Atypical presentation of Dengue outbreak in 2022-study at a dedicated Dengue Hospital in Dhaka, Bangladesh

Md. Zakirul Islam[1*], Md. Abdullahel Kafee[2], Anjuman Ara[3], Yesmin Akhter[4], Jahanara Laizu[5], Mohammad Fazlul Huq[6], Tahera Khatun[7]

[*1]Associate Professor, Department of Medicine, Kurmitola General Hospital, Dhaka, Bangladesh,
Email: zakir.doc@gmail.com,
Orcid ID: 0009-0002-9772-7152

[2]Associate Professor, Department of Medicine, Kurmitola General Hospital, Dhaka, Bangladesh.
Email: kafeenidch@gmail.com,
Orcid ID: 0009-0001-9906-3452

[3]Assistant Professor, Department of Gynaecology and Obstetrics, TMSS Medical College, Bogura, Bangladesh.
Email: docanjuman42@gmail.com,
Orcid ID: 0009-0001-7741-2105

[4]Registrar, Department of Medicine, Kurmitola General Hospital, Dhaka, Bangladesh.
Email: dr.rakhey87@gmail.com,
Orcid ID: 0009-0004-2715-3565

[5]Assistant Professor, Department of Nuclear Medicine, National Institute of Kidney Diseases & Urology (NIKDU), Dhaka, Bangladesh,
Email: laizu31@gmail,
Orcid ID: 0009-0000-0657-1953

[6]Junior Consultant, Department of Medicine, Kurmitola General Hospital, Dhaka, Bangladesh.
Email: mfhuq94ndc@gmail.com,
Orcid ID: 0009-0006-8466-4577

[7]Indoor Medical Officer, Department of Medicine Kurmitola General Hospital, Dhaka, Bangladesh.
Email: tahera.ssmc@gmail.com,
Orcid ID: 0009-0003-4072-437X

*Corresponding author
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Abstract

Background: Dengue fever, a mosquito-borne viral disease, has emerged as a significant public health concern worldwide. The disease's presentation can vary widely, with atypical manifestations becoming increasingly common. This study aimed to analyze the atypical presentation of dengue during the 2022 outbreak in a dedicated dengue hospital in Dhaka, Bangladesh. **Material & Methods:** This retrospective observational study was conducted at the Kurmitola General Hospital, at Dhaka, Bangladesh using data of 300 patients from hospital records collected over a one-year period from January 2022 to December 2022. The variables analyzed included demographic characteristics, clinical presentations, laboratory findings, and hospital stay duration. **Results:** The majority of the participants were males (74.67%), with the largest proportion falling within the 19-29 age range (39%). The most common clinical presentation was fever (99%), followed by bodyache (44.33%) and gastroenteritis (38%). The majority of participants tested positive for the NS1 antigen (90.33%). The majority had a hospital stay duration between 1 and 3 days (48.67%). **Conclusion:** The study provides valuable insights into the atypical presentation of dengue, emphasizing the importance of demographic factors, clinical presentations, and laboratory findings in understanding the disease's manifestation and progression. The findings underscore the importance of early diagnosis and prompt treatment in managing dengue outbreaks. Future research should focus on understanding the factors contributing to atypical presentations and their implications for disease management and control.

Keywords:- Dengue, Fever, Epidemic, Outbreak, Atypical presentation.

INTRODUCTION

Dengue, a mosquito-borne viral infection, has rapidly spread across the globe over the past few decades. The World Health Organization (WHO) estimates that about half of the world's population is now at risk. Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.[1] In

Bangladesh, dengue has become a significant public health concern. The country experienced a massive outbreak in 2019, with over 101,354 reported cases and 179 deaths.[2,3] This was a stark increase from the 10,148 cases and 26 deaths reported in 2018, highlighting the escalating threat of the disease in the region.[3] Dengue is caused by any one of four related viruses, named DEN-1, DEN-2, DEN-3, and DEN-4.[4] For this reason, a person can be infected with a dengue virus as many as four times in his or her lifetime. While many dengue infections produce only mild illness, some can progress to Dengue Hemorrhagic Fever (DHF), a severe form of the disease. DHF is a leading cause of hospitalization and death among children and adults in many Asian and Latin American countries.[1] The clinical presentation of dengue varies significantly. While some individuals show no symptoms, others suffer from high fever, severe headache, pain behind the eyes, joint and muscle pain, rash, and mild bleeding. More severe forms of the disease, such as DHF and Dengue Shock Syndrome (DSS), can result in plasma leakage, fluid accumulation, respiratory distress, organ impairment, and severe bleeding.[1,5] Atypical presentations of dengue have been increasingly reported. These include unusual clinical manifestations and unusual locations of the disease. For instance, a study conducted in Thailand reported that the incidence of inapparent and symptomatic dengue virus infection varied significantly from year to year, illustrating the spatial and temporal diversity of dengue virus infection.[6] The global distribution of dengue has been influenced by both human activities and climatic factors. Urbanization, increased travel and trade, inadequate vector control, and climate change have all contributed to the spread of the Aedes mosquitoes that carry the dengue virus, leading to an increase in dengue outbreaks worldwide.[7] In the context of Bangladesh, the rapid urbanization of Dhaka, the capital city, has created an environment conducive to the breeding of Aedes mosquitoes. This, coupled with increased population movement within the country and across borders, has contributed to the rise in dengue cases.[8] Given the increasing burden of dengue, there is a pressing need for comprehensive studies on its epidemiology, clinical presentation, and management. This study aims to contribute to this body of knowledge by examining the atypical presentation of dengue in a dedicated Dengue Hospital in Dhaka, Bangladesh, during the 2022 outbreak.

MATERIAL AND METHODS

This retrospective observational study aimed to investigate the atypical presentations of Dengue fever during the 2022 outbreak in Bangladesh. The study was conducted at a dedicated Dengue Hospital located in Dhaka city. The study population comprised of 300 Dengue fever patients who were admitted to the hospital during the study period from January 2022 to December 2022. All admitted confirmed (NS1 positive or IgM anti-dengue anti-body positive) dengue fever cases during the mentioned time period with an age of 12 years or more were included in this study. Patients were excluded if they were not diagnosed with Dengue fever, if they were admitted outside the study period, and with incomplete hospital records. Data for this study were collected retrospectively from the hospital registered record book. The data included demographic information, clinical presentation, laboratory

findings, Dengue classification, comorbidities and coinfections, treatment and management details, and hospital course and outcome. The collected data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize the demographic, clinical, and laboratory characteristics of the patients. The association between the variables and atypical presentation of Dengue were assessed using appropriate statistical tests. A p-value of less than 0.05 was considered statistically significant. This study was approved by the Institutional Review Board of the hospital, and all methods were carried out in accordance with relevant guidelines and regulations. As this was a retrospective study using anonymized patient data, the requirement for informed consent was waived.

RESULTS

[Table 1] presents the distribution of participants (n=300) according to their baseline demographic characteristics.

The largest proportion of participants falls within the 19-29 age range, constituting 117 individuals or 39% of the sample. The age group ≤18 represents 48 participants, accounting for 16% of the total. Other age categories include 30-39 (65 participants or 21.67%), 40-49 (31 participants or 10.33%), 50-59 (19 participants or 6.33%), 60-69 (13 participants or 4.33%), 70-79 (4 participants or 1.33%), and ≥80 (3 participants or 1%). The range of ages in the sample spans from 12 to 95 years, with a mean age of 31.28 ± 13.80. In terms of gender, the majority of participants are male, comprising 224 individuals or 74.67% of the total sample, while females account for 76 participants or 25.33%.

Analyzing residency, the data showed that the majority of participants were from urban areas, which was 261 individuals or 87% of the sample.

The most common clinical presentation was fever, with 297 individuals or 99% of the total participant. The other clinical presentation in accordance with their frequency were bodyache (133, 44.3%), gastroenteritis (114, 38%), abdominal pain (70, 23.33%) of the total. Bleeding was experienced by 39 participants (13%). Less commonly reported presentations include cough (18, 6%), rash (3, 1%), shock (2, 0.67%), and encephalitis (1, 0.33%). [Table 2]
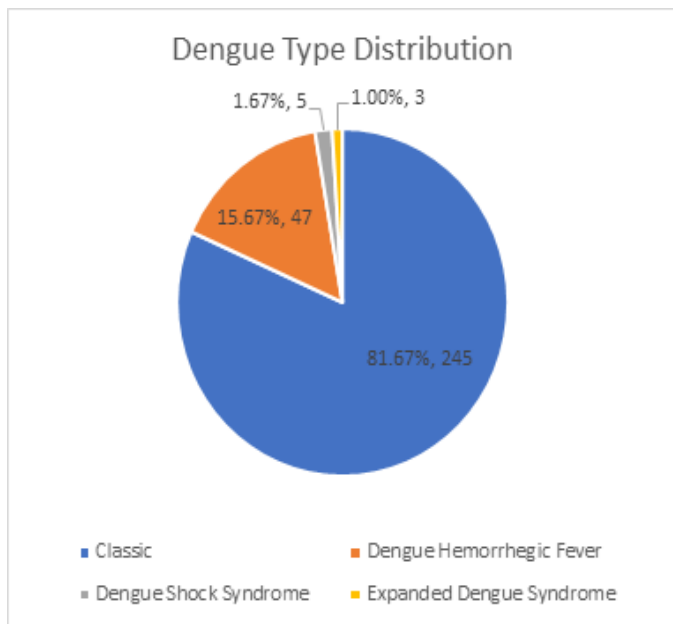
[Table 3] presents the distribution of participants (n=297) based on the duration of fever they experienced at admission. 28 individuals (9.43%) reported to had a fever for less than 3 days. The majority 162 (54.55%) had a fever of 3-5 days. A significant number, 107(36.03%) experienced fever for more than 5 days at the time of their admission.
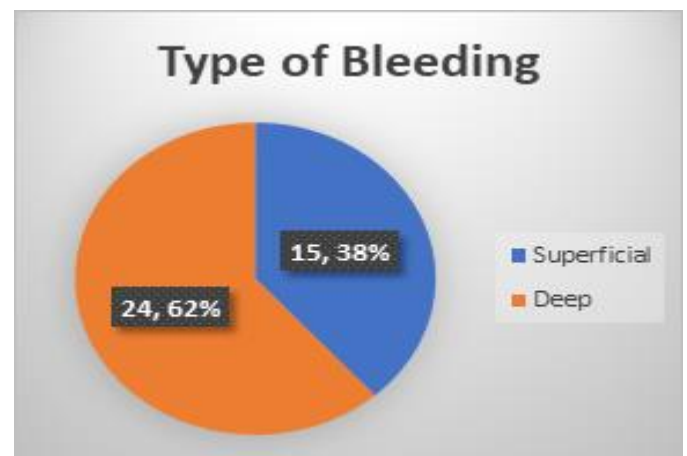
Figure 1: Distribution of participants by type of bleeding [n=39]

[Figure 1] displays the distribution of participants (n=39) according to the type of bleeding they experienced. 15 out of 39 (38.46%) were reported to had superficial bleeding, while a larger proportion of participants, 24 (61.54%) of the participant, had experienced deep bleeding.

The majority, 271(90.33%) were tested positive for NS1. Other's 21 (7.00 %) and 41 (13.67%) were tested positive for IgM and IgG antibodies respectively. Among the participant, 33 (11.00 %) individuals had had an evidence of plasma leakage. [Table 4]

Figure 2: Distribution of participants by type of dengue [n=300]

[Figure 2] Pie chart showing the distribution of participants (n=300) based on the type of Dengue fever. Among the participants, the majority, 245(81.67%) individuals, were diagnosed with classic Dengue fever. A significant number, 47 (15.6 %) individuals, had Dengue hemorrhagic fever. Only 5 (1.67%) individual, were diagnosed with dengue shock syndrome and Additional 3(1.00%) participants were diagnosed with expanded dengue syndrome.

[Table 5] represents the distribution of participants (n=300) based on their clinical comorbidities. Majorities had no comorbidities, which was 268 (89.33%) of the total participants. Diabetes was the most common comorbidity, which was 14 (4.67%) of the total participants. Other common comorbidities according to their frequency were Hypertension, Hypothyroidism and Bronchial asthma with a frequency of 7 (2.33%), 3 (1.00%) and 2 (0.67%) respectively.

[Table 6] displays the distribution of participants according to their hospital stay duration. Among the participants (n=300), 146 individuals or 48.67% had a hospital stay lasting between 1 and 3 days. A slightly smaller proportion, 126 individuals or 42% of the sample, stayed in the hospital for a duration of 4 to 6 days. A smaller group of participants, 28 individuals or 9.33% of the sample, had a hospital stay lasting 7 days or more.

[Table 7] presents the distribution of participants (n=300) based on the complications during their hospital stay. Majority, 293 individuals or 97.67%, had had no complications. A small number, 7 (2.33%) individual had experienced minor complications. There were no reported cases of mortality among the participants.

Table 1: Baseline demographic characteristic of study population [n=300].

Variable	Frequency	Percentage
Age		
≤18	48	16.00%
19-29	117	39.00%
30-39	65	21.67%
40-49	31	10.33%
50-59	19	6.33%
60-69	13	4.33%
70-79	4	1.33%
≥80	3	1.00%
Range	12-95	
Mean	31.28 ± 13.80	
Gender		
Male	224	74.67%
Female	76	25.33%
Residency		
Urban	261	87.00%
Sub-Urban	39	13.00%

Table 2: Clinical presentations of Dengue fever among the study participant [n=300]

Clinical Presentations	Frequency	Percentage
Fever	297	99.00%
Body ache	133	44.33%
Gastroenteritis	114	38.00%
Abdominal Pain	70	23.33%
Bleeding	39	13.00%
Cough	18	6.00%
Rash	3	1.00%
Shock	2	0.67%
Encephalitis	1	0.33%

Table 3: Distribution of participants by duration of fever at diagnosis [n=297]

Fever Duration	Frequency	Percentage
<3 days	28	9.43%
3-5 days	162	54.55%
>5 days	107	36.03%

Table 4: Laboratory findings [n=300]

Variables	Frequency	Percentage
NS1 positive	271	90.33%

49

IgM positive	21	7.00%
IgG positive	41	13.67%
Evidence of Plasma Leakage	33	11.00%

Table 5: Distribution of participants by clinical comorbidities [n=300]

Comorbidities	Frequency	Percentage
Diabetes	14	4.67%
Hypertension	7	2.33%
Ischemic Heart Disease	1	0.33%
Hypothyroid	3	1.00%
Chronic obstructive pulmonary disease	1	0.33%
Asthma	2	0.67%
Malignancy	1	0.33%
Others	3	1.00%
None	268	89.33%

Table 6: Distribution of participants by hospital stay duration

Hospital Stay duration	Frequency	Percentage
1-3 days	146	48.67%
4-6 days	126	42.00%
≥7 days	28	9.33%

Table 7: Distribution of participants by complications at discharge [n=300]

Complications	Frequency	Percentage
No Complications	293	97.67%
Minor Complications	7	2.33%
Mortality	0	0.00%

DISCUSSION

The findings of this study provide a comprehensive overview of the atypical presentation of dengue in a dedicated dengue hospital in Dhaka, Bangladesh, during the 2022 outbreak. The demographic characteristics of the participants, their clinical presentations, laboratory findings, and hospital stay duration were analyzed and compared with other studies of similar nature. Our study reveals that the majority of the participants are males (74.67%), which aligns with the findings of a study conducted in Uttar Pradesh, India, where a higher prevalence of vector-borne diseases, including dengue, is observed among males.[9] This can be attributed to their increased exposure to outdoor environments, where the vectors of these diseases are prevalent. This finding is also consistent with a study conducted in Brazil, which reports a higher incidence of dengue among males.[10] In terms of age distribution, the largest proportion of participants falls within the 19-29 age range (39.00%). This corresponds to the findings of a study conducted in India, which reports a

higher prevalence of vector-borne diseases, including dengue, among young adults.[9] This could be due to the increased mobility and outdoor activities of individuals in this age group, which may increase The increased mobility and outdoor activities of individuals in this age group may contribute to their higher exposure to disease vectors. A study conducted in Thailand also reports a similar age distribution among dengue patients.[11] The most common clinical presentation among the participants in our study is fever (99.00%), followed by body ache (44.33%) and gastroenteritis (38%). These findings are similar to those reported in other studies, where fever is identified as the most common symptom of dengue, followed by other symptoms such as body ache and gastroenteritis.[12,13] A study conducted in Malaysia also reported fever as the most common symptom among dengue patients.[14,15] Our study also reveals that the majority of participants test positive for NS1 (90.33%), indicating the presence of the NS1 antigen associated with dengue. This is consistent with the findings of other studies, which report a high prevalence of NS1 positivity among dengue patients.[16] A study conducted in Vietnam also reports a high prevalence of NS1 positivity among dengue patients.[17] Regarding hospital stay duration, our study finds that the majority of participants have a hospital stay lasting between 1 and 3 days (48.67%). This is shorter than the hospital stay duration reported in other studies, which can be attributed to the early diagnosis and prompt treatment of dengue in the dedicated dengue hospital where our study is conducted. A study conducted in Singapore reports a longer hospital stay duration among dengue patients.[18] In conclusion, our study provides valuable insights into the atypical presentation of dengue during the 2022 outbreak in Dhaka, Bangladesh. The findings of our study are largely consistent with those of other studies, highlighting the importance of early diagnosis and prompt treatment in managing dengue outbreaks.

Limitations of the Study

The study was conducted in a single hospital at the capital city of Bangladesh so the result may not reflects the actual scenario of the whole country. Moreover age under twelve were not included in this study which might also influence the study result.

CONCLUSIONS

The findings underscore the importance of demographic factors, clinical presentations, and laboratory findings in understanding the disease's manifestation and progression. The study revealed that dengue predominantly affected young adults, particularly males, and fever was the most common symptom, followed by bodyache and gastroenteritis. The majority of the patients tested positive for the NS1 antigen at earlier stage, emphasizing the role of NS1 testing in early diagnosis. Although most the patients present with very common & classical symptoms, some serious presentation like severe hemorrhage, shock, encephalitis or meningoencephalitis and expanded dengue syndrome may demand very urgent attention and quick management to rescue the patient from nearby death situation.

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