Public Awareness Towards Dengue Infection in Rural Area of Bangladesh

Md Salequr Rahman[1]*, Md Humayun Kabir[2], Sharmina Afrin[1], Saida Sharmin[3]

[1] Department of Community Medicine and Public Health, Delta Medical College, Dhaka
[2] Department of Community Medicine and Public Health, Jahurul Islam Medical College, Kishoreganj
[3] Department of Community Medicine and Public Health, International Medical College, Gazipur

Abstract: *Background:* Dengue fever poses a significant public health threat in Bangladesh. This study aimed to assess the knowledge of adults regarding public awareness towards dengue infection in a rural area of Bangladesh. *Methods:* This descriptive cross-sectional study was conducted among 450 adult respondents (male and female) at Dhamrai Upazilla Health Complex, Bangladesh, from April 10, 2022 to October 17, 2022. Participants were assessed on their knowledge of dengue infection. Demographic characteristics including age, gender, religion, education, income, family size, housing, room sharing, and sanitation practices were also collected. *Results:* Out of 450 respondents, 40.44% were aged 18-25 years, and 52% were male. The majority (90%) were Muslim. Regarding education, 23.33% had studied up to secondary level, with 13.78% being illiterate. Nearly one-third (34.44%) had an income between BDT 10,000-15,000. Most respondents (58.89%) had a family size of 2-4 members, and 45.33% lived in full brick buildings. For sanitation, 86.66% used Paka (concrete) toilets, and 96.66% reported using personal protective equipment. A high proportion (92.22%) of respondents were aware of dengue, with 41.78% obtaining information from newspapers/magazines. While 77.78% correctly identified dengue as a communicable disease, 18.89% did not know about prevention methods. The majority (67.8%) knew about most dengue symptoms, with fever being the most commonly recognized symptom (69.33%). Flower vases (23.33%) and discarded bottles (21.11%) were identified as primary mosquito breeding sites. Interestingly, 77.33% of respondents expressed no desire to know more about dengue. *Conclusion:* The study revealed a generally high level of awareness about dengue among the rural population in Dhamrai Upazilla, particularly regarding its communicability and symptoms. However, there are still significant gaps in knowledge regarding prevention methods and a surprising lack of desire among a large proportion of the population for further information. These findings underscore the need for targeted health education programs that focus on comprehensive prevention strategies and aim to reignite interest in continuous learning about dengue, especially for those with limited education and income.

Keywords: Dengue Fever, Rural Area, Awareness, Bangladesh

INTRODUCTION

Dengue virus (DENV) infection is a significant mosquito-borne viral disease, primarily transmitted to humans through the bite of infected female Aedes aegypti and Aedes albopictus mosquitoes.[1] The disease is caused by a virus belonging to the Flaviviridae family, comprising four distinct but closely related serotypes: DENV-1, DENV-2, DENV-3, and DENV-4. While initial infection typically results in classical Dengue Fever (DF), subsequent infections with a different serotype (secondary infection) can increase the risk of developing more severe forms, including Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS), collectively termed "Severe Dengue," which carries a significant risk of fatality. Globally, dengue is endemic in over 120 countries, predominantly in tropical and subtropical regions.

A substantial proportion, approximately 52%, of the global population at risk of acquiring dengue resides within the ten countries of the World Health Organization (WHO) South-East Asia region, a region that includes Bangladesh.[2] The historical understanding of dengue dates back to ancient Chinese medical texts, with its association with flying insects noted as early as the Jin Dynasty (256-420 AD). The pivotal discovery of Aedes mosquito transmission occurred in 1906, and by 1907, dengue was identified as the second human disease (after yellow fever) confirmed to be caused by a virus. The marked global spread of dengue during and after World War II has been attributed to widespread ecological disruptions. Severe dengue was first clinically recognized during epidemics in the Philippines and Thailand in the 1950s.

In Bangladesh, dengue has emerged as a significant and persistent public health threat since its initial documented epidemic in 2000, which recorded 5,551 cases and 93 deaths.[3] Although clinically suggestive cases and small outbreaks occurred sporadically between 1964 and 1999 across the country, they were not officially reported.[4-6] The first definitive detection of dengue infection in Bangladesh traces back to an outbreak of febrile illness in Dhaka in late summer 1964, from which Dengue virus type 3 was isolated.[4] The officially reported epidemic of 2000, which also saw reports of severe dengue cases, likely stemmed from a dengue virus strain introduced from endemic countries to the east of Bangladesh.[5-9] Since 2000, dengue cases have been reported annually in all major cities of Bangladesh, with the largest reported epidemic occurring in 2002, registering 6,132 cases.[3] While hospital-based surveillance notifications have shown a decline since 2002, it is acknowledged that true case numbers remain under-ascertained.[10, 11] Symptoms of dengue typically manifest 3 to 14 days following infection and can include a high fever, headache, vomiting, muscle and joint pain, and a characteristic skin rash. Recovery usually spans 2 to 7 days. The prevalence and intensity of dengue transmission are influenced by various local environmental factors such as rainfall, temperature, relative humidity, and the impact of unplanned urbanization. Given the persistent threat of dengue in Bangladesh, understanding public awareness and knowledge about the disease, its transmission, prevention, and symptoms, particularly in rural settings, becomes crucial for effective public health interventions.

MATERIALS AND METHODS
Study Design
This was a descriptive, cross-sectional study conducted to assess the knowledge of dengue infection among an adult population. The study was carried out from April 10, 2022 to October 17, 2022. The study site was the Dhamrai Upazila Health Complex, a healthcare facility located in Dhamrai, Bangladesh.

Study Population
The study population comprised adult men and women attending the Dhamrai Upazila Health Complex during the study period. A total of 450 participants were included in the final sample. A non-probability, purposive sampling technique was utilized to select the respondents. The inclusion criterion was any adult male or female willing to participate. Conversely, individuals who were critically ill, unable to communicate effectively, or diagnosed with psychological abnormalities were excluded from participation. Children were also excluded from the study.

Data Collection
Data were collected through face-to-face interviews using a pre-tested, structured questionnaire. The questionnaire was designed to gather information on two main areas: (1) participants' knowledge regarding dengue infection and (2) their sociodemographic characteristics. The demographic variables included age, gender, religion, educational attainment, monthly income, family size, housing conditions, room sharing practices, and household sanitation facilities.

Data Analysis
Following data collection, all questionnaires were manually checked for completeness and consistency. The data were then coded and entered into a computer for analysis. The analysis was performed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize the findings.

Ethical Considerations

Verbal informed consent was obtained from each participant before the interview, after explaining the purpose and nature of the study. Participants were assured of the confidentiality of their responses and informed that their participation was entirely voluntary.

RESULTS

This study included a total of 450 respondents. The findings are presented in two main sections: the socio-demographic profile of the participants and their knowledge and practices related to dengue fever.

Socio-Demographic Characteristics of Respondents

The socio-demographic data includes details on age, gender, religion, education, income, family size, and living conditions.
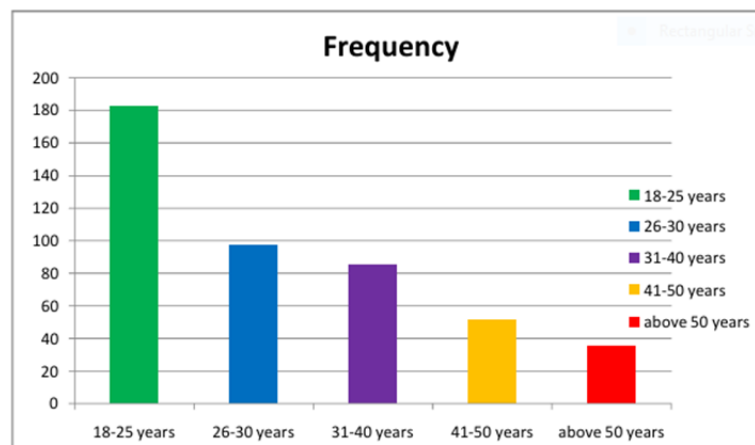

Figure 1: Distribution of Respondents by Age (n=450)

Age and Gender

As shown in (Figure 1), the largest age group consisted of individuals aged 18-25 years, representing 40.44% of the respondents. This was followed by the 26-30 years group (21.56%), 31-40 years group (18.89%), 41-50 years group (11.33%), and the above 50 years group (7.78%). The gender distribution was relatively balanced, with 52% male and 48% female respondents.

Religion and Education

The religious composition of the respondents was predominantly Muslim (90%), with the remaining (10%) being Hindu. Educational qualifications varied, with the largest segment having completed secondary education (23.33%). This was followed by higher secondary (18.89%), lower secondary (16.22%), and primary education (14.44%). A significant portion of respondents were illiterate (13.78%) or could only provide a signature (13.33%).

Monthly Income

The monthly income distribution showed that the largest group (34.44%) earned between 10,000-15,000 Taka. (20%) earned above 15,000 Taka, (19.78%) earned below 5,000 Taka, (18.89%) had an income between 5,000-10,000 Taka. A small fraction (6.89%) had no income.

Household Characteristics

Family Size: A majority of respondents (58.89%) belonged to families with 2-4 members, while (40%) had families with more than four members. Only (1.11%) of respondents lived alone.

Housing and Room Sharing

The most common type of residence was a full building (45.33%), followed by a half-building (38.89%). In terms of living space, (54.44%) of respondents shared their room with 2-4 people, (34.44%) shared with more than four people, and (11.11%) shared with fewer than two people.

Sanitation

The vast majority of participants (86.66%) used a paka (sanitary) toilet, while (10%) used a pit toilet and (3.33%) used an open place.

Knowledge, Attitudes, and Practices Regarding Dengue

This section details the respondents' awareness, knowledge of prevention and transmission, and understanding of dengue symptoms and outcomes.

General Awareness and Sources of Information

General awareness of dengue was very high, with (92.22%) of respondents confirming they knew about the disease.
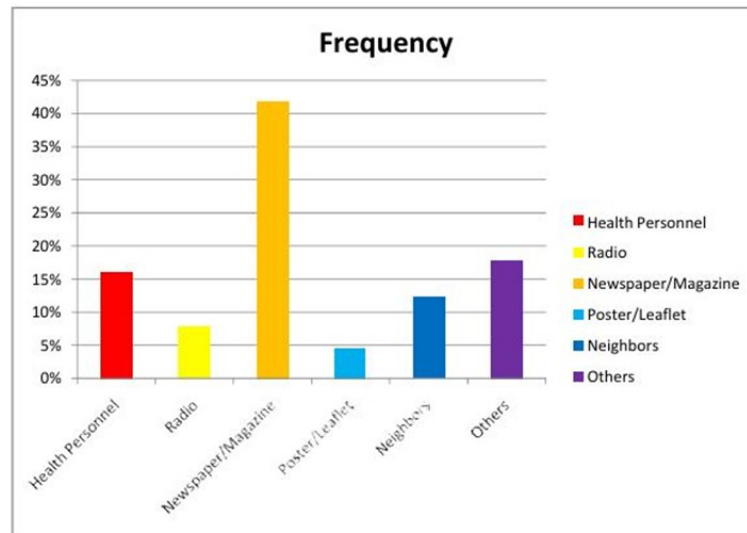

Figure 02: Distribution of Respondents by Source of Knowledge about Dengue (n=450)

The primary source of this information was newspapers/magazines (41.78%), followed by health personnel (16%), neighbors (12.22%), radio (7.78%), and posters/leaflets (4.44%). Other sources accounted for 17.78% of responses (Figure 02).

Knowledge of Dengue Prevention and Transmission

Prevention

A large majority (81.11%) knew that dengue is preventable. When asked about specific prevention methods, the most common response was the use of a mosquito net (45.56%). Other methods cited were personal hygiene (15.56%) and environmental change (15.33%). Almost all respondents (96.66%) reported using some form of personal protective equipment.

Table 1: Distribution of Respondents by Transmission of Dengue (n=450)

Transmission	Frequency	Percentage
By mosquito bite	317	70.44%
By bite of fly	32	7.11%
By water	41	9.11%
By food	38	8.44%
Others	22	4.88%
Total	**450**	**100%**

Transmission

While 70.44% correctly identified mosquito bites as the mode of transmission (Table 01), a significant portion held misconceptions, with 77.78% stating that dengue is a communicable disease. Vector and Breeding Sites: Knowledge of

the specific mosquito vector was high, with (92.66%) correctly identifying the Aedes mosquito. Furthermore, (78.44%) of participants knew about the mosquito's breeding places. The most frequently mentioned breeding sites were flower vases (23.33%), discarded bottles (21.11%), uncovered water tanks (13.33%), discarded tires (13.77%), and coconut shells (12.88%).

Knowledge of Dengue Symptoms and Outcomes

Over two-thirds of respondents (67.8%) stated they were aware of dengue symptoms. Fever was overwhelmingly identified as a symptom of dengue (69.33%) and as its main symptom (61.33%). Other symptoms such as headache, arthralgia, and rash were identified by a much smaller percentage. Regarding the outcome of the disease. 50.2% believed that patients recover if treated, while a substantial portion (41.1%) believed the outcome is death.

Interest in Further Information

Despite high general awareness, a majority of respondents (77.33%) indicated they did not want to know more about dengue, while 20.44% expressed an interest in receiving more information. The response for the remaining 2.66% of participants was not specified. This survey provides a snapshot of dengue risk factors and awareness within the study population, offering valuable insights that can inform public health interventions. Comparing these findings with previous studies, particularly one conducted in Dhamrai Upazilla, highlights both continuities and shifts in demographic patterns and knowledge about dengue.

DISCUSSION

Demographics and Socioeconomic Factors

Our study revealed a significant proportion of respondents (40.44%) belonging to the 18-25-year age group, followed by 26-30 years (21.56%).[11] This indicates a largely young adult population, which might influence their information-seeking behaviors and susceptibility to public health messaging. This contrasts with a previous study in Dhamrai Upazilla where (31.18%) were in the 15–25-year age group, suggesting a potential slight shift towards an older young adult demographic or differences in the sampled populations.[13]

Dengue Awareness and Knowledge

A key finding is the high level of dengue awareness, with 92.22% of respondents indicating they knew about the disease. This is attributed to recent outbreaks, such as chikungunya, and the role of media. Indeed, newspapers/magazines were the primary source of information (41.78%), followed by health personnel (16%), neighbors (12.22%), and radio (7.78%). This highlights the critical role of diverse media channels and community networks in disseminating health information. Similar to the findings in the provided text, public awareness campaigns in India are crucial for dengue prevention and control. The Indian government and various health organizations utilize a mix of media channels to educate the public about the disease.[14-16] While a significant majority (77.78%) correctly identified dengue as a communicable disease, a concerning 22.22% still considered it non-communicable. This gap in understanding underscores the need for clearer public health messaging on disease transmission. Encouragingly, (81.11%) knew about dengue prevention methods. Among these, mosquito nets were the most recognized method (45.56%), followed by personal hygiene (15.56%), environmental change (15.33%), and vaccination (12.22%). The emphasis on environmental change is crucial, given the role of mosquito breeding sites.

The majority (70.44%) correctly identified mosquito bites as the mode of dengue transmission. While a significant portion of respondents knew about most dengue symptoms, (32.2%) were unaware, highlighting a knowledge deficit. Among those who knew, fever was the most commonly recognized symptom (69.33%), followed by headache (7.77%), arthralgia (6.4%), and rash (6.22%). Similarly, fever was overwhelmingly identified as the main symptom (61.33%). In Sri Lanka, A study among patients in a teaching hospital found that although 90.2% correctly identified mosquito bites as the mode of transmission, only a small fraction correctly identified other important details, like the type of mosquito (36.4% said Aedes) or its preferred breeding sites (88.4% said clear, stagnant water).[17, 18] Regarding the outcome of dengue, 50.2% believed recovery was possible with treatment, while a substantial 41.1% perceived death as the fate. This indicates a mixed understanding of disease

prognosis, which could impact care-seeking behaviors. Crucially, 92.66% correctly identified the Aedes mosquito as the vector, demonstrating a strong understanding of the specific vector involved. In contrast, a study in Thailand found that a majority of patients believed dengue had a high mortality rate (63%) and required hospitalization (91.3%). This is a higher proportion of people believing in a fatal outcome than in Bangladesh, but it also highlights a similar knowledge gap: a perception of inevitable severity that may lead to inappropriate care-seeking behaviors.[19-20] Knowledge about mosquito breeding places was also high (78.4%). Flower vases were most frequently cited (23.33%), alongside discarded bottles (21.11%), discarded tires (13.77%), and uncovered water tanks (13.33%). This detailed knowledge about breeding sites is vital for targeted vector control strategies.

Desire for Further Knowledge

Despite high existing awareness, a majority of respondents (77.33%) surprisingly indicated they did not want to know more about dengue, with only (20.44%) expressing a desire for further information. This finding is critical as it suggests a potential complacency or feeling of sufficient knowledge, which could hinder sustained engagement in preventive behaviors. Public health campaigns might need to focus not just on providing information but also on reinforcing the ongoing need for vigilance and updated knowledge, perhaps by emphasizing emerging risks or new prevention techniques.

CONCLUSION

This study, conducted among 450 adults in rural Dhamrai, Bangladesh, revealed high general awareness (92.22%) of dengue fever. Most respondents correctly identified mosquito bites as the transmission mode (70.44%) and the Aedes mosquito as the vector (92.66%). Knowledge of breeding sites like flower vases (23.33%) and discarded bottles (21.11%) was also prevalent, as was awareness of symptoms, particularly fever (69.33%). However, significant knowledge gaps persist. A notable 18.89% were unaware of prevention methods, and 22.22% incorrectly believed dengue was non-communicable. Crucially, 77.33% expressed no desire for further dengue information, indicating potential

complacency. These findings highlight an urgent need for targeted public health interventions. Future campaigns must extend beyond basic awareness to focus on comprehensive prevention strategies, correct misconceptions about disease communicability, and, most importantly, reignite interest in continuous learning about dengue. Tailored educational programs, especially for those with limited education and income, are vital to ensure sustained community engagement and effective vector control, strengthening resilience against future epidemics.

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