


# Knowledge, Awareness and Health-seeking Behavior Regarding Dengue among Residents of Urban Kolkata, West Bengal

Rupak Chatterjee<sup>1</sup>, Shatavisa Mukherjee<sup>2</sup>

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## ABSTRACT

**Background:** As dengue is a preventable vector-borne disease, the community's knowledge, attitude, and health-seeking behavior play an important role in successfully preventing the upsurge of cases and reducing mortality. This study thus tried to assess the knowledge, awareness, and health-seeking behavior among the Urban Kolkata residents.

**Methods:** A cross-sectional observational study was performed among urban residents visiting the community healthcare center in Urban Kolkata. The survey questionnaire was formulated, tested, and administered to assess the knowledge, awareness, and health-seeking behavior regarding dengue. Responses were statistically analyzed.

**Results:** The study was conducted on 158 residents of Urban Kolkata. 69.62% of individuals pointed out stagnant water as a prime mosquito breeding area and 77.22% of subjects held dark indoor places as the main resting place of dengue mosquitoes during the day. All respondents believed that cleaning mosquito breeding and resting places and using mosquito repellents were the most preventive measures. 83.54% of respondents believed cleaning the house surrounding to be an effective mode of breeding prevention. 51.90% of respondents would attend a government healthcare facility in the event of encountering fever, followed by 20.25% opting for private consultation and 18.99% self-treating themselves with over-the-counter drugs. Only 39.34% knew that bleeding was a warning sign. Knowledge parameters showed a significant positive association with age and educational status ( $p = 0.001$ ).

**Conclusion:** Dengue awareness is essential to prevent and control the spread of the disease, reduce its impact on public health, and foster a sense of responsibility within the community. Public health campaigns, educational programs, and community engagement are important tools in raising awareness about dengue and its prevention.

**Keywords:** Dengue, Health seeking behavior, Knowledge, Urban residents, West Bengal.

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## INTRODUCTION

Dengue fever (DF) ranks among the most prevalent vector-borne illnesses globally. Dengue fever is transmitted by the bite of infected female *Aedes* mosquitoes, with *Aedes aegypti* and *Aedes albopictus* serving as the primary vectors. There are four known strains of dengue virus which is a flavivirus, and arbovirus (DENV1, DENV2, DENV3, DENV4). Dengue is most prevalent in tropical and subtropical regions of the world. Countries in Southeast Asia, the Western Pacific, the Americas, and parts of Africa are particularly susceptible to dengue outbreaks due to the favorable climate and presence of the *Aedes* mosquitoes. The manifestations of DF range from mild to severe and can encompass elevated body temperature, intense headache, muscle and joint pain, rash, a tendency to bleed, and severe abdominal and joint pain. In more critical instances, the condition may advance to dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS), posing a potential threat to life.<sup>1,2</sup> Recently, the fifth variant DENV-5 has also been reported which follows the sylvatic cycle, unlike the four other serotypes which follow the human cycle.<sup>3</sup>

Dengue fever is endemic in almost all parts of India and tends to occur in a seasonal trend, although the pattern is changing. West Bengal also sees a large number of dengue cases every year and it is a major public health problem.<sup>4</sup> Rapid and unplanned urbanisation, increased mobility, increase in mosquito breeding habitats, climate change, and ineffective mosquito control

<sup>1</sup>Department of Medicine, Bijoygarh State General Hospital, Kolkata, West Bengal, India

<sup>2</sup>Department of Clinical and Experimental Pharmacology, Calcutta School of Tropical Medicine, Kolkata, West Bengal, India

**Corresponding Author:** Shatavisa Mukherjee, Department of Clinical and Experimental Pharmacology, Calcutta School of Tropical Medicine, Kolkata, West Bengal, India, Phone: +91 9830529192, e-mail: shatavisa100@gmail.com

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measures: All together contribute to an increase in dengue cases.<sup>5</sup> *Aedes aegypti* mosquitoes are endophilic and mostly stay indoors, breeding places being stagnant water-filled containers, and are day-biters. *Aedes albopictus*, on the other hand, is exophilic, and commonly lives in outdoors but is a more aggressive daytime biter with bites being exclusively on humans.<sup>6</sup> Recent studies report that dengue virus infection increases the attraction of mosquitoes towards the host and hinders biting efficiency. This leads to infected mosquitoes biting more to attain similar blood repletion

as uninfected mosquitoes.<sup>7</sup> Dengue transmission occurs via blood feeding by mosquitoes. This includes two stages: Host-seeking and biting behaviors. Detection of olfactory cues initiates long-range distance host-seeking. Exhaled carbon di-oxide concentrations elicit host seeking behavior. Thermal, visual, humidity, and other olfactory cues mediate short-distance host seeking. As a mosquito inserts its proboscis into the host skin and starts taking its blood meal, this host-seeking behavior stage gets completed.<sup>7</sup>

As dengue is a preventable vector-borne disease, the community's knowledge, attitude, and health-seeking behavior play an important role in successfully preventing the upsurge of cases and reducing mortality. This study thus tried to assess the knowledge, awareness, and health-seeking behavior among the Urban Kolkata residents.

## METHODS

A cross-sectional observational study assessing the knowledge, awareness, and health-seeking behavior regarding dengue was performed among urban residents visiting the Community Healthcare Center in Urban Kolkata, during the period April–October 2023.

The study conduct was approved by an independent Ethics Committee and written informed consent was obtained from all the study participants. The study included adult residents of either sex who were visiting the community healthcare outpatient setup during the study period for any ailments. Those having difficulty comprehending the questionnaire or those unwilling to participate were excluded.

The survey questionnaire included three sections: (1) Demographic characteristics (2) Knowledge regarding dengue transmission, prevention practices, and disease symptoms, and (3) Health-seeking behavior. The survey questionnaire was formulated taking clues from earlier conducted studies and was pretested for validation in a subset population. The questionnaire reliability was assessed using the Cornbach alpha coefficient, which was 0.71 indicating acceptable reliability. The questionnaire was further administered to 200 urban residents attending the community healthcare outpatient setup. Of the 200 administered questionnaires, 170 were returned. Data completeness was checked and a further 12 questionnaires were excluded from the analysis due to their incompleteness.

Descriptive data was represented as mean, standard deviation, frequency, or percentages, as applicable. Association was probed using Pearson's correlation coefficient. A *p*-value of 0.05 was considered significant. All statistical analysis for various measures was performed using various standard statistical software packages like Microsoft Excel and GraphPad Prism.

## RESULTS

The study was conducted on 158 residents of Urban Kolkata. The recorded mean age of the study population was 39.36 ± 10.55 years, with majority (58.23%) belonging to the age-group of 35–54 years. Males represented 51.9% of the study population. Among the individuals surveyed, 37.97% had attained education up to the secondary level, while 6.33% received no formal education. Office staff comprised 40.51% of the subjects surveyed, while tradesmen accounted for 17.72% (Table 1).

Knowledge regarding dengue transmission included questions pertaining to mosquito breeding areas, biting times, and resting

**Table 1:** Demographic characteristics

Characteristics	Frequency	Percentage
Sex		
Male	82	51.90
Female	76	48.10
Age (years)		
18–34	40	25.32
35–54	92	58.23
≥55	26	16.46
Educational status		
Uneducated	10	6.33
Primary education	46	29.11
Secondary education	60	37.97
Graduate and above	42	26.58
Occupation		
Unemployed	24	15.19
Office staff	64	40.51
Laborer	22	13.92
Small tradesman/business	28	17.72
Others	20	12.66

places. Stagnant water was highlighted as a key breeding ground for mosquitoes by 69.62% of the individuals surveyed and 70.89% individuals believed that dengue mosquitoes bite at night time. The primary resting place of dengue mosquitoes during the day was indoors for 77.22% of the subjects surveyed. Knowledge regarding prevention practices was assessed with questions regarding personal preventive measures and ways to prevent mosquito breeding. All respondents believed that cleaning mosquito breeding and resting places and using mosquito repellents were the most preventive measures. Among the respondents, 83.54% considered cleaning the surroundings of their house to be an effective method of preventing breeding. While all individuals knew fever as a dengue symptom, knowledge regarding other symptoms like malaise, headache, and rash were present in 70.89, 56.96, and 53.16% respectively (Table 2).

Health-seeking behavior was assessed. If they experienced a fever, 51.90% of respondents indicated their willingness to seek medical care at a government healthcare facility, followed by 20.25% opting for private consultation and 18.99% self-treating themselves with over-the-counter drugs. While 98.73% knew about the necessity of oral rehydration, 82.28% believed in the use of papaya leaf for increasing platelet count. Among the respondents, 87.34% had knowledge regarding the use of paracetamol for fever management in cases of dengue. Knowledge regarding alarming signs of dengue was grossly less. Only 39.34% knew that bleeding was a warning sign. Among the respondents, 51.9% believed that a decrease in platelet count warranted hospital admission. However, there was a lack of knowledge regarding the specific platelet levels necessitating transfusion (Table 3).

Knowledge parameters showed significant positive association with age and educational status (*p* = 0.001). However no association was observed for the health seeking behavior elements.

## DISCUSSION

Dengue fever can be a serious and sometimes life-threatening illness, particularly prevalent in tropical and subtropical regions.

**Table 2:** Knowledge regarding dengue transmission, prevention practices and disease symptoms

	Frequency	Percentage
<b>Mosquito breeding area</b>		
Stagnant water	110	69.62
Tall grasses/bushes	40	25.32
Others (latrine, cowshed)	8	5.06
<b>Biting time</b>		
Night	112	70.89
Day	32	20.25
Any time	10	6.33
Do not know	4	2.53
<b>Resting places</b>		
Dark place inside house during day	122	77.22
Dirty areas	16	10.13
Edge of ponds, stagnant water	12	7.59
Do not know	4	2.53
Others (lavatory)	4	2.53
<b>Personal preventive measures</b>		
Untreated bed nets	146	92.41
Insecticide-treated bed nets	12	7.59
Window nets	108	68.35
Using insecticide sprays	96	60.76
Cleaning of mosquito breeding and resting places	158	100.00
Using mosquito coils/repellents	158	100.00
Treatment and prophylaxis	56	35.44
Do not know	0	0.00
<b>Ways to prevent mosquito breeding</b>		
Cleaning of house surrounding	132	83.54
Draining of stagnant water	110	69.62
Clearing of bushes	90	56.96
Others	0	0.00
Do not know	0	0.00
<b>Disease symptoms</b>		
Fever	158	100.00
Rash	84	53.16
Headache	90	56.96
Nausea/vomiting	70	44.30
Bleeding	62	39.24
Body ache	112	70.89
Shock or severe dengue	62	39.24

Dengue infection causes a wide range of clinical manifestations, from mild fever to potentially fatal dengue shock syndrome. The presence of high fever, accompanied by symptoms such as severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands, or a rash, should prompt suspicion of dengue fever. Typically, these symptoms endure for 2–7 days, emerging after an incubation period of 4–10 days following a bite from an infected mosquito.<sup>8</sup>

Regarding diagnosis, detection of NS1 antigen by ELISA method in case of fever less than 5 days and dengue IgM in cases of fever more than 5 days is recommended, which is in accordance with guidelines from the Centers of Disease Control and Prevention.<sup>9</sup>

**Table 3:** Health-seeking behavior

	Frequency	Percentage
<b>Response if self or a family member gets fever</b>		
Attend government healthcare facility	82	51.90
Consult private doctor	32	20.25
Take antipyretics from pharmacy	30	18.99
Wait to see if fever goes away itself	14	8.86
<b>Treatment</b>		
ORS needs to be taken	156	98.73
Papaya leaf increases platelet count	130	82.28
Alcohol or hypertonic drinks to be avoided	36	22.78
Paracetamol for fever	138	87.34
Antibiotics needed	128	81.01
<b>Warning or danger signs</b>		
Bleeding	62	39.24
Lethargy or restlessness	0	0.00
Convulsions	0	0.00
Shortness of breath or palpitations	14	8.86
Repeated vomiting	24	15.19
Severe abdominal pain	20	12.66
Dizziness	14	8.86
Not able to drink	14	8.86
Reduced urine output	14	8.86
Cold clammy extremities	0	0.00
<b>Hospitalization</b>		
All dengue cases need hospitalization	58	36.71
Decreasing platelet count is indication for admission	82	51.90
Dangers signs are there to be noticed	18	11.39
<b>Indication for platelet transfusion</b>		
Less than 10,000 or any with bleeding	8	5.06
Less than 50,000	34	21.52
Less than 1 lakh	36	22.78
Do not know	80	50.63

The primary focus in treating dengue involves managing symptoms, with key elements including sufficient hydration, paracetamol for fever or muscle pain, and monitoring for potential complications like early signs of DHF or DSS. There is no specific medication for treating dengue infection, underscoring the importance of prevention. Preventive measures, particularly against mosquito bites, are crucial in this regard. Effective control of the dengue vector is achieved through various methods, with an integrated approach being the most advantageous. This approach avoids overreliance on any single method by combining multiple strategies. To significantly reduce mosquito populations, eliminating breeding grounds is essential. This involves actions such as filling, leveling, and draining breeding sites, as well as maintaining environmental cleanliness and removing water-holding containers like discarded tins, empty pots, broken bottles, coconut shells, and other artificial water collections.<sup>10</sup>

A community-based study conducted in Delhi reported that people were majorly aware of dengue transmission and its breeding source. However, the preventive measures were not satisfactory.<sup>11</sup>

In our study, around 70% of subjects could tell that stagnant water is the prime breeding site. Another study among the urban population of Haryana stated better awareness regarding dengue among males. Further, awareness was statistically associated with factors like education, occupation, and socioeconomic class.<sup>12</sup> In our study also, knowledge parameters had a significant positive association with educational status.

A study conducted in Goa indicated that participants demonstrated a satisfactory understanding of the infection source and modes of transmission. However, there was a notable deficiency in knowledge regarding symptomatology and treatment. Less than 33% of the population recognized symptoms like pain behind the eye and abdominal pain. Approximately 61.84% were aware that *Aedes* mosquitoes transmit dengue. Non-student participants exhibited the least knowledge about symptoms and the vector responsible for transmitting the dengue virus. Regarding treatment, 44.7% believed in the beneficial effects of papaya leaves, with a higher proportion among the non-student population. Knowledge about dengue complications, such as DHF, was reported by 56.6% of the population, while 32.3% were aware of dengue shock syndrome.<sup>13</sup> Our study noted that 82.28% of subjects believed in the beneficial use of papaya leaves.

In the group of participants from Tamil Nadu, 93.7% were familiar with dengue infection. Half of the participants accurately identified the symptoms of dengue. A substantial 89% correctly acknowledged that the transmission of dengue occurs through the *Aedes* mosquito. Approximately 40% of the participants possessed accurate knowledge about the breeding habitats and biting habits of the *Aedes* mosquito. When it came to preventing mosquito bites, the study participants employed various methods, with 63.4% using mosquito coils and 14.7% relying on mosquito nets. Interestingly, 24.1% did not adopt any specific method for preventing mosquito bites.<sup>14</sup>

Conducted in eastern India, a cross-sectional descriptive study revealed that a majority of participants possessed accurate knowledge about the causative agent, seasonal occurrence, breeding grounds of the vector mosquito, reservoirs of infection, case fatality, recurrence of infection, and the absence of specific treatment for dengue. However, there were misconceptions regarding the mode of transmission. Additionally, participants exhibited a solid understanding of various preventive measures. Interestingly, despite their knowledge, their actual practices were deemed unsatisfactory. Notably, students with exposure to dengue demonstrated a higher score in terms of their practices.<sup>15</sup>

In our study, 83.54% of respondents believed in cleanliness as an effective means of vector breeding prevention. Samajdar and Joshi.<sup>16</sup> also opined about regular sweeping as an effective mode to prevent metabolic disorders and also to improve environmental cleanliness to fight against communicable diseases.

Promoting dengue awareness among the community is essential to prevent the spread of this mosquito-borne viral disease. Educational Workshops and Seminars may be organized in the community to educate residents about dengue, its symptoms, and prevention measures. Local health authorities or experts can be invited to speak at these events. Creating and distributing informational flyers, posters, and brochures that explain the symptoms of dengue, its transmission, and prevention methods can increase the knowledge quotient, however, one must make sure to use simple language and visuals for better understanding. The use of social media platforms to share dengue awareness messages, facts, and prevention tips can be of help. The community

should be engaged by posting regular updates, infographics, and success stories related to dengue prevention. Collaboration with local newspapers, radio stations, and television channels can help to spread dengue awareness messages. Interviews with health experts and survivors can help convey the importance of prevention. Health camps may be arranged where people can get free dengue tests and information about how to protect themselves from dengue. Partnering with schools and youth organizations can help educate children and young adults about dengue, who can, in turn, educate their families and communities. Community members should be encouraged to participate in regular clean-up drives to remove mosquito breeding sites. Dengue-spreading mosquitoes breed in stagnant water, so eliminating these breeding sites is crucial. Distributing insect repellents or mosquito nets to vulnerable populations, such as pregnant women and children, can protect them from mosquito bites. Collaboration with local health authorities to implement mosquito control measures like fumigation and larvicide treatments in areas with high dengue prevalence is necessary. The importance of using mosquito nets, wearing long-sleeved clothing, and using mosquito repellents, especially during peak mosquito activity times (dawn and dusk) must be emphasized during community awareness sessions. Community members must be encouraged to report suspected dengue cases promptly to local health authorities for early intervention and to prevent the spread of the disease. Though limited by its sample size and regional representation, the present study definitely paves a path for future research on this area of community awareness regarding vector-borne diseases.

## CONCLUSION

Dengue awareness is essential to prevent and control the spread of the disease, reduce its impact on public health, and foster a sense of responsibility within the community. Public health campaigns, educational programs, and community engagement are important tools in raising awareness about dengue and its prevention.

## ORCID

Shatavisa Mukherjee  <https://orcid.org/0000-0001-9524-1525>

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