Original Article

Clinical and Laboratory Findings of Dengue Patients in 2023 Outbreak in Dhaka, Bangladesh

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Abstract

Background: Dengue fever, a mosquito-borne viral disease, imposes significant public health challenges globally, particularly in Bangladesh. It has been experiencing its most severe outbreak of dengue on record in 2023 and putting huge pressure on the health system.

Objective: Tto investigate the demographic characteristics, clinical manifestations, laboratory findings in dengue patients.

Methods: This observational study was conducted at tertiary level Kurmitola General Hospital, Dhaka from July 2023 to December 2023, involving 1000 patients diagnosed with dengue fever. Data on demographics, clinical symptoms and laboratory parameters were collected and analyzed.

Results: The majority of participants were in the 21-30 age group (40%), Female (55%) predominance with 98% being Muslim and 85% residing in urban areas. All patients exhibited fever, with other common symptoms including vomiting (42%), loose motion (32%), and abdominal pain (27%). Laboratory findings showed significant thrombocytopenia and elevated liver enzymes, while renal function remained normal.

Conclusion: The study highlights the prevalence of dengue fever among young urban population, with fever as a predominant symptom in patients with marked thrombocytopenia. These findings emphasize the need for a nuanced approach to assessing and managing dengue fever on the basis of clinical and laboratory findings.

Keywords: Dengue Fever, Clinical Manifestations, Laboratory Findings, Outbreak.

Introduction

Dengue fever, a mosquito-borne viral infection, caused by the dengue virus (DENV), has seen a notable shift in its presentation and epidemiology, reflecting its evolving nature and the changing dynamics of vector-borne diseases worldwide.[1] Since April 2023 Bangladesh has been experiencing its most severe outbreak of dengue on record and putting huge pressure on the health system. The higher incidence of dengue was taking place in the context of an unusual episodic amount of rainfall, combined with high temperatures and high humidity, which had resulted in an increased mosquito population throughout Bangladesh. Dengue's clinical spectrum ranges from mild febrile illness to severe forms, including Dengue Hemorrhagic Fever (DHF), Dengue Shock Syndrome (DSS) and Expanded Dengue Syndrome, often complicated by plasma leakage.[2,3] Plasma leakage, a hallmark of dengue infection, is characterized by a significant reduction in blood pressure and shock in dengue has been viewed as a critical indicator of disease severity, guiding clinical management and prognosis.[4] Additionally, the diagnostic approach in dengue patients differ from previous as because clinical symptoms are changing with time due to viral mutation.[5] The role of diagnostic tests, has been highlighted as a crucial aspect of patient management due to wide involvement of nervous, hepatobiliary and renal system in expanded dengue syndrome.[6] This has led to a reevaluation of treatment protocols and a call for more evidence-based approaches in managing plasma leakage, shock and encephalitis in severe dengue patients. The relationship between clinical as well as biochemical findings patterns and clinical outcomes in dengue, particularly in the context of plasma leakage in DHF, has been a focus of recent research.[7] This association is critical for understanding the disease's progression and for developing strategies for early intervention and monitoring. The timing of plasma leakage onset and its correlation with disease severity have been explored, with findings suggesting a need for heightened vigilance during specific periods of the illness.[8] The lack of consensus on its prognostic value and the variability in clinical features across different regions highlight the need for further investigations. Studies exploring the pathophysiological mechanisms underlying shock, encephalitis, hepatitis, nephritis in dengue, its impact on clinical outcomes, and the efficacy of various management strategies are essential to refine our understanding and improve patient care.[9,10] However, various clinical features in dengue represents a complex clinical challenge, with its significance in disease severity and management. The aims of this study to evolve nature of dengue fever, marked by changing clinical presentations and laboratory findings, necessitates a continuous reevaluation of our understanding of this disease.

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Materials and Methods

This observational study was conducted from July 2023 to December 2023 at Kurmitola General Hospital. We included 1000 patients diagnosed with dengue fever, confirmed through NS1 antigen or Dengue IgM tests. The study focused on patient's age more than 12 years. Exclusion criteria were set to omit patients with preexisting diseases associated with rash, bleeding such as decompensated cirrhosis of liver, aplastic anemia, leukemia, idiopathic thrombocytopenic purpura, ensuring a more homogenous study group and minimizing confounding factors. Plasma leakage was defined as evidence of pleural effusion, ascites and increase in hematocrit. The primary objective was to observe the clinical and laboratory findings in these patients and its correlation with the severity of disease. Data collected included demographics,clinical symptoms, laboratory findings. For statistical analysis, we used SPSS v25. The study adhered to ethical standards with informed consent obtained from all participants. Patient confidentiality was strictly maintained.

Results

Table-I: Distribution of baseline characteristics among the participants (n=1000)

Variables		Frequency	Percentage (%)
Age	≤20	100	10
	21-30	400	40
	31-40	280	28
	41-50	90	09
	51-60	60	06
	61-70	70	07
Sex	Male	450	45
	Female	550	55
Religion	Muslim	980	98
	Hindu	20	02
Residence	Urban	850	85
	Semi-urban	140	14
	Rural	10	01

The age distribution of the participants varied with the majority falling within the 21-30 age group, accounting for 40% of the total sample. This was followed by the 31-40 age group, representing 28%. In case of gender issue, predominant group was female (55%). In terms of religious affiliation, the vast majority of the participants were Muslim, making up 98% of the sample. Regarding the residence of the participants, a significant portion, 85%, resided in urban areas.

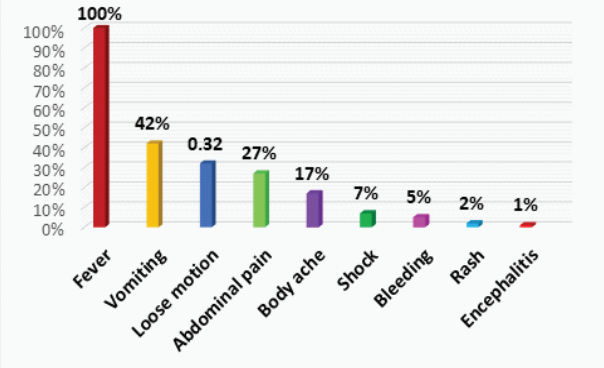

Figure-1: Distribution of clinical findings among the participants (n=1000)

Fever was universally present in all participants, accounting for 100% of the cases. Vomiting was the second most common symptom, experienced by 42% of the patients. This was followed by loose motion and abdominal pain, reported in 32% and 27% of the cases, respectively.

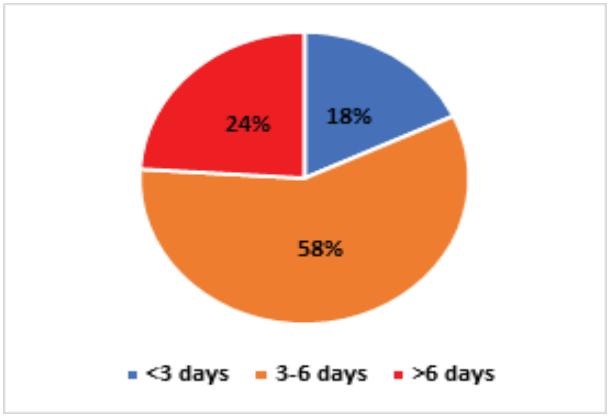

Figure-2: Distribution of fever duration among the participants (n=1000)

The most common duration of fever was between 3 to 6 days, experienced by 58% of the patients.

Table-II: Distribution of mean ±SD biochemical parameters among the participants (n=1000)

Variables	Mean±SD
Platelet Count(Highest)	332212.93±44273.42
Platelet Count (Lowest)	14617.55±1575.29
Hemoglobin	14.83±7.91
Total count	3692.49±879.67
Neutrophil Count	1289.55±860.28
HCT	38.84±11.28
SGPT	2290.82±689.93
SGOT	367.19±107.03
Creatinine	1.22±0.65
Total Protein	4.91±0.52
Albumin	2.91±0.89
HbA1C	6.32±1.08

The highest platelet count was observed 332212.93±44273.42 while the lowest platelet count recorded 14617.55±1575.29, indicating significant thrombocytopenia in the cohort.

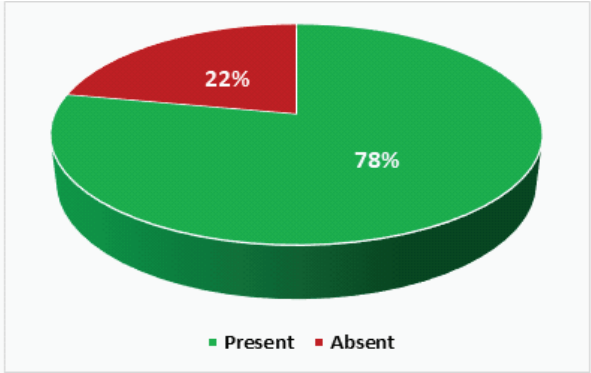

Figure-3: Distribution of participants by evidence of plasma leakage (n=1000)

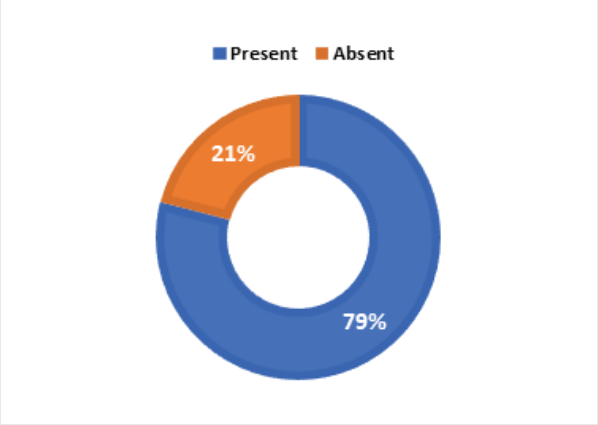

Figure-4: Incidence of thrombocytopenia (n=1000)

Among the total participants, 79% had thrombocytopenia reported with 21% cases normal platelet count.

Table-III: Distribution of comorbidities and coinfection among the participants (n=1000)

Variables		n	%
Comorbidities	Diabetes	100	10
	Hypertension	130	13
	Chronic kidney Disease	10	1
	Hypothyroidism	20	2
	Asthma	20	2
	No comorbidities	720	72
Coinfection	No coinfection	920	92
	Enteric Fever	30	3
	Urinary Tract Infection	50	5

It was found that 72% of the participants did not have any comorbidities. However, comorbid conditions were present in a minority of the cases: diabetes was observed in 10%. In terms of coinfections, a significant majority of the patients, 92%, did not have any coinfection.

Discussion

The demographic profile of this study participants, predominantly within the 21-30 age group (40%) and residing in urban areas (85%), aligns with global trends in dengue fever epidemiology where the disease predominantly affects younger adults in urban settings.[11,12] The high prevalence of dengue in urban areas, as seen in this study, is consistent with other studies highlighting the role of urban environmental factors in dengue transmission.[13] The overwhelming majority of participants being Muslim (98%) reflects the demographic composition of the region and may not significantly influence the disease pattern. The clinical presentation of dengue in this study, with universal fever occurrence, is consistent with the established symptomatology of the disease.[14] The prevalence of vomiting (42%), loose motion (32%) and abdominal pain (27%) in this cohort is slightly higher compared to other study, indicating possible regional variations in clinical manifestations.[15] The The occurrence of more severe symptoms like shock (7%) and bleeding (5%) is comparable to other study, underscoring the potential severity of dengue fever.[15] The duration of fever in this study, predominantly between 3 to 6 days, aligns with the typical clinical course of dengue fever as reported in other study.[16] This duration is crucial for clinical decision-making and monitoring for warning signs of severe disease. The findings on laboratory parameters, particularly the mean platelet count indicating significant thrombocytopenia, are in line with other study that have reported thrombocytopenia as a common hematological manifestation in dengue fever.[17] The renal function, as indicated by creatinine levels and the metabolic status, reflected by HbA1C levels, were within normal ranges, suggesting that these systems were not severely affected in this cohort.[18] However, the data showed that 78% of the participants exhibited evidence of plasma leakage and 79% had thrombocytopenia. The majority of patients not having comorbidities (82%) aligns with the demographic profile of dengue affecting younger, otherwise healthy individuals. However, the presence of comorbid conditions like diabetes and hypertension in a minority of patients is a crucial consideration for clinical management, as comorbidities can complicate the disease course.[19] In terms of coinfections, a significant majority of the patients, 92%, did not have any coinfection that consistent with other study.[19] These findings indicate that fever is a common feature in dengue patients, its presence alone or may be complicated with many other systems involvement such as nervous system, cardiovascular system.

Conclusion

This study's findings offer a comprehensive understanding of dengue fever in an urban population, with a particular focus on clinical and laboratory findings. Data revealed that variable symptoms and signs in dengue patients along with comorbidity and co-infection in few cases were observed. Laboratory findings were suggestive of more organ involvement in dengue patients following expanded dengue syndrome. Additionally, the study highlighted that onset of the disease does not necessarily correlate with other severe clinical manifestations such as plasma leakage and shock. These findings emphasize the need for a nuanced approach to managing dengue fever, considering multiple factors originating from clinical and biochemical parameters in dengue patients.

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