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Original Research Article

Clinical spectrum and in-hospital outcomes of dengue among adult patients in a tertiary care hospital of Bangladesh

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ABSTRACT

Background: Dengue is a major mosquito-borne viral disease posing a significant public health challenge in Bangladesh. This study aimed to evaluate the clinical spectrum and in-hospital outcomes of dengue among adults admitted to a tertiary care hospital.

Methods: This descriptive cross-sectional study was conducted in the Department of Medicine, Sirajganj Medical College, Bangladesh, from January to December 2025. A total of 112 adults aged ≥18 years with serologically confirmed dengue infection by NS1 antigen and/or anti-dengue IgM antibody were enrolled through convenience sampling. Data were analyzed using SPSS version 26.0.

Results: Fever was the most common symptom (100%), followed by myalgia (83.9%), headache (76.8%), arthralgia (65.2%), and nausea/vomiting (60.7%). Thrombocytopenia (platelet count <100,000/mm³) occurred in 75.0% of patients, leukopenia in 54.5%, elevated aspartate aminotransferase (AST) in 43.8%, and elevated alanine aminotransferase (ALT) in 37.5%. Dengue hemorrhagic fever developed in 14.3% of patients, dengue shock syndrome in 5.4%, and in-hospital mortality was 2.7%. Clinical warning signs, severe thrombocytopenia, and elevated AST were significantly associated with prolonged hospitalization ($p<0.05$).

Conclusions: Dengue among hospitalized adults predominantly presented with fever, myalgia, headache, and gastrointestinal symptoms, with thrombocytopenia being the most frequent laboratory abnormality. Although most patients recovered and were discharged, serious complications and mortality occurred. Clinical warning signs, severe thrombocytopenia, and elevated AST were associated with longer hospital stays, highlighting the importance of early recognition, laboratory monitoring, and timely management to improve patient outcomes.

Keywords: Dengue fever, In-hospital outcomes, Thrombocytopenia, Hematocrit

INTRODUCTION

Dengue fever is the most rapidly spreading mosquito-borne viral disease worldwide and remains a major public health challenge in tropical and subtropical regions. It is caused by four antigenically distinct serotypes of the dengue virus (DENV-1 to DENV-4), which are transmitted primarily by *Aedes aegypti* and *Aedes albopictus* mosquitoes. The World Health Organization (WHO) estimates that approximately 390 million dengue infections occur annually, of which nearly 96 million manifests clinically, with an increasing incidence over the past two decades due to rapid urbanization, climate change, globalization, and inadequate vector control measures. Approximately half of the world's population is currently at risk of dengue infection, making it one of the most important emerging arboviral diseases globally.[1,2] The clinical manifestations of dengue infection range from

asymptomatic illness and uncomplicated dengue fever to severe dengue characterized by plasma leakage, severe bleeding, shock, and multiorgan dysfunction. According to the WHO 2009 classification, dengue is categorized into dengue without warning signs, dengue with warning signs, and severe dengue, facilitating early recognition and appropriate management. Common clinical features include acute febrile illness, headache, retro-orbital pain, myalgia, arthralgia, nausea, vomiting, rash, and thrombocytopenia. However, atypical manifestations involving the liver, heart, kidneys, central nervous system, and gastrointestinal tract are increasingly recognized, particularly among hospitalized adult patients, contributing to increased morbidity and mortality.[2-4] Bangladesh has experienced a dramatic rise in dengue incidence over the last decade, transforming the disease into a year-round public health concern rather than a seasonal outbreak. Since the first major epidemic in 2000, recurrent outbreaks have occurred with progressively increasing numbers of cases and deaths. The unprecedented nationwide epidemic resulted in the highest number of reported dengue cases and fatalities in the country's history, with transmission extending beyond Dhaka to all administrative divisions. The expanding geographical distribution, changing epidemiological pattern, and increasing burden among adults have placed enormous pressure on tertiary healthcare facilities.[5,6] Adult patients with dengue frequently present with diverse clinical features and varying disease severity. While fever remains the hallmark symptom, warning signs such as persistent vomiting, severe abdominal pain, mucosal bleeding, hepatomegaly, and clinical fluid accumulation may indicate progression to severe dengue. Laboratory abnormalities including thrombocytopenia, leukopenia, hemoconcentration, elevated liver enzymes, and coagulation disturbances are common and play an important role in diagnosis, monitoring, and prognostication. Early identification of these clinical and laboratory indicators is essential to reduce complications through timely supportive management.[7-9] In-hospital outcomes of dengue depend on several factors, including age, comorbidities, timing of hospital presentation, disease severity, and quality of supportive care. Most hospitalized patients recover completely with appropriate fluid management; however, a proportion develop severe complications such as dengue shock syndrome, severe hemorrhage, acute liver injury, acute kidney injury, myocarditis, encephalopathy, and respiratory failure requiring intensive care. Recent studies from Bangladesh have demonstrated that prompt recognition of warning signs and evidence-based management substantially improve clinical outcomes and reduce mortality among hospitalized adults.[8-10]

METHODS

This descriptive cross-sectional study was conducted in the Department of Medicine, Sirajganj Medical College, Sirajganj, Bangladesh, from January 2025 to December 2025 to assess the clinical spectrum and in-hospital outcomes of adult patients with dengue fever. A total of 112 adult patients (≥18 years) with serologically confirmed dengue infection by NS1 antigen and/or anti-dengue IgM antibody were enrolled using convenient sampling. Patients admitted with confirmed dengue fever who provided informed written consent were included, whereas patients aged below 18 years, pregnant women, patients with concomitant infections (e.g., malaria, typhoid fever, leptospirosis), chronic liver disease, chronic kidney disease requiring dialysis, hematological disorders, malignancy, or incomplete clinical records were excluded. Ethical approval was obtained from the Institutional Review Board, and written informed consent was obtained from all participants before enrollment. Data were collected using a predesigned structured case record form that included socio-demographic characteristics, comorbidities, clinical manifestations, physical examination findings, laboratory investigations, complications, treatment, duration of hospital stay, ICU admission, and final in-hospital outcomes. Dengue cases were classified according to the World Health Organization (WHO) 2009 classification into dengue without warning signs, dengue with warning signs, and severe dengue. Dengue hemorrhagic fever (DHF) was defined as dengue infection associated with increased vascular permeability resulting in plasma leakage with thrombocytopenia and hemorrhagic manifestations, while dengue shock syndrome (DSS) was defined as DHF accompanied by circulatory failure manifested by hypotension or narrow pulse pressure (<20 mmHg) due to severe plasma leakage. Patients were managed according to national and WHO dengue management guidelines and were followed until discharge, referral, death, or leaving against medical advice. Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean±standard deviation (SD), and categorical variables were presented as frequency and percentage. The Chi-square test was used to determine the association between clinical spectrum variables and in-hospital outcomes. A p-value <0.05 was considered statistically significant.

RESULTS

The mean age of the patients was 36.8±12.9 years, with the highest proportion (34.8%) belonging to the 18–30 years age group. Males constituted 60.7% of the study population, while 64.3% were from urban areas. Most patients (62.5%) had no documented comorbidity (Table 1).

All patients (100%) presented with fever. Other common manifestations included myalgia (83.9%), headache (76.8%), arthralgia (65.2%), and nausea/vomiting (60.7%). Warning signs such as abdominal pain, mucosal bleeding, hepatomegaly, and clinical fluid accumulation were observed in 43.8%, 16.1%, 14.3%, and 10.7% of patients, respectively (Table 2).

Table 1: Relative risk of abnormal Doppler indices with adverse perinatal outcome.

Characteristics	N	Percentage (%)
Age (years)		
18–30	39	34.8
31–40	33	29.5
41–50	22	19.6
51–60	12	10.7
>60	6	5.4
Total	112	100.0
Mean age (years)	36.8 ± 12.9	
Sex		
Male	68	60.7
Female	44	39.3
Total	112	100.0
Comorbidities		
None	70	62.5
Hypertension	19	17.0
Diabetes mellitus	15	13.4
Hypertension+Diabetes	8	7.1

Table 2: Clinical presentation of the study patients (n=112*).

Clinical Features	N	Percentage (%)
Fever	112	100.0
Myalgia	94	83.9
Headache	86	76.8
Arthralgia	73	65.2
Nausea/Vomiting	68	60.7
Abdominal pain	49	43.8
Skin rash	31	27.7
Retro-orbital pain	28	25.0
Mucosal bleeding	18	16.1
Hepatomegaly	16	14.3
Clinical fluid accumulation	12	10.7
Total	112	100.0

*Multiple features.

Thrombocytopenia was the predominant laboratory abnormality, with 75.0% of patients having platelet counts below 100,000/mm³, while 26.8% had counts below 50,000/mm³. Leukopenia occurred in 54.5%, elevated AST in 43.8%, elevated ALT in 37.5%, and raised hematocrit in 21.4% of patients (Table 3).

Most patients (69.6%) had an uncomplicated hospital course. Dengue hemorrhagic fever developed in 14.3%, acute liver injury in 8.0%, dengue shock syndrome in 5.4%, and acute kidney injury in 4.5% of patients. 7.1% required ICU admission, while 12.5% received blood or platelet transfusion (Table 4).

A favorable in-hospital outcome was observed in the majority of patients, with 94.6% recovering and being discharged. The overall in-hospital mortality was 2.7%. More than half of the patients (58.9%) stayed in the hospital for 5 days or less, with a mean hospital stay of 5.2±2.3 days (Table 5).

Table 3: Laboratory findings of the study patients (n=112*).

Laboratory parameters	N	Percentage (%)
Platelet count <100,000/mm³	84	75.0
Platelet count <50,000/mm³	30	26.8
Leukopenia (<4,000/mm³)	61	54.5
Hematocrit increase >20%	24	21.4
Elevated ALT (>40 IU/l)	42	37.5
Elevated AST (>40 IU/l)	49	43.8
Elevated Serum Creatinine	10	8.9
Mean platelet count (×10³/mm³)	72.4±38.6	
Mean hematocrit (%)	42.8±5.1	

*Multiple findings

Table 4: Complications and in-hospital management (n=112*).

Variables	N	Percentage (%)
Complications		
No complication	78	69.6
Dengue hemorrhagic fever	16	14.3
Dengue shock syndrome	6	5.4
Acute liver injury	9	8.0
Acute kidney injury	5	4.5
ICU admission	8	7.1
Blood/platelet transfusion	14	12.5

*Multiple response.

Table 5: In-hospital outcomes of the study patients (n=112*).

Outcomes	N	Percentage (%)
Recovered and discharged	106	94.6
Referred to higher center	2	1.8
Left against medical advice	1	0.9
Death	3	2.7
Hospital stay≤5 days	66	58.9
Hospital stay >5 days	46	41.1
Mean hospital stay (days)	5.2±2.3	

*Multiple outcomes.

Patients with hospital stays longer than 5 days more frequently presented with persistent nausea/vomiting (78.3% vs. 48.5%; p=0.001), abdominal pain (60.9% vs. 31.8%; p=0.002), mucosal bleeding (28.3% vs. 7.6%; p=0.004), and clinical fluid accumulation (21.7% vs.

3.0%; p=0.002) than those discharged within 5 days. Laboratory abnormalities including platelet count <50,000/mm³ (41.3% vs. 16.7%; p=0.004) and elevated AST (58.7% vs. 33.3%; p=0.008) were also significantly associated with prolonged hospitalization. Moreover, complications such as dengue hemorrhagic fever (26.1% vs. 6.1%; p=0.003) and dengue shock syndrome (10.9% vs. 1.5%; p=0.030) were significantly related to poorer in-hospital outcomes, reflected by a longer duration of hospital stay (Table 6).

Table 6: Association between clinical spectrum and in-hospital outcomes (hospital stay >5 days) (n=112).

Clinical spectrum	Hospital stay≤5 days (n=66)	Hospital stay>5 days (n=46)	P value*
Abdominal pain	21 (31.8%)	28 (60.9%)	0.002
Persistent nausea/vomiting	32 (48.5%)	36 (78.3%)	0.001
Mucosal bleeding	5 (7.6%)	13 (28.3%)	0.004
Clinical fluid accumulation	2 (3.0%)	10 (21.7%)	0.002
Hepatomegaly	5 (7.6%)	11 (23.9%)	0.016
Platelet count <50,000/mm³	11 (16.7%)	19 (41.3%)	0.004
Elevated AST (>40 IU/l)	22 (33.3%)	27 (58.7%)	0.008
Acute liver injury	2 (3.0%)	7 (15.2%)	0.022
Dengue hemorrhagic fever	4 (6.1%)	12 (26.1%)	0.003
Dengue shock syndrome	1 (1.5%)	5 (10.9%)	0.030

*Chi-square test.

DISCUSSION

The present study showed that dengue admissions were concentrated in young to middle-aged adults, with a mean age of 36.8±12.9 years, male predominance (60.7%), and a higher proportion from urban areas (64.3%). This pattern fits the changing epidemiology of dengue in Bangladesh. In the multicenter outbreak study by Hasan et al among 401 confirmed cases, the mean age was 29.81±11.64 years, 88.3% were male, and 73.1% were urban residents, while Pulock et al reported that the largest age group was 16–25 years (36.71%) and nearly two-thirds of 1313 patients were male.[10,11] These findings indicate that dengue in Bangladesh is increasingly affecting economically productive adults, especially males and urban residents, which is consistent with the present hospital-based profile. The present study found that fever was universal (100%), followed by myalgia (83.9%), headache (76.8%), arthralgia (65.2%), nausea/vomiting (60.7%), and abdominal pain (43.8%), while mucosal bleeding and fluid accumulation were less frequent. Similar symptom patterns were described by Ali et al in 77 dengue patients from Jashore, where fever was present in 96.1%, headache in 87.0%, body ache in 66.2%, nausea in 55.8%, vomiting in 31.2%, and abdominal pain in 7.8%.[12] Hasan et al also reported fever in 94.3%, headache in 70.3%, myalgia in 66.1%, nausea in 49.9%, and abdominal pain in 43.9%. In addition, Pulock et al found fever in 99.54%, anorexia in 69.54%, severe headache in 66.03%, persistent vomiting in 27.57%, and severe abdominal pain and tenderness in 20.03%.[10,11] Together, these studies show that the classic febrile and musculoskeletal syndrome of dengue remains dominant, but gastrointestinal and warning-sign symptoms are increasingly common among hospitalized adults. Thrombocytopenia was the most important laboratory abnormality in the present study, with 75.0% having platelet counts below 100,000/mm³ and 26.8% below 50,000/mm³; leukopenia was seen in 54.5%, while elevated AST and ALT were noted in 43.8% and 37.5%, respectively. These abnormalities reflect the typical hematological and hepatic involvement of dengue. Pulock et al also reported that platelet reduction and ALT elevation were more prominent among severe dengue patients, reinforcing the value of serial CBC and liver function monitoring in admitted cases.[10] Most patients in the present study had an uncomplicated course (69.6%), but 14.3% developed dengue hemorrhagic fever, 5.4% dengue shock syndrome, 8.0% acute liver injury, 4.5% acute kidney injury, and 7.1% required ICU admission. Despite these complications, 94.6% recovered and were discharged; the mean hospital stay was 5.2±2.3 days, and mortality was 2.7%. Hasan et al reported a median hospital stay of 4 days in non-severe cases and 5 days in severe cases, with overall mortality of 0.75% and 5.6% in severe dengue, while Ali et al noted a mean stay of 4±2 days, 95% recovery, and no deaths.[11,12] Mallhi et al found a mean hospital stay of 4.88 ± 2.74 days, prolonged hospitalization in 49.2%, and a case fatality rate of 1.1%.[13] These studies collectively show that although most hospitalized patients recover, complications substantially increase the need for prolonged care and intensive monitoring. The present study also showed that abdominal pain, persistent vomiting, mucosal bleeding, clinical fluid accumulation, severe thrombocytopenia, elevated AST, dengue hemorrhagic fever, and dengue shock syndrome were associated with longer hospital stay. This pattern is supported by Pulock et al, who found that severe abdominal pain and tenderness, persistent vomiting, severe lethargy, pleural effusion, ascites, low platelet count, and raised ALT were linked with severe dengue.[10] Hasan et al similarly reported longer hospitalization and higher mortality in severe cases, and Mallhi et al documented that prolonged hospitalization was more frequent in DHF (67.1%) than in DF (46.7%).[11,13]

Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. The study assessed only in-hospital outcomes, and no post-discharge follow-up was performed to evaluate long-term complications or recovery.

CONCLUSION

The present study demonstrated that dengue fever among adult patients predominantly affected young adults and commonly presented with fever, myalgia, headache, and gastrointestinal symptoms, with thrombocytopenia being the most frequent laboratory abnormality. Although the majority of patients experienced favorable in-hospital outcomes with recovery and discharge, a notable proportion developed complications such as dengue hemorrhagic fever, dengue shock syndrome, acute liver injury, and acute kidney injury. Clinical warning signs and laboratory abnormalities, particularly severe thrombocytopenia and elevated liver enzymes, were significantly associated with prolonged hospitalization.

Recommendations

Early recognition of clinical warning signs and prompt monitoring of laboratory parameters, particularly platelet count and liver enzymes, should be emphasized to facilitate timely intervention and improve in-hospital outcomes among patients with dengue fever. Standardized management according to national and WHO guidelines should be ensured in all healthcare facilities, and public health measures focusing on vector control and community awareness should be strengthened. Further multicenter studies with larger sample sizes and long-term follow-up are recommended to better understand the clinical spectrum and outcomes of dengue in Bangladesh.

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