23	11.4
Once a week	92	45.5
Rarely/never	86	42.6
Consumption of Sugary beverages		
Daily	3	1.5
2-3 times/week	58	28.7
Once a week	72	35.6
Rarely/never	69	34.2
Consumption of Salted Snacks		
Daily	1	0.5
2-3 times/week	48	23.8
Once a week	71	35.1
Rarely/never	82	40.6
Consumption of Sugary bakery items		
Daily	8	04.0
2-3 times/week	49	24.3
Once a week	71	35.1
Rarely/never	74	36.6

*Multiple responses

The major factor influencing the choice of HFSS foods as reported by participants were taste (82.2%) followed by social media influences like advertisements (48%) and lower Cost (31.2%). Majority of participants reported Friends (62%), social media (60%) and family

(34%) as sources of information regarding HFSS foods. About half of the participants read food labels sometimes, whereas 12% always read them before buying HFSS foods. Whereas one third rarely or never reads it. The mean BMI of participants was 22.5 ± 3.3 kg/m^2 with a range of 14.7-33.7kg/m^2. Most of them were within normal BMI whereas 25% were Overweight and 22% were obese. About 12% were underweight. (Table 3)

Table 3: Factors influencing HFSS choice and Anthropometric assessment of participants. (N=202)

Variable	n	%
Factors influencing choice of HFSS foods*		
Taste	166	82.2
Advertisements	17	8.4
Packaging	27	13.4
Cheaper	63	31.2
Offers & Discounts	39	19.3
Non-Availability of healthy alternatives (Convenience)	47	23.3
Social media influences	98	48.5
Sources of information*		
Media	64	31.7
Social media	121	59.9
Family	68	33.7
Friends	125	61.9
Advertisements	40	19.8
Reading food labels of HFSS foods		
Always	25	12.4
Sometimes	101	50.0
Rarely	62	30.7
Never	13	6.4
Not aware	1	0.5
Anthropometry (Asian classification of BMI) (n=198)		
Underweight	23	11.6
Normal	81	40.9
Overweight	50	25.3
Obese	44	22.2

*Multiple responses

About 51.5% (n=104) of participants were classified as High Consumers of HFSS foods and 48.5% (n= 98) as Low consumers. A significant number of participants were regularly taking HFSS foods of any type. The distribution of HFSS consumption was similar among females (51.6%) and males (50%). Similarly, the distribution of HFSS consumption was comparable between participants who were staying in Hostel and paying guest (50%), however those staying along with families had a higher HFSS consumption (58%), but this was not statistically significant. The consumption was more among those who were not aware about HFSS food (53.3%), compared to those who had some form of awareness (52.5%) but this was not statistically significant. Those who consumed larger serving size per meal time (71.4%) had a higher HFSS food intake than others but this was also not statistically significant. The participants who had perception of negative impact of HFSS foods on health were High consumers but, this was not statistically significant. Those participants who always combined soft drinks with HFSS foods had a higher HFSS consumption and this was statistically significant (p value <0.001). The distribution of High HFSS was more among those who practiced reading of food labels (60%), compared to others, but this was not a statistically significant association. (Table 4)

The logistic regression model was statistically significant, $x^2 = 19.14$, p 0.014, indicating that the predictors reliably distinguish between high and Low HFSS consumers. Gender, Place of stay, Family income, Self-perceived Awareness level about HFSS, Perception about impact of HFSS foods on their health and Practice of reading food labels were included in the model for predicting the independent predictors. Those who perceived a negative impact of HFSS foods on their health were 1.4 times higher HFSS consumers than others and was an independent predictor (p 0.037). Females, staying as Paying guest, income more than Rs

Table 4: Relationship of factors with HFSS consumption level (N=202)

Variables	High HFSS consumer, n (%)	Low HFSS consumer, n (%)	Total n (%)	p value
Gender				
Female	82 (51.6)	77 (48.4)	159 (100.0)	0.613
Male	21 (50.0)	21 (50.0)	42 (100.0)	
Others	1 (100)	0 (0)	1 (100)	
Place of stay				
Alone as paying guest	1 (50.0)	1 (50.0)	2 (100.0)	0.684
Home with family	22 (57.9)	16 (42.1)	38 (100.0)	
Hostel	81 (50.0)	81 (50.0)	162 (100.0)	
Monthly Family income (Rs.)				
Less than 10,000	9 (34.6)	17 (65.4)	26 (100.0)	0.237
10,001-50,000	34 (56.7)	26 (43.3)	60 (100.0)	
50,001-1,00,000	27 (46.6)	31 (53.4)	58 (100.0)	
1,00,001-5,00,00	13 (46.4)	15 (53.6)	28 (100.0)	
> 5,00,000	7 (70.0)	3 (30.0)	10 (100.0)	
Self-perceived awareness				
Very aware	32 (49.2)	33 (50.8)	65 (100)	0.905
Somewhat aware	64 (52.5)	58 (47.5)	12 (100.0)	
Not Aware	8 (53.3)	7 (46.7)	15 (100.0)	
Perception about impact on health				
Very negative	20 (57.1)	15 (42.9)	35 (100.0)	0.098
Somewhat negative	44 (61.1)	28 (38.9)	72 (100.0)	
Neutral	37 (41.6)	52 (58.4)	89 (100.0)	
Somewhat Positive	3 (60)	2 (40)	5 (100)	
Positive	0 (0)	1 (100)	1 (100)	
Frequency of combining soft drinks with other foods				
Always	9 (100)	0 (0)	9 (100)	<0.001
Sometimes	70 (61.4)	44 (38.6)	114 (100.0)	
Rarely/never	25 (31.6)	54 (68.4)	79 (100.0)	
Practice of reading Food labels				
Always	15 (60)	10 (40)	25 (100)	0.74
Sometimes	50 (49.5)	51 (50.5)	101 (100)	
Rarely/never	39 (51.3)	37 (48.7)	76 (100.0)	

10,000, Low awareness level, practice of reading food labels were not statistically significant independent predictors. (Table 5)

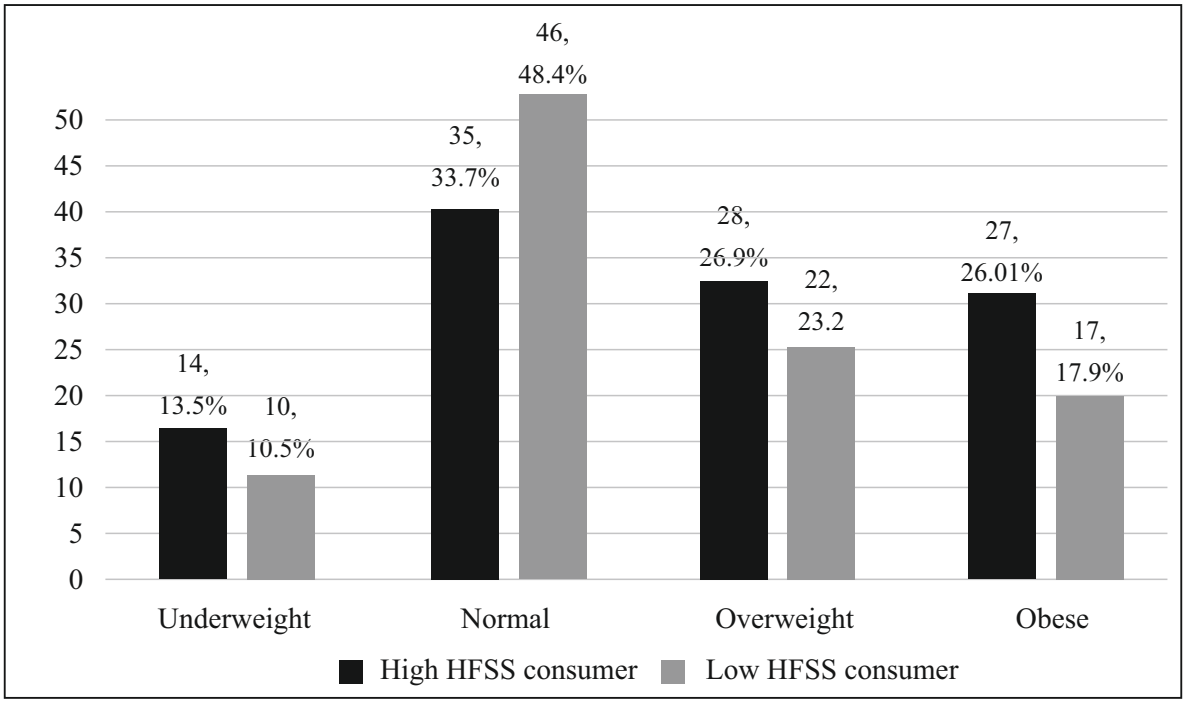
The distribution of Underweight (13.5%), Overweight (26.9 33.7%) and Obesity (26%) were more among those who had high Intake of HFSS foods than those who had low intake but not statistically significant (p value 0.191). (Figure 1)

Discussion:

Table 5: Multivariate Logistic regression for independent predictors of HFSS food consumption

Variables	Exp B (95% CI)	p value
Gender	1.186 (0.570-2.466)	0.649
Place of stay	1.273 (0.622-2.601)	0.509
Family Income	1.113 (0.839-1.478)	0.457
Self-perceived Awareness level about HFSS	1.176 (0.698-1.981)	0.542
Perception about impact of HFSS foods on their health	1.474(1.024- 2.121)	0.037
Practice of reading food labels	0.892(0.581- 1.369)	0.601

Figure 1: Relationship of HFSS intake with BMI



The study indicates that a significant majority of participants (92.6%) were aware of HFSS foods, with 60% being somewhat aware and 32% very well aware. This level of awareness is consistent with findings from international studies, which suggest that awareness often correlates with consumption patterns. In a similar study done in Karachi by Mirza et al though students had high level of awareness about unhealthy foods, a vast majority were consuming junk foods.[11] Also, in another qualitative study done in US by Sogari et al.[12], though the students knew the unhealthy diet practices but were not able to refrain from it. The sources of information were reported mainly as friends, family and social media similar to another study where websites and school were reported by Mizia et al in Poland.[13]

Interestingly, while 36% of participants perceived HFSS foods as having a negative impact on health, 44% had no opinion. This ambivalence may reflect a broader trend observed in many studies where individuals recognize the health risks associated with HFSS foods but continue to consume them due to taste preferences or social influences.[12] The major factors influencing food choices were reported as taste (82.2%), social influences (48%), and cost (31.2%). These factors are frequently reported as primary drivers behind dietary choices among young adults and children globally, emphasizing

the challenge of promoting healthier eating habits in a taste-driven market.[13-15]

In terms of consumption frequency, confectioneries (54.5%), fast foods (53%), and sugary drinks (45%) emerged as the most regularly consumed HFSS foods. This aligns with global trends where fast food consumption is notably high among young adults due to convenience and taste preferences.[3,17] Additionally, the preference for purchasing HFSS foods from college canteens (64.9%) reflects a social environment that promotes such dietary choices, similar to findings in other studies, where food accessibility in educational institutions impacts dietary habits.[13,16]

The study reveals that about 40% of participants consume medium portions at a time, which corresponds to meal portions. The portion sizes play a crucial role in dietary habits. Studies indicate that larger portion sizes contribute to increased calorie intake and are linked to obesity rates among young adults. Portion size control is one of the healthy dietary habits perceived by students in the study done by Mizia et al.[13]

Moreover, the frequency of fast-food consumption-45% once a week-echoes findings from various studies indicating that regular fast food consumption is prevalent among young adults globally.[17] However, the frequency of consumption of packaged foods was much lower than study done by Haseena et al.[18] in North of Kerala. Post COVID-19 pandemic, the consumption of junk foods has significantly increased among the youths as reported by Parker et al.[19] Studies have shown that they consumes fast food due to its convenience and palatability, despite being aware of its negative health implications.[13]

Participants expressed a desire for better access to healthier choices and more awareness programs, suggesting an acknowledgment of the need for systemic changes to support healthier eating behaviors. This sentiment is echoed in advocating for policy changes that enhance food environments in educational institutions to promote healthier options while reducing the availability of HFSS foods.[20] It also emphasizes the need to have food literacy among the children and young adults in order to make healthy choices in day-to-day life.

The Front of Package Labeling (FOPL) has not yet been enforced in India, to warn against the HFSS foods. However, only about 12% read the food labels every time and 50% read at least sometimes while purchasing the foods. This highlights that implementation of FOPL may have a good impact on the choice of purchasing these HFSS foods among young adults.

Conclusion:

The results of this study highlight the factors influencing the individual preferences, and awareness regarding the HFSS foods among the medical undergraduates. Due to accessibility, social influences and taste preferences, many individuals continue to consume HFSS foods despite being well aware of the health dangers involved. The noteworthy consumption trends especially for fast food and sugary drinks, emphasize the difficulties in encouraging healthier eating practices in a society that frequently places convenience and taste above nutritional content. Although people are aware of the issue, making better dietary choices is not always the result. This discrepancy highlights the necessity of focused interventions that address the underlying causes of consumption patterns in addition to increasing awareness.

To conclude, while there is a clear awareness of HFSS foods among young adults, translating this awareness into healthier eating habits remains a significant challenge. Addressing this issue requires a multifaceted approach involving education, policy changes, and improved access to healthier food options.

Recommendations:

Educational institutions ought to endeavour to make more healthful food options available in the campus canteen & premises. Working with neighbourhood businesses to provide wholesome substitutes may be able to influence consumer behaviour. Price

reduction/subsidizing the healthier foods and categorization of foods as green and red may encourage healthier choices among young adults at these outlets.

To reduce the excessive calorie intake from HFSS foods, encourage young adults to use portion management techniques. The visual signals/posters for proper serving sizes could be highlighted in institutional canteens as these are the common access zones of HFSS foods to medical undergraduates

Encourage the implementation of Front of Package Labelling (FOPL) laws in India to give consumers more lucidity about HFSS foods. This could empower consumers to make informed decisions at the point of purchase.

Declaration

Funding: Nil

Conflict of Interest: Nil

Acknowledgments: We extend our sincere gratitude to National Institute of Health and Family Welfare, New Delhi, India and State Institute of Health and Family Welfare, Bangalore, India for their guidance and support.

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Pattern and Severity of Substance Use Disorder among Patients Seeking Treatment at De-addiction Centres in District Amritsar, Punjab

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Abstract:

Introduction: Worldwide substance use is a major public health problem. There are multiple socio-demographic correlates of substance use disorders. **Objective:** To study pattern and severity of substance use disorder (SUD) among patients seeking treatment at two de-addiction centres in Amritsar. **Methods:** A cross-sectional study was conducted on 203 patients with substance use disorders seeking treatment selected by total enumerative method in the time period from 25th March – 24th April,2025 using a predesigned and pretested proforma. The severity of substance use disorder was graded as Mild=2-3, Moderate= 4-5 and Severe=6+ using Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria for substance use disorder. **Results:** Mean age of the study participants was 36.4±11.1 years and majority (98%) were males. In order of frequency, substances used were opioids 170 (83.7%), alcohol 77 (37.9%), OTC (over the counter drugs) 42 (20.7%) and tobacco 31 (15.3%). Peer pressure was the commonest reason for the initiation of substance use. By grade, 170 (83.7%) participants had severe, 24 (11.8%) had moderate and 9 (4.5%) participants had mild grade of substance use disorder. Significant associations between severity of substance use disorder and frequency of substance use (OR= 3.61,95% CI=1.10-11.85), clinically diagnosed depression (OR=3.75, 95% CI=1.25-11.19), financial or legal issues faced due to substance use (OR =4.68, 95% CI=2.08-10.50) and current pattern of substance use (OR=4.30 95%, CI=1.50-12.32) were found. **Conclusion:** Sociocultural factors play a dominant role in substance use disorders. Socio-culturally relevant behaviour change communication and targeted interventions are need of the hour.

Keywords: Alcohol, Depression, Opioid, Peer pressure, Substance use disorder, Tobacco

Introduction:

Substance abuse has become a great public health concern across the globe. According to the latest United Nations Office on Drugs and Crime (UNODC) World Drug Report, the number of people using drugs in 2025 was 316 million and this number has increased by 28% over the past decade.[1] The most commonly abused drugs are alcohol, marijuana (Ganja), bhang, hashish (charas), various kinds of cough syrups, sedative tablets, brown sugar, heroin, cocaine, tobacco (cigarette, gutka, pan masala) etc. It is estimated that in India, there are approximately 62.5 million alcohol users, 8.7 million cannabis users and 2 million opioid users. Also, India stands second as a tobacco consumer worldwide with an estimated 250 million tobacco users of age 10 years and above.[2,3]

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Devgun P, Nagpal M, Bajwa D, Ghara HK, Gupta R, Kaur A et al. Pattern and Severity of Substance Use Disorder Among Patients Seeking Treatment at De-addiction Centres in District Amritsar, Punjab. Healthline. 2025;16(3): 183-188
	DOI : 10.51957/Healthline_735_2025	

Received : 23-05-2025 **Accepted** : 23-09-2025 **Published :** 30-09-2025

The self-administration of those substances which produces mental and behavioural disorders are called psychoactive substances according to ICD -11 (International Classification of Diseases). World Health Organization (WHO) states that substance abuse is persistent or sporadic use of psychoactive drugs, alcohol and other illicit drugs which is inconsistent with or unrelated to acceptable medical practice.[4]

Many studies have shown that substance use usually starts during adolescence or early youth and there are multiple social, biological and psychological factors that are responsible for substance abuse. Peer pressure, the desire of experimentation and low self-esteem makes them vulnerable to substance abuse.[5]

Various community-based surveys have reported that substance use disorders have many physical, social, psychological and financial implications. Substance abuse is a risk factor for many non-communicable diseases. Injectable drug users are at risk of infections like HIV, Hepatitis C and Hepatitis B.[6]

Recent data on the pattern and extent of substance use is scanty; hence the present study was conducted to know the pattern and severity of substance use and the factors affecting substance use disorder.

Methods:

The study was a cross-sectional study conducted among the patients with substance use disorders seeking treatment at two de-addiction centres in Amritsar after taking due permissions from the Institutional Ethical Committee (letter no. SGRD/IEC/2025-430 dated 24/3/2025). Data was collected over a period of 1 month from 25th March to 24th April 2025. Informed consent was taken from all the study subjects and confidentiality of information was assured.

The study included all patients with substance use disorder who were seeking treatment at any one of two de-addiction centres in Amritsar and provided informed consent, as well as those who were able to comprehend and communicate clearly. Based on this a total of 203 study subjects were recruited for the study by complete enumeration method

Study tool: A self designed questionnaire which included questions on socio-demographic variables and substance use was administered to the study participants. The questionnaire also included a pre-validated scale; Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) [7] which was used to assess the severity of substance use disorder.

Data collection: Students of MBBS admission batch 2021 who chose research as elective along with a clinical psychologist conducted the interviews after sensitization and training in the art of interviewing. The questionnaire was interviewer administered. Back translation was used to convert the questionnaire to the vernacular language.

Statistical Analysis: The data collected were compiled and analysed using SPSS version 23.0. Descriptive statistics were applied as means and percentages. Inferential statistics like odds ratio with confidence intervals were calculated and valid conclusions were drawn.

Operational definitions:

Substance use: World Health Organisation states that substance use is persistent or sporadic use of psychoactive drugs, alcohol and other illicit drugs which is inconsistent with or unrelated to acceptable medical practice.

DSM-5[7]: The "Diagnostic and Statistical Manual of Mental Disorders", Fifth Edition, text revision, often called as the DSM-V-TR or DSM-5-TR criteria. The DSM-5-TR allows clinicians to specify how severe or how much of a problem the substance use disorder is, depending on how many symptoms are identified.

- Mild: Two or three symptoms indicate a mild substance use disorder.
- Moderate: Four or five symptoms indicate a moderate substance use disorder.
- Severe: Six or more symptoms indicate a severe substance use disorder.

Results:

Table 1 shows that mean age of the study participants was 36.4±11.1 years and the median income of the family was 25,000 per month with the interquartile range (IQR) from 15,000 to 35,000 per month. Out of the

total 203 study participants, 199 (98%) were males, majority i.e. 86 (42.4%) were semi-skilled workers and 35.5% had studied up to high school. 140 (69%) were married and 61.1% belonged to nuclear family.

Figure 1 shows that most common substances abused were opioids 170 (83.7%) followed by alcohol 77 (37.9%), OTC (over the counter drugs) 42 (20.7%) and tobacco 31 (15.3%).

Table 1: Distribution of study participants according to socio-demographic parameters (N=203)

Sociodemographic parameters	n (%)
Gender	
Male	199 (98%)
Female	3 (1.5%)
Transgender	1 (0.5%)
Occupation	
Professional	18 (8.9%)
Skilled	47 (23.2%)
Semi - skilled	86 (42.4%)
Unskilled	35 (17.2%)
Unemployed	17 (8.4%)
Educational status	
Graduate and above	40 (19.7%)
High school	72 (35.5%)
Till matric	60 (29.6%)
Till primary	21 (10.3%)
Illiterate	10 (4.9%)
Marital status	
Married	140 (69%)
Unmarried/Bereaved/separated	63 (31%)
Type of family	
Nuclear	126 (62.1%)
Joint/others	77 (37.9%)

Figure 1: Percentage distribution of substances used by the study participants

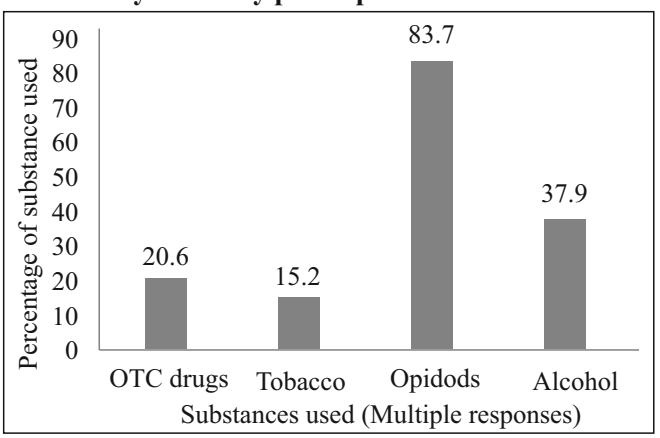

Table 2: Distribution of the study participants according to factors associated with substance use (N=203)

Factors associated with substance use	n (%)
Frequency of substance use	
Daily use	135 (66.5%)
≥3 times	55 (27.1%)
<3 times	1 (0.5%)
Irregular	12 (5.9%)
Number of routes by which substance used	
Single (Oral/parenteral/Inhalation)	163 (80.3%)
Dual	37 (18.2%)
All	3 (1.5%)
Status of substance use	
Stopped/under treatment	17 (8.4%)
Continued with same substance as initiated on	121 (59.6%)
Addition of another substance to substance initiated on	57 (28.1%)
Changed to another substance	8 (3.9%)
Occasion for indulging in substance use now (n=186)	
Recreational/happy	31 (16.7%)
Sad/Depressed/anxious	53 (28.5%)
Not related	102 (54.8%)
Know someone with substance use disorder	
Yes	149 (73.4%)
No	54 (26.6%)
Most compelling reason for first use	
Peer pressure	105 (51.7%)
Curiosity	42 (20.7%)
Stress relief	32 (15.8%)
Any other	24 (11.8%)
Perception- My substance use habit is problematic	
Yes	188 (92.6%)
No	15 (7.4%)
Previously sought treatment for substance abuse	
Yes	115 (56.7%)
No	88 (43.3%)
Faced financial/legal issues due to substance abuse	
Yes	124 (61.1%)
No	79 (38.9%)
Debt incurred due to substance use	
Yes	137 (67.5%)
No	66 (32.5%)
Clinically diagnosed case of depression	
Yes	62 (30.5%)
No	141 (69.5%)

Perusal of table 2 reveals that the mean age of starting substance use was 24.9±7.26 years and median expenditure on substance use is 5600/month which ranged from 2000 to 10,000 per month; 137 (67.5%) had incurred debt for indulging in substance use; 149 (73.4%) knew someone with substance use before initiating and the commonest reason for initiation to substance abuse was peer pressure in 105 (1.7%) cases followed by curiosity, stress relief and others.

Majority i.e., 135 (66.5%) were practising substance use daily and the most common route of administration was single i.e. either oral, parenteral or inhalation 163 (80.3%) followed by double either oral+parenteral, oral+inhalation or parenteral+ inhalation 37 (18.2%) and 3 (1.5%) were using through all the three routes. Regarding the current pattern of substance use, 121 (59.6%) were continuing with the same substance as they were initiated on, others either added another or changed to some other substance or stopped taking respectively.

Table 3: Distribution of the study participants according to the severity of substance use disorder using DSM -5 criteria (N=203)

Grade (Score)	n (%)
Mild (2-3)	9 (4.5%)
Moderate (4-5)	24 (11.8%)
Severe (≥ 6)	170 (83.7%)

More than half, 102 (54.8%) reported that indulging in substance use was not related to feeling of sadness or happiness. Out of the total study subjects, 62 (30.5%) were clinically diagnosed cases of depression, 188 (92.6%) perceived substance use as a problem, 115 (56.7%) had undergone treatment for substance use in the past too. 124 (61.1%) participants reported facing financial and legal issues due to indulging in substance use.

Table 3 shows the severity of substance use disorder according to DSM-5 criteria. Out of the total 203 study subjects 170 (83.7%) had severe substance use disorder.

Perusal of Table 4 shows that frequency of substance use (OR= 3.61, 95% CI=1.10-11.85), clinically diagnosed depression (OR=3.75, 95% CI 1.25-11.19), financial or legal issues due to substance use (OR=4.68, 95% CI=2.08-10.50) and the current pattern of substance use (OR=4.30, 95% CI=1.50-12.32) were significantly associated with the severity of SUD while no association was found with type of family, marital status, in touch with somebody with substance use, debt incurred due to substance use, number of routes of substance use and substance use perceived as a problem.

Table 4: Association of variables related to substance use with severity of substance use (N=203)

Variables related to substance use	Mild/ Moderate, n=33	Severe, n= 170	Odds Ratio (95%CI)	p value
Know someone with substance use disorder				
No	5 (9.3)	49 (90.7)	0.44 (0.16-1.20)	0.103
Yes	28 (18.8)	121 (81.2)		
Frequency of substance use				
Irregular or <3 times/day	5 (38.5)	8 (61.5)	3.61 (1.10-11.85)	0.024
Daily or ≥3 times/day	28 (14.7)	162 (85.3)		
Pattern of substance use				
Stopped/under treatment	7 (41.2)	10 (58.8)	4.30 (1.50-12.32)	0.003
Same substance/ Addition/ Changed	26 (14.0)	160 (86.0)		
Number of routes of substance use				
Single	29 (17.8)	134 (82.2)	1.94 (0.64-5.90)	0.231
Dual or All	4 (10.0)	36 (90.0)		
Debt incurred due to substance use				
Yes	25 (18.2)	112 (81.8)	1.61 (0.68-3.81)	0.267
No	8 (12.1)	58 (87.9)		
Faced financial/legal issues due to substance abuse				
No	23 (29.1)	56 (70.9)	4.68 (2.08-10.50)	<.001
Yes	10 (8.1)	114 (91.9)		
Clinically diagnosed case of depression				
No	29 (20.6)	112 (79.4)	3.75 (1.25-11.19)	0.01
Yes	4 (6.5)	58 (93.5)		

Discussion:

Present study showed that mean age of the subjects with substance abuse was 36.4 ± 11.1 years. The findings were not in concordance with many of the studies as most of the studies on substance abuse are done either on adolescents or school children.[8,9] The study by Saikia N et al.[8] on male adults in North-East India also reported that substance use is more common in skilled and semi-skilled workers and that the likelihood of substance use goes down with increasing educational status. A study in Nigeria by Dapap DD et al.[10] done on the patients with substance use in the emergency department showed that 59.5% were married, similarly in present study we found that 69% were married.

A study by Kumar S et al.[11] in Karnataka reported that in their study 22% were tobacco users and 8.2% were tobacco users. A National Survey on Extent, Pattern and Trends of Drug Abuse in India also reported that most commonly used substances in India are alcohol (21%), cannabis (3%) and opiates (0.7%).[12] Another cross-sectional study done in India by Rao R et al.[13] showed that most commonly used substance was tobacco (31.4%) followed by alcohol (23.8%) and cannabis (4.1%).

In the present study, it was found that continued close association with a substance user was found in 149 (73.4%) of the study participants. Peer pressure, 105 (51.7%) was identified as the most common reason for initiation to substance use. A review done in India by Gupta H et al.[14] on medical students also reported that family history and peer pressure are the important associated factors for SUD. Another study done on male adolescents in suburban areas of Delhi by Daniel LT et al.[15] showed that substance use is seen more among those who had nuclear families (67.2%) and having low educational status (52.7%). A study in Nigeria by Vincent CN et al.[16] showed that the mean age of starting substance abuse was 23± 3.7 years which is consistent as in our study. Present study showed that out of the total 66.5% were practicing substance use daily and 80.3% were using single route of administration. A study on school students in Nigeria by Adelekan ML et al.[17] reported that approximately 50% of the study subjects sniff or snort and 52.9% used substance on daily basis.

The present study observed that the average income of the families of substance user was 25,000/month ranging from 15,000 to 35,000/month and the median expenditure is 5600/month ranging from 2000 to 10,000 per month. The expenditure was found to be ranging from 1.4% to 66.7% of the family income. Studies done by Murthy P et al.[18] and Patel R et al.[19] have also mentioned about the socio-economic impact or the financial burden in the family due to substance use.

In the present study, it was observed that majority i.e., 83.7% were suffering from severe substance use disorder and the factors significantly associated with the severity of substance use disorder were frequency of substance use, diagnosed case of depression, those who had faced some financial or legal issues due to substance use and the pattern of substance use; other factors like age, sex, type of family, marital status, age of initiation, anyone known with substance use and type of substance use did not affect the severity of substance use disorder. A descriptive cross-sectional study by Olashore AA et al.[20] on socio-demographic correlated reported that factors significantly associated with substance use were age, poor participation in religious activities, earning more than 150 USD per month and having a father or friend indulged in substance use.

Another community-based study by Kamate RP et al.[21] on adolescents reported that low socio-economic status and family history were significantly associated with substance use.

Present study provides data on individuals seeking treatment for substance abuse which is one of its kind, as majority of studies on substance use are either done in adolescents or school children.

Conclusion:

Health communication in terms of designing behaviour change communication models should be customized taking into account the regional burden of substance use and the pattern of substance use. The targeted interventions also must align with the pattern and severity of the substance use for them to be able to

bring about a decrease in the burden of substance use in the community. Periodic surveys should be carried out to assess the effectiveness of behaviour change communication and targeted interventions.

Limitations:

Small sample size and health facility-based survey make the present study less generalizable. More studies need to be conducted to address the issue of substance use.

Declaration:

Funding: Nil

Conflict of Interest: Nil

Annexure:

List of Co-Investigators:

Davinder Singh Bajwa; Harleen Kaur Ghara; Riya Gupt; Arshanpreet Kaur; Brisleen Kaur; Sehajpreet Kaur; Ivjeet Singh Kalkat; Pooja Khanna; Aditya Raj Malhotra; Kabir Singh Sadana; and Akarshit Saini, MBBS Student, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar, India.

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Perceptions and Effect of Mentoring of MBBS Students in a Peripheral Medical College of West Bengal

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Abstract:

Introduction: Various medical colleges of West Bengal have developed 'Mentoring Program' offering guidance to students. **Objectives:** To assess mentees' and mentors' perception regarding mentoring during MBBS, to identify the barriers in a mentor-mentee relationship, to observe the effect of mentoring on perceived stress among students and identify association between stress level and socio-demographic profile. **Methods:** Institution based analytical study (November 2021 - October 2022) where total enumeration of third year students was done (n=183). HESI scale was used for the stress score & association between stress level and socio-demographic profile (chi-square/fisher's exact test) were done. **Results:** Majority of the students 151 (82.51%) stated that they were benefitted from the mentoring. Among the benefitted students 35 (23.18%) stated it as academic, 22 (14.57%) as personal and 88 (58.27%) as both. Most of the students felt an ideal mentor should be friendly 161 (87.98%), easily approachable 166 (90.71%), a good listener 144 (78.69%), understandable 148 (80.87%), soft spoken 125 (68.31%), and should guide by valuable suggestions 138 (75.41%). About the barriers in communicating with the mentor 61 (33.33%) stated time constraints as the major barrier. A significant reduction in mean stress scores, from 2.48 (±0.39) before a mentoring program to 2.40 (±0.34) after ($p < .005$) by HESI scale was seen by paired t-test. Stress was not found to be significant with socio-demographic profile (chi-square/fisher's exact test). **Conclusions:** Perception regarding mentoring among the mentors & mentees was found to be positive. Mentoring played a significant role in stress reduction among the students.

Keywords: Medical education, Mentoring, Mentors, Medical students, Psychological stress

Introduction:

Mentoring is crucial for successful career in medical field. Mentoring was introduced formally in medical education during late 1990s.[1] As per the definition of Standing Committee on Postgraduate Medical and Dental Education it is, "A process whereby an experienced, highly regarded, empathetic person (the mentor) guides another (usually younger) individual (the mentee) in the development and re-examination of their own ideas, learning, and personal and professional development."[2]

The three essential purposes of mentoring are continuing education, personal support and professional development. A successful mentoring relationship

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Lahiri S, Choudhari S, Mukhopadhyay P, Sarkar M. Perceptions and Effect of Mentoring of MBBS Students in a Peripheral Medical College of West Bengal. Healthline. 2025;16(3): 189-194
	DOI : 10.51957/Healthline_723_2025	

Received : 18-07-2025 **Accepted** : 06-09-2025 **Published :** 30-09-2025

depends on the active participation of both mentor and mentee. Mentoring in relation to the medical education is a long-term relationship between the mentor and the mentee, benefitting the mentor and mentee as well as the society by bringing out the best medical graduate who can take care of the community.

MBBS course can be stressful to students. There is a growing concern about stress and depression in MBBS students and its effect. Students are often unwilling to seek help for stress and emotional problems which can only be magnified leading to burnout occurring early in their careers.[3,4]

Though mentoring is practiced in many medical colleges in West Bengal, the analysis on how far it helps the students in achieving its objectives is not much known. [5,6]

As a part of Advance Course in Medical Education project mentoring of the Phase III Part 1 MBBS students of Bankura Sammilani Medical College, Bankura started from 2022. Hence, the present study was done to assess the perception of mentees and mentors about mentoring programme and its effect on perceived stress among medical students. The objectives of the present study were to assess the perception of mentoring programme among the mentees (Phase III Part 1 MBBS students) and mentors (Selected Faculties of Department of Community Medicine of the Institution), to identify the barriers in a mentor-mentee relationship, if any to observe the effect of mentoring on perceived stress among the MBBS students & to find out any association present between stress level and socio-demographic profile.

Methods:

It was an institution based analytical study with longitudinal design. Total study period was 12 months (November 2021 - October 2022). Study Population were Phase III MBBS students (2019- 2024) of the medical college as mentee and selected ten faculties of Department of Community Medicine of the said Institution. The inclusion criteria were all the students of Phase III Part 1 MBBS and exclusion criteria was students who were not willing to take part in the study.

Total enumeration of Phase III Part 1 MBBS students was done. Out of total 200 students 183 students responded.

Study tool: Questionnaire was prepared after thorough literature search, and was validated by the faculties of the department, and pilot study was done. The questionnaire contained questions regarding perception of mentoring and perceived stress (Higher Education Stress Inventory Scale) in medical education.

To assess the stress levels, the instrument Higher Education Stress Inventory (HESI) developed by Dahlin et al.[7] specifically to assess stress among medical students was used. The instrument contained 33 statements designed to assess degree of stress and its generators. The responses are rated on a four-point Likert scale (i.e. 1-4), "1=totally disagree", 2=somewhat disagree", 3=somewhat agree, 4=totally agree; with reversed order for items describing absence of stressors. High scores are always less favourable. Total questions were 33, total score of each student was divided by 33 to get the mean stress score for each student. Then the total mean stress scores of all students were divided by the total number of students(183) to get the final mean stress score. The instruments were initially tested in a pilot study in 20 students and reliability and validity assured.

Study technique: The students of Phase III Part 1 MBBS (2019 batch) experienced the mentorship programme for 6 months. This was their first experience with a mentorship program. First week of every month was scheduled for a formal meeting between the mentors and the mentees. From the department of Community Medicine, 10 faculties acted as their mentors. Apart from this, the students met their mentors whenever needed as an informal meeting. The students shared with their mentors any academic challenges, personal issues or any psychological problem which they were facing while pursuing the course.

Before starting of the mentoring programme, the mentees were asked to fill up the HESI questionnaire in a google form shared with them in a common WhatsApp group to assess the perceived stress score. After 6 months of mentorship program the mentees were again asked to fill up the HESI questionnaire to assess the perceived

stress score. The mentees and the mentors were asked to fill up and submit a google form questionnaire online containing various questions regarding their perception of mentoring.

Data analysis: Data were entered into Microsoft excel. IBM SPSS Statistics for Windows, Version 22.0; IBM Corp., Armonk, NY, USA) was used for analysis of the data. For analysis of categorical data number and percentage were used. As data were normally distributed, so paired t-test was used to test the difference between HESI scores of medical students before and after mentoring programmes. To test association between stress level and socio-demographic profile chi-square test/fishers exact test was used. For all statistical purposes, p value less than 0.05 was considered significant. Ethical consideration: Ethical clearance was taken from the Institutional Ethics Committee (BSMC/Aca:-3710). Written informed consent was obtained from all the students and their mentors.

Results:

Out of 200 students 183 participated and properly filled the questionnaires which were taken into consideration for analysis of results. Among the students 109 (59.56%) were males & 74 (40.44%) were females. The age of the students was expressed in mean ± SD was 21.73 ± 1.07 years. Among the students 6.01% students had doctor parents and 86.89% were resided in the hostel.

Out of 6 mentoring sessions conducted, 25.68% of students had attended all the sessions, whereas 12.02% had attended only one session, 10.38% attended five sessions and 14.21% attended four sessions. Average number of sessions attended by the students were 3.63 ± 1.83.

Majority of the students (82.51%) stated that they were benefitted from the mentoring sessions. Among the benefitted students, 23.18% stated it as academic, 22 (14.57%) as personal and 88 (58.27%) as personal and academic both.

One to one mentoring was preferred by 34.42% students, whereas 29.51% students preferred group mentoring and 36.07% students preferred both one to one and group mentoring methods. Among the students who preferred one to one mentoring, all (100 %) preferred to have mentoring through face-to-face meeting whereas some preferred interaction over phone (38.10%), email (3.17%) and WhatsApp (71.43%) (multiple response question). The quality of the contact with mentor was stated as adequate by 83.06% students, and the rest 16.94% did not have adequate contact with mentor. Among the mentees 62.30% stated that they were proactive during the sessions.

Topics discussed during the mentoring sessions were academics (87.43%), hostel issues (38.25%), personal problems (69.95%) and general discussion nothing in particular (15.85%).

Majority of the students (98.36%) had the opinion that mentoring was a good idea. Regarding perceptions of mentees about which were most enjoyable, most of them (74.32%) stated to be interaction followed by mentors concern (59.02%) and felt supported (49.18%). (Table 1)

Majority of the students (97.81%) stated that the goal of mentoring was to develop professionalism and support students in their personal growth while many students had opted that to help in career development (49.18%) and few opined for the support in the research (27.87%).

Among the students 93.44 % thought that their mentors were approachable. About 54.10% felt very relaxed and satisfied after mentoring session, 33.33%

Table 1: Distribution of mentees according to the part most liked during the mentoring sessions (N= 183)

Part most liked in the mentoring sessions	Number (%)*
Interaction	136 (74.32)
Mentors concern	108 (59.02)
Felt supported	90 (49.18)
Advice about medical profession	77 (42.08)
Allowed settling in	37 (20.22)
Single person addressing all problems	27 (14.75)
Nothing	16 (8.74)

* Multiple responses

felt relaxed to some extent, and 4.37% of them were not relaxed but confused.

Most of the students (90.71%) feel an ideal mentor should be easily approachable followed by friendly (87.98%) and understandable (80.87%). (Table 2)

Most of the students opine that the responsibilities of a mentee are to listen to their mentors (78.14%), to be punctual (65.03%), to discuss their problems freely with their mentors without any hindrance and follow their mentors instructions (85.79%). In addition, 92.35% suggested that choice to be given for the mentees in selecting their own mentors.

About the barriers in communicating with the mentor, 33.33% stated time constraints as the major barrier. (Table 3)

Though 70% mentors think that mentoring is a good idea, among the mentors 50% think that there was inadequate contact with the mentees. Among the mentors 70% believed that mentees are getting benefitted from the program. Things mentors enjoyed most about mentoring like personal contact with students (90%), saw things from students perspective (70%) etc.

Table 2: Distribution of mentees according to characteristics an ideal mentor should have (N= 183)

Characteristics an ideal mentor should have	n (%)*
Easily approachable	166 (90.71)
Friendly	161(87.98)
Understandable	148 (80.87)
A good listener	144 (78.69)
Should guide the students by their valuable suggestions	138 (75.41)
Soft spoken	125 (68.31)

* Multiple responses

Table 3: Distribution of mentees according to barriers in communicating with the mentors (N= 183)

Barriers in communicating with the mentor	n (%)*
No barriers	84(45.90)
Time constraints	61(33.33)
I didnt commit to the program	26(14.20)
Combination of the above reasons	23(12.57)
Tried but couldnt meet	17(9.29)
Mentor was uninterested	2(1.10)

* Multiple responses

Table 4: Association between sociodemographic profile of study participants with their stress level (N= 183)

Sociodemographic profile	Stress level		$\chi 2$	p-value
	Low (92) n (%)	High (91) n (%)		
Gender				
Male	53 (49.1)	55 (50.9)	0.152	0.764
Female	39 (52.0)	36 (48.0)		
Staying at				
Hostel	84 (52.8)	75 (47.2)	3.171	0.075
Home	8 (33.3)	16 (66.7)		
Residence				
Rural	27(51.9)	25 (48.1)	0.079	0.779
Urban	65(49.6)	66 (50.4)		
Medium of School Education (Fishers Exact Test)				
Bengali	35(51.5)	33(48.5)	0.133	0.966
English	53 (49.5)	54(50.5)		
Hindi	4 (50.0)	4(50.0)		
Doctor Parent/s				
Yes	5 (45.5)	6 (54.5)	0.109	0.742
No	87 (50.6)	85 (49.4)		

Among mentors 80% thought they developed both communication skills: listening & affective skills: problem solving during mentoring.

Things found difficult by the mentors in the program like mentees lack of interest (60%), lack of time (40%) etc. Suggestions for improvement by the mentors were circulate mentoring guide (80%), frequent review or feedback (60%), mentor to mentor meetings (60%) etc.

According to the HESI scale the mean stress score was 2.48± 0.39 before the mentoring program had started (min score 1.24, max score 3.42). The mean stress score was 2.40± 0.34 after the mentoring program ended (min score 1.24, max score 3.30). Difference between the stress score before and after mentoring program was statistically significant (p= 0.00043 by paired t-test. Considering median value of stress to be 2.42, the study participants were categorized into High stress level 91 (49.73%) with score more than 2.42 and low stress level 92 (50.27%) with score 2.42 or less. There were no significant association between stress level & socio-demographic profile.(Figure 4)

Discussion:

Mentoring means guiding someone through proper approach. As mentoring was not a regular part of this institution, this was first time that mentoring was introduced, as a result the impact of this mentoring program for low. In the present study, majority of the students 82.51% stated that they were benefitted from the mentoring sessions. Among the benefitted students, 23.18% stated it as academic, 14.57% as personal and 58.27% as personal and academic both. A study by Karuna SP et al.[6] showed the students benefitted academically (36%) or personally (4.7%) or both (16.3%). Among the students who preferred one to one mentoring in this study, all (100 %) preferred to have mentoring through face-to-face meeting which is similar to the study by Karuna SPet al.[6] and the remaining preferred over phone (38.10%), email (3.17%) and WhatsApp (71.43%). The quality of the contact with mentor was stated as adequate by 83.06% students similar to study by Karuna SP et al.[6]

Majority of the students (97.81%) stated that the goal of mentoring was to develop professionalism and support students in their personal growth while many students had opted that to help in career development (49.18%) and few opined for the support in the research (27.87%). Present study findings are comparable with study done by Karuna SP et al.[6], Bhatia et al.[5] and Rose et al.[8]

Among the students 93.44 % thought that their mentors were approachable. About 54.10% felt very relaxed and satisfied after mentoring session, 33.33% felt relaxed to some extent, and 4.37% of them were not relaxed but confused. Most of the students felt an ideal mentor should be friendly (87.98%), easily approachable (90.71%), a good listener (78.69%), understandable (80.87%), soft spoken (68.31%), and should guide the students by their valuable suggestions (75.41%). These findings are similar to the study by Shilpa M et.al.[9]

About the barriers in communicating with the mentor, 45.90% students stated that there were no barriers in communicating with the mentor, but most of them (33.33%) stated time constraints as the major barrier and some (12.57%) stated the combination of reasons which are quite similar to study by Alqahtani SS et al.[10]

Things found difficult by the mentors in the program were mentees lack of interest (60%), lack of time (40%) etc while suggestions for improvement by the mentors were circulate mentoring guide (80%), frequent review or feedback (60%), mentor to mentor meetings (60%) etc. which are similar to the study by Saeed Saleh Alqahtani et al.[10] and Bhatia et.al.[5]

According to the HESI scale the mean stress score was 2.48± 0.39 before the mentoring program had started and 2.40± 0.34 after the mentoring program ended. Among the students 91(49.73%) had stress. A study by Dagistani et.al[11] revealed prevalence of stress of 54.7% among medical students. Difference between the stress score before and after mentoring program was statistically significant(p= 0.00043) by paired t-test. Thus, the mentoring programme achieved significant reduction in stress among the students.

Strength and Limitations:

The Strength of the study is that it emphasised the importance of including mentoring programme in the ongoing medical education curriculum as amended by NMC much before the current ongoing mentoring programmes in some medical institutions.

The study had some limitations like sample size calculation was not done instead complete enumeration of 3rd phase Part 1 MBBS students were done. Other Professional MBBS students could not be included due to time constraint. Self-reported data(google form) were used and only 10 mentors were included in the study which can have potential bias.

Conclusion:

The study advocates that mentoring should be an essential part of medical education. The effort needed is small, as it is not difficult for committed faculties to find time for their mentees. Importantly, there are benefits for both mentors and mentees; also bonding and trust between teachers and students grow.

Recommendation:

The authors further recommend conduction of interventional studies for seeing the effect of such mentoring programme in medical education among MBBS students.

Declaration:

This research work is an outcome of an educational research project undertaken for an Advance Course in Medical Education (ACME) under the NMC Nodal Centre for Faculty Development Programme**,** Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education & Research, Wardha (MS).

Funding: Nil

Conflict of Interest: Nil

Acknowledgement:

Authors are thankful to the MEU of Bankura Sammilani Medical College and all faculties of Dept. of Community Medicine of Bankura Sammilani Medical College for whole heartedly helping us in this mentoring program. Authors are also grateful to all the Phase III Part 1 MBBS students of BSMC for participating in this mentoring programme.

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Effectiveness of an Educational Intervention on Treatment Adherence Among Hypertensive Patients in Rural Delhi

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Abstract:

Introduction: Hypertension is a major public health challenge in low- and middle-income countries like India, with low awareness and control rates, especially in rural areas. Poor adherence to treatment remains a significant barrier. This study evaluated the effectiveness of an educational intervention in improving medication adherence among hypertensive patients in rural Delhi. **Objective:** To evaluate the effectiveness of a multifaceted educational intervention package in improving treatment adherence and blood pressure control among hypertensive patients in rural Delhi. **Methods:** A quasi-experimental, before-and-after study was conducted among 102 hypertensive patients at the Rural Health Training Centre, Najafgarh. The intervention included flipchart-based counselling, weekly voice and text messages, and follow-up visits conducted at 2,4,6 months. Data were collected using Hill Bone Medication Adherence Scale for medical adherence. Cochran's Q, McNemar, Chi square and logistic regression were used for statistical significance of adherence changes and associations. **Results:** Medication adherence increased significantly from 47 (53.9%) at baseline to 72 (70.5%) post-intervention ($p < 0.001$). The mean Hill Bone Scale score decreased from 31.4 ± 6.2 to 28.49 ± 4.46, indicating better adherence. Significant associations were found between adherence and regular Blood Pressure checks ($p = 0.03$), weight loss ($p = 0.001$), and blood pressure control ($p = 0.02$). **Conclusion:** The study demonstrates that educational interventions significantly improve medication adherence and blood pressure control in rural settings. Regular monitoring and lifestyle changes, especially weight loss, further enhanced adherence, highlighting the need for scalable, sustainable hypertension management strategies.

Keywords: Blood pressure, Educational intervention, Hypertension, Medication adherence

Introduction:

Hypertension, commonly referred to as high blood pressure, is a chronic medical condition characterized by persistently elevated pressure in the blood vessels. It is a leading risk factor for cardiovascular diseases (CVDs), stroke, and renal complications, contributing significantly to global morbidity and mortality. Despite the availability of effective treatments, hypertension remains poorly controlled, particularly in low- and middle-income countries (LMICs) like India, where awareness, treatment, and control rates are alarmingly low.[1]

According to the National Family Health Survey (NFHS-5), the prevalence of hypertension in India has risen to 24% among men and 21% among women, with only 50% of individuals aware of their hypertensive

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Mondal A, Kapoor R. Effectiveness of an Educational Intervention on Treatment Adherence Among Hypertensive Patients in Rural Delhi. Healthline. 2025;16(3): 195-200
	DOI : 10.51957/Healthline_742_2025	

Received : 04-06-2025 **Accepted** : 22-09-2025 **Published :** 30-09-2025

status.[2] Rural areas face additional challenges, with awareness, treatment, and control rates significantly lower than in urban regions. For instance, a systematic review and meta-analysis conducted in 2014 found that in rural India, the rates of awareness, treatment, and control of hypertension were 25.1%, 24.9%, and 10.7%, respectively, compared to higher rates of 41.9%, 37.6%, and 20.2% in urban areas.[3] This disparity underscores the urgent need for targeted interventions to address the growing burden of hypertension in rural and resource-limited settings.

Effective management of hypertension requires a combination of pharmacological and non-pharmacological interventions. However, poor adherence to treatment regimens and lifestyle modifications remains a major barrier to achieving blood pressure control. Studies have shown that adherence to antihypertensive medications is often suboptimal, with rates ranging from 30% to 50% in LMICs.[4] Educational interventions have shown promise in improving patient outcomes by enhancing knowledge, self-management practices, and adherence to treatment.[5] These interventions can empower patients to take an active role in managing their condition, leading to better blood pressure control and reduced risk of complications.

This study aimed to evaluate the effectiveness of a multifaceted educational intervention package in improving treatment adherence and blood pressure control among hypertensive patients in rural Delhi. The intervention package included flipchart-based counselling, weekly voice and text messages, and follow-up visits over six months. By addressing the specific needs and challenges faced by hypertensive patients in rural areas, the study sought to contribute valuable insights into more effective methods for managing hypertension and reducing its associated health risks.

Methods:

Study Design and Setting

A quasi-experimental, before-and-after study was conducted at the Rural Health Training Centre (RHTC). The study was conducted over 18 months, with patient recruitment completed by October 2023. The RHTC provides healthcare services, including screening and management of non-communicable diseases (NCDs) such as hypertension.

Study Population

The study included 110 hypertensive patients aged above 30 years, diagnosed with hypertension, and currently on treatment. Patients residing in Najafgarh for at least six months were included. Exclusion criteria included patients without access to smartphones and those experiencing hypertensive crises.

Sample Size Calculation

The sample size was calculated based on a study by G.K. Mini et al.[5], using a mean difference in systolic blood pressure of 8.0 mmHg and diastolic blood pressure of 4.4 mmHg. The formula used for sample size calculation, $n = (Z\alpha/2+Z\beta)^2*2*\sigma^2 / d^2$ where, $Z\alpha/2$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), $Z\beta$ is the critical value of the Normal distribution at β (e.g. for a power of 80%, β is 0.2 and the critical value is 0.84), $\sigma 2$ is the population variance, and d is the mean difference. With a 95% confidence interval and 80% power and considering the mean difference of diastolic blood pressure (minimum of the two), the required sample size was 92. Accounting for a 20% loss to follow-up, the final sample size was 110. The study participants were selected from the hypertensive patients attending the NCD clinic, employing purposive sampling.

Intervention

The intervention package included:

- **Flipchart-Based Counselling**: A 20-minute session on hypertension, risk factors, lifestyle modifications, and medication adherence., conducted every 2 months, till 6 months.
- **Voice and Text Messages**: Weekly reminders on diet, physical activity, salt reduction, and medication adherence., for 6 months.
- **Follow-Up Visits**: Participants were followed up at 2-, 4-, and 6-months post-intervention.

Operational Definition:

Controlled hypertension: Systolic Blood Pressure <140 mmHg and Diastolic Blood Pressure <90 mmHg, among people with high blood pressure.

Regular Blood Pressure Measurement: Weekly once getting the blood pressure checked.

Regular Eye check-up: Eye check-up done by ophthalmologist once in 6 months

Regular Blood Tests: Getting the blood tests advised by the doctor by 2 weeks.

Data Collection

Data were collected using, structured, validated questionnaires which included a socio-demographic profile to capture participant characteristics. Medication adherence was assessed using the Hill-Bone Medication Adherence Scale. The Hill Bone scale based on patients self-report was designed in the form of a rating scale for use by health care professionals to assess patients adherence to anti-hypertensive therapy in three main domains: i) medication-taking ii) salt intake restriction, and iii) appointment keeping.[6] Scores above the mean value of the scale was taken as adherent and below, as non-adherent. Additionally, anthropometric and clinical measurements such as blood pressure, height, weight, and BMI were recorded to evaluate the participants' health status. Further, BG Prasad Scale 2022 was used to derive the socioeconomic classification.

Ethics: Ethical clearance was taken from the Institutional Ethics Committee, VMMC and SJH (IEC/VMMC/SJH/ THESIS/2023/CC-77). Informed consent was taken from the participants before including them in the study.

Statistical Analysis

Data were analysed using SPSS version 21. Descriptive statistics, Cochran Q test, and McNemar test were used to assess changes in medication adherence over time. A p-value < 0.05 was considered statistically significant. Chi square test and further, multivariate logistic regression was used for testing association.

Results:

A total of 110 participants were recruited at the first visit at the RHTC from June to October 2023 and were subsequently followed up for 6 months.

Table 1: Distribution of study participants according to sociodemographic details (N=110)

Variables	Frequency, n (%)
Age (Years)	
<40	14 (12.7%)
41-50	29 (26.4%)
51-60	36 (32.7%)
61-70	21 (19.1%)
>70	10 (9.1%)
Gender	
Male	38 (34.5%)
Female	72 (65.5%)
Religion	
Hindu	102 (92.7%)
Muslim	5 (4.6%)
Sikh	3 (2.7%)
Educational Status	
Illiterate	17 (15.6%)
Primary School	23 (21%)
Middle School	29 (26.5%)
Secondary School	19 (17.4%)
Intermediate School	9 (8.4%)
Graduate	9 (8.4%)
Postgraduate	3 (2.7%)
Occupation Category	
Unskilled	14 (12.7%)
Semi-Skilled	10 (9.1%)
Skilled	18 (16.4%)
Clerical	1 (0.9%)
Semi-Professional	0 (0%)
Professional	11 (10%)
Home Makers	56 (50.9%)
Family Type	
Nuclear	57 (51.8%)
Joint Family	53 (48.2%)
Socioeconomic Status	
Lower Class	37 (33.6%)
Lower Middle Class	48 (43.6%)
Middle Class	17 (15.5%)
Upper Middle Class	7 (6.4%)
Upper Class	1 (0.9%)

The majority of participants (32.7%) were aged 51-60 years, with a mean age of 54.5 ± 11.6 years. Females constituted the larger proportion of the study population (65.5%), and Hindus formed the predominant religious group (92.7%). In terms of education, most participants (26.5%) had attended middle school, while only 2.7% were postgraduates. Occupation-wise, homemakers

represented the largest group (50.9%). More participants lived in nuclear families (51.8%) compared to joint families (48.2%), and the majority (43.6%) belonged to the lower-middle socioeconomic class. Regarding hypertension duration, most participants (35.4%) had been diagnosed with the condition for 1-5 years, with a mean duration of 5.19 ± 5.55 years. Overweight/obesity (87.3%) and diabetes (50.4%) were the most common comorbidities. In terms of health monitoring, 76.4% of participants regularly monitored their blood pressure, but only 8.2% underwent regular eye checkups, and a mere 2.7% regularly followed up with blood tests as advised by their doctor. (Table 1,2)

A total of 8 patients (7.2%) were lost to follow-up, leaving 102 patients who completed the follow-up and were included in the final analysis.

The proportion of participants who were adherent to medications increased from 53.9% at baseline to 58.8% at the first follow up. It further increased to 65.7% in the second follow up and to 70.5% the last follow up. This difference in proportion, over subsequent visits was found to be statistically significant, (p=0.046) on applying Cochrane Q test.

The proportion of participants who were adherent to medications increased from 53.9% at baseline to 70.5% at the last follow up. This difference was found to be statistically significant (p=0.002), on applying McNemar test. (Table 3) (Figure 1)

The mean score also decreased (indicating better adherence) from 31.4±6.2 at the baseline, to 30±5.3 at 2 months, to 29.4±4.5 at 4 months, and to 28.49±4.46 at 6 months. Significant associations were observed between medication adherence and regular BP checks ($x^2 = 3.36$, $p = 0.047$), weight loss ($x^2 = 10.64$, $p = 0.001$), and blood

Table 2: Distribution of study participants according to clinical history (N=110)

Category	Frequency, n (%)
Duration of Hypertension	
<1 Year	33 (30%)
1-5 Years	39 (35.4%)
5-10 Years	17 (15.5%)
>10 Years	21 (19.1%)
Comorbidities*	
Overweight/Obesity	96 (87.3%)
Diabetes	57 (50.4%)
Overweight/Obesity + Diabetes	52 (47.2%)
Stroke	1 (0.9%)
Hypothyroidism	2 (1.8%)
Regular BP Monitoring	
Yes	84 (76.4%)
No	26 (23.6%)
Regular Eye Checkup	
Yes	9 (8.2%)
No	101 (91.8%)
Regular Blood Tests	
Yes	3 (2.7%)
No	107 (97.3%)

*Categories are not mutually exclusive

Table 3: Distribution of study participants according to medication adherence by Hill Bone Scale Before and after interventions (N=102)

Hill Bone Scale Scoring	Adherent (%)	Non adherent (%)
Baseline (First visit)	55 (53.9)	4746.1)
Follow up (first) at 2 months	60 (58.8)	42 (41.2)
Follow up (second) at 4 months	67 (65.7)	35 (34.3)
Follow up (third) at 6 months	72 (70.5)	30 (29.5)
Cochran Q	*17.79 (p<0.001)*	
McNemar x^2	*9.97 (p=0.002)*	

Statistical analysis done by Cochran Q test and McNemar test

Figure 1: Distribution of study participants according to medication adherence by Hill Bone Scale at baseline and subsequent follow up visits after interventions.(N=102)

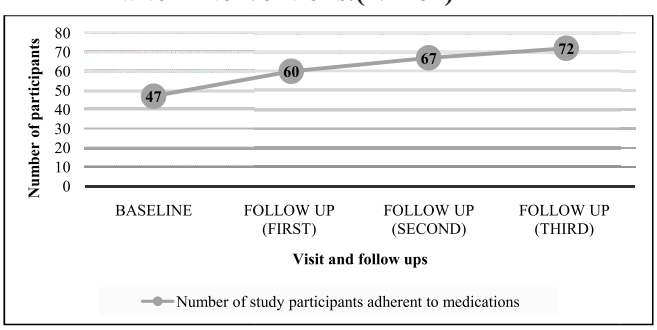

Table 4: Multivariate logistic regression of medication adherence with variables (N=102)

Variable	OR	95% CI (OR)	p-value	AOR	95% CI (AOR)	Adjusted p-value
Regular BP Check						
Yes	3.36	1.02 11.07	0.047	2.86	1.12 7.31	0.03
No	Reference					
Weight Loss						
Yes	10.64	3.45 32.82	0.001	9.48	3.45 26.05	0.001
No	Reference					
BP Control						
Controlled	6.56	1.56 27.58	0.010	4.98	1.29 19.23	0.02
Uncontrolled	Reference					

Note. OR: Odds Ratio, AOR: Adjusted Odds Ratio

pressure control ($x^2 = 6.56$, $p = 0.010$). However, no significant associations were found between medication adherence and age groups, gender, religion, profession, education, family type, or obesity status. Further, on conducting multivariate logistic regression. Regular BP checks, weight loss and BP control remained significant. (Table 4)

Discussion:

This study demonstrated the effectiveness of a comprehensive educational intervention in enhancing treatment adherence among hypertensive patients in rural Delhi. The intervention led to a significant improvement in medication adherence, increasing from 46.1% to 70.5%. These findings underscore the potential of structured educational programs to address the challenges of hypertension management in resource-limited settings.

The results align with existing literature, reinforcing the efficacy of similar interventions. For example, G.K. Mini et al.[5] reported a 15.9% increase in medication adherence following a comparable intervention, while Suza et al.[7] documented a 2.68-point reduction in the Hill Bone Scale score post-intervention, which is consistent with the 2.91-point reduction observed in this study. The significant increase in adherence underscores the potential of scalable, low-cost interventions to address the challenges of hypertension management in similar settings.

In current study significant associations were observed between medication adherence and regular blood pressure checks, weight loss, and blood pressure control. Patients who regularly monitored their blood pressure had a significantly higher likelihood of adherence, with an adjusted odds ratio (AOR) of 2.86 (95% CI: 1.127.31, p = 0.03). This finding aligns with the study by Kim et al.[8], who demonstrated that regular blood pressure monitoring significantly enhances adherence, and is further supported by Burnier et al.[9] who emphasized the critical role of medical adherence in achieving optimal blood pressure control.

Similarly, weight loss showed a significant association with adherence, with an adjusted OR of 9.48 (95% CI: 3.4526.05, p = 0.001). This is consistent with Schroeder et al.[10], who highlighted the importance of lifestyle modifications, including weight loss, in improving medical adherence, and corroborates the findings of Appel et al.[11], who demonstrated that comprehensive lifestyle changes significantly enhance blood pressure control and adherence.

Furthermore, controlled blood pressure was significantly associated with adherence, with an adjusted OR of 4.98 (95% CI: 1.2919.23, p = 0.02). Similar association was reported by Ozumba et al.[12]

Conclusion:

The study highlights the effectiveness of a multifaceted educational intervention in improving treatment adherence (53.9% to 70.5%) among hypertensive patients in rural Delhi. The intervention package, which included flipchart-based counselling, voice and text messages, and follow-up visits, led to significant improvements in medication adherence and

self-care practices. These findings underscore the need for scalable and sustainable educational interventions to address the growing burden of hypertension in resource-limited settings.

Limitations:

While the study demonstrated significant improvements in medication adherence, it is important to acknowledge its limitations. The quasi-experimental design restricts the ability to establish causality, and the reliance on self-reported data may introduce potential biases, such as recall or social desirability bias. Additionally, the intervention was administered alongside existing standard care, and the absence of a comparison group limits the ability to attribute the observed improvements in adherence solely to the intervention. These factors highlight the need for further large-scale randomized controlled trials to validate the effectiveness of the intervention and to isolate its impact from other confounding variables. Such studies would provide more robust evidence and strengthen the generalizability of the findings.

Recommendations:

To address hypertension management in rural areas, educational interventions such as flipchart-based counselling and digital reminders should be integrated into primary healthcare services. Scaling up voice and text messaging systems can serve as a cost-effective strategy to reinforce health behaviours. Training community health workers (CHWs) to deliver these interventions can enhance their reach and effectiveness. Regular follow-up visits and blood pressure monitoring should be emphasized to ensure sustained adherence. Educational programs must prioritize lifestyle modifications, such as diet and physical activity. Policymakers should prioritize hypertension control in national health programs, while further research evaluates the long-term impact and cost-effectiveness of these interventions. Collaboration with NGOs can amplify reach and sustainability. By implementing these recommendations, healthcare systems can improve hypertension management and patient outcomes, particularly in resource-limited settings.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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Frailty and its Determinants among Elderly People of Rural Tamil Nadu - A Cross-Sectional Study

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Abstract:

Introduction: Frailty is defined as a clinically recognizable state of increased vulnerability resulting from aging associated decline in reserve and function across multiple systems. Unlike chronological aging, frailty is a dynamic and potentially reversible condition if identified early. Understanding its prevalence, risk factors, and consequences is essential for developing targeted interventions that can improve quality of life, reduce healthcare costs, and promote healthy aging. **Objectives:** To assess the prevalence of Frailty among elderly people aged 60 years and above in a rural area of Tamil Nadu. **Methods:** A community based cross sectional study was done in 166 elders using multistage sampling method to assess the prevalence of frailty of rural Tamil Nadu. A semi-structured pretested questionnaire was used and Frailty was measured using Fried's phenotypic criteria. **Results:** The study revealed that the prevalence of Frailty was found to be 33.1%, 54.2% were pre-frail and 12.7% were non-frail. Statistically significant association was found between prevalence of frailty and age, gender, level of education, marital status, living arrangement, economic independence and vision. Female participants were more frail (41.4%) than male participants (16.4%).This study shows 92.9% of the participants who were of age 80 years and above were frail. **Conclusion:** The study shows that frailty is a prevalent condition among the elderly, reflecting the growing vulnerability of this age group to adverse health outcomes. Comprehensive Geriatric Care addressing all domains of ageing must be implemented from primary health care.

Keywords: Elderly, Frailty, Fried's criteria

Introduction:

With the elderly population increasing rapidly, frailty has emerged as a major public health concern. Unlike chronological aging, frailty is potentially reversible if detected early, making its study highly relevant. Understanding its prevalence and determinants is crucial for developing targeted interventions to promote healthy aging, reduce healthcare burden, and improve quality of life.

Methods:

This cross sectional study was conducted among 166 elderly people, of 60 years and above of a village in North Tamil Nadu. Basic sociodemographic details, presence of comorbidities, polypharmacy (consuming more than 4 drugs) were collected. The participants were asked about life description i.e., whether they are feeling happy with their life. Then frailty was assessed followed by assessing vision using Snellen's chart.

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Ammal MM, Vijayakumar M, Vijayalakshmi M. Frailty and its Determinants among Elderly People of Rural Tamil Nadu - A Cross-Sectional Study. Healthline. 2025;16(3): 201-205
	DOI : 10.51957/Healthline_754_2025	

Received : 27-06-2025 **Accepted** : 22-09-2025 **Published :** 30-09-2025

Study Tool:

Frailty was assessed by Fried's phenotypic criteria.[3]

Phenotypic criteria devised by Fried et al:

a) Low grip strength assessed by handheld Dynamometer[6]
   - Weakness was assessed by hand grip strength using Dynamometer.
   - Maximum strength of dominant hand was assessed.
   - Male participants whose hand grip strength <26 kg and female participants with hand grip strength <16 kg were documented as low grip strength.

b) Slow walking speed assessed by 4m walking speed test[7]
   - Walking speed was calculated for each participant using distance in meters and time in seconds.
   - Participants whose gait speed is less than 1m/s (i.e., >4 seconds) were documented as slow walking speed
   - Participants whose gait speed <1m/s i.e., >4 seconds were documented as slow walking speed.

c) Low physical activity by Katz ADL scale[8]

   This measures their ability to perform activities of daily living independently.

   The scale consists of adequacy of performance for six functions without supervision, assistance or direction being given. – bathing, dressing, toileting, transferring, continence and feeding. A score of 1 is given for independence of each function. The score ranges from 0 to 6. Score of 5 and above means no impairment in activities of daily living.

d) Low energy by self- declaration of tiredness and

e) Unintentional weight loss was assessed by self-declaration and nutritional status was measured using Mini Nutritional Assessment scale.[9] Total score for MNA is - maximum 14 points. 12-14 points: Normal nutritional status. 8-11 points: At risk of malnutrition. 0-7 points: Malnourished

Sampling method:

Multistage random sampling was used in which initially districts, then villages and later participants were listed and selected using lottery method. The sample size was calculated based on the prevalence of frailty is 12.2% by Curcio et al[10], with a 95% confidence and an absolute precision of 5%. An excess sampling of 10% was taken to account for non-response. Minimum sample size was calculated as 166.

Data Analysis:

Data were entered in Microsoft Excel 2010 and analysed using Statistical Package for Social Sciences software (Version 16). Descriptive statistics were shown by frequencies and percentages. Data were represented by tables, charts, and figures. Factors were tested for significance (p-value <0.05) at 95% confidence interval. Finally multivariable logistic regression was performed, including all the significant risk factors.

Ethical approval:

The study was approved by Institutional Ethical Committee of Madras Medical College, Chennai. (Cert. No – 30122017). Informed written consent was obtained from the participants before data collection. Confidentiality and privacy of the participants were maintained.

Results:

The data obtained were analysed using SPSS software version 16. Among 166 study participants, 71.1%(118) belonged to age group 60 to 61 years, 20.5% (34) in the age group 70 to 79 years and 8.4% (14) were 80 years and above, with mean age of 66.2 years and standard deviation of 7.3 years. Predominantly, the participants were female. Of the study participants, 111 were females (66.9%) and 55 (33.1%) were males. Most of them are illiterates (64.5%), 31.1% had school education and 4.2% were graduates. Almost 90%

Table 1: Sociodemographic details and their association with prevalence of Frailty (N=166)

Variables	n (%)	P-value
Age Group (years)		
60-69	118 (71.1%)	<0.001
70-79	34 (20.5%)	
≥80	14 (8.4%)	
Gender		
Male	55 (33.1%)	0.001
Female	111 (66.9%)	
Education		
Illiterate	107 (64.5%)	0.001
Primary	19 (11.4%)	
Middle	16 (9.7%)	
High	12 (7.2%)	
Higher Secondary	5 (3%)	
Graduate	7 (4.2%)	
Religion		
Hindu	150 (90.4%)	0.153
Christian	12 (7.2%)	
Muslim	4 (2.4%)	
Marital Status		
Never Married	2 (1.2%)	<0.001
Married	82 (49.4%)	
Widowed	80 (48.2%)	
Divorced/Separated	2 (1.2%)	
Source of Income		
Work/Pension	68 (40.9%)	0.003
Spouse	23 (13.9%)	
OAP	41 (24.7%)	
Children	21 (12.7%)	
Property	8 (4.8%)	
No income	5 (3%)	
Living		
Alone	26 (15.7%)	0.004
With relative	140 (84.3%)	
Co-morbidities		
Has at least one co-morbidity	99 (59.6%)	0.240
No comorbidity	67 (40.4%)	
Vision		
Normal	43 (25.9%)	0.001
Decreased	123 (74.1%)	
Polypharmacy		
Yes	59 (35.5%)	0.594
No	107 (64.5%)	
Nutritional status		
Normal	82 (49.4%)	<0.001
At risk of malnutrition	45 (27.1%)	
Malnourished	39 (23.5%)	
Sleep		
Normal	82 (49.4%)	<0.001
Decreased	84 (50.6%)	
Life description		
Happy	94 (57%)	0.004
Unhappy	72 (43%)	

(90.4%) of the participants were Hindus. Of the study participants, around 49% were staying currently married and 50.6% were widowed/separated/never married. 41% of the participants are either working or receiving pension, around 25% were depending on Old age pension by the Government and 3% had no source of income and are depending on others for their expenses. About 15.7% of participants were living alone.

Among the participants, 59.6% had at least one co-morbidity. Around 74% were having diminished vision and 25.9% had normal visual acuity. Of the participants 35.5% had polypharmacy (consuming more than 4 drugs). In respect to nutritional status, 23.5% and 25.1% were malnourished and at risk of developing malnutrition respectively. The study participants showed decreased sleep in 50.6% of elderly people. The participants when they are asked to about life description i.e whether they are feeling happy with their life, 43% described their life as unhappy. (Table 1)

Among the study participants, 33.1% (55) were frail, 54% (90) were pre-frail and 12.7% (21) were non frail. (Figure 1) Frailty was found to be more prevalent among females in the study. 41.4% of female participants were frail while 16.4% of males were frail. Pre-frailty was more among males (70.9%) than females (45.9%). Around 13% of both males and females were non-frail. (Table 1) Frailty was more prevalent among participants whose age were 80 years and above. Almost 93% of the participants who age was 80 years and above were frail. Above 70 years, all of the participants were

Figure 1: Prevalence of Frailty

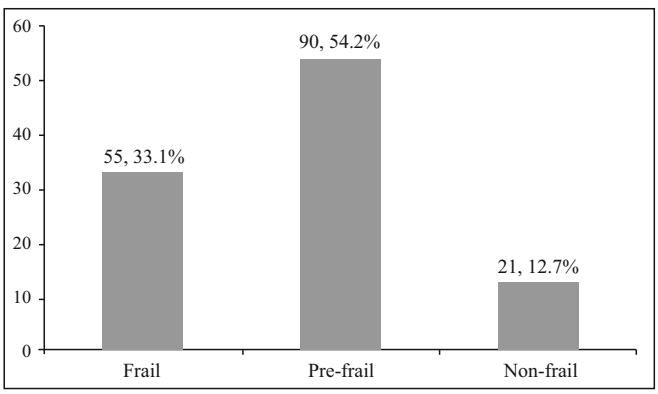

Table 2: Binary Logistic Regression between variables and prevalence of frailty

Variables included	Regression coefficient	P-value	Odds ratio	AOR, 95%CI
Age group	2.175	0.002	6.306	8.802 (2.2 - 35.211)
Gender	1.473	0.039	3.617	4.362 (1.075 - 17.708)
Life description	3.788	0.000	54.643	44.176 (11.83 - 164.959)
Vision	1.916	0.007	5.205	6.796 (1.681 - 27.476)

either frail or pre-frail. In the 60 - 69 years age group, 22% were frail. (Table 1) Statistically significant association was found between prevalence of frailty and age, gender, level of education, marital status, living arrangement, economic independence and vision. (Table 1). Logistic regression was performed to ascertain the adjusted effects of age, gender education, marital status, living arrangement, economic independence, life description, sleep, comorbidities, polypharmacy and vision on Frailty status of the participants.

The model identifies the following four variables as the most significant variables. i.e. age gender, life description and vision status. (Reference group – 80 years and above in age, females in gender, feeling unhappy in life description and low visual acuity in vision)

The adjusted odds of the participants in age group of 80 years and above are 8.802 times more likely to become frail than other age groups. The adjusted odds for female participants to become frail is 4.362 times more than the male participants. The adjusted odds for participants who describe their life as unhappy is 44.176 times more likely to become frail than who describe their life as happy. Participants whose had diminished vision have 6.796 times more odds to become frail than those with normal vision.

Discussion:

The study has been conducted to assess the prevalence of frailty and to identify the associated risk factors for frailty among elderly people of Tamil Nadu.

In the study, 71.1% of the participants were between 60 - 69 years of age. The mean age of the participants was 66.2 years. Almost 67% of the participants were females. Most of the participants (64.5%) were illiterate. Majority were following Hinduism. Around 50% were currently married. In the study of Curcio et al[10] Curcio et al, mean age of the participants was 70.2 years. 52.2% were women and 39% lack formal schooling. In this study, 70.7% were below poverty line. Buttrey et al, in Germany observed that 34.8% of the study participants were between were 65 – 69 years of age. 25.7% were in the low socioeconomic status. 9.7% were currently smoking.[11]

In the current study, prevalence of Frailty among the participants, was found to be 33.1%, 54.2% were pre-frail and 12.7% were non-frail which were consistent with similar study using similar criteria by Kashirkar et al[12] Kashirkaret al among 250 community dwelling adults in Pune, Maharashtra stated that the prevalence of frailty was 26%, Pre-frail was 63.6% and Non-frail was 10.4%. But the prevalence of frailty in the current study was found to be higher than the study done in geriatric department of Madras Medical College, in which the prevalence was 21%.[13] The difference in prevalence might be due to different study setting which was a hospital based study and also the participants with acute illness were excluded in the MMC study.

The prevalence of frailty was observed to be more in women in the present study. 41.4% of female participants were frail and 16.4% of men were frail. In the study by Palamo et al[14], Chile, in which the prevalence of frailty in women 27.1% and in men 19.3% which is in consistent with the present study with increased prevalence among females.

Frailty was observed to be more prevalent in participants who were 80 years and above in the present study. Almost 93% of participants who were 80 years and above were frail but in the study in Germany, by Buttery et al[11], prevalence of Frailty among older adults above 75 years was stated as 44.1% which was almost half of the prevalence of the current study. The high prevalence in the present study might be due to difference in study setting and standard of living. In Germany study, the data had been taken from German Health Interview and Examination Survey (DEGS) for adults and the data of adults above 65 years had been included for the study.[11] But in the current study, the age of the participants included were from 60 years and the number of participants above 80 years were also less.

Being a cross sectional study, the study doesn't establish causal relationships. As the study is from rural settings, the findings might not be generalizable to urban or diverse settings.

Conclusion:

The study highlights that frailty is a prevalent condition among the elderly, reflecting the growing vulnerability of this age group to adverse health outcomes. Early identification and management are essential, as frailty is potentially reversible. These findings emphasize the need for routine screening, community-based interventions, and policies focused on healthy aging to reduce the burden of frailty and improve quality of life in older adults.

Recommendations:

Comprehensive Geriatric Care addressing all domains of ageing must be implemented from primary health care. Targeted interventions to prevent progression from pre-frail to frail and also from frailty leading to disability must be planned and implemented.

Declaration

Funding: Nil

Conflict of Interest: Nil

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Perceptions and Challenges of Health Personnel in Managing Animal Bite Cases at a Rural Health Training Centre (RHTC) of Medical College in Ahmedabad: A Qualitative Study

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Abstract:

Introduction: Animal bite in human is a public health concern in India. Prompt reporting followed by wound care and vaccination are essential to avoid rabies. Perception of service provider towards treatment contributes an important role for prevention against rabies. **Objectives:** To explore the perception and challenges faced by health personnel in animal bite cases management **Methods:** A qualitative study was conducted at the RHTC of medical college in Ahmedabad. Data were collected through Focus Group Discussions (FGDs) of ASHAs and Key Informants Interviews (KII) with service providers (3 Medical Officers (MOs), 1 staff nurse, 1 pharmacist, and 2 support staff). Data were analysed thematically. Ethical approval and informed consent were obtained. **Results:** Service providers' KIIs showed that MOs were unclear about classification of animal bites due to a lack of formal/updated training. Immunoglobulins were the only ARV-related logistics not available at facility. No system in place to monitor cases of animal bites. ASHA's FGD shared that community still continues to treat wounds with traditional remedies like chhikni, turmeric etc., and also take vow due to belief. The local authority isn't doing enough to address stray dog problem and recent surge in dog bite incidents reported. ASHAs knew importance of ARV, but having a partial knowledge of its schedule. They did not receive any formal training on managing animal bites, despite ASHA's were ready to learn more about it. **Conclusion:** The study highlighted inadequacies in the management of animal bites, such as a lack of resources, misunderstandings in the community and insufficient staff training.

Keywords: Animal bite management, Challenges, Perception, Qualitative study, Service providers

Introduction:

Rabies is one of the oldest zoonotic diseases, in which patient suffers from painful spasms with fatal consequences. The Integrated Diseases Surveillance Program of Govt. of India reports approximately 6-7 Million animal bites each year.[1] Globally many countries have achieved rabies elimination and there is Global call for rabies elimination i.e., "Rabies: Zero by 2030". National Rabies Control Program (NRCP) was launched by Ministry of Health and Family Welfare, Govt. of India to prevent human deaths due to rabies. The strategies of the program include capacity building of health professionals on appropriate animal bite management.[1] The community is still not adequately

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Prajapati S, Sharma R, Baxi H, Patel B, Pirzada A, Bapat N. Perceptions and Challenges of Health Personnel in Managing Animal Bite Cases at a Rural Health Training Centre (RHTC) of Medical College in Ahmedabad: A Qualitative Study.Healthline. 2025;16(3): 206-213
	DOI : 10.51957/Healthline_754_2025	

Received : 16-07-2025 **Accepted** : 20-09-2025 **Published :** 30-09-2025

aware of rabies and its consequences if not managed appropriately.[2] The most crucial steps in preventing rabies are early reporting, wound care and timely post exposure prophylaxis. Noncompliance with the ARV is one of the most serious concerns.[3] Another major challenge is irregular supply of ARV and immunoglobulin at Primary Health Centres (PHCs) in rural India.[4] There are many myths related to wound care, such as applications of home remedies like turmeric/chillies on biting wound. In such scenario, health personals attitude towards animal bite management plays an important role in prevention of rabies.[5] Community health workers like ASHA, as part of the same community can contribute in rabies control.

Present study was planned with the objective to explore the perception and challenges faced by service providers in animal bite cases management.

Methods:

A qualitative study was conducted ata PHC located in Kalol taluka of Gandhinagar district which is also a RHTC of medical college. The study was conducted between May to December 2023.The study participants were service providers mainly MOs, staff nurse, pharmacist, support staff and ASHA workers at selected health facility.

Data Collection and analysis: A qualitative methods such as KIIs of service providers and FGDs of ASHAs were conducted to explore their perception and challenges in animal bite cases management. Total seven KIIs were conducted and their perceptions and challenges were identified. Framework for themes and sub themes was prepared for thematic/interview guide and responses generated during KII were coded manually. Themes identified were mainly infrastructure including human resource (1), operational (2) and administrative issues (3). Physical verification of infrastructure at health facility was also carried out by the investigator as per checklist. KIIs and FGDs were conducted using an interviewer guides and checklists prepared by investigators through literature review and with the help of expert consultation. These guides and checklists were validated for contents and face validation during validation workshop.

Two FGDs were conducted (16 ASHAs participated till the information was saturated) and each FGD had eight participants with duration of 40-45 minutes to assess their perceptions about management of animal bite cases. Responses of the participants were recorded manually as well as by audio recorder with due written consent of the participants. The audio recordings were transcribed verbatim in Gujarati, which was then translated into English using Google Translate. Data were analysed thematically and categorized as per sub theme emerged and responses were noted in field notes and thematic analysis was done manually.

Ethical Consideration: Study was conducted after approval from the Institutional Ethics Committee (ECR/404/nst/Gj/2013/RR-20). Informed written consent was obtained from all study participants.

Results:

Overall, a total of seven KIIs of service providers and two FGDs of ASHAs were conducted to explore the perception, practice and challenges in management of animal bite cases.

Key Informant Interviews (KIIs): Total seven KIIs were conducted among services providers working at RHTC having different work profile and experience. (Table 1) Their perception and challenges were categorized into three themes (1) Infrastructure (including human resource) (2) Operational and (3) Administrative.

Infrastructure: It was observed that Information, Education and Communication (IEC) materials, category wise animal bite management chart was not available, signages were not displayed appropriately places and simple wash basin marked as wound wash area which was not convenient specially for lower limb animal bite cases. Only gloves were used during wound dressing for personal protections by staff. Animal bite

Table 1: Profile of Service Providers/ Key Informants at RHTC (N=7)

Category	Age (Years)	Gender	Experience (Years)	NRCP Training Status	Remark
1. Medical officer (MBBS)	50	Male	27	Yes	Formally trained 9 years back
2. Medical officer (MBBS)	25	Male	1 month	No	Recently joined as MO
3. Medical officer (AYUSH)	39	Female	15	Yes	Formally trained 2 years back
4. Staff nurse	33	Male	8	Yes	Formally trained 2023
5. Pharmacist	31	Male	9	No	Formally trained
6. Support staff I	45	Female	10	No	Informally trained
7. Support staff II	40	Female	7	No	Informally trained

Table 2: Perception and Challenges of Service Providers at RHTC (N=7)

Themes	Sub-themes	Responses/codes
1. Infrastructure & Human Resource	Human resource	Staff available round the clock.
		Management during OPD hours and working days only.
		Vaccine not given throughout the day.
		MOs inadequate knowledge of bite categorization.
	IEC material	Only one signage.
		Not displayed appropriately.
		Pamphlets not available.
		Category chart not displayed.
	Persona Protective Equipments (PPEs)	Using only gloves.
		No perceived need of further PPE.
	Designated wound wash area	Simple basin available. Inconvenient to use for victim.
2. Operational	Vaccine & other logistic	ARV available but vial wastage seen. Cold chain issues observed. TT stock out for months.
	Referral	Cat III cases to higher centres.
	Follow up of cases	No established follow up mechanism. Missed follow up due to incorrect contact details. Migration & travelling main reasons for loss to follow up.
	Social issues and beliefs	Lack of perceive need of all scheduled doses.
		Superstitions (Hadkaimata badha) widely prevalent in community.
3. Administrative	Reporting	Pharmacist on IHIP portal daily. Post OPD data missing.
	Supervision	Lack of structured supervision.
	Training	Lack formal /updated training. All perceived need of training.

management facility was available only on working days more so during OPD hours. Wound management was not supervised by health staff. Service providers except MOs, didnt aware about correct duration of wound wash. MOs were not clear in categorization of animal bites due to lack of proper formal training or refresher training.

Operational: It was found that all logistics related to ARV except Immunoglobulins were available at PHC. There was no any established mechanism for follow up of animal bite cases. Many patients misplace the case paper and are unaware of need of further vaccination. Social issue and belief related to dog bite is widely seen

in community. Many cases are missed follow-up due to incorrect contact details. More awareness in the community is required regarding need of ARV.

Administrative: It was observed that no structured supervision of dog bite cases. Pharmacist doing reporting in Integrated Health Information Platform (IHIP) but post Out Patient Department (OPD) data was missed. All staff of PHC including MOs perceived need of refresher training. (Table 2)

Focus Group Discussion (FGD): ASHAs, being the front-line health workers are the key informant in spreading awareness about cause, mode of transmission and prevention. As per the thematic guidelines identified theme/s were including their basic concepts about rabies, preferences and practices of animal bite management at home by the community and ASHAs, experiences of animal bite, handling of biting animal, pet vaccination, perception of community about ARV compliance, their experiences of animal bite and death due to rabies, status of training and finally their suggestions.

It was observed that ASHAs did not receive any formal training related to animal bite management but had read about rabies by themselves through their module/s. All ASHA had good understanding of rabies, referred locally as "hadkava". They know that it is caused by bite of rabid dog and rabies can be prevented by vaccine, prompt local wound management and a bit about first Aid. Whenever, they see cases of dog bite, all of them always advice to first to go nearest health facility and take the tetanus injection along with rabies vaccine (though less informed about exact schedule details), one of them shared that they also take follow up about vaccination from dog bite cases. According to them, now a days community is aware about urgency of dog bite management and usually they visit health facility, but still many victims after the bite apply home-based remedies such as tobacco snuff, turmeric, chilli powder etc. over the wound and many believes in keeping badha of Hadkaimata along with vaccination. Pet vaccination practice is seen only among educated owners. Overall, they stated that there is menace of stray dogs in community through the year. Biting animal is mostly dog stated by all and two of the them also narrated that if dog appears rabid it is either driven away from the area or if it bites many then it is killed. Action taken by local people is informing local authority (municipalities) to take away and sterilized and will send back to same locality. They also reported the increase in dog bite incidents in the community, emphasizing the need for awareness, vaccination of dogs, and dispelling myths. All ASHAs perceived need of training as they had not received any training in animal bite management. (Table 3)

Some verbatim by ASHA quoted below:

- *"When dog bites and if it is not cleaned, it gets infested with worms can leads to rabies."*
- *"When rabiddog bites any human or animal and if vaccine is not taken, it causesrabies."*
- *"Rabid dog is running here and there constantly, in direction of wind"*
- *"A rumour would spread in the village if it was discovered that the dog had rabies"*
- *"If you pour water on the dog, it will run away and the dog will die after three and half days."*
- *"When a dog bites, we apply the snuff on the wound, as well as tobacco, use home remedies first, wereferred them to Rancharda, sometime also put turmeric milko to the wound"*
- *"First take vow of hadkaimata badha that they will not eat rice for 7 or 11 days, then go for vaccination."*
- *"We had an aged lady who was bitten by a simple dog, after 6 months the germs spread in her body, Snuff was applied on the wound when she was bitten. Tried lots of different treatment but the germs had spread in all of her body. She was died after that."*
- *"If injection not taken, then it will happen even after 6-7 years. Within 3 years also."*

Table 3: Community Practices and Perceptions of ASHA for Animal Bite Management (N=16)

Themes	Sub-themes	Response/s
1. Basics of Rabies	Disease and cause	Aware of Rabies with local term Hadakava, Caused by rabid dog bite (16)
	Transmission	by dog bite (16); by other animals biting also (cat, buffalo); (3); Contact of saliva/licks of rabid dog (1);
	Symptoms/signs - human	Biting others (1); Fear of water (2); Runs arounds when hears loud noise (2); Shivering (1); Unable to hold glass (1);
	Symptoms/signs - animal	Bites anyone who comes across (12); Running constantly in direction of wind (3); Drooling of saliva (3); Fear of water (1); Die within 3-4days (4)
	Preventive measures	Vaccine (15); Wash wound with water and then go to the hospital for injection (13); Application of chhikani (snuff) or tobacco (2)
2. Animal bite perceptions	Vulnerable people	Children, field workers, strangers, morning walkers perceived as vulnerable
	Biting time (time & place)	Throughout the year, more in winters (16); When dog have puppies (3); Anytime during day (2); Streets and field area (6)
	Biting animals	Stray dog (16); sometime pet dogs (10)
3. Animal bite management practices	Usual line of action of ASHA	Advise patient to go nearest health centre (16); Take TT injection (1)
	Community preference	Usually go to health facility (3); Apply home remedies such as turmeric/milk/ chhikani (snuff) (2); Also goes to traditional healers, first keep badha of hadkaimata, then go for vaccination (12)
	Wound manage locally	Apply snuff (5); Cleaning with Dettol or water (2); Use turmeric or chili (3)
4. Handling of biting animal	Community and local authority	Community beats/kills biting dogs, local authorities capture and sterilize the dog
5. Pet Vaccination	Belief	Pet dogs vaccinated (16); Depends education level of pet dog owner (1)
	Practice	Pet dogs vaccinated but not stray dogs (16)
6. Community Perception for ARV compliance	Compliance	If vaccine is not taken, may lead to rabies even after 6-7 years.
	Challenges	Uneducated parents (2); Lack of awareness (2); Superstitions (4); Lack of perceived need of vaccine (1); Belief in traditional practices (hadkaimata badha)
7. Animal bite experiences	Recent cases/death	Surge dog bite incidents (16); Cases reporting at PHC increased (3)
8. Training status	Training	Formal training for animal bite management not received and perceived need of training (16)
9. Suggestions	For community	Community awareness (4); Dog vaccination (2); Prevention of dog bite incidents (2); Dispel myths and superstitions through awareness (1)
	For health system	Formal training of ASHA rabies program (2); Encourage vaccine compliance (2); Discover treatment for rabies (1)

**Figure in parenthesis indicate no. of responses by participants*

- *"If there is little blood coming out, do not get the vaccine. Only if there is a lot of blood, then go for it."*
- *"Previously 14 doses were given but now it is good that only 3-4 doses are required"*

Discussion:

Treatment of dog bite cases in rabies endemic countries like India needs to be initiated immediately since all animal bites are considered from suspected rabid animals, people residing in rural area are more at risk of animal bite. Health care providers at first level of contact should be competent enough to provide timely management of animal bite cases. Community engagement for prevention of animal bite cases is crucial and to explore the perception of community, ASHAs are the best key informants as they are the part of that community. This study investigated that how service providers perceived and deal with the situations of animal bite.

In the current study, all health personnel up to the level of ASHA had heard of rabies as a disease and thought it to be a fatal disease and spread by dog bite and some also mentioned biting by other animals like cat and buffaloes. However, only one participant was aware that rabies could be transmitted through licks of a rabid dog. A similar finding was obtained in a study conducted in rural area of Eastern India by Dinesh P Sahu at el.[6]and in a multi-centric study in India[7] and study in rural Karnataka.[8] Also, one research among public health personnel in Vietnam revealed insufficient awareness of the potential risk by licks/scratches of rabid animals.[9]

KIIs of service providers revealed that MOs were unclear in their categorization of animal bites due to a lack of appropriate formal training or refresher training. All logistics related to ARV was available except Immunoglobulins (RIG), despite the fact the provision of RIG at all health facilities under the national program. Patients belong to category III bite have to visit secondary or tertiary care facilities as RIG are not available at PHCs leading to poor compliance. Sambo M et al.[10] and Patil et al.[11] show that non-availability of ARV and RIG in PHC compels the patients to go to the higher centres which ultimately cause the delay in the treatment. In this study it was observed that there is no formal system in place to investigate reports of animal bites at the centre. Many people lose the case paper and don't realize they need to get more shots. Due to inaccurate contact information or disregard for follow-up instructions, many cases are overlooked and loos to follow up occurs.

The WHO states that following rabies virus exposure, wounds must be immediately cleaned, flushed for at least 15 minutes with soap and water or just water, and disinfected with antiviral agents.[12] This study showed non-avail ability of designated wound washing area, IEC material, proper display of IEC and animal bite category chart at health facility. In a multicentric study, it was discovered that even the practice of wound washing at health centre, which is a crucial component of animal bite management, was only practiced at one of the six centres.[13] Animal bite management was carried out only during OPD hours and working days and ARV also not provided 24*7 at health centre which may lead to delayed treatment as patients have to wait for next day opening of health facility. Study by Joseph et al. shows similar results that inability to come early for vaccination included work related barriers, anti-rabies clinic being closed on Sundays/national holidays and unawareness about timely PEP.[14] Also, a study conducted in Himachal Pradesh by Dhiman AK shows that that more than two third of the patients came 24 hours after the dog bite for the treatment. Distance of the health centre from the house of the victim is an important factor for delay in the treatment. During this time patients use home remedies or go to traditional healers.[5]

It is very common to see or hear practices such as applying certain irritants to the local wound site or not washing the site after an animal bite in country like India. These practices are believed to help contain the virus and

prevent its spread. From the interviews in current study, it was found that social issues and belief regarding dog bite is widely prevalent in the community. Dog bite patients used the home remedies like application of snuff, use of turmeric or chili on wound before coming to the hospital and keep beliefs like Hadkai Maata baadha and some goes to traditional healers. Along with the same reporting from some other national and international studies[15,16], studies by Jain et al.[17] and Salve et al.[18] also demonstrated a high prevalence of such methods in Muradnagar and at a PHC in Haryana, respectively. With this belief in mind, they chose not to seek appropriate medical advice.[15-18] However, they were not aware of the potential for infection due to irritation of such applicants. This demonstrates once more how a lack of education is a significant contributing factor to vaccine delays. Study by Bhargawa et al.found the similar findings that patients applied home remedies which have no benefit at all, it causes harm only.[19] One such study also shows that traditional healers are very famous in the villages because they are easily accessible and give the cost-effective treatment.[5]

In present study, health care providers revealed that among many patients lack of perceive need of all the doses after taking first dose. Study conducted by Patil at al. shows that 21 % patients did not report to health facility after first dose.[11] Similar finding observed in study by Mahendra BJ et al. [20]

During FGD, ASHA revealed that stray dogs are not receiving vaccinations, but pet dog owners' educational level affects their pet's vaccination status. Additionally, they noted the rise in dog bites in the neighbourhood, highlighting the importance of raising awareness, vaccinating dogs, and busting myths. Community Awareness is required to strengthens regarding need of ARV. Although one might expect ASHA to be trained in animal bite management, this study shows that none of them had received formal training and having a partial knowledge regarding vaccination schedule. Similar finding was also observed in study conducted in western India by Tiwari et al.[21] This indicates the need of refresher/ updated training for all staff of PHC including ASHA at the field level.

Conclusions:

This study identifies inadequacies in the management of animal bites, such as a lack of resources, misunderstandings in the community and insufficient staff training. Effective rabies prevention and improved public health outcomes depend on addressing these through focused training, greater resources, and increased public knowledge.

Recommendations:

Public awareness campaigns should be carried out on the importance of early reporting of animal bites, proper wounds care, ARV full compliance and pet vaccinations. Health facilities must have easy access to all required resources to prevent any treatment delays. Services providers and ASHA should get regular training/updates on the anti-rabies program.

Limitations:

This is facility based qualitative study and due to small, non-random samples, the findings may not be representative of a larger population, limiting their generaliz ability. Though all the investigator/s were Gujarati doctors. Google translator was used to translate Gujarati to English.

Declaration

Funding : SHSR, Gujarat

Conflict of Interest: Nil

Acknowledgements: We would like to thank the State Health System Resource Centre- Gujarat (SHSRC-G) for its technical and financial assistance to this research. We are also appreciative to the staff of RHTC and ASHA workers who participated in this study and contributed to its success.

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A Study on Occupational Correlates For Workplace Wellbeing, Morbidities and Occupational Health and Safety Vulnerability Measures amongst Diamond Workers in Surat

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Abstract:

Introduction: Workers in diamond industry are exposed to various hazards. There are only few published scientific studies on workplace well-being, occupational health and safety measures in diamond workers. **Objectives:** To study occupational correlates for workplace wellbeing, morbidities and occupational health and safety vulnerability measures in diamond workers. **Methods:** The current study was a cross-sectional analytical study conducted on 350 diamond workers in four diamond industries located in Surat, Gujarat. Two stage convenient sampling was done with selection of industries in the first and selection of participants in the second. A questionnaire eliciting Socio demographic, Occupational and epidemiological variables was prepared along with workplace well-being questionnaire and Occupational Health and Safety (OHS) vulnerability measure. Proportions, Chi-square, Fishers exact test and ANOVA, Post Hoc tests were calculated for tests of significance. **Results:** Out of 350 workers, 260 experienced health issues. Pain in the wrists, elbows, and shoulders (Musculo skeletal disorders) was reported by 156 (44.5%). Significant difference was found between different styles of work amongst diamond workers and work satisfaction. The workers when asked about OHS (Occupational Health and safety) Vulnerability Measures, all the workers mentioned "Never" for Question 8WH (Workplace Hazards-WH) Experience being bullied or harassed at work. **Conclusions:** All the five types of workers have medium level of work satisfaction, but differences are evident by mean scores with Table work having highest score over other type of works. Those doing Taliya and Mathala work had more health issues than Table, Ghat, and Athphel workers.

Keywords: Diamond workers, Occupational health and safety measures, Workplace wellbeing

Introduction:

There are numerous processes involved in creating a shining diamond, and these processes require participation of many workers, known as "diamond cutters." It involves the following basic steps. Diamond rough is selected or sorted. 2.Marking the 'rough' for manufacturing. 3. 'Rough' crystal is cleaved and/or sawed. 4. Girdle bruiting 5. Facets polishing.[1] Newer and modern techniques have come up and there have been lot of advancement in this industry for different processes and procedures. Industries where there are human interface and the known five styles /type of jobs in diamond cutting workers were practiced were taken in this study. These types of works include 1. Talia tarasi – Polishing the Bottom 24 facets 2. Ghat tarasi – Cutting and Polishing (Bruiting) 3. Table – Polishing the topmost single facet 4. Athpel-Polishing the top 8 facets 5. Mathala – Polishing the top 24 facets [2,3,4] Dust, heat, poor

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Bhut P, Sharma D. A Study on Occupational Correlates For Workplace Wellbeing, Morbidities and Occupational Health and Safety Vulnerability Measures amongst Diamond Workers In Surat. Healthline. 2025;16(3): 214-220
	DOI : 10.51957/Healthline_715_2025	

Received : 20-07-2025 **Accepted** : 29-09-2025 **Published :** 30-09-2025

lighting, inadequate hygiene, and other such issues are some hazards of many that diamond workers have to face.[3] The workers have to work in an atmosphere, which affects their mental, behavioural and physical health. Workplace satisfaction, safety, and health are the three pillars of workplace well-being.[5] The research was planned to study occupational correlates for workplace wellbeing, morbidities and occupational health and safety vulnerability measures in diamond workers.

Methods:

The current study was a cross-sectional analytical study done in four diamond-cutting and polishing industries located in Surat, Gujarat during May 2021-November 2022. The study population comprised of Diamond workers from selected industries who fulfilled inclusion criteria. Sample size n was calculated by = [DEFF*Np (1-p)]/ [(d2/Z21-á/2*(N-1) +p*(1-p)][6] where p- 72% in this study is taken as the prevalence of musculoskeletal disorders [7]. Confidence limits as % of 100 (absolute +/- %) (d)=5% and N- Population size= 100000, DEFF- Design effect 8X8 1, Z21-á/2= 1.96. The calculated sample size was 310 and 31 for non-responses. So, final sample size came as 341 which was rounded to 350. The sampling was basically done in 2 steps and in both it was convenient sampling as getting the responses was a big challenge. Studying occupational correlates in industry is a challenge owing to permission to conduct the study, as several industry owners declined to participate. A list of fourteen industries was prepared where more than 500 workers were employed and were within the reach of the authors by area. Four of the fourteen diamond industries approached agreed to participate in the study. In the second stage, total of 350 participants for the data collection were selected from the four identified industries where the owner granted permission for the study. 150 study participants (diamond workers) form 1st Industry, 90 from 2nd Industry, 80 from 3rd Industry and 30 from 4th Industry.

Inclusion criteria: Workers who were working in the diamond industry for more than 1 year. The workers who were present during the date and time of interview were interviewed.

Exclusion criteria: Workers who were working in diamond industry, but not directly working with diamonds like clerks, accountants, gatekeepers

Ethical Clearance: The study has been cleared by IEC of the institute with reference number IEC/BU/129 Faculty/17/145/2021 dated 31/05/2021

Questionnaires

A questionnaire eliciting Socio demographic, Occupational and epidemiological variables was prepared. For workplace wellbeing, the work place well-being questionnaire by Gordon Parker, Black Dog institute [8] was used. For workplace health and safety, the Occupational Health and Safety (OHS) vulnerability measure of the Institute for Work & Health (IWH)[9] was used. Both these questionnaires are available in public domain. The translated Gujarati questionnaire was read out to the respondents and responses were noted. Hazard risk matrix was prepared by asking the diamond workers. This includes likelihood of occurrence of an event and its severity. The multiplication of both gives the risk level of the event.

Workplace wellbeing was measured in four different constructs, 1. Work satisfaction 2. Organizational respect for the employee 3. Employer care 4. Intrusion of work into private life

Total there were 31 questions and each question was measured on a scale of Not at all as 0 to Extremely as 4.

Work satisfaction categories based on scoring were Low = 0-11; Medium = 12-30; High = 31-40. Include questions no -1,2,3,6,10,12,19,23.

Organisational respect for the employee categories based on scoring were Low =0-7; medium 8-21; High = 22-28. Include question no-4,7,9,11,17,20,24,31.

Employer care categories based on scoring were Low 0-7; medium 8-21; High 22-28. Include question no-8,13,16,21,25,28,29.

Intrusion of work into private life categories based on scoring were Low = 0-5; medium 6-17; High= 18-26. Include question no -5,14,15,18,22,26,27,30. Question 26 is reverse scored.

OHS (Occupational Health and safety) Vulnerability Measure questionnaire

The tool assesses OHS vulnerability in four parts: There is no scoring.

1: Workplace hazards (WH) (9 questions). The 8 options are from Never to Everyday with one as Don't know/Not Applicable.

   For other 3 constructs, the 5 options are from Strongly agree to Strongly disagree and one option as Don't know/Not Applicable.

2: Workplace policies and procedures (WPP) (7 questions).

3: Occupational health and safety awareness (OHSA) (6 questions)

4: Participation in occupational health and safety (POHS) (5 questions)

Results:

A total of 350 participants took part in the study. The distribution of workers among the various work types in the diamond cutting industry is shown in Table 1. A total of 350 participants took part in the study, of which 44 (12.57%) were working with the Ghat type, 107 (30.57%) with the Taliya, 69 (19.71%) with the Table work type, 46 (13.14%) with the Athphel type, and 84 (24%) with the Mathala work type. 106 (30.28%) workers were in the age category 40-45, 90 (25.71%) were in 30-35 years, 69 (19.71) were in 35-40 years. 300 (85%) workers chewed tobacco, and 72 (20.6%) used to smoke cigarettes.

Out of 350 workers, 260 experienced health issues. Fatigue was reported by 180 (51.4%) followed by pain in the wrists, elbows, and shoulders (MSDs) 156 (44.5%) and minor injuries to any body part 141 (40%). 135 (38.5%) of workers reported visual issues, 120 (34.2%) workers mentioned perceived stress, 114 (32.5%) reported headache and 77 (22%) complained of backache. 41 (11.7%) reported bodily pain. Hypertension was reported by 28 (8%) of workers and 29 (8.3%) had diabetes. The difference was significant for Fatigue. Perceived stress, bodily pain, giddiness and diabetes by type of work. (Table 2)

Significant difference was found between different types of work in diamond industry and all the constructs of workplace wellbeing. (Table 3) In Work satisfaction, Employer care and Intrusion of work into private life average scores fall in the medium category of satisfaction in all. In Organizational respect for the employee, average scores fall in the low category for Athpel type of work whereas it is in medium category of satisfaction for all other 4 types of work (These categories are mentioned in the Materials and Methods). The mean scores were highest for Work satisfaction in Table type of work. By post Hoc test (Tukey HSD), a significant difference was found between Taliya & Ghat, Table, Mathala for Work satisfaction. The mean scores were highest for Organizational respect for the employee

Table 1: Distribution of Diamond Workers According to their Type of Work with Age and Addiction (N=350)

Variables	Type of work					Total, n (%)
	Athpel	Ghat	Table	Mathala	Taliya	
Age Groups (Years)						
25-30	7	2	5	11	13	38 (10.85)
30-35	8	22	19	18	23	90 (25.71)
35-40	7	4	20	16	22	69 (19.71)
40-45	14	13	16	31	32	106 (30.28)
45-50	5	3	8	3	9	28 (8.0)
50-55	5	0	1	5	8	19 (5.42)
Addictions						
Tobacco chewing	41	40	59	69	91	300 (85)
Smoking (Cigarrete)	11	17	11	16	17	72 (20.6)
Total	46 (13.14)	44 (12.57)	69 (19.71)	84 (24.0)	107 (30.57)	350 (100.0)

Table 2: Distribution of Workers According to Different Morbidities and Type of work (N=350)

Particulars	Type of work					n (%)	x^2, p value
	Athpel	Ghat	Table	Mathala	Taliya		
Reported Health Problems	30	39	42	63	86	260 (74.28)	15.32, .004
Specific Morbidities[#]							
Small injuries over any body part	13	22	27	30	49	141 (40)	6.609, .158
Fatigue	20	15	36	36	73	180 (51.4)	21.02,<.001
Pain over wrist, elbows, and shoulder (MSD)	19	24	31	32	50	156 (44.5)	3.60, .46
Difficulty in hearing	1	1	2	1	9	14 (4)	6.28, .139*
Difficulty in vision	13	19	27	26	50	135 (38.5)	7.53, .110
Backache	7	11	14	20	25	77 (22)	1.85, .76
Stress (Perceived)	15	22	11	28	44	120 (34.2)	17.43, .002
Headache	17	17	21	22	37	114 (32.5)	3.03, .552
Breathlessness	4	4	2	0	9	19 (5.4)	11.38,.013*
Bodily pain	2	4	7	6	22	41 (11.7)	11.24, .021*
Giddiness	2	2	13	1	1	19 (5.4)	23.99, .001*
Anxiety	1	6	2	5	4	18 (5)	6.72, .123
Hypertension	4	2	5	5	11	28 (8.0)	2.47, .64
Diabetes	2	8	9	7	3	29 (8.3)	12.46, 01

Note. [#]Multiple responses, MSD-Musculoskeletal disorders, *Fisher, Exact, Test

Table 3: Workplace well-being and the type of work (N=350)

Workplace Wellbeing Particulars	Type of work					F Test, p value
	Athpel	Ghat	Table	Mathala	Taliya	
	Mean (SD)					
Work satisfaction	27.02 (2.54)	27.39 (1. 57)	27.77 (2.15)	27.61 (1.57)	26.07 (3.31)	6.97, <.001
Organizational respect for the employee	21.98 (1.14)	22.95 (.42)	22.46 (.96)	22.15 (.66)	21.54 (1.48)	16.21, <.001
Employer care	23.46 (.72)	23.48 (.54)	23.33 (.63)	23.55 (.68)	23.23 (.57)	3.42, .009
Intrusion of work into private life	13.93 (2.51)	12.45 (1.60)	13.59 (2.13)	15.46 (1.54)	13.12 (2.83)	17.97, <.001

in Ghat type of work. By post Hoc test, a significant difference was found between Ghat & Taliya, Athphel, & Mathala. Significant difference was also found between Taliya & Table, Mathala for Organizational respect for the employee. The mean scores were highest for Employer care and Intrusion of work into private life in Mathala type of work. By post Hoc test, a significant difference was found between Taliya & Mathala in Employer care. By post Hoc test, a significant difference was found between Ghat & Athphel, Mathala. Significant difference was also found between Mathala & Taliya, Table, Athphel for Intrusion of work into private life.

Noise, Headache, Difficulty in vision and hearing are very likely as identified by the workers and have moderate consequence. Injuries on hand and Fingers might be sliced were in likely chance of getting and severe consequence. (Figure 1)

For Occupational health and safety Vulnerability Measures in Part 1: Workplace Hazards (WH) Part 2: Workplace policies and procedures (WPP) Part 3:

Figure 1: Hazard Risk Matrix (5 x 5)[10] for Diamond workers

Likelihood of occurrence	Severity of consequences				
	Negligible (1)	Minor (2)	Moderate (3)	Significant (4)	Severe (5)
Very unlikely (1)	1	2	3	4	5
Unlikely (2)	2	4	6	8	10
Possible (3)	3	6	9 Acute respiratory infection	12	15
Likely (4)	4	8	12 Psychosocial effect	16	20 Injuries n Fingers might be sliced
Very Likely (5)	5	10	15 Noise Headache Difficulty in vision and hearing	20 Pain over wrist, shoulder Backache	20

Risk	Very Low	Low	Medium	High	Very High	Extreme

Occupational health and safety awareness (OHSA) Part 4: Participation in occupational health and safety (POHS), these are the findings.

All the workers mentioned "Every day" for Q 2 WH (Do repetitive movements with your hands or wrists (packing, sorting, assembling, cleaning, pulling, pushing, typing) for at least 3 hours during the day, Q 5 WH (Work in a bent, twisted or awkward work posture) & Q 7 WH (Work in noise levels that are so high that you have to raise your voice when talking to people less than 1 meter away.) All the workers mentioned "Never" for Q 8WH (Experience being bullied or harassed at work). Everyone strongly agreed for Q 10 WPP (Everyone receives the necessary workplace health and safety training when starting a job, changing jobs or using new techniques), Q 16 WPP (Communication about workplace health and safety procedures is done in a way that I can understand) and Q19 OHSA (I know how to perform my job in a safe manner). Collectively strongly agree and agree was seen as option opted for Q 17 OHSA (I am clear about my rights and responsibilities in relation to workplace health and safety), Q 20 OHSA (If I became aware of a health or safety hazard at my workplace, I know who (at my workplace) I would report it to) and Q25 POHS (I know that I can stop work if I think something is unsafe and management will not give me a hard time). The majority 94.9% of the workers disagreed with the Q 23 POHS (I feel free to voice concerns or make suggestions about workplace health and safety at my job). All the workers opted for "agreed" for Q 24 POHS (If I notice a workplace hazard, I would point it out to management.)

Discussion:

It remains a challenge to obtain jobs in highly urbanized and industrialized cities like Surat, the people can easily get employment in these diamond industries. To start working in the diamond industry, the workers felt that they don't require any resource as such. Due to this, the workers were moderately satisfied with the current work based on their education. Global recession in diamond industry has impact on diamond workers as well.[11] Bhardava[12] found that 71.2 % workers had history of tobacco use, among them 68.1 % were active in consuming tobacco. Smoking form of tobacco was actively used by 11.4 %. Out of 350 workers, 260 (74.28%) experienced health issues. Those doing Taliya

and Mathala work had more health issues than Table, Ghat, and Athphel workers. This association was found to be significant. Taliya (68%) and Table (52.2%) workers had experienced more fatigue than Ghat ,Mathala and Athpel.. Yadav et al [3] in their study found mild level of stress among the diamond workers manifesting in form of headaches, diarrhoea, constipation, nausea, aches, and many more symptoms. Mehta and Ribadiya [13] reported that more than 35% had refractive problems and 6.58 % of workers had hypertension. Bhalala B et al[14] found that overall, 47% were suffering from work related musculoskeletal disorders. These authors identified the work-related musculoskeletal disorders for separate works and have found that in Polishing (bottom) 41% had elbow pain, 24% had low back pain. In polishing (top) unit, they found 46% had low back pain, 22% had cervical spine pain. In bruiting work unit, 67% had thumb and fingers pain, 33% had low back pain. The working requires a variety of physical activities which includes continuous, repetitive motions, uncomfortable postures for extended periods of time, and exposure to vibrations. Mechanical stressors affect neck, back, shoulder, elbow, wrist, hand and fingers.[14] Nahar S mentioned musculoskeletal discomfort in the low back, followed by the neck and fingers as the most common. In diamond assorters, it was in the elbow, then the neck. The posture adopted by diamond workers while at work induces muscle exhaustion and muscle imbalance, resulting in protective muscle contraction and muscle spasm.[15] Polishing work requires high level of concentration and focus. It is also physically exhausting because it requires long sitting durations which causes strain in different body parts.[4] In this study, it was found that light was adequate to do the work. In a study done by Agarwal and Patel[4], they found that the workers perceived light, noise, temperature and humidity as comfortable. The fine work which requires proper lighting, that involves constantly checking the diamond facet through an eye piece can cause a lot of eye strain. They mentioned that the polishing unit owners must provide adequate lighting facilities in their units.[4] Agarwal and Patel also found the sound levels within the range of the permissible standards.[4] Every day, these workers are exposed to dangerous particles like carbon dust. These workers were also exposed to injuries in eyes by flying chips or injuries from sharp tools.[16] Every day, workers adopted a bent, awkward work posture. As the result, some workers reported chronic back aches and generalized body pain. Noise levels are so loud that workers must raise their voices when speaking to persons who are less than one meter away. All the workers mentioned "Yes" for this. As a result, workers have complained about hearing problems. Occupational Safety and Health Administration (OSHA) sets limits on noise exposure in the workplace. These limits are based on a worker's time weighted average over an 8 hours day. OSHA'S permissible exposure limit (PEL) is 90 dBA for all workers for an 8 hour per day.[17] Information regarding workplace health and safety procedures is communicated in a way that is easy for workers to understand and everyone agreed to it. The findings from Bhopal gas tragedy has mentioned that the instruction manuals were in English, which the workers were not able to understand.[18] Hazard risk matrix helps in identification of hazards at workplace, likelihood of being affected and the impact. This is a way to ensure safety and mitigation of suffering. Workplace health promotion increases employee's capacity, workplace productivity, and employee and employer relationship. In order for employees to feel comfortable and motivated, a company must be concerned about their safety and health. [4]

Limitations:

Causal association of morbidities can't be proved as this study was a cross-sectional study. These were associated problems with the work. Age related outcomes and the duration of service/employment which is added in years is contributing to more exposure over time so to prove the causal association longitudinal studies are warranted. The current associations are static associations based on cross sectional study.

Conclusion:

All the five types of workers have medium level of work satisfaction, but differences are evident by mean scores with Table work having highest score over other type of works. Those doing Taliya and Mathala work had

more health issues than Table, Ghat, and Athphel workers. Periodical medical examination is important to address the health problems in the workers in diamond industry.

Declaration

Funding: Nil

Conflict of Interest: Nil

Acknowledgement:

We would like to heartfully acknowledge the Diamond industries owners for their permission to conduct the study without whose permission this study was not possible at all and also the diamond workers who participated in this study.

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Assessment of Patient Satisfaction in Outpatient Department of PHCs in a Surendranagar District: A Cross-Sectional Study

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Abstract:

Introduction: The Bhore Committee (1946) proposed the Primary Health Centre (PHC) as the fundamental unit of the public health system, providing comprehensive care to rural populations, focusing on preventive and promotive aspects. PHC services should be comprehensive, accessible, acceptable, community-driven, and affordable. Patient satisfaction reflects their experience and attitude toward the quality of services provided. **Objective:** To assess the level of patient satisfaction with various quality-related parameters of outpatient department (OPD) at PHCs and to identify factors influencing satisfaction. **Methods:** A cross-sectional survey was conducted from March to August 2023 among adult patients (aged 18 and above) attending the OPD of selected PHCs in Surendranagar District, Gujarat. Twenty PHCs were selected through simple random sampling (2 from each of the 10 talukas), and 10 patients per PHC were enrolled via convenience sampling. Patients with emergency conditions, chronic illnesses, or serious health issues were excluded. Data were collected using a pre-tested, semi-structured questionnaire, and analysed using Microsoft Excel and SPSS version 26. **Results:** Overall, 81% (162) of patients were satisfied with their PHC visit. Key issues reported included unavailability of doctors (68%, 22), essential medicines (74%, 20), and drinking water (89%, 9). About 16.5% (33) faced difficulty reaching the PHC. Suggestions included ensuring drug availability (47.5%, 95), posting specialist doctors (30.5%, 61), and providing ambulance services (23.5%, 47). **Conclusion:** The study indicates high patient satisfaction with PHC services but highlights gaps in transportation, availability of doctors and medicines, and access to drinking water and ambulance services.

Keywords: Outpatient Department; Patient Satisfaction; Primary Health Centre; Services

Introduction:

The concept of the Primary Health Centre (PHC) was introduced by the Bhore Committee (1946) as a basic health unit to provide integrated healthcare, focusing on rural populations and emphasising preventive and promotive aspects.[1] PHC services should be comprehensive, accessible, acceptable, community-driven, and economically viable.[2] Patients possess certain anticipations regarding the healthcare delivery they seek when they present themselves at healthcare facilities.[3]

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Kadri SAS, Nimavat JH, Sochaliya KM, Padhiyar PR, Jasani PK, Vasava PJ. Assessment of Patient Satisfaction in Outpatient Department of PHCs in a Surendranagar District: A Cross-Sectional Study. Healthline. 2025;16(3): 221-230
	DOI : 10.51957/Healthline_734_2025	

Received : 22-05-2025 **Accepted** : 07-08-2025 **Published :** 30-09-2025

Patient satisfaction is defined as the attitude that reflects patients' preferences or aversions toward the services rendered, following their experiences with healthcare provisions.[4] Patients actively consume healthcare services, making their feedback essential for improving service quality. Patient satisfaction depends on factors like clinical service quality, facility cleanliness, access to clean water and medications, and staff behaviour.[5]

The PHC serves as the first contact between doctors and community in rural area.[6,7] Outpatient satisfaction, which reflects both the perceived quality and efficiency of services, has increasingly become a focal point for evaluating healthcare delivery and informing government strategies in resource-limited settings.[8] This study aimed to assess patient satisfaction with different quality-related aspects of outpatient services at Primary Health Centres (PHCs) and to analyse the factors influencing it.

Methods:

This cross-sectional study was conducted among adult patients (aged 18 years and above) visiting the Outpatient Department (OPD) of Primary Health Centres (PHCs) in Surendranagar District, Gujarat. The district has 48 PHCs distributed across 10 talukas (administrative divisions). To obtain a representative sample, 2 PHCs from each taluka were selected through simple random sampling. From each of the 20 selected PHCs, 10 patients were enrolled using a convenience sampling method based on the first-come, first-selection technique, resulting in a total sample size of 200 patients. Patients visiting for emergency or presenting with serious conditions or chronic illnesses were excluded from the study.

Data were collected using a pre-designed, pre-tested semi-structured questionnaire. The tool was translated into the local vernacular (Gujarati) by a language expert. Its validity was assessed through the Content Validity Index (CVI = 0.7), and pilot testing was conducted on 20 patients across two PHCs. The data collected during pilot testing were solely used for refining the tool and were not included in the final analysis. Informed consent was obtained from all participants prior to the interview. Data collection was conducted during different time slotsmorning hours at some PHCs and afternoon or evening hours at others.

The study also included a qualitative component in which patients were asked to provide suggestions for improving OPD services. These responses were analysed and presented both as percentages and as verbatim quotes, grouped under thematic categories.

Data were analysed using Microsoft Excel 2021 and SPSS version 26. Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study.

Results:

In this study, most of the patients (27.5%) belonged to the 30-39 years of age group, and 70% of the patients were male. The majority of participant had education up to secondary level (31.5%) and 30% were illiterate. About one-third of the patients (32.5%) were labourers. Additionally, 71.5% resided in the same village where the PHC was located, and approximately three-fourths (75.5%) had visited the PHC two or more times. The primary reason for most visits was routine check-ups. (Table 1)

Various levels of points of care were used to identify the burden of problems during the visit of patient. The main difficulties were reported in the doctors consultation room (19%), in reaching the PHC (16.5%), and at the pharmacy window (13.5%). (Figure 1)

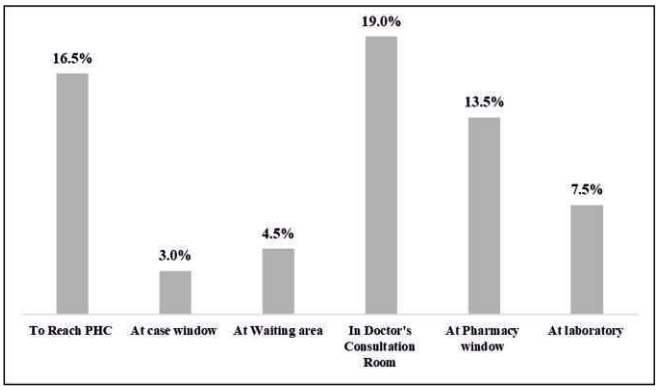
In detail, reasons for these difficulties felt by patients at each level were assessed. In the doctors consultation room, the main issues were the unavailability of the doctor (68%), the doctor was busy with other work (40%), and 26% of patients reported that the doctor had not given them enough time. The second major difficulty was in reaching the PHC, main problems were unavailability of a vehicle (90%), followed by poor road

Table 1: Socio-Demographic Profile of Study Participants (N=200)

Variable	n	%
Age (in years)		
<20	7	3.5
20-29	43	21.5
30-39	55	27.5
40-49	33	16.5
50-59	24	12
>60	38	19
Gender		
Male	140	70
Female	60	30
Education		
Illiterate	60	30
Primary	42	21
Secondary	63	31.5
Higher Secondary	16	8
Graduate	19	9.5
Occupation		
Business	33	16.5
Home maker	44	22
Job	15	7.5
Labour	65	32.5
Retired	26	13
Student	16	8
Unemployed	1	0.5
Locality		
Other Village	57	28.5
Village where PHC is situated	143	71.5
No. of time PHC is visited		
First Visit	49	24.5
Visited 2-4 Times	78	39
Visited ≥5 Times	73	36.5
Purpose of visit		
Check up	153	76.5
Follow up	19	9.5
Lab test	22	11
Other reason*	6	3

Note: *Other reasons include visits for certification for administrative purposes (e.g., medical fitness or sick leave), health education, and contraceptive services.

Figure 1: Proportion of Patients Reporting Difficulties at Various Service Points in PHCs (N=200)



conditions (51%). The third major problem was at the pharmacy level, where the primary issue was the unavailability of medicine (74%). (Figure 2)

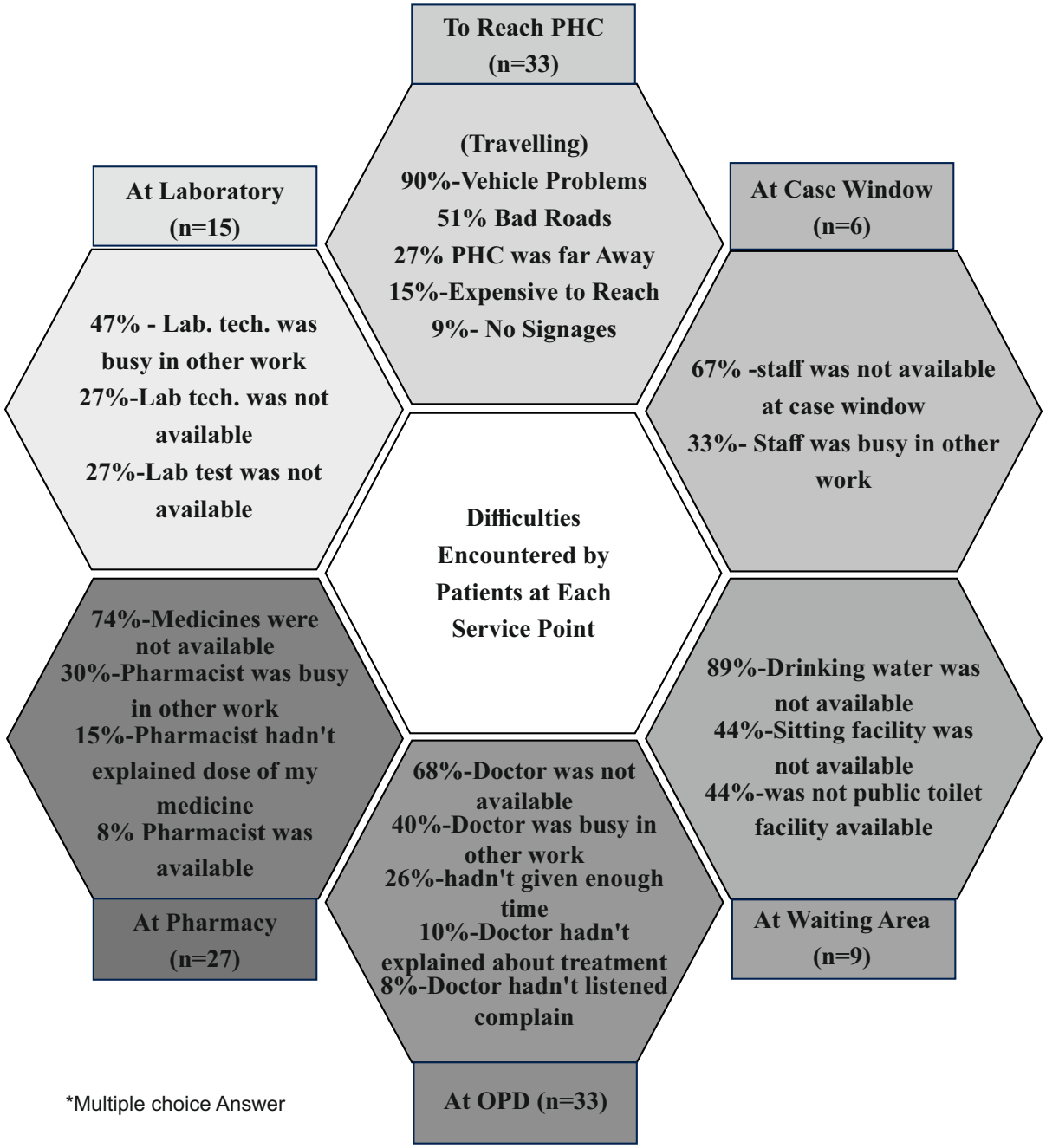
In addition to the above-mentioned problems, 3-7% of patients experienced difficulties at the case window, in the waiting area, and at the laboratory (Figure 1). For these issues staff was unavailable or busy in other work which was a problem at the case window and laboratory while unavailability of basic amenities was many issues in the waiting area. (Figure 2)

Approximately 13% of patients visited the PHC despite not preferring it, mainly due to the non-availability of nearby hospital (92.31%), followed by the free availability of treatment (38.46%) and free medicine (34.52%). (Figure 3)

Participants were also interviewed about their satisfaction with the current visit, with 81% reporting that they were satisfied. Satisfaction was assessed across four categories: doctor, staff, services, and infrastructure/amenities. A major gap in satisfaction and non-satisfaction was found in relation to doctors, staff and infrastructure/amenities. (Figure 4)

Among the four categories examined, satisfaction with staff and infrastructure showed a statistically significant association with overall satisfaction. [$x^2=5.328$, $p = 0.021$ and $x^2=4.376$, $p=0.039$, respectively]. (Table 2) In contrast, satisfaction with

Figure 2: Difficulties Encountered by Patients at Each Service Point



doctors and services**,** though frequently reported, did not show a significant statistical relationship with overall satisfaction.

Further association between socio-demographic factors and satisfaction with staff (n=86) and infrastructure (n=71) was analysed among participants who cited staff or infrastructure as a reason for their satisfaction or dissatisfaction**.** In satisfaction with staff, a significant association was found with education (p=0.025), indicating that satisfaction levels varied across different educational backgrounds. (Table 3) In terms of infrastructure, a significant association was observed with village of residence (p = 0.016), suggesting that participants from the same village were more likely to report satisfaction. (Table 4)

Figure 3: Reasons for Repeat Visits to Primary Health Centre (PHC) Despite Patient Dissatisfaction (N=26)

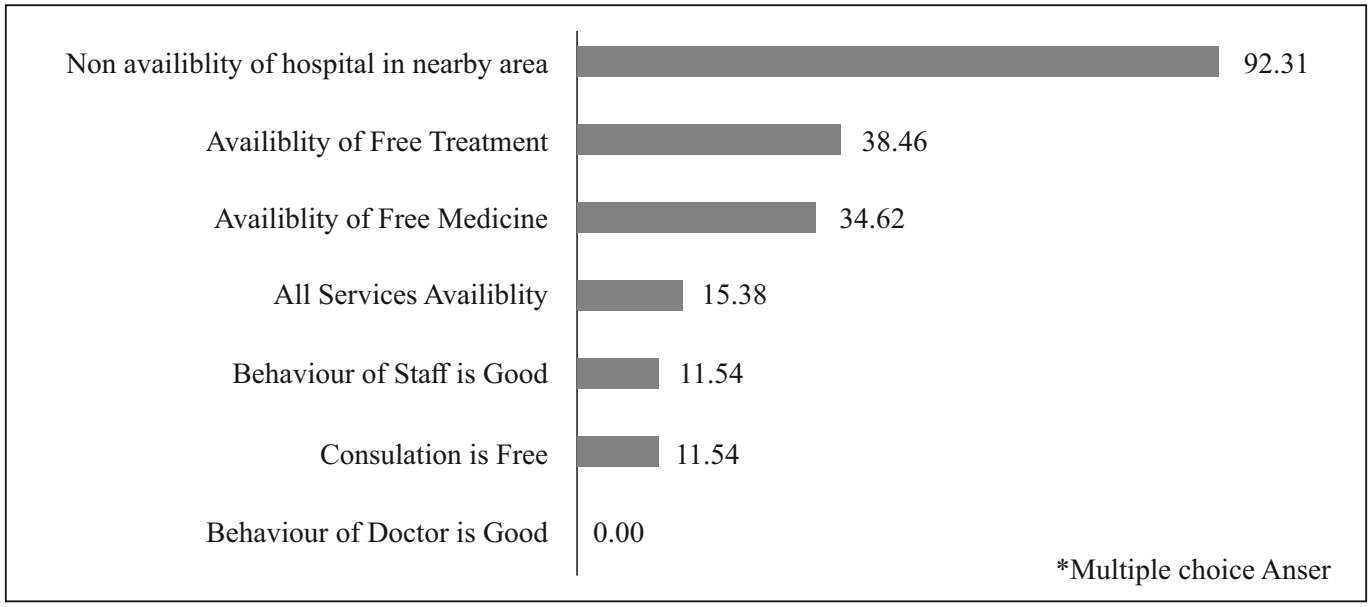
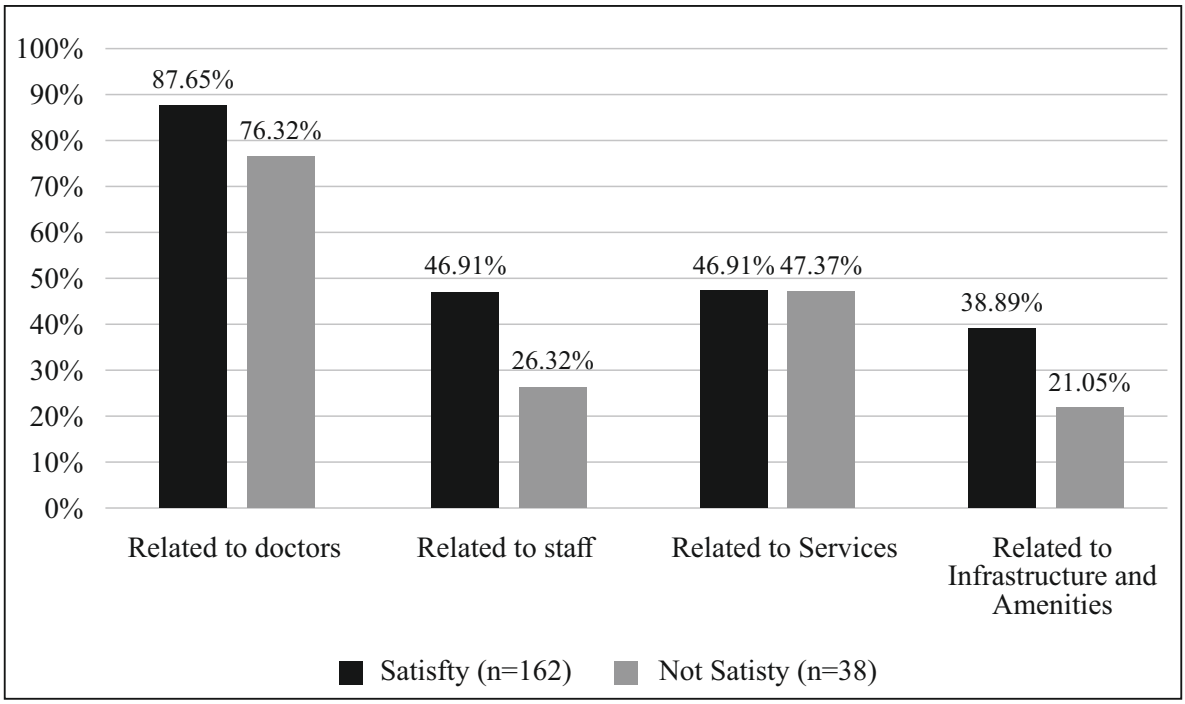


Figure 4: Reasons for Patient Satisfaction and Dissatisfaction on the Day of Visit (N = 200)



Note: Out of 200 patients, 162 reported being satisfied and 38 not satisfied with their visit on the day of data collection. Patients could select multiple reasons for their satisfaction or dissatisfaction from the following categories: doctor, staff, services, and infrastructure & amenities.

The participants were also asked for suggestions to improve OPD services. Nearly half of the participants (47.5%) recommended that all essential medicines should be available, while 30.5% expressed the need for specialist services, from doctors. This was followed by the demand for an ambulance (23.5%) and advanced laboratory services (22.5%). A small proportion of patients (14.15%) highlighted the need for proper

Table 2: Association of Reason for Satisfaction with Overall Satisfaction (N=200)

Reason for satisfaction	Overall Satisfaction		Chi-square (p value)
	Satisfied	Non-Satisfied	
Doctor			
Yes	142 (83.0%)	29 (17.0%)	3.192 (0.074)
No	20 (69.0%)	9 (31.0%)	
Staff			
Yes	76 (88.4%)	10 (11.6%)	5.328 (0.021)
No	86 (75.4%)	28 (24.6%)	
Services			
Yes	72 (80.0%)	18 (20.0%)	0.106 (0.74)
No	90 (81.8%)	20 (18.2%)	
Infrastructure			
Yes	63 (88.7%)	8 (11.3%)	4.376 (0.039)
No	99 (76.7%)	30 (23.3%)	

Table 3: Association of Socio-Demographic Factors with Staff Satisfaction (N=86)

Sociodemographic Factor	Satisfaction with Staff		p value*
	Satisfied	Non-Satisfied	
Village			
Same	58 (92.1%)	5 (7.9%)	0.123
Other	18 (78.3%)	5 (21.7%)	
Education			
Illiterate	19 (90.5%)	2 (9.5%)	0.025
Primary	18 (81.8%)	4 (18.2%)	
Secondary	27 (96.4%)	1 (3.6%)	
High School	3 (50.0%)	3 (50.0%)	
Graduate	9 (100.0%)	0 (0.0%)	
Occupation			
Labour	22 (84.6%)	4 (15.4%)	0.438
Home maker	19 (90.5%)	2 (9.5%)	
Student	3 (60.0%)	2 (40.0%)	
Job	6 (100.0%)	0 (0.0%)	
Business	15 (93.8%)	1 (6.3%)	
Retired	11 (91.7%)	1 (8.3%)	
No. of visit			
1 Visit	23 (95.8%)	1 (4.2%)	0.47
2-4 Visit	22 (84.6%)	4 (15.4%)	
≥5 Visit	31 (86.1%)	5 (13.9%)	
Purpose of visit			
Check up	58 (87.9%)	8 (12.1%)	0.349
Follow up	5 (83.3%)	1 (16.7%)	
Lab	10 (100.0%)	0 (0.0%)	
Other	3 (75.0%)	1 (25.0%)	

*Fisher's Exact Test

Table 4: Association of Socio-Demographic Factors with Infrastructure Satisfaction (N=71)

Sociodemographic Factor	Satisfaction with Infrastructure		p value*
	Satisfied	Non-Satisfied	
Village			
Same	51 (94.4%)	3 (5.6%)	0.016
Other	12 (70.6%)	5 (29.4%)	
Education			
Illiterate	16 (94.1%)	1 (5.9%)	0.463
Primary	17 (81.0%)	4 (19.0%)	
Secondary	23 (92.0%)	2 (8.0%)	
High School	3 (75.0%)	1 (25.0%)	
Graduate	4 (100.0%)	0 (0.0%)	
Occupation			
Labour	20 (87.0%)	3 (13.0%)	0.878
Home maker	19 (90.5%)	2 (9.5%)	
Student	1 (100.0%)	0 (0.0%)	
Job	5 (100.0%)	0 (0.0%)	
Business	8 (88.9%)	1 (11.1%)	
Retired	8 (80.0%)	2 (20.0%)	
No of visit			
1 Visit	18 (94.7%)	1 (5.3%)	0.639
2-4 Visit	19 (90.5%)	2 (9.5%)	
≥5 Visit	26 (83.9%)	5 (16.1%)	
Purpose of visit			
Check up	49 (89.1%)	6 (10.9%)	0.809
Follow up	4 (80.0%)	1 (20.0%)	
Lab	9 (90.0%)	1 (10.0%)	
Other	1 (100.0%)	0 (0.0%)	

*Fisher's Exact Test

referral services, while 8.5% stressed the provision of delivery services.

Some of the suggestions are mentioned here as verbatim. (Thematic analysis)

Suggestions regarding medicine availability:

1. "Jaroori davao hoti nathi."
   (Essential medicines are not available)
2. "Badhi davao ahi malti nathi."
   (All medicines are not available here.)
3. "Ghani var dava hoti j nathi."
   (Many times, medicines are simply not available.)

Suggestions regarding the doctor and staff:

4. "Mota doctors ave to saru rahe."
   (It would be better if senior doctors are available.)
5. "Vadhare saravar mate bahar javu pade chhe."
   (We have to go outside for better treatment.)
6. "MD doctor ave to vadhare saru re."
   (It would be better if an MD doctor is available.)

Suggestion regarding laboratory service:

7. "Private laboratory jevi tapas ahi thavi joiye."

   (The Investigations here should be like those in private laboratories.)

Suggestions regarding other services:

8. "Ambulance ni jaroor che."

   (There is a need for an ambulance.)

9. "Ahi thi mota davakhana java davakhana nu vahan hovu joie."

   (The health centre should have a vehicle to transport patients to bigger hospitals.)

10. "Davakhana ma chokhai ni jaroor chhe."

    (There is a need for cleanliness in the hospital.)

    When asked about their willingness to recommend the PHC to others, 81.5% responded positively, 15.5% said they would not recommend it, and 3% were unsure.

Discussion:

Approximately one-fourth of patients belonged to the 3039-year age group, consistent with the findings of Krupal et al.[9] Around 30% of participants were either illiterate or had education only up to the secondary level, whereas Krupal et al.[9] reported a higher proportion (70%) with education limited to the primary level. Nearly one-third (32%) were labourers and 33% were housewives, closely mirroring the proportions reported by the same study.

A majority of patients (76%) visited PHCs for general check-ups, highlighting the preventive orientation of services provided at this level, in line with observations by Mohammed et al.[10]

Difficulties experienced during doctor consultations, reported by approximately 20% of participants, included long waiting times and inadequate communication, also cited as barriers by Mohammed et al.[10]

Transportation and geographical barriers were evident, with 16.5% of patients reporting challenges in reaching the PHC. Similar concerns were highlighted by Samina et al. (2013).[11] and in WHO's 2019 review of 40 years of PHC implementation.[12] Short consultation time was identified as a dissatisfaction factor by 24% of patients, aligning with findings from Zhang et al.[13] in China.

Only 15% of patients reported that the pharmacist adequately explained medication usage. In contrast, higher satisfaction levels with pharmacy services were reported in the study by Al Zaidan et al.[14] Furthermore, 44% of patients noted inadequate seating facilities, a finding comparable to the study by Abdullah et al. (2023).[15]

A significant proportion (92.31%) of participants visited the PHC due to the lack of nearby health facilities. Similar trends were documented by Khalid et al. (2020).[16] Overall patient satisfaction was 81%, slightly below the 92% reported by Krupal et al.[9] Satisfaction with doctors was relatively high (87.65%) and aligned with the levels reported by Fatima et al.[17] However, satisfaction with infrastructure was reported by only 40% of patients, in agreement with WHOs 2020 report on challenges in rural health systems.[18]

A statistically significant association was observed between overall satisfaction and two key factors: staff behaviour ($\div^2 = 5.328$, $p = 0.021$) and infrastructure ($\div^2 = 4.376$, $p = 0.039$). Comparable statistical associations were not identified in the reviewed literature. Satisfaction with staff was also significantly associated with education level ($p = 0.025$). A study conducted in Majmaah[19] similarly found higher satisfaction among those with primary education (95.6%), with a decreasing trend as education level increased, possibly due to differing expectations.

Availability of essential medicines was a prominent concern, as nearly 47.5% of participants suggested its improvement. This underscores its critical role in shaping patient satisfaction, a view supported by Dinesh et al. (2021).[20] Additionally, 30.5% of participants emphasized the need for specialist doctor services, consistent with the findings of Krupal et al. (2013)[9],

which linked improved accessibility to specialist consultations with enhanced satisfaction. About 22% of patients recommended improvements in diagnostic laboratory services, reflecting diagnostic limitations previously highlighted by WHO [18].

Limitation:

This study has certain limitations. The use of convenience sampling at the PHC level may introduce sampling bias, limiting the generalizability of the findings. Only 10 patients were interviewed per PHC, which may not fully capture the diversity of patient experiences. Responses were self-reported and subject to recall bias.

Conclusion:

In this study, the majority of OPD patients were from the village where the PHC is located, with a higher proportion of male patients. A smaller proportion of patients came from other villages, mainly reporting transportation difficulties.

At the OPD, patients mainly felt difficulties during doctors consultation, at the pharmacy window, and in the laboratory- primarily due to issues related to human resources. These challenges closely reflected the reasons patients gave for their satisfaction or dissatisfaction with the care received during their current visit.

The main reason patients visited the PHC despite dissatisfaction was non-availability of hospital in nearby area and availability of free treatments and free medicine in PHC.

Recommendations:

In depth analysis of issues regarding human resources can be carried out by government or non-government agency. Regular assessment of patients satisfaction on particular interval related to the quality of care at different level should be done. This will improve planning of health care service at the facility level.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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A Cross-Sectional Study About Household Solid Waste Management Practices Among Residents in Urban Slum Area of Mumbai

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Abstract:

Introduction: Household solid waste management is a primary step to curb environmental pollution. **Objective:** To determine household solid waste management practices among residents in urban slum area in Mumbai. **Methods:** A Cross-sectional study was conducted in a community field practice area. Two hundred participants were selected by using systematic random sampling method. Data were collected using a structured questionnaire. **Results:** The study revealed 151 (75.5%) of families used wastebins in households, 129 (64.5%) used public bins for disposal of waste, and 133 (66.5%) of households did not segregate the waste generated. Statistically significant association was found between education and waste management practices. **Conclusion:** This study showed that majority of waste generated was kitchen waste, and very small percentage of people segregated waste material, even though the appropriate method for waste disposal had been practiced. Measures must be taken to reduce generated waste and create awareness regarding proper waste disposal methods.

Keywords: Household, solid waste management, waste disposal

Introduction:

Household waste, also known as solid waste composed of garbage and rubbish, which are disposable materials generated by households. Solid waste management is a prime problem for many urban local bodies in India, where industrialization has resulted in increased solid waste generation per person.[1] Household wastes can be classified as biodegradable and nonbiodegradable wastes.[2] Open dumping of wastes is a non-sanitary and non-engineered approach that manifests the surrounding environmental pollution issues, which also causes health risks.[3]

Waste segregation practices should be socially acceptable, affordable, and participatory with efficient management, essential for promoting waste segregation.[4] A key component of composting is the efficient segregation of waste, where mixed waste is often dumped in open areas. This is one of the major contributors to global warming. Segregation can help to reduce the burden of handling waste and greenhouse gas (GHG) emissions.[5]

There is a need to practice an integrated solid waste management approach such as incorporating more environmentally and economically friendly concepts of

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Krishna CUA, Hadaye RS. A Cross-Sectional Study About Household Solid Waste Management Practices Among Residents in Urban Slum Area of mumbai. Healthline. 2025;16(3): 231-236
	DOI : 10.51957/Healthline_739_2025	

Received : 28-05-2025 **Accepted** : 12-08-2025 **Published :** 30-09-2025

source separation, recycling of wastes, and public-private partnership.[6]

The study aims to determine household solid waste management practices among residents in urban slum area in Mumbai.

Methods:

This cross-sectional study was conducted in the field practice area of the Community Medicine Department of a one of the Medical College in Mumbai. The sample size was calculated using a previous study about knowledge, practices, and household waste management in Kaiparambu panchayat of Thrissur district, Kerala[7], which showed that 59.2% of people segregated their waste. By taking 59.2% as prevalence and 7% as the allowable error sample size was 200 as per $4pq/L^2$ where p = prevalence rate, q=100-p, L=allowable error. The families residing in the area for at least 6 months were included in the study, and the respondents were adult persons, preferably women, who were available at the household. Household where adult person not available on 3 visit or not willing to give consent were excluded. The study period was from August 2022-November 2022. The study was approved by the Ethics Committee for Academic Research Projects (ECARP/2022/138).

The study was conducted in an urban slum with a population of 92,596 (2011 census). It consists of a total of 11 sectors with 13,975 houses altogether. All the houses are numbered. The first house was selected by simple random sampling and after that, with the help of systematic random sampling, the next household was selected till 19 samples were collected from each plot. The consecutive house was included if any house was found locked or inclusion criteria were not fulfilled.

From each house, one participant was selected. Data were collected from all sectors. Prior informed consent was obtained from the study subjects. The purpose of the study was fully explained to the participants. Sociodemographic details of the study subjects were collected first, followed by questions about household waste management practices. Data were collected using a structured interview schedule and a checklist. Information about sociodemographic data and questions regarding household waste collection, waste segregation, waste disposal, waste management practices, and its effects was obtained. Measurement of the waste was done by digital weighing scale.

Qualitative data was represented in the form of frequency and percentage. Quantitative data was represented using Mean ± SD. Association between variables was assessed by the Chi-Square test. SPSS (Statistical Package for Social Sciences) version 23 was used for statistical analysis.

Operational definitions:

Waste segregation is sorting out or separating wastes into biodegradable and non-biodegradable wastes, into separate bins.

Waste disposal is the management of unwanted materials from generation point to final disposition.

Waste management practices include separation of wastes, collection, treatment and disposal methods.

Effects of waste management refers to the consequences of handling waste materials such as diseases, air pollution and flood.

Results:

Socio-demographic factors of the study population

Two hundred households were included in the study. The mean age of respondents was 38.67 ±10.80. A majority (93.5%) of the participants were females, 79% of the study population belonged to the Muslim religion, 21% belonged to the Hindu religion, 20.5% were illiterate, 21% had completed primary education, 47.5% had completed secondary education, 8.5% had completed higher secondary, 2.5% were graduated. Also, 75% of the participants were unemployed, 81% were married, 4.5 % were unmarried, 1% were divorced, 0.5% were separated, 1.5% were in live-in relationships and 11.5% were widows. More than half (59.5%) belonged to nuclear family, 33% belonged to the joint family and

Table 1: Distribution of Wastes and their Disposal Methods in the Households (N=200)

Variables	n	%
Category of generated waste		
Kitchen Waste	148	74
Plastic	42	21
Paper	15	7.5
Clothes	2	0.5
Others	2	0.5
Disposal of generated waste		
Cardboard box	3	1.5
Plastic bags	43	21.5
Wastebin	151	75.5
No storage	3	1.5
Disposal of collected waste		
Public bin	129	64.5
Open dumpsite	12	6
Road/street side	3	1.5
Drains/gutters	25	12.5
Municipal vehicle	52	26

7.5% belonged to 3-generation family. According to the Modified BG Prasad Scale, in 2021 the majority (48%) belonged to the middle class,27% to the lower middle class, and 16% to the upper middle class.

Household solid waste management

Waste segregation was done in only 33.5% of households. About 73% (146) of households generated 1 kg of waste daily, 12% (24) generated 2 kg of waste, 1% (2) generated 3 and 4 kg of waste and 12.5% (25) of household generated less than 1 kg of waste.

Among the study population, 87% emptied the waste container daily, and 9.5% once in 2 days. Only 3.5% used composting methods for kitchen waste and 11% were aware of e-waste. Only 13.5% of households' house-to-house collection of waste was carried out. The majority (91.5%) carried shopping bags while grocery shopping, 62.5% carried cloth bags, and 36.5% carried plastic bags. More than half of the study population (65.5%) agreed that burning plastic waste caused health hazards. They believed that the presence of heaps of solid wastes caused diseases (55.5%) and air pollution (56%).

Table 2: Comparison Between the Segregation of Waste and Factors Influencing Practice (N=200)

Variable	Segregation		Chi-square	p-value
	Segregating	Not segregating		
Education				
Illiterate	8 (11.9%)	32 (24.1%)	4.09	0.01
Literate	59 (88.1%)	101 (75.9%)		
Occupation				
Employed	20 (29.9%)	30 (22.6%)	1.26	0.26
Unemployed	47 (70.1%)	103 (77.4%)		
Socioeconomic status				
I (Upper class)	3 (4.5%)	2 (1.5%)	6.37	0.17
II (Upper middle class)	12 (17.9%)	20 (15%)		
III (Middle Class)	32 (47.8%)	64 (48.1%)		
IV (Lower middle class)	13 (19.4%)	41 (30.8%)		
V (Lower class)	7 (10.4%)	6 (4.5%)		
Perception of risk of disease				
Yes	30 (44.8%)	81 (60.9%)	4.61	0.03
No	37 (55.2%)	52 (39.1%)		

Table 3: Comparison Between Wastebin Usage and Factors Influencing Practice (N=200)

Variable	Wastebin usage		Chi-square	p-value
	Yes	No		
Education				
Illiterate	24 (15.9%)	16 (32.7%)	6.49	0.01
Literate	127 (84.1%)	33 (67.3%)		
Occupation				
Employed	34 (22.5%)	16 (32.7%)	2.02	0.15
Unemployed	117 (77.5%)	33 (67.3%)		
Socioeconomic status				
I (Upper class)	4 (2.6%)	1 (2%)	3.87	0.42
II (Upper middle class)	24 (15.9%)	8 (16.3%)		
III (Middle Class)	73 (48.3%)	23 (46.9%)		
IV (Lower middle class)	43 (28.5%)	11 (22.4%)		
V (Lower class)	7 (4.6%)	6 (12.2%)		
Perception of Risk of Disease				
Yes	82 (54.3%)	29 (59.2%)	0.36	0.62
No	69 (45.7%)	20 (40.8%)		

Discussion:

Socio-demographic characteristics

In the present study, women were chosen as they mostly managed household waste. The study area had a Muslim majority and had completed their secondary education. Based on the Modified BG Prasad Scale, most of the participants (48%) belonged to the middle class. In contrast to the present study, a study conducted by Nivya and Usha in Northern Kerala showed a majority of the participants were Hindus (83%) and 65.8% of women had an education level up to high school, 47% belonged to the upper middle class based on BG Prasad classification 2016 but a majority (57%) belonged to family size with less than or equal to four members.[8]

Household solid waste management

Most of the wastes generated in the present study (Table 1) were kitchen wastes and plastics and 73% of households generated about 1 kg of waste daily. Similarly, a study conducted by Rinnie and Falendra in Jammu City showed that slum areas produced (95%) 0-2kg of waste per day, and a majority of waste was food waste followed by plastic waste, paper, and cardboard waste.[9] In the present study, 75.5% of households used waste bins for waste disposal, and only 33.5 % segregated their waste. Among these, 87% emptied waste containers daily, and 64.5% used public bins for the disposal of waste. In a survey conducted by Pooja and Vandana in Mumbai, most of them (87.2%) stored their garbage in the dustbin, while the remaining household garbage was stored in plastic bags, buckets, *etc*. Regarding garbage disposal, 78.9% of the respondents handed it over to the garbage collector to whom they paid to collect the waste at their doorstep,19.3% threw it in the community bin or the vehicle and 63.3% of households segregated their waste.[10]

In the present study, in 13.5% of households, house-to-house waste collection happens,12.5% disposed of their wastes near drains/gutters, and only 3.5% used the composting method for the disposal of wastes. Waterlogging due to blockage of gutters during the rainy season in Mumbai creates damage to both the physical and biological environment. Similarly, the study conducted in Jammu City showed that the percentage of

households availing of door-to-door collection services was rarer in slum areas, and some of the respondents (43.3%) openly dumped the waste on roadsides or nearby vacant spaces, and only 4.17% practiced composting of household waste in their homes.[9]

In the present study, 12% of study participants were aware of e-wastes, and 65.5% agreed that burning plastics caused health hazards. People were aware of the side effects of plastic usage. A similar study conducted in Thrissur showed that 45.6% of people had an idea about e-wastes, and 94.4% of people thought that burning plastics causes health hazards.[7]In the present study, 11% of households used the recycling method of waste disposal. A study conducted in Bangladesh showed that 43% of participants reused old materials.[11]

In the present study, we found that there was a significant association between waste management practice and the perception of risk of disease conditions among households (Table 2) If segregation of waste did not happen risk of disease was high according to the study population. Similarly, a study conducted on the East coast of Malaysia showed that the majority (95.9%) of the respondents suggested poor waste management could contribute to disease occurrence, whereas 2.7% suggested it does not cause diseases and another 1.5% were unsure if it causes any diseases.[3]

Also, in the present study, we found that there was a significant association between education and waste management practices (Table 3) Literate people demonstrated proper waste management practices, such as using bins for waste disposal and segregation of waste. A study conducted in northeastern Ethiopia found that lower educational status was significantly associated with poor waste management practices.[12]

Limitations:

Despite the findings, there are some limitations to the present study. As the study is limited to an urban slum area, findings cant be generalized.

Conclusion and Recommendations:

The segregation of waste material was lacking even though municipal services like public bins were utilized well by people. The majority of waste generated in households was kitchen waste, but the usage of the composting method was very low. Literate people had better practices of waste bin usage and waste segregation methods. Education is an important factor that helps in proper waste management practices. Environmental education should be given. Measures need to be taken to reduce waste generation. Awareness creation and behaviour change are needed to promote source segregation of waste and make a "Garbage Free" India. Activities such as door-to-door collection should be encouraged.

Acknowledgements:

The authors acknowledge the staff of the Community Medicine department and the urban health centre.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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Monitoring of the National Mass Drug Administration Campaign for Lymphatic Filariasis Elimination in Narmada District, Gujarat: An Experience

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Abstract:

This study evaluates MDA campaign in Gujarat for lymphatic filariasis elimination in the Narmada district. While ashram schools achieved 95% coverage, household compliance reached only 75% due to work conflicts, and migrant workers showed 80% uptake with mop-up challenges. Key barriers included medical condition-related refusals (60%), Fear of side effect of medication (30%), and documentation gaps (40%). Implementation challenges involved poor timing (missing 25% workers), exclusion of commercial sectors, and weak coordination. Successful institutional delivery models contrasted with gaps requiring: 1) adjusted distribution timings, 2) targeted counselling for chronic patients, 3) workplace-based MDA, and 4) enhanced digital IEC in local dialects. The findings emphasise the need for improved microplanning, real-time monitoring, and private-sector integration. These results demonstrate that tailored approaches targeted working populations, migrants, and comorbid patients can significantly improve compliance. The study provides actionable recommendations to strengthen MDA implementation, supporting India's 2027 elimination target through context-specific strategies that address ground-level challenges while leveraging successful institutional models.

Keywords: Disease Eradication, Lymphatic Filariasis, Mass Drug Administration

Introduction:

Lymphatic Filariasis (LF), known as Hathipaon in Hindi and Hathipaga in Gujarati, is a major public health issue in India, contributing to 40% of the global LF burden.[1] Chronic LF causes permanent disability, social stigma, and economic losses, with 111 endemic districts still at risk despite control efforts.[2] To accelerate elimination by 2027, India launched a revised Mass Drug Administration (MDA) strategy in February 2025, covering 13 states with a triple-drug regimen (DEC + Albendazole + Ivermectin/IDA).[3] However, past MDA rounds in Gujarat reported low compliance (65-75%) due to side-effect fears and weak community engagement.[4,5]

This study evaluates the 2025 MDA round in Narmada district, Gujarat focusing on drug compliance, microplanning, and IEC effectiveness in Dediyapada and Nandod blocks. The findings aim to identify gaps and inform strategies to meet India's 2027 LF elimination target.

Methods:

A cross-sectional evaluation was conducted through field visits to health facilities, schools, and villages. The team observed drug distribution, coverage, and compliance while reviewing records like microplans and meeting minutes.

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Jain A, Lakra LA, Rasania SK. Monitoring of the National Mass Drug Administration Campaign for Lymphatic Filariasis Elimination in Narmada District, Gujarat: An Experience. Healthline. 2025;16(3): 237-239
	DOI : 10.51957/Healthline_728_2025	

Received : 08-06-2025 **Accepted** : 12-08-2025 **Published :** 30-09-2025

Study Population: The study included MDA beneficiaries, healthcare workers, school children, high-risk groups (migrants, farmers, tribals), and community leaders.

Sampling: Purposive sampling targeted high-priority areas (LF-positive zones, low-coverage regions). Convenience sampling supplemented data collection during field visits.

Data Collection: Data was gathered through observation, checklists, interviews, and record reviews. Photographic evidence documented field activities.

Data Analysis: Rates and refusal reasons were analysed descriptively. Qualitative insights from stakeholders helped identify implementation gaps.

Ethical Considerations: Verbal consent was obtained, confidentiality was maintained, and health concerns referred appropriately.

Monitoring was conducted from 15-18 February 2025 across PHCs, subcentres, ashram schools, and villages. The team included health professionals and local workers like ASHAs. Structured observation tools, interviews, and document reviews assessed the MDA campaign.

Results:

1. Coverage and Compliance
    - Schools: 95% coverage in ashram schools showed effective institutional delivery.
    - Households: Only 75% coverage due to work-related absenteeism, especially in urban part of Dediyapada.
    - Migrants: 80% compliance among sugar mill workers, but transient housing limited mop-up efficiency.
2. Reasons for Refusal & Challenges
    - Medical conditions (60%): Patients with diabetes, hypertension, or TB feared drug interactions.
    - Side-effect fears (30%): Misconceptions persisted despite IEC efforts.
    - Documentation gaps: Missing meeting minutes and faded house markings (40%) due to poor materials.
3. Systemic Gaps
    - Timing issues: Daytime distribution conflicted with work schedules, leaving 25% unreached.
    - Excluded groups: Shops, hotels, and private clinics were missed in coverage.
    - Coordination issues: Lack of real-time data updates hindered adaptive management.

Table 1. Coverage Metrics

Population	Coverage	Data Source
Ashram Schools	High (>95%)	Direct observation
Rural Households	Moderate (~70%)	PHC Khedipada records
Migrant Workers	~80%	Field interviews

Challenges Identified

- The timing of visits conflicted with work/farming hours.
- Lack of standardised and visible figure markings.
- Weak linkage with private practitioners and industry clinics.
- Incomplete utilisation of booth activities and self-help groups.
- Limited documentation of coordination meetings.

Suggestions

- **Time-Sensitive Visits**: Early morning or late evening rounds to reach the working population.
- **Mop-Up Strategy**: Ensure timely execution and update markings.
- **Commercial Engagement**: Cover workplaces like shops and mills systematically.
- **Refusal Management**: Medical officers should counsel NCD/TB patients and involve them through OPD-based group counselling.

- **Digital IEC & Documentation**: Extend use of dialect-specific digital IEC and mandate meeting minute records.

  Integration with Local Health Services: Include charitable or private clinics in outreach.

Recommendations:

The MDA monitoring in the Narmada district highlights both significant progress and persistent challenges in eliminating Lymphatic Filariasis (LF). Key strategies such as effective microplanning, targeted IEC, and inclusive community engagement particularly among tribal and migratory populations have proven crucial. These ground-level insights not only reflect on-the-ground realities but also demonstrate scalable solutions that can inform national policy. By integrating such localised successes into broader strategies, India can accelerate its goal of eliminating LF by 2027 and advance the vision of a Viksit Bharat.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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From 99DOTS to 99DOTSLite in Gujarat: A Pragmatic Leap in TB Treatment Adherence

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Abstract:

In 2013, Microsoft Research India launched a digital adherence technology (DAT) called 99DOTS which was created to overcome low treatment adherence in India's tuberculosis (TB) program. It employed the use of envelope-based medication delivery with concealed numbers which were unlocked and dialed by the patient to record compliance. Although successful in small-scale pilots, widespread adoption revealed several weaknesses such as dependence on packaging, complexity, and imprecision. To address these, the Central TB Division introduced a simplified version of its system, 99DOTSLite, in 2023, which relies on district-specific toll-free numbers (TFNs) printed on the medication packs or ID cards. Patients verify intake by making a missed call which gets automatically registered in Ni-kshay and thus followed up in real time in case of missed doses. In comparison to the previous systems, 99DOTSLite is affordable, compatible with any TB regimen, user-friendly, and easily integrated with the digital TB environment of India. Even though issues with phone access, connection, and possible false reporting are possible, 99DOTSLite is an open-ended, patient-centered innovation essential to India TB elimination activities.

Introduction and Origins of 99DOTS:

Tuberculosis (TB) remains one of India's most pressing public health concerns, accounting for over a quarter of global TB cases, according to the WHO Global TB Report 2023.[1] In order to eradicate tuberculosis in India by 2025, the National Tuberculosis Elimination Programme (NTEP) made addressing the problem of inadequate treatment adherence especially in environments with limited resourcesa top priority. In this context, the innovation of 99DOTS emerged in 2013, developed by Microsoft Research India as a low-cost digital adherence technology (DAT).[2]

The system used envelope-wrapped TB pills printed with hidden phone numbers, revealed when the patient took their daily dose. Patients were instructed to make a free call to this number, which automatically logged their adherence in a centralized system accessible to health workers. The first pilot was launched in 2014 at St. Johns Medical College, Bengaluru, with approximately 20 HIV-TB co-infected patients.[3,4] By 2017, over 93,000 patients had been enrolled under NTEP across India.[5]

However, as the system was scaled up, it revealed limitations in sustainability, including dependency on special packaging, operational burden, and usability challenges for both providers and patients.[6] Additionally, a 2020 evaluation of 99DOTS noted variability in accuracy of adherence reporting when compared to video directly observed therapy (vDOT), raising questions about reliability in real-world settings.[7] Further studies also reported differences in patient acceptability across geographies, highlighting the need for a more simplified and inclusive model.[8]

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Rathod M, Solanki H. From 99DOTS to 99DOTSLite in Gujarat: A Pragmatic Leap in TB Treatment Adherence. Healthline. 2025;16(3): 240-242
	DOI : 10.51957/Healthline_H761_2025	

Received : 09-07-2025 **Accepted** : 20-08-2025 **Published :** 30-09-202

The Need for 99DOTSLite:

To address these limitations, the Central TB Division introduced 99DOTSLite in 2023 - a streamlined and scalable version of 99DOTS.[6] It eliminates the need for envelope-based packaging and hidden codes. Instead, 99DOTSLite uses district-specific toll-free numbers (TFNs), which are saved in patient's phones or placed as stickers/stamps on medication strips or boxes. Patients confirm dose intake through a missed call to the TFN, triggering an automatic "thank you" message and logging adherence in Ni-kshay, India's digital TB registry.[9]

This transition represented a significant improvement in terms of logistics, cost, and compatibility. 99DOTSLite supports pediatric, drug-resistant TB (DR-TB), and short-course regimens, unlike the earlier version which was limited by packaging format. It also integrates real-time adherence alerts and dashboard-level supervision for program managers.[6]

Operational Features of 99DOTSLite:

The system involves several core steps:

- A unique TFN is assigned to each district and saved in patients phones under "99DOTSLite".
- TFNs are affixed via stickers or stamps on TB ID cards or medication packs.
- Patient's make a missed call after taking medication and receive a confirmation SMS.
- The system logs adherence on the Ni-kshay dashboard (Real-Time-Web-Dashboard).
- If no call is received for 3 consecutive days, a telephonic follow-up is initiated; if 7 days are missed, a home visit is triggered.
- These features help achieve NTEP indicators such as ≥80% patient coverage under ICT-based adherence and <20% missing three or more doses.[6]

Moreover, 99DOTSLite reduces digital adherence costs by 30-40% per patient, compared to envelope-based systems, making it more sustainable in the long run.[9]

Launch and Expansion:

The official launch of 99DOTSLite took place on April 19, 2023, in Ranchi district, Jharkhand, where stakeholders reported strong acceptability and technical feasibility.[10] Drawing on the early operational lessons, Gujarat piloted the model in Rajkot and Ahmedabad districts.[11] Maharashtra, Karnataka, Uttar Pradesh, Tamil Nadu, and West Bengal are among the states that have included 99DOTS Lite in their NTEP strategy as of the middle of 2024.[6] The dashboard integration into Ni-kshay has enabled more effective, real-time tracking and supervision, which has become a cornerstone of India s digital TB control ecosystem.[9]

Operational Advantages:

99DOTSLite offers several key benefits:

- Envelope-free design: No special printing or logistics needed.
- Compatibility with all TB regimens, including paediatric and DR-TB.
- Low-tech Low-Cost Solution: Operates on basic phones with no internet required.
- AI-powered alerts: Automatically detects adherence lapses.[6] Allows health workers for real time adherence tracking daily via a dashboard.
- Reduced training burden: ASHA workers and DOT providers find it easier to implement and counsel patients.
- Cost-effective: Digital monitoring expenses are reduced significantly.[9]
- Patient-friendly: Requires minimal digital literacy, making it suitable for vulnerable populations.

Moreover, compared to vDOT and family-DOT models, 99DOTSLite offers an optimal balance between technological innovation and practical field deployment in India's vast TB program.[9,12]

Challenges and Considerations:

Despite its strengths, the model faces challenges:

- Some patients, especially in tribal and remote areas, lack access to mobile phones.

- Poor network connectivity continues to hinder consistent reporting.
- Patients may forget to save the TFN or fail to make calls despite taking medication.
- Patients may call the number without taking the medicine, or caregivers/others may call on their behalf creating false adherence data.
- Follow-up mechanisms require sustained workforce engagement.

Additionally, the accuracy of self-reported adherence via missed calls though improved remains an area needing continuous evaluation. Comparisons with vDOT and SMS-based systems have shown that while 99DOTSLite increases reach, the quality of adherence monitoring may still be influenced by patient behavior.[7,9]

Conclusion:

99DOTSLite marks a transformative step in TB care delivery, representing a shift from logistics-heavy solutions to minimalist, scalable, patient-centric models. Gujarat s leadership in adopting and adapting the platform demonstrates its feasibility and potential for national scale-up. With structured training, stakeholder engagement, and ongoing research, 99DOTSLite can serve as a vital component of India's TB elimination roadmap.

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Recommendation: Authors should provide well-grounded recommendations based on the key findings of their study. These recommendations should align with the study objectives and contribute to clinical practice, public health policies, or future research directions. Recommendations should be practical, evidence-based, and clearly linked to the results, avoiding overgeneralization or claims beyond the studys scope.

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Declaration: Authors must disclose any conflicts of interest that may have influenced the study, including financial, institutional, or personal relationships. Details of funding sources should be clearly stated, specifying whether the funding body had any role in study design, data collection, analysis, or manuscript preparation. Additionally, authors must declare any use of artificial intelligence (AI) in research, data analysis, or manuscript drafting, ensuring transparency in the research process.

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