Global Journal of Medicine & Public Health

Awareness and Practices for Dengue Prevention: A Cross -sectional study in the Sarojini Nagar Block of Lucknow, Uttar Pradesh, India

Monika Aggarwal[1], Rizwana Bano[2], Arunima Saini[3],

ABSTRACT

Dengue fever, caused by the Aedes aegypti mosquito, is one of the fastest-growing viral infections globally, posing a significant public health threat in over 100 countries. According to the World Health Organization (WHO), an estimated 390 million Dengue infections occur annually, with approximately 96 million manifesting clinically severe illness.[1]

Objective

1. To assess the Knowledge about Dengue fever and its preventive measures among community members.
2. To identify behavioral practices and community attitudes that contribute to the rising cases of Dengue fever

Methods

A cross-sectional study was conducted in Sarojini Nagar Block situated in District Lucknow of State Uttar Pradesh, India, from July 2024 to September 2024.The dengue-related knowledge, attitudes and behaviours of a household, which was evaluated using a composite score divided into three categories: poor, satisfactory, and good. Twelve questions about dengue were provided to the participants in order to assess their level of knowledge; correct answers received a score of 1, while incorrect answers received a score of 0. Twelve(12) was the highest possible score.Data was analysed using SPSS 24 version.

Result

Awareness regarding mode of dengue transmission and breeding place of vector was high among participants but only 20.6% of participants correctly identified a virus as the cause of Dengue, while 57.3% did not know the cause, and 13.2% mistakenly thought it was caused by bacteria. Overall 37% of the participants had a satisfactory level of knowledge.

Discussion

Significant lack of understanding about the viral origin of Dengue presents a major public health concern. Awareness campaigns must focus on educating the public about the true cause of Dengue, as proper knowledge can enhance community engagement in vector control and reduce the spread of misinformation.

Conclusion:

Although General Awareness about dengue fever and its symptoms is present in rural population but specific knowledge about its preventive measures and practices to get protected from the disease is not satisfactory.

Keywords: Dengue Fever, Awareness, KAP, Aedes aegypti

GJMEDPH 2025; Vol. 14, issue 2 | OPEN ACCESS

2*Corresponding author: Rizwana Bano , Senior Resident, Department of Community Medicine and Public Health, King George's Medical University,Lucknow, Email: rbano186@gmail.com 1. Monika Agarwal[1] ,Professor and Head of Department, Department of Community Medicine and Public Health,King George's Medical University,Lucknow,Email: Monicaag51@gmail.com; Arunima Saini, Assistant Professor, Department of community medicine, Kanti Devi Medical College,Mathura, Email:dr.arunimasaini@gmail.com

Conflict of Interest—none | Funding—none

INTRODUCTION

Dengue is the second most prevalent mosquito-borne illness that affects people.The highest number of dengue cases was recorded in 2023, affecting over 80 countries in all regions of WHO. Since the beginning of 2023 ongoing transmission, combined with an unexpected spike in dengue cases, resulted in a historic high of over 6.5 million cases and more than 7300 dengue-related deaths reported.[1]Once thought to be just a tropical disease in certain areas, Dengue is now prevalent in cities and nearby towns. This change is mainly due to reasons like fast urban growth, poor sanitation & climate changes.[2] In 2023 alone, the National Vector Borne Disease Control Program (NVBDCP) reported more than 2,89,235 cases across India. Uttar Pradesh (UP), which is India's most crowded state, contributed around 12 percent of cases (35,402 cases in UP) during 2023.[3] Vector control interventions are the most commonly used approach to minimize or prevent dengue virus (DV) transmission in endemic regions. These measures include source reduction, cleanup campaigns, regular emptying and cleaning of containers in households, cemeteries, green spaces, and schools, covering water storage containers, installing water supply systems, and managing solid waste.[4]

Rural areas and fast-growing towns create a perfect spot for Dengue to spread more easily because of poor sanitation and bad waste disposal practices.At the community level, there is limited information on the influence of knowledge, attitudes, and practices of community members, along with the exploration of vector breeding sites, in controlling dengue fever. Therefore, this study aimed to assess the community's knowledge, attitudes, and practices regarding dengue fever transmission and prevention, as well as the identification of mosquito breeding sites in study area.

Aim/objective

This study aims to evaluate the knowledge, attitudes, and practices (KAP) regarding dengue fever among residents of Sarojini Nagar Bvlock, Lucknow, Uttar Pradesh. It seeks to assess awareness about dengue transmission, symptoms, and preventive measures while identifying gaps and misconceptions that may contribute to disease persistence. The study also explores the influence of socio-demographic factors such as education and socio-economic status on dengue-related knowledge. Additionally, it examines community perceptions of risk, willingness to engage in preventive behaviors, and trust in control measures. Findings will help design targeted health interventions to enhance public awareness and promote effective dengue prevention strategies.

Material and Methods

Study Design and Setting

We conducted a cross-sectional survey from July 2024 to September 2024 to assess the dengue-related knowledge, attitude and practices among residents of the Sarojini Nagar Block, a semi-urban area in Lucknow, Uttar Pradesh. This area was selected based on its socio-economic diversity and the recent increase in dengue cases reported by the local health department.

Study population

The study included 567 participants aged 18 years and above, selected using purposive sampling to ensure representation across age, gender and socio-economic strata.

Eligibility criteria required participants to be permanent residents of the area, able to comprehend the questionnaire, and willing to participate voluntarily. Those unable to participate due to language barriers or health conditions were excluded from the study. A sample size of 584 was calculated using a prevalence estimate of 58 percent for dengue knowledge taken from a study done in Delhi,[5] with a 95 percent confidence interval, a 5 percent allowable error, and a design effect of 1.5 to account for the purposive sampling method. A total of 567 participants were approached for the interview.

Variables

The primary outcome variable was dengue-related knowledge, which was assessed using a composite score based on correct responses to 12 questions regarding dengue transmission, symptoms, and

ISSN# 2277-9604

preventive measures. Responses were scored as follows: correct answers received a score of 1, and incorrect answers received a score of 0. Total scores ranged from 0 to 12, categorized into three levels: poor (scores <7), satisfactory (scores of 7–9), and good (scores of 10–12). Sociodemographic variables, including age, gender, educational attainment, socio-economic status, and housing characteristics, were included as independent variables. Among the participants, 37% (211 out of 567) had a poor level of knowledge about Dengue fever, with scores below 7. A majority of 62% (350 out of 567) showed a satisfactory level of knowledge, scoring between 7 and 9, while only 1% (6 out of 567) demonstrated a good level of knowledge, with scores ranging from 10 to 12.

Data Collection and Measurement

Data were collected using a semi-structured questionnaire developed after extensive literature review and consultations with public health experts. The questionnaire covered socio-demographic information, knowledge of dengue transmission and prevention, attitudes toward dengue control, and preventive practices. Before the main study, the questionnaire was pretested in a similar community to ensure clarity, reliability, and validity, with adjustments made to enhance understanding.

Bias

To minimize response bias, interviewers received thorough training, emphasizing the importance of neutral questioning and maintaining participant confidentiality. Anonymity was ensured to promote honest responses. Potential selection bias due to purposive sampling was partially addressed by targeting diverse geographic areas within the block to include a range of socio-economic backgrounds.

Statistical Analysis

Descriptive statistics were calculated for all study variables. Categorical variables were expressed as frequencies and percentages, while continuous variables were reported as means and standard deviations. Chi-square tests was used to examine associations between sociodemographic factors and dengue-related knowledge levels. A p-value of <0.05 was considered statistically significant. All analyses were performed using statistical software (e.g., SPSS, version 24.0).

Results

A total of 567 individuals were approached for the interview. Majority of participants (56.4%) were upto 40 years of age.Almost half of participants were male (51.7%), while another half (48.3%) were female. The largest proportion of participants (40%) had received education upto intermediate level, while 21 percent were illiterate. A predominant majority (92.6%) were married, separated, or widowed.Most of the participants belonged to the middle (35.6%) or lower middle (27.2%) class.**(Table 1)**

Table 1: Socio-demographic characteristics of study participants (N=567)

Variables	Frequency(n)	Percentage(%)
Age(years)		
20-40 years	320	56.4
41-60 years	188	33.2
More than 60 years	59	10.4
Gender		
Male	293	51.7
Female	274	48.3
Education		
Illiterate	119	21.0
Upto middle school	123	21.7
Middle to intermediate	227	40.0
Graduate and above	98	17.3

Marital status		
Unmarried	42	7.4
Married/Separated/Widow	525	92.6
*Socio-economic class		
Upper class	24	4.2
Upper Middle class	80	14.1
Middle class	202	35.6
Lower Middle Class	154	27.2
Lower Class	107	18.9

***Socio-economic class is based on Modified B.G. Prasad classification-2023**
Data are displayed in frequency(%)

Than half (51%) lived in houses at the same level as the ground ,about 9.0 percent houses were situated lower than ground level. More than half of houses had closed drainage system (52.4%). Nearly half of the houses had doors and windows without screens (49.6%) While around 46.4 percent houses had screened doors and windows. Refrigerators were the most common household item (39.5%), followed by coolers (28.9%). The majority of participants had never had indoor spraying conducted (68.4 percent). Indoor spraying within one year was reported by 26.5 percent of participants.**(Table 2).**

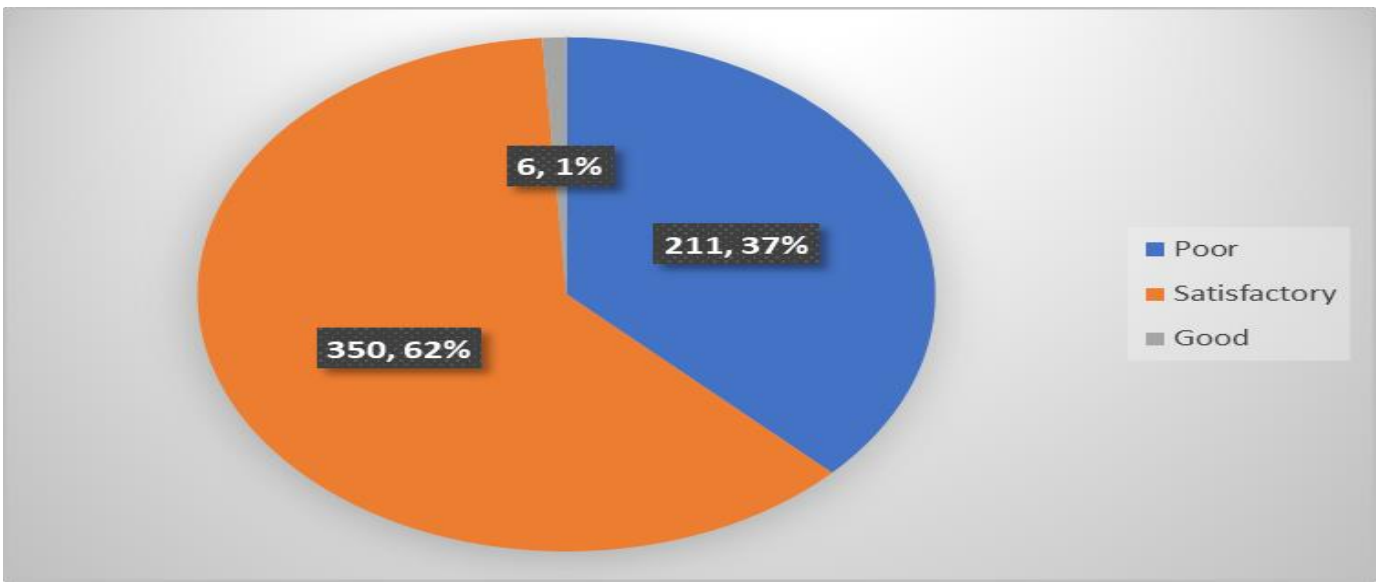
Table 2 : Environment and housing characteristics of study households(N=567)

Variables	Frequency(n)	Percentage(%)
Elevation of the house from the ground		
High rise	223	39.3
At same level	293	51.7
Low rise	51	9.0
Conduction of drain		
Closed	297	52.4
Open	270	47.6
Doors and windows screen against mosquito entry		
Complete	263	46.4
Complete with holes	5	0.9
Incomplete or badly damaged	18	3.2
Absent	281	49.6
Household items associated with mosquito breeding		
Refrigerator only	224	39.5
Air conditioner only	13	2.3
Coolers only	164	28.9
Refrigerator and coolers	120	21.2
All of the above	46	8.1
Indoor Residual Spray(IRS) done in households		
Within 1 month	17	3.0
Within 1 year	150	26.5
Between 1-2 years	12	2.1
Never	388	68.4
Mosquito breeding sites around houses		
Present	263	46.4%
Absent	304	53.6%
Use of Bed nets to prevent mosquito bite		

Every night	258	45.5
3-6 nights per week	81	14.3
1-2 nights per week	97	17.1
Never	131	23.1
Households which disposed water holding containers		
No	220	38.8
Yes	347	61.2

One-fourth of the participants (37%—211 out of 567) had a poor level of knowledge (scores <7) regarding dengue fever. A majority, 62% (350 out of 567), demonstrated a satisfactory level of knowledge (scores between 7 and 9). Only 1% (6 out of 567) had a good level of knowledge (scores between 10 and 12).**(Figure 1)**

Figure 1: Level of knowledge about dengue fever, it's transmission and preventive measures among study participants(N=567)



Around 85 percent of participants had heard of dengue . 82.7 percent of participants correctly identified mosquito bites as the primary mode of transmission of dengue. 20.6 percent knew that it was caused by virus. Fever and Headache were the most common symptoms of dengue fever they were aware. Only few of them were aware of other symptoms such as bleeding ,joint pain and rashes. Knowledge about mosquito breeding sites was reasonably high, with 66 percent of participants correctly identifying water as the primary breeding ground. Around one-fourth (27%) of participants did not know whether all mosquito species transmit Dengue.One third of participants (34.4%) identified daytime as the most common time of biting, and the majority of the participants (75.3%) correctly identified that fogging should be done once a week to control mosquitoes. Large proportion of participants (83.2%) had never heard of insecticide-treated bed nets.More than half of the participants (54.3%) believed that bed nets were the best method for protecting against Dengue,a very small proportion (3%) believed that preventing mosquito bites altogether was an effective strategy.
(Table 3, Figure 2)

Table 3: Awareness about Mosquito borne diseases, cause of dengue fever, mosquito breeding sites and preventive measures among study participants (N=567)

Koo,	Frequency(n)	(%)
Heard of Dengue		
No	82	14.5
Yes	485	85.5
Cause of Dengue fever		
Virus	117	20.6
Bacteria	75	13.2
Fungus	2	0.4
Don't know	325	57.3
Other	48	8.5
Mode of transmission of dengue virus		
Mosquito bite	469	82.7
Unclean water	69	12.2
Other	29	5.1
Diseases Transmitted by mosquito		
Dengue only	110	19.4
Malaria only	94	16.6
Dengue and Malaria both	96	16.9
Don't know	197	34.7
Others	70	12.4
Symptoms of dengue		
Fever	230	40.5
Headache	145	25.5
Vomiting	40	7.1
Joint pain	45	8.1
Bleeding with rash	20	3.6
All	19	3.3
Don't Know	68	11.9
Mosquito lays eggs in		
Garbage	156	27.5
Water	374	66.0
Plants	7	1.2
Soil/cattle dung	5	0.9
Others	25	4.4
Does all types of mosquito transmit dengue ?		
No	215	37.9
Yes	199	35.1
Don't know	153	27.0
Breeding place of dengue causing mosquito		
Man-made containers	170	30.0
Rain pools and puddles	165	29.1

Dirty water	227	40.0
Large water body	5	0.9
Timing of mosquito bite		
Day time	195	34.4
Night time	203	35.8
Evening	54	9.5
Morning	6	1.1
No specific time	109	19.2
Frequency of fogging insecticides		
Once in a week	427	75.3
Once in 2 weeks	9	1.6
Once in month	82	14.5
Once in 6 months	43	7.6
Never	6	1.1
Heard of insecticide treated bed nets		
No	472	83.2
Yes	95	16.8
Preventive measures		
Mosquito repellent	185	32.6
Bed nets	308	54.3
Remove mosquito breeding sites	32	5.6
Insecticide	16	2.8
Prevent from a mosquito bite	17	3.0
Chemical fogging	9	1.6

The findings suggest that there was no statistically significant association between age and knowledge of Dengue fever (p = 0.678). Across all age groups, most participants demonstrated poor or satisfactory knowledge, with very few showing good knowledge. The association between gender and knowledge about Dengue was also not statistically significant (p = 0.644). Both males and females exhibited similar knowledge levels. Education(p<0.001) and socio-economic class(p<0.001) found to be statistically highly significant in our study population. **(Figure3)**

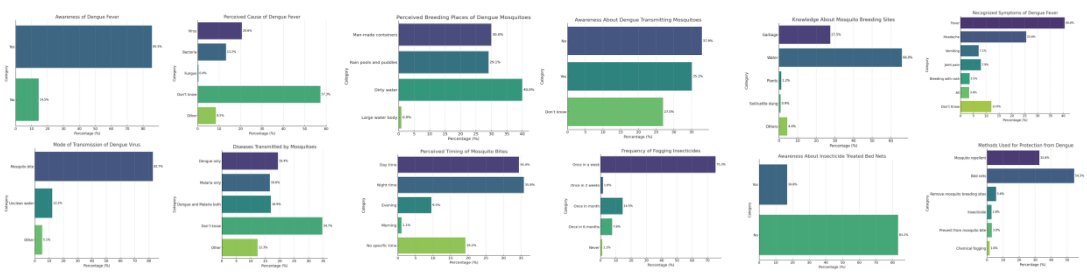
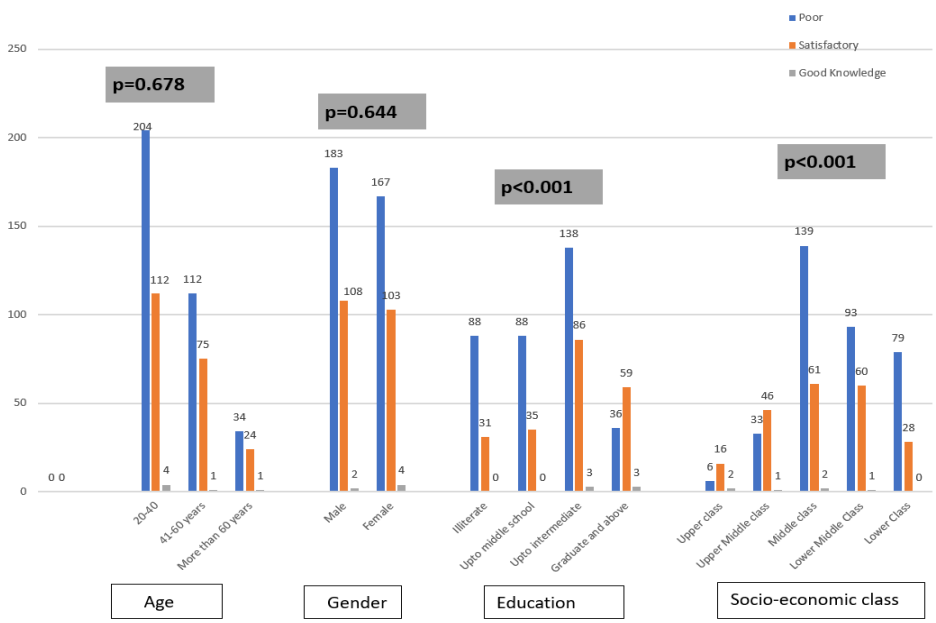


Figure 3 : Association Between Level of Knowledge regarding Dengue fever and sociodemographic characteristics of study participants(N=567)



Participants were asked 12 questions regarding Dengue Fever, including its symptoms and preventive measures. The questions, as presented in Table 3 and Figure 2, were scored based on correctness. Correct answers were assigned a score of 1, while incorrect or negative answers were given a score of 0.

The participants' knowledge scores were then categorized into three levels:

- Poor Knowledge: Score less than 7
- Satisfactory Knowledge: Score between 7 and 9
- Good Knowledge: Score between 10 and 12

Attitude of the participants towards preventive measure of Dengue fever (Table 4)

Table 4 Attitude of the participants toward risk perception and their role in dengue preventive practices (N=567)

Variables	Agree	Neutral	Disagree
Risk Perception and Preventive actions			
You were at risk of dengue fever	351 (62.0%)	147 (26.0%)	68 (12.0%)
Efforts to control mosquito breeding sites			
Want to help prevent dengue cases in their area	379 (66.8%)	180 (31.8%)	8 (1.4%)
My responsibility is to remove mosquito breeding sites in and around residence	387 (68.3%)	158 (27.9%)	22 (3.8%)
Removal of mosquito breeding sites even when there is no outbreak	404 (71.2%)	144 (25.4%)	19 (3.4%)

Removal of mosquito breeding sites will reduce chance of dengue infection among family members	415 (73.3%)	135 (23.9%)	17 (2.8%)
Community and Government roles			
Every household should commit to remove mosquito breeding sites	394 (69.5%)	142 (25.0%)	31 (5.5%)
Chemical fogging by health authority prevents dengue infection	251 (44.2%)	196 (34.6%)	120 (21.2%)
Misconception about Dengue fever			
Dengue infection occurs only in rainy season	217 (38.3%)	227 (40.0%)	123 (21.7%)
Emotional responses and worries			
Worry almost every day that someone in family will get dengue	194 (34.1%)	227 (40.1%)	146 (25.8%)
Every year someone in village gets dengue	235 (41.6%)	211 (37.2%)	121 (21.2%)
Fever makes you worry it may be dengue	173 (30.4%)	247 (43.5%)	147 (26.1%)
Do not worry about dengue because it can be easily treated	221 (39.0%)	263 (46.4%)	83 (14.6%)
Take part in public activity for dengue control	337 (59.6%)	184 (32.4%)	46 (8.0%)
Use of bed nets to prevent mosquito bite			
More expensive nets were more effective	235 (41.5%)	221 (39.1%)	111 (19.4%)
Action taken to help mosquito net last long	269 (47.5%)	237 (41.9%)	61 (10.6%)
Easier to get good night's sleep under mosquito net	309 (54.5%)	178 (31.4%)	80 (14.1%)
Not easy to sleep in net because you have to fold and unfold it next morning	246 (43.4%)	180 (31.7%)	141 (24.9%)
Do not like sleeping under net when weather is too warm	255 (45.1%)	189 (33.4%)	123 (21.5%)

Risk Perception and Preventive Actions

A majority of respondents, 62 percent, agreed that they were at risk of dengue fever while 26 percent remained neutral, and 12 percent disagreed. This indicates that most that while most participants recognize the risk. Similarly, 66.8 percent expressed a desire to prevent dengue in their area, suggesting strong community interest in disease prevention efforts.Personal responsibility was another important aspect. 68.3 percent of participants agreed that it is their responsibility to remove mosquito breeding sites in and around their residence, with 27.9 percent being neutral.

Efforts to Control Mosquito Breeding Sites

Respondents showed strong support for removing

ISSN# 2277-9604

mosquito breeding sites, even in the absence of an outbreak. 71.3 percent of the participants agreed with this proactive approach, emphasizing a high level of awareness about the role of environmental management in dengue prevention. Additionally, 73.3 percent agreed that removing breeding sites reduces the risk of infection among family members, underscoring the belief in the effectiveness of preventive actions.

Community and Governmental Roles

Regarding community-wide responsibility, 69.5 percent believed that every household should be committed to removing mosquito breeding sites, however, trust in chemical fogging as an effective prevention method was lower, with only 44.2 percent agreeing.

Misconceptions About Dengue Fever

One of the more concerning findings was related to misconceptions about dengue transmission and treatment. 38.3 percent of respondents believed that dengue infection only occurs during the rainy season, which is a significant misconception since dengue-carrying mosquitoes can breed year-round.

Additionally, while 39 percent of respondents agreed that they do not worry about dengue because it can be easily treated, a larger proportion (46.4%) remained neutral.

Emotional Responses and Worries

The emotional impact of dengue on families was evident, with 34.1 percent worrying almost every day about a family member contracting dengue, 41.6 percent of respondents stated that every year someone in their village contracts dengue.

Use of Mosquito Nets

Regarding the use of mosquito nets, 54.5 percent agreed that it makes it easier to get a good night's sleep, though 43.4 percent also expressed concern about the inconvenience of using nets, particularly the need to fold and unfold them each morning. Additionally, 45.1 percent reported that they disliked using nets when the weather is too warm, which indicates that even effective preventive measures like nets face practical barriers to widespread adoption.

Discussion

Majority of the Study participant(85.5%) had heard about dengue fever and and 82.7 % knew mosquito bite as mode of transmission of disease. Studies conducted in Delhi found similar results, with 91.3% of respondents identifying mosquitoes as the primary mode of transmission. Comparable findings were observed in Bangladesh (86.3%) and South India (85.6%).[6-8] However, only 20.6 percent of participants in our study were aware that dengue is caused by a virus.This could be due to most of the participants were not educated enough and had poor health literacy. Viral cause of Dengue fever was unknown to other parts of india, Puducherry from Central India, also reported low awareness about viral cause of disease as only 17.9 percent knew that it is caused by virus .[9]Fever (40.5%) and Headache(25.5%) were the most common symptoms of Dengue that participants were aware of, very few of them knew about other symptoms as vomiting(7.1%), joint pain (8.1%), bleeding with rash(3.6%).This was in contrast to a study done in other parts of India where large number of participants(65%) were aware of Fever as being the symptom of Dengue.[10] This disparity may be due to difference in sample sizes in two studies as well as population socioeconomic characteristics which affects knowledge about health problems.Finding from our study suggest that Socioeconomic status and educational level are highly associated with knowledge of the disease, this is also observed in other Indian studies done in Puducherry and North India. These findings emphasize the need for health education campaigns targeting underprivileged groups. Notably, no significant association between knowledge levels and demographic factors like age and gender was observed, mirroring results from studies in Nepal and Ethiopia.[11-12]Practical knowledge about mosquito breeding habitats in our study was insufficient. Observations made during study reveals that Mosquito breeding sites were present around 46.4% houses and 45.5 % of participants used bed nets every night to prevent mosquito bite.Although general awareness about Dengue fever and its symptoms remained higher but specific knowledge regarding cause of dengue, breeding places of aedes mosquito and its preventive measures is still low in rural population.

In our study, misconceptions and poor practices around preventive measures were evident.Awareness about insecticide treated bed nets needs to be raised among community members as it was very low in our study,almost 83.2% percent of participants had never heard of insecticide treated bed nets in contrast to another study done in northeast part of India, revealed that 38.57 percent of participants were aware of bed nets treated with insecticides.[13]Awareness and availability of insecticide treated bed nets could be one of the important tools to prevent Dengue in dengue endemic areas.

Conclusion

Compared to other Indian research studies, gives us similar results showing huge gaps in knowledge & misunderstandings about Dengue fever exist everywhere. Even though urban areas have made progress understanding it better, rural sectors and those with lower income still struggle a lot with details on its cause, how it spreads & how to prevent it effectively.The strong association between educational background & knowledge about Dengue indicates we really need to focus our campaigns more towards less educated populations along with addressing issues like low literacy in rural areas of India,with continuous efforts from government of India literacy has been improved in many states still it persists in some part of the country. Additionally, the acknowledgment of mosquito breeding sites near residences highlights an area for intensified public health interventions and community education to mitigate the risk of dengue transmission. Quadrivalent vaccine which is under the research can be milestone for India to prevent dengue as all 4 strains of dengue (DENV,DENV2,DENV3,DENV4) are prevalent in India. Till the availability of vaccine awareness about dengue and adoption of preventive measures against mosquito bite remains the mainstay to reduce cases of dengue in rural communities of India.[14]

REFERENCE

1. World Health Organization (WHO). (2023). Dengue and severe dengue. Retrieved from https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue.

2. Mutheneni SR, Morse AP, Caminade C, Upadhyayula SM. Dengue burden in India: recent trends and importance of climatic parameters. Emerg Microbes Infect. 2017 Aug 9;6(8):e70. doi: 10.1038/emi.2017.57. PMID: 28790459; PMCID: PMC5583666.

3. National Vector Borne Disease control Program: Dengue situations in India.Available at https://ncvbdc.mohfw.gov.in/index4.php?lang=1&level=0&linkid=431&lid=3715

4.Kebede T, Tesema B, Mesfin A, Getachew D. A Community-Level Knowledge, Attitude, and Practice about Dengue Fever and the Identification of Mosquito Breeding Containers in Dire Dawa City of Ethiopia: A Cross-Sectional Study. Can J Infect Dis Med Microbiol. 2023;2023.

5.Chaudhary, Neeru, Knowledge, Attitude, Practices of People Regarding Dengue Fever and Acceptance of Dengue Vaccine: A Cross-Sectional Survey in Delhi, India (October 29, 2022). Available at SSRN: https://ssrn.com/abstract=4318281 or http://dx.doi.org/10.2139/ssrn.4318281

6.Chinnakali P, et al. High level of awareness but poor practices regarding denguefever control: A cross-sectional study from North India. North Am J Med Sci. 2012.

7.Hossain MI, et al. Knowledge, awareness, and preventive practices of dengue outbreak in Bangladesh: A countrywide study. PLoS One. 2021.

8. Jeelani S, et al. Community knowledge, awareness, and preventive practices regarding dengue fever in Puducherry, South India. Public Health. 2015.

9.Taksande A, Lakhkar B. Knowledge, attitude and practice (KAP) of dengue fever in the rural area of central India. Shiraz E-Med J. 2012.

10.Oza JR, Patel U V, Gajera KD, Professor A. ISSN 2347-954X (Print) Knowledge and Preventive Practices Regarding Dengue among Dengue Fever Cases Admitted at Tertiary Care Hospital, Rajkot, Gujarat, 2014. Sch J Appl Med Sci (SJAMS [Internet]. 2016;4(8C):2957–61.

11.Phuyal P, et al. The knowledge, attitude, and practice of community people on dengue fever in Central Nepal: A cross-sectional study. BMC Infect Dis. 2022.

12. Kebede T, et al. A Community-Level Knowledge, Attitude, and Practice about Dengue Fever and Identification of Mosquito Breeding Containers in Ethiopia. Can J Infect Dis Med Microbiol. 2023.

13.Hazarika R, Sadhukhan S. Knowledge, awareness, practice and preventive method against mosquito borne diseases in Tezpur, Assam, Northeast India. Int J Mosq Res. 2024;11(1):125–8.

14. Medigeshi GR, Islam F, Lodha R. Quadrivalent dengue-virus vaccines: challenges and opportunities for India. Lancet Infect Dis [Internet]. 2024;3099(24):23–4. Available from: http://dx.doi.org/10.1016/S1473-3099(24)00137-3