



Original Article

Pattern and Outcome of Dengue Fever Cases in a Tertiary Hospital in Dhaka: A One-Year Observational Study

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Abstract

Background: Dengue fever is a vector-borne viral infection that continues to be a major public health concern in tropical and subtropical regions, including Bangladesh. The disease manifests in a range of clinical presentations, from mild flu-like symptoms to severe forms, including dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). This study aims to explore the demographic and clinical characteristics of dengue patients, seasonal patterns, and the clinical outcomes of those treated at a tertiary care hospital in Dhaka, Bangladesh.

Methods: This one-year observational study was conducted in the Department of Internal Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, to evaluate the pattern and outcomes of dengue fever cases. A total of 100 patients diagnosed with dengue fever were considered as the study subjects. Statistical analysis was performed using SPSS version 20.0.

Results: The study found that dengue fever primarily affected young adults, with the 19–30 years age group being most prevalent. Fever (100%), headache (80%), and myalgia/arthritis (75%) were the most common symptoms, with 20% of patients showing signs of severe disease, such as bleeding manifestations. The disease severity included 65% with dengue fever, 25% with dengue hemorrhagic fever, and 10% with dengue shock syndrome. Laboratory results revealed significant thrombocytopenia and elevated liver enzymes (AST and ALT), while treatment focused mainly on symptomatic management and intravenous fluids. The overall mortality rate was low at 2%.

Conclusion: This study highlights the significant burden of dengue fever in Dhaka, with seasonal outbreaks coinciding with the monsoon period. The findings demonstrate that male adults, particularly in the age groups of 19–40 years, are most affected. The majority of cases presented with classic symptoms such as fever, headache, and myalgia, with a notable proportion progressing to severe forms like dengue hemorrhagic fever and dengue shock syndrome.

Keywords: Dengue Hemorrhagic Fever, Dengue Shock Syndrome, Myalgia, Thrombocytopenia

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Introduction

Dengue fever, a mosquito-borne viral disease, is a major public health challenge in tropical and subtropical regions, particularly in Southeast Asia, including Bangladesh.¹ The disease is primarily transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitoes, with infections ranging from mild febrile illness to severe complications such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).² The global burden of dengue has increased significantly over the past few decades, with more than 50 million cases estimated to occur annually.³ Bangladesh first experienced a major dengue outbreak in 2000, which resulted in over 5,500 reported cases and 93 deaths.⁴ Prior to this, sporadic cases of dengue-like illness had been reported, but laboratory confirmation of dengue virus (DENV) infections was lacking. Since the 2000 outbreak, dengue has become endemic in Bangladesh, with recurrent seasonal outbreaks observed in Dhaka, the country's most densely populated city.⁵

The epidemiology of dengue in Dhaka has exhibited seasonal variation, with cases peaking during the monsoon and post-monsoon seasons (July to October) due to increased mosquito breeding following heavy rainfall.⁶ Studies have shown that the majority of dengue cases occur during these months, coinciding with a rise in vector density. Moreover, temperature and humidity play critical roles in viral replication and mosquito survival, further influencing dengue transmission dynamics.⁷ Clinically, dengue fever presents with non-specific symptoms, including high fever, severe headache, retro-orbital pain, myalgia, arthralgia, rash, and leukopenia.⁸ In severe cases, patients may progress to DHF or DSS, characterized by increased vascular permeability, thrombocytopenia, and plasma leakage, which can lead to multi-organ failure if untreated.⁹ Studies from Bangladesh indicate that while the majority of dengue cases are self-limiting, a significant proportion require hospitalization due to severe complications, especially among children and individuals with secondary infections.¹⁰

One of the major concerns in dengue epidemiology is the circulation of multiple DENV serotypes, which can lead to severe disease manifestations through antibody-dependent enhancement (ADE).¹¹ Bangladesh has reported all four dengue serotypes (DENV-1 to DENV-4), with shifting dominance patterns in different outbreak years. The co-circulation of multiple serotypes increases the risk of severe disease, particularly in individuals who have been previously infected with a different serotype.¹² Studies suggest that secondary infections with a heterotypic serotype are associated with higher rates of DHF and DSS, emphasizing the need for continuous serological surveillance.¹³ Despite efforts to control mosquito populations, dengue outbreaks in Dhaka remain a recurrent challenge due to ineffective vector management programs and limited public awareness

regarding preventive measures. Conventional vector control strategies, such as larviciding and fogging, have shown limited long-term effectiveness due to the adaptability of *Aedes* mosquitoes and their ability to breed in small, artificial water containers.¹⁴ Additionally, the absence of a licensed dengue vaccine during the study period meant that disease prevention relied solely on vector control and personal protective measures. The healthcare system in Bangladesh faces considerable strain during dengue outbreaks, with hospitals often exceeding capacity due to a sudden influx of patients. Studies indicate that inadequate healthcare infrastructure, limited availability of intensive care units (ICUs), and delays in seeking medical attention contribute to increased morbidity and mortality rates.¹⁵ Furthermore, laboratory diagnostic facilities for dengue, including NS1 antigen detection and PCR-based assays, are not widely available in all healthcare centers, leading to potential underreporting of cases.¹⁶ This study aims to explore the demographic and clinical characteristics of dengue patients, seasonal patterns, and the clinical outcomes of those treated at a tertiary care hospital in Dhaka, Bangladesh.

Methods

This one-year observational study was conducted in the Department of Internal Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, to evaluate the pattern and outcomes of dengue fever cases. A total of 100 patients diagnosed with dengue fever, based on clinical presentation and laboratory confirmation of dengue virus infection through NS1 antigen, IgM/IgG serology, or RT-PCR, were included in the study. Patients of all age groups and both sexes were considered, while those with co-infections or pre-existing severe comorbidities were excluded. Data were collected prospectively, including demographic details, clinical features, laboratory findings, disease severity (as per WHO dengue classification), treatment modalities, and patient outcomes. Patients were categorized into dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS) based on WHO criteria.

The primary outcomes assessed were duration of hospital stay, complications, need for intensive care, and mortality. Statistical analysis was performed using SPSS version 20.0, where categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean \pm standard deviation. Chi-square tests and independent t-tests were applied where appropriate, with a significance level set at $p < 0.05$. Ethical approval was obtained from the Institutional Review Board of BSMMU, and written informed consent was obtained from all participants.

Results

Table 1: Age Distribution of Dengue Patients (N = 100)

Age Group (Years)	Number	Percentage
≤ 18	15	15.0
19 – 30	30	30.0
31 – 40	25	25.0
41 – 50	18	18.0
> 50	12	12.0

The highest proportion of cases was observed in the 19–30 years age group (30%), followed by the 31–40 years group (25%), suggesting that younger adults are more susceptible to dengue infection. [Table 1]

Table 2: Demographic and Seasonal Distribution of Dengue Patients (N = 100)

Variable	Value (n, %)
Gender	
Male	60 (60.0)
Female	40 (40.0)
Seasonal Distribution	
Monsoon & Post-Monsoon (July–Oct)	65 (65.0)
Other months	35 (35.0)

The majority of cases occurred in males (60%) and during the monsoon and post-monsoon periods (65%), highlighting a seasonal pattern of dengue outbreaks. [Table 2]

Table 3: Clinical Symptoms of Dengue Patients (N = 100)

Symptoms	Number	Percentage
Fever	100	100.0
Headache	80	80.0
Myalgia/Arthralgia	75	75.0
Retro-orbital Pain	50	50.0
Nausea/Vomiting	40	40.0
Skin Rash	35	35.0
Bleeding Manifestations	20	20.0
Abdominal Pain	18	18.0

Fever was the most common clinical presentation (100%), followed by headache (80%), myalgia/arthralgia (75%), and retro-orbital pain (50%). Bleeding manifestations were observed in 20% of cases, indicating severe disease in a subset of patients. [Table 3]

Table 4: Dengue Severity Based on WHO Classification (N = 100)

Dengue Classification	Number	Percentage
Dengue Fever (DF)	65	65.0
Dengue Hemorrhagic Fever (DHF)	25	25.0
Dengue Shock Syndrome (DSS)	10	10.0

Most patients presented with dengue fever (65%), while 25% developed dengue hemorrhagic fever (DHF), and 10% progressed to dengue shock syndrome (DSS), indicating severe complications in a subset of patients. [Table 4]

Table 5: Key Laboratory Parameters of Dengue Patients (N = 100)

Laboratory Parameter	Mean ± SD	Reference Range
Hemoglobin (g/dL)	13.5 ± 1.2	12–16
Hematocrit (%)	42.1 ± 3.5	36–47
Total Leukocyte Count (cells/mm ³)	3500 ± 900	4000–11000
Platelet Count (cells/mm ³)	90,000 ± 35,000	150,000–450,000
Serum ALT (U/L)	48.3 ± 20.1	<40
Serum AST (U/L)	75.4 ± 25.6	<40

Thrombocytopenia (low platelet count) was a prominent finding, with a mean platelet count of 90,000 ± 35,000 cells/mm³. Elevated liver enzymes (AST and ALT) were also observed, indicating hepatic involvement in dengue infection. [Table 5]

Table 6: Treatment and Outcomes of Dengue Patients (N = 100)

Treatment/Outcome	Number	Percentage
Symptomatic Treatment	80	80.0
Intravenous Fluid Therapy	65	65.0
Blood Transfusion	12	12.0
ICU Admission	10	10.0
Hospital Stay > 7 Days	18	18.0
Mortality	2	2.0

The majority of patients (80%) received symptomatic treatment and 65% required intravenous fluid therapy. Blood transfusions were administered in 12% of cases, primarily due to severe thrombocytopenia and bleeding manifestations. ICU admission was required in 10% of cases, and the overall mortality rate was 2%. [Table 6]

Discussion

Dengue fever continues to be a major public health concern in Bangladesh, with outbreaks predominantly occurring during the monsoon and post-monsoon seasons. Our study found a male predominance (60%), which is consistent with previous studies in dengue-endemic regions, where males are more commonly affected due to higher outdoor exposure, increasing the risk of mosquito bites.^{17,18} The seasonal distribution of cases revealed that 65% of the cases occurred during the monsoon and post-monsoon months (July to October), which is in line with findings from other regions in South Asia and Southeast Asia, where dengue transmission peaks during the rainy season.⁶ This seasonal surge due to increased mosquito breeding in stagnant water, which is abundant in the monsoon period, creating an ideal

environment for the *Aedes aegypti* mosquito, the primary vector for dengue.¹⁹ In terms of age distribution, the highest number of cases were observed in the 19–30 years age group (30%), followed by 25% in the 31–40 years group. These findings are consistent with previous studies conducted in Bangladesh and other dengue-endemic areas, which have shown that young adults are more likely to contract dengue, possibly due to increased outdoor activities, work, or social gatherings during the peak transmission periods.¹⁷ The relatively lower incidence in older adults and children, as seen in our study, may reflect a degree of immunity in the population or reduced exposure, as older individuals may limit outdoor activities during the peak mosquito-breeding seasons. The clinical manifestations observed in our study were consistent with those typically seen in dengue infections. Fever was present in 100% of the patients, followed by headache (80%), myalgia (75%), and retro-orbital pain (50%), which are hallmark symptoms of dengue.²⁰ Bleeding manifestations, including petechiae, epistaxis, and gum bleeding, were observed in 20% of patients, indicating the development of more severe forms such as dengue hemorrhagic fever (DHF) in a subset of cases. In line with previous studies, the presence of bleeding in dengue is a key predictor of disease severity and an indicator of vascular permeability changes that contribute to plasma leakage.^{21,22} Regarding disease classification, our study found that 65% of patients had uncomplicated dengue fever, 25% developed dengue hemorrhagic fever (DHF), and 10% presented with dengue shock syndrome (DSS). This distribution is similar to studies conducted in other endemic regions, where the majority of cases present as uncomplicated dengue fever, but a significant proportion progress to more severe forms, particularly DHF and DSS, which require intensive management.²³ These findings underscore the need for timely recognition and management of complications, particularly in at-risk patients, to prevent progression to severe forms of the disease. Laboratory findings in our study revealed significant thrombocytopenia (mean platelet count $90,000 \pm 35,000$ cells/mm³), which is commonly observed in dengue infections due to platelet destruction and sequestration in the spleen.²⁴ Elevated liver enzymes (AST and ALT) were also observed in many cases, indicating hepatic involvement, which is frequently seen in dengue infections, especially in patients with severe disease.¹ Regarding treatment, symptomatic management was the primary approach, with 80% of patients receiving supportive care, including antipyretics and fluids. Intravenous fluid therapy was required in 65% of patients, which is in line with standard management protocols for dengue, particularly for patients with dehydration or signs of plasma leakage.²⁵ A small proportion of patients (12%) required blood transfusions due to severe thrombocytopenia or bleeding complications, while 10% of patients were admitted to the intensive care unit (ICU) for close monitoring and management of complications such as shock. Despite the

presence of severe manifestations in some cases, the overall mortality rate was 2%, which is lower than the mortality rates reported in previous studies from countries with higher dengue-related mortality, such as Thailand and the Philippines.²⁶ This relatively low mortality rate may reflect the quality of care provided in a tertiary care setting and the prompt recognition and management of severe cases.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion

In conclusion, this study highlights the significant burden of dengue fever in Dhaka, with seasonal outbreaks coinciding with the monsoon period. The findings demonstrate that male adults, particularly in the age groups of 19–40 years, are most affected. The majority of cases presented with classic symptoms such as fever, headache, and myalgia, with a notable proportion progressing to severe forms like dengue hemorrhagic fever and dengue shock syndrome.

Recommendation

Based on the findings of this study, it is recommended that public health efforts in Bangladesh focus on strengthening dengue surveillance, particularly during the monsoon season, to detect and manage cases early. Awareness campaigns targeting high-risk groups, such as young adults, should emphasize preventive measures such as avoiding mosquito bites and eliminating breeding sites. Additionally, healthcare facilities should be equipped with timely diagnostic tools and adequate resources to manage severe cases, ensuring prompt treatment to reduce complications and mortality. Further research into vector control strategies and the impact of vaccination could also help in reducing the overall burden of dengue.

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