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Original Article

CLINICAL PROFILE OF DENGUE PATIENTS ADMITTED DURING THE 2023 BANGLADESH DENGUE OUTBREAK

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Abstract

Background: *Dengue virus infection, a major public health concern in tropical regions, can cause a spectrum of illness. Bangladesh experiences seasonal dengue outbreaks, with the 2023 outbreak being the worst in recent years. DENV-2 predominance, low population immunity, and overwhelmed healthcare systems likely contributed to the severity. This study investigates the clinical profile of patients admitted during the 2023 outbreak peak (April-July) at a tertiary care hospital in Dhaka, Bangladesh.*

Methods: *A retrospective analysis of medical records from dengue-confirmed patients (NS1 Ag, IgM, or IgG) admitted during the 2023 outbreak peak (April-July) at Shaheed Monsur Ali Medical College Hospital, Dhaka, Bangladesh, was conducted. A standardized data collection form captured demographics, clinical profile, vital signs, laboratory findings, and treatment details. Disease severity was classified using WHO guidelines. Descriptive statistics and frequency calculations summarized the data.*

Results: *This study analysis included 174 dengue patients admitted during the 2023 outbreak peak. The mean age was 36.44 years (range: 15-67 years) with a male predominance (55.7%). Fever was universal, followed by frequent headaches (93.1%) and myalgia (77.6%). Thrombocytopenia (78.7%) and elevated hematocrit (56.3%) were common laboratory findings. Fluid resuscitation with crystalloids and paracetamol for fever management were used for all patients. Blood transfusions were administered in only 14.9% due to severe thrombocytopenia or bleeding.*

Conclusion: *This study describes the clinical profile of the dengue patients admitted during the 2023 Bangladesh outbreak. Findings align with prior research on dengue presentations and management. Further studies are needed to explore the impact of factors like serotype and disease severity. The study highlights the importance of maintaining a high index of suspicion for dengue, particularly during outbreaks, to facilitate timely diagnosis and optimal management.*

Keywords:
Dengue Fever, Clinical Profile, Outbreak

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Introduction

Dengue fever, a mosquito-borne viral illness caused by the dengue virus (DENV), is a major public health concern in tropical and subtropical regions [1]. DENV is a single-stranded RNA virus with four serotypes (DENV-1, DENV-2, DENV-3, DENV-4), some researchers claiming that a fifth serotype also exists (DENV-5) [2,3]. All serotypes can cause a spectrum of illness, ranging from a mild, self-limiting febrile illness to severe dengue, characterized by plasma leakage, hemorrhage, and organ dysfunction [4]. The World Health Organization (WHO) estimates that 390 million

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dengue infections occur globally each year, with 96 million clinically apparent cases [5].

Bangladesh, located in South Asia, experiences a significant burden of dengue fever due to its tropical climate and favorable conditions for mosquito breeding [6]. Dengue outbreaks occur seasonally, typically peaking during the monsoon months (June-September) and the post-monsoon months (October-November) [7]. The 2023 outbreak, however, was unprecedented in its scale and severity.

The 2023 dengue outbreak in Bangladesh was the worst recorded in recent years. According to WHO reports, the outbreak began in April and peaked in June and July, and the Ministry of Health and Family Welfare (MOHFW) reported nearly 69,500 cases of dengue fever between January and early August of 2023, with over 327 deaths. This translates to a case fatality rate of around 0.47% [8]. These numbers likely represent an underestimation of the true burden of the outbreak, as many mild cases may not have been reported to healthcare facilities.

Several factors contributed to the severity of the 2023 outbreak. First, the predominant serotype during the outbreak was DENV-2, which is associated with a higher risk of severe dengue compared to other serotypes. Second, a significant proportion of the infected population had limited immunity to DENV-2, leading to a larger pool of susceptible individuals [8]. Third, the rapid surge in cases overwhelmed healthcare facilities, leading to shortages of beds, fluids, and medications for treatment [9].

The 2023 dengue outbreak placed immense strain on Bangladesh's healthcare system. Hospitals across the country witnessed a surge in dengue admissions, exceeding their capacity to manage patients effectively. Many patients faced delays in diagnosis and treatment due to overcrowding in emergency departments and a shortage of qualified medical personnel [9]. The outbreak also highlighted the need for improved surveillance systems, early warning mechanisms, and robust vector control programs to prevent future outbreaks.

Detailed studies of patients admitted during dengue outbreaks are crucial for understanding the clinical characteristics, risk factors for severe disease, and optimal treatment strategies. Understanding these aspects is essential for improving patient care during future outbreaks. This study aims to contribute to this knowledge base by profiling patients admitted to a tertiary care hospital in Dhaka, Bangladesh, during the peak months (April-July) of the 2023 outbreak.

Materials and Methods

This study delves into the clinical characteristics of patients admitted for dengue fever in the Department of Medicine at Shaheed Monsur Ali Medical College Hospital, a leading tertiary care facility in Dhaka, Bangladesh. Employing a retrospective design, we examined the medical records of patients admitted during the peak months (April-July) of the severe 2023 dengue outbreak. This timeframe provided a comprehensive picture of the clinical profile prevalent during this critical period.

Inclusion criteria were stringent, ensuring data quality and robust analysis. Only patients with confirmed dengue diagnoses, established through confirmatory laboratory tests such as NS1 antigen detection, Dengue IgM, or Dengue IgG, were included. This approach minimized the risk of incorporating cases with alternative diagnoses that might skew the results. Conversely, patients with incomplete medical records were excluded to maintain data integrity and avoid potential biases arising from missing information.

To gather comprehensive clinical data, a standardized data collection form was meticulously designed. This form served as a robust tool for capturing a wide range of patient information. Demographic details, including age, gender, and residence, were documented to understand the population demographics affected by the outbreak. Additionally, the form captured a detailed record of clinical profile experienced by the patients. This data encompassed the classic presentations of dengue fever, such as high fever, severe headache, muscle and joint pain, and nausea/vomiting. Furthermore, the form documented vital signs, laboratory findings (including complete blood count, liver function tests, and platelet counts), and treatment details administered during hospitalization.

Disease severity classification played a crucial role in this study. Following the guidelines established by the World Health Organization (WHO) [10], patients were categorized based on the presence or absence of warning signs and the severity of plasma leakage. This classification system allowed for a standardized approach to evaluating disease severity and identifying patients at higher risk of complications.

Data analysis employed descriptive statistics to summarize the demographic characteristics of the

admitted patients. This provided insights into the age groups and genders most affected during the outbreak. Additionally, frequencies were calculated for categorical variables such as clinical profile and disease severity classifications. These frequencies offered a clearer understanding of the prevalent symptom patterns and the distribution of disease severity among the admitted patients. Microsoft Excel served as the primary tool for data analysis, facilitating efficient organization, calculation, and visualization of the collected information.

Results

This retrospective analysis evaluated the clinical profile of 174 patients admitted for dengue fever at Shaheed Monsur Ali Medical College Hospital during the peak months (April-July) of the 2023 Bangladesh outbreak.

Demographic Profile

Descriptive statistics revealed a mean (± S.D.) age of (36.44 ± 9.62) years (range: 15 - 67 years) for the admitted patients. 55.7% were male and 44.3% were female. Almost all the patients, 91.3%, resided in Dhaka city, while 8.6% came from other districts within Bangladesh. Regarding monthly family income, the majority i.e. 52.3% belonged to the 50,000 – 1 lakh BDT (Bangladeshi Taka) category (Table-I).

Clinical Profile

Fever was the most prevalent symptom, reported by all 174 of patients. Headache (93.1%) and myalgia (77.6%) were also frequently encountered. Retro-orbital pain was found in 21.9% of the patients. Gastrointestinal symptoms such as abdominal pain (39.1%), nausea/vomiting (10.3%) were observed in a number of patients. Other clinical features such as, rashes (25.3%), bleeding manifestations (4.0%), hepatomegaly (13.8%), and splenomegaly (10.9%) were also documented. Bradycardia and pleural effusion were observed in 27.6% and 11.5% of patients, respectively. (Figure-1)

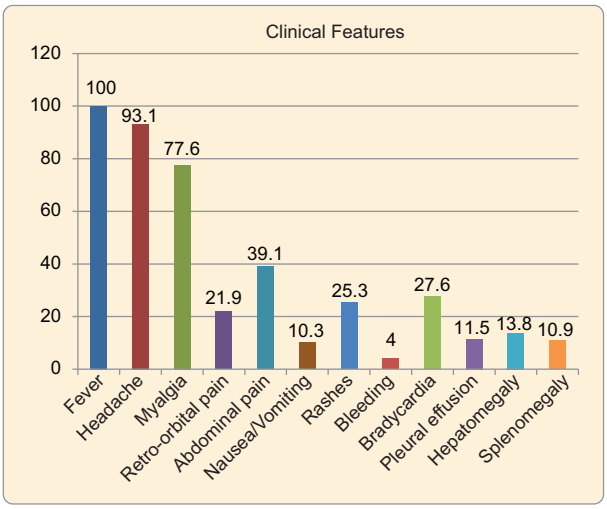

Figure-1: *Distribution of clinical features among dengue patients*

Table-I

Demographic profile of the patients

Attributes		Frequency (%) (n = 174)
Sex	Male	97 (55.7)
	Female	77 (44.3)
Age (years)	15 - 25	12 (6.9)
	26 - 40	122 (70.1)
	41 - 60	33 (17.2)
	> 60	7 (4.0)
	Mean ± S.D = 36.44 ± 9.62	
Area of residence	Dhaka	159 (91.3)
	Outside Dhaka	15 (8.6)
Monthly family income (BDT; Tk.)	< 50,000	58 (33.3)
	50,000 – 1 lakh	91 (52.3)
	> 1 lakh	25 (14.4)

Laboratory Results

Hematological parameters revealed elevated hematocrit (indicating hemoconcentration) in 56.3% of patients. Thrombocytopenia (low platelet count; < 50,000/mm^3 of blood) was a prominent feature, with 78.7% of patients having platelet counts below the normal range. 29.3% of the patients had decreased WBC counts (< 4,000/mm^3 of blood). Liver function tests demonstrated elevated alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels in 47.1% and 39.1% of patients, respectively. Serum creatinine levels, indicating kidney function, were elevated in 10.3% of cases. (Table-II).

Table-II

Distribution of abnormal laboratory parameters among dengue patients

Abnormal laboratory parameters	Frequency (%) (n = 174)
Elevated hematocrit (> 45%)	98 (56.3)
Thrombocytopenia (< 50,000/mm^3 of blood)	137 (78.7)
Lymphopenia (< 4,000/mm^3 of blood)	51 (29.3)
Elevated ALT (> 45 IU/L)	82 (47.1)
Elevated AST (> 45 IU/L)	68 (39.1)
Elevated Serum Creatinine	18 (10.3)

Treatment

Fluid resuscitation remained the cornerstone of treatment for all patients. All patients received intravenous crystalloid fluids. Paracetamol was the principal antipyretic agent employed for the control of fever. Platelets transfusion were given in only 14.9% of patients due to severe thrombocytopenia or bleeding complications. (Figure-2)

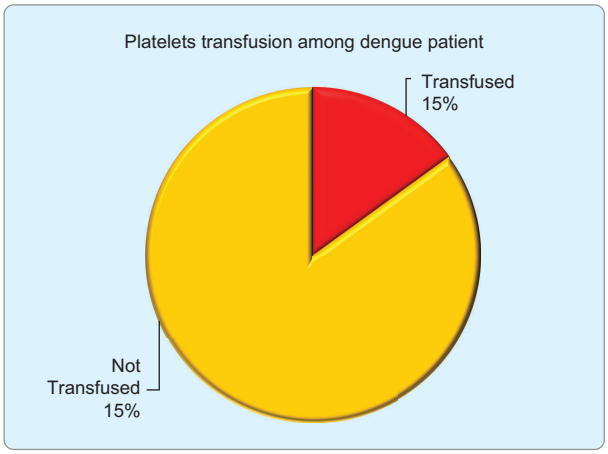

Figure-2: *Distribution of platelet transfusion among dengue patients*

Discussion

This retrospective study investigated the clinical profile of 174 dengue patients admitted to Shaheed Monsur Ali Medical College Hospital during the peak months (April-July) of the 2023 Bangladesh dengue outbreak. The findings contribute valuable insights into the characteristics, presentations, and management of dengue fever in this patient population.

The majority of the patients belonged to the age group (26-40 years) and the mean (36.44 years) aligns with other relevant studies done in the sub-continent region reporting a predominance of young to middle-aged adults with dengue infection [11,12]. This could be partially explained by behavioral differences, such as males spending more time outdoors for work or leisure activities, potentially increasing their exposure to mosquito bites. However, further investigation is necessary to understand the interplay of social norms, occupational risks, and biological susceptibility in this context. The majority of patients (91.3%) resided in Dhaka city, reflecting the likely higher burden of dengue in urban areas due to factors like population density and mosquito breeding grounds [13].

Fever, the hallmark symptom of dengue, was universally present in our study, a finding consistent with other relevant studies. The high prevalence of headache (93.1%) and myalgia (77.6%) aligns with previous studies underlining their importance in early clinical suspicion of dengue [12,14]. Gastrointestinal symptoms, including abdominal pain (39.1%) and nausea/vomiting (10.3%), were observed, highlighting the diverse clinical presentations of dengue that can mimic other illnesses [15]. The observed rates of hepatomegaly (13.8%) and splenomegaly (10.9%) are comparable to findings from other studies [14,16]. Notably, a large proportion of patients (27.6%) exhibited bradycardia, which can be a sign of dengue with warning signs or severe dengue [17]. Pleural effusion, observed in 11.5% of our patients, is a complication observed in dengue fever though mostly it is mild and self-resolving requiring no intervention [18].

Elevated hematocrit (56.3%) in our study suggests hemoconcentration, a known consequence of plasma leakage in dengue [12,14,19]. The high prevalence of thrombocytopenia (78.7%) underscores its importance as a diagnostic marker and prognostic indicator in dengue. The finding of decreased white blood cell counts (29.3%) aligns with the characteristic leukopenia often observed in dengue patients [14,19].

The rates of elevated liver enzymes (ALT 47.1%, AST 39.1%) are consistent with previous research done in the country [20], reflecting potential liver involvement during dengue infection. The observed incidence of elevated serum creatinine (10.3%) is comparable to a study conducted in southern India suggesting that kidney dysfunction was a less frequent complication in our cohort.

Fluid resuscitation with intravenous crystalloid solutions remained the mainstay of treatment for all patients and the use of use of paracetamol as the primary antipyretic medication in our study, concurs with established management guidelines for dengue [10]. The relatively low rate of blood transfusions (14.9%) in our study population might be due to the inclusion criteria focusing on hospitalized patients, potentially excluding those with milder presentations managed without transfusions. Additionally, factors like the availability of blood products and specific transfusion protocols at our hospital could influence the transfusion rate.

Limitations of the study

This study has limitations inherent to its retrospective design. Lack of data on disease severity classification and dengue serotype distribution limits a more comprehensive analysis. Future studies with prospective data collection and larger sample sizes encompassing diverse geographical areas could provide a more robust understanding of dengue epidemiology and clinical characteristics in Bangladesh.

Conclusion

Our study provides a snapshot of the clinical profile of dengue patients admitted during the 2023 Bangladesh outbreak. The findings are largely consistent with previous research on dengue presentations and management. Further investigations are warranted to explore the potential influence of factors like dengue serotypes and disease severity on clinical manifestations and treatment outcomes. This study emphasizes the importance of maintaining a high index of suspicion for dengue, particularly during outbreaks, due to its diverse clinical presentations. By recognizing the spectrum of symptoms and laboratory abnormalities associated with dengue, healthcare professionals can ensure prompt diagnosis and appropriate management, potentially improving patient outcomes.

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