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# Spectrum of Clinical Profile of Dengue Syndrome Admitted in Dengue Referral Center

**Mazharul Islam[1*], Hossain M[2], Mahbub Hasan[3], Rakib Mia[4]**

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*Corresponding Author

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***ABSTRACT***

***Introduction:*** *Dengue fever is one of the most rapidly spreading mosquito-borne viral infections worldwide, caused by four serotypes of dengue virus and transmitted mainly by Aedes aegypti. The disease presents with a wide spectrum of clinical manifestations ranging from mild febrile illness to severe complications such as dengue shock syndrome, hemorrhage, and multi-organ dysfunction.* ***Aim of the Study:*** *To evaluate the spectrum of clinical presentations, laboratory findings, complications, and outcomes among dengue-confirmed patients admitted to a dengue referral center.* ***Methods & Materials:*** *This hospital-based observational study was conducted at the Dhaka North City Corporation (DNCC) Dedicated COVID-19 and Dengue Referral Hospital in Dhaka, Bangladesh. The study was conducted over six months from August 2025 to January 2026 to evaluate the spectrum of clinical profiles among 60 dengue-confirmed patients. The diagnosis was confirmed by NS1 antigen testing or dengue IgM/IgG serology, according to the WHO 2009 criteria. Sociodemographic data, clinical features, warning signs, laboratory parameters, complications, and outcomes were recorded using structured data sheets. Data were analyzed using SPSS version 26.* ***Results:*** *Most patients were aged 50–60 years (45%), 70% were male, and 75% were from urban areas. Fever and headache were present in 100% of cases, while arthralgia and fatigue (93.3%), nausea (91.7%), and myalgia (81.7%) were common symptoms. The most frequent warning sign was a rising hematocrit with a rapid fall in platelets (85%), followed by clinical fluid accumulation (63.3%). Laboratory findings showed leukopenia, thrombocytopenia, and elevated liver enzymes. The most common complication was dengue hepatitis (76.7%), followed by acute kidney injury (31.7%) and dengue shock syndrome (28.3%). The recovery rate was 98.3%, with a mortality rate of 1.7%.* ***Conclusion:*** *Dengue infection in hospitalized patients showed diverse clinical manifestations. Gastrointestinal symptoms were prominent, with diarrhea emerging as the most frequent manifestation, while rash was observed less commonly. These findings suggest a shift toward gastrointestinal-predominant presentations of dengue in Bangladesh and emphasize the importance of early recognition of atypical symptoms for timely diagnosis and management.*

***Keywords:*** *Dengue, Fever, Clinical profile, Bangladesh*

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1. *Assistant Professor, Department of Medicine, Dhaka North City Corporation Hospital, Dhaka, Bangladesh (ORCID: 0009-0006-8717-2623)*
2. *Assistant Professor, Department of Medicine, Satkhira Medical College, Satkhira, Bangladesh*
3. *Assistant Professor, Department of Medicine, 250-bedded general hospital, Narayanganj, Bangladesh*
4. *Medical Officer, 250-bedded general hospital, Chandpur, Bangladesh*

## INTRODUCTION

Dengue fever, caused by four antigenically distinct serotypes of the dengue virus (DENV-1 through DENV-4), remains one of the most rapidly spreading vector-borne infectious diseases globally. Transmitted primarily by the female Aedes aegypti mosquito, and to a lesser extent by Aedes albopictus, dengue virus infection poses a significant and increasing threat to public health in tropical and subtropical regions worldwide. According to the World Health Organization (WHO), 2024 witnessed a historic high of over 14.6 million reported cases and more than 12,000 dengue-related deaths, representing a more than twelvefold increase compared to a decade earlier, surpassing all previously recorded annual figures [1]. These numbers are widely regarded as significant underestimates, given that many cases remain asymptomatic or undiagnosed, and robust surveillance systems are lacking in numerous endemic nations [2]. The global burden of dengue has escalated dramatically over the past three decades. Between 1990 and 2021, worldwide dengue incidence more than doubled, rising from approximately 26.45 million to nearly 58.96 million cases, while dengue-related deaths climbed from 14,315 to 29,075 and disability-adjusted life-years (DALYs) increased from 1.25 million to 2.08 million [3]. The South-East Asia and Western Pacific regions bear a disproportionately large share of this burden, with countries such as Bangladesh, Vietnam, the Philippines, and India reporting some of the highest case fatality ratios [4]. In 2023 alone, Bangladesh reported the highest dengue-associated deaths globally at 1,705, while Brazil led in absolute case counts with over three million infections [4]. Climate change, population mobility, rapid urbanization, and inadequate vector control have been identified as the primary drivers of this expanding epidemic footprint [5]. Dengue virus infection presents as a wide spectrum of clinical illness, ranging from asymptomatic or self-limiting febrile illness to life-threatening manifestations including severe plasma leakage, hemorrhagic fever, dengue shock syndrome (DSS), and expanded dengue syndrome (EDS) involving multi-organ dysfunction. The 2009 WHO classification categorizes dengue into three clinically relevant groups: dengue without warning signs, dengue with warning

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signs, and severe dengue, with the latter defined by severe plasma leakage leading to shock, severe bleeding, or severe organ impairment [6]. The clinical phases of dengue febrile, critical, and recovery follow a predictable yet dynamic course, and accurate recognition of the transition from the febrile to the critical phase is essential for timely clinical intervention and mortality reduction. The pathophysiology of severe dengue is driven by a complex interplay between viral virulence, host immune responses, and serotype-specific immunological dynamics. Secondary infection with a heterologous DENV serotype carries a markedly elevated risk for severe disease, largely attributed to antibody-dependent enhancement (ADE), in which pre-existing non-neutralizing antibodies facilitate enhanced viral uptake by Fc-receptor-bearing immune cells [7]. This process triggers a cytokine cascade involving tumor necrosis factor-alpha (TNF-α), interleukins, and the complement pathway which promotes endothelial dysfunction, increased vascular permeability, and the hallmark plasma leakage seen in dengue hemorrhagic fever [8]. Furthermore, dengue virus non-structural protein 1 (NS1) has been shown to directly bind to endothelial glycocalyx components, disrupting barrier integrity and potentiating plasma leakage [8]. Thrombocytopenia, another critical manifestation, results from the combined effects of impaired thrombopoiesis, direct megakaryocyte infection by DENV, autoantibody-mediated platelet destruction, and platelet activation and apoptosis [9]. The clinical profile of hospitalized dengue patients demonstrates considerable heterogeneity. Studies from endemic regions have reported that fever, headache, myalgia, arthralgia, and retroorbital pain are the predominant presenting features, while thrombocytopenia, elevated liver enzymes, and hemoconcentration serve as important laboratory indicators of severity [10]. In a prospective study from India, fever was identified in 98.1% of dengue-seropositive patients, with thrombocytopenia found in 60.6% of cases [10]. Data from Bangladesh during the severe 2022 outbreak showed that approximately 24.7% of confirmed dengue patients developed severe disease, with febrile-phase hypotension, profound thrombocytopenia, and hemoconcentration as early predictors of progression [11]. Dengue shock syndrome accounted for the predominant severe phenotype in Vietnamese cohorts, affecting up to 82.7% of severely ill patients, with hepatic impairment emerging as the most common organ complication [12]. Expanded dengue syndrome (EDS) represents an increasingly recognized entity encompassing unusual and potentially life-threatening manifestations beyond classical dengue fever and dengue hemorrhagic fever, including neurological complications (encephalopathy, encephalitis, febrile seizures), acute kidney injury, fulminant hepatic failure, acute pancreatitis, acalculous cholecystitis, and hemophagocytic lymphohistiocytosis. In a retrospective cohort from North India, EDS occurred in 18.5% of hospitalized pediatric dengue patients, with neurological involvement being the most common manifestation, followed by gastrointestinal and renal complications [13]. The management of EDS remains challenging, and heightened clinical suspicion is essential to avoid diagnostic delays and initiate appropriate supportive care [7]. Therefore, this study aimed to characterize clinical profiles, laboratory patterns, and outcomes among dengue-confirmed patients in a referral center to inform evidence-based practice.

## METHODS & MATERIALS

This hospital-based observational study was conducted at the Dhaka North City Corporation (DNCC) Dedicated COVID-19 and Dengue Referral Hospital in Dhaka, Bangladesh, a specialized referral center for the management of COVID-19 and dengue patients. The study was conducted over six months from August 2025 to January 2026 to evaluate the spectrum of clinical profiles among 60 dengue-confirmed patients. Dengue confirmation was based on a positive NS1 antigen test, IgM, or IgG serology, according to the WHO 2009 criteria. Structured data collection forms were used to capture sociodemographic characteristics, presenting symptoms, warning signs, hemorrhagic manifestations, laboratory parameters, serological results, complications, and outcomes, with follow-up until discharge or death. All patients underwent complete blood count, liver and renal function tests, and dengue serology, with additional investigations such as chest X-ray and abdominal ultrasound performed as clinically indicated. Clinical severity was classified per WHO 2009 guidelines into dengue without warning signs, dengue with warning signs, and severe dengue, with warning signs including abdominal pain, persistent vomiting, fluid accumulation, mucosal bleeding, lethargy, hepatomegaly, and rapid hematocrit rise with platelet fall, and severe dengue defined by severe plasma leakage, bleeding, or organ involvement. Data were analyzed using SPSS version 26.0, with frequencies and percentages for categorical variables and means ± standard deviations for continuous variables, presented in tables. The study was approved by the institutional ethics committee, and written informed consent was obtained from all patients or their guardians, with strict confidentiality maintained.

### Inclusion Criteria

- Patients with laboratory-confirmed dengue infection (NS1/IgM/IgG positive)
- Patients admitted to the dengue referral center during the study period
- All age groups and both sexes
- Patients who provided informed consent

### Exclusion Criteria

- Patients with suspected dengue but negative laboratory tests
- Patients with incomplete clinical or laboratory records
- Patients who declined participation or consent

## RESULTS

This table presents the demographic profile of 60 dengue patients. The majority were aged 50–60 years (45%), followed by 40–50 years (35%). Males predominated at 70% versus 30% females. Most patients were from urban areas (75%). Among the 18 female patients, only 2 (3.3%) were pregnant, while 16 (26.7%) were not (*Table I*).

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**Table I: Sociodemographic Characteristics of the Study Patients (*n* = 60)**

| Variable | Frequency | Percentage (%) |
|---|---|---|
| **Age group (years)** | | |
| <40 | 2 | 3.3 |
| 40–50 | 21 | 35.0 |
| 50–60 | 27 | 45.0 |
| 60–70 | 7 | 11.7 |
| >70 | 3 | 5.0 |
| **Sex** | | |
| Male | 42 | 70.0 |
| Female | 18 | 30.0 |
| **Residence** | | |
| Urban | 45 | 75.0 |
| Rural | 15 | 25.0 |
| **Pregnancy status (n=18 females)** | | |
| Pregnant | 2 | 3.3 |
| Not pregnant | 16 | 26.7 |

*Table II* lists the symptoms reported at presentation. Fever and headache were universal (100%). Arthralgia and fatigue were both highly prevalent (93.3% each), followed by nausea (91.7%) and myalgia (81.7%). Diarrhea affected 68.3% of patients. Less common symptoms included vomiting (31.7%), abdominal pain (30%), and rash and retro-orbital pain (both 20%).

**Table II: Presenting Clinical Symptoms of Dengue Patients**

| Symptom | Frequency | Percentage (%) |
|---|---|---|
| Fever | 60 | 100 |
| Headache | 60 | 100 |
| Retro-orbital pain | 12 | 20.0 |
| Myalgia | 49 | 81.7 |
| Arthralgia | 56 | 93.3 |
| Fatigue | 56 | 93.3 |
| Rash | 12 | 20.0 |
| Nausea | 55 | 91.7 |
| Vomiting | 19 | 31.7 |
| Abdominal pain | 18 | 30.0 |
| Diarrhea | 41 | 68.3 |

*Table III* documents serious clinical features. The most frequent finding was a rising hematocrit with rapid platelet fall (85%), followed by clinical fluid accumulation such as ascites or pleural effusion (63.3%). Mucosal bleeding was noted in 30% of patients. Epistaxis (20%) and gum bleeding (18.3%) were the most common hemorrhagic manifestations. Persistent vomiting and lethargy/restlessness each occurred in 16.7% of cases. Petechiae and myocarditis were the rarest findings (1.7%).

**Table III: Warning Signs and Hemorrhagic Manifestations**

| Clinical Feature | Frequency | Percentage (%) |
|---|---|---|
| Petechiae | 1 | 1.7 |
| Gum bleeding | 11 | 18.3 |
| Epistaxis | 12 | 20.0 |
| Hematemesis | 2 | 3.3 |
| Melena | 3 | 5.0 |
| Menorrhagia | 9 | 15.0 |
| Persistent vomiting | 10 | 16.7 |
| Severe abdominal pain | 5 | 8.3 |
| Clinical fluid accumulation | 38 | 63.3 |
| Mucosal bleeding | 18 | 30.0 |
| Lethargy/restlessness | 10 | 16.7 |
| Hepatomegaly | 6 | 10.0 |
| Rising hematocrit with rapid platelet fall | 51 | 85.0 |

The mean hemoglobin level was 10.0 ± 1.6 g/dL and the mean hematocrit was 42 ± 6%. The mean total white blood cell count was 4000 ± 1300/mm$^3$, reflecting leukopenia commonly observed in dengue infection. The mean platelet count was 160000 ± 65000/mm$^3$, with a minimum value of 22000/mm$^3$ indicating significant thrombocytopenia in some patients. Differential leukocyte counts showed mean neutrophils of 47 ± 11% and lymphocytes of 20 ± 8%. Liver enzymes were elevated, with mean SGOT (78 ± 35 U/L) higher than SGPT (64 ± 28 U/L), suggesting hepatic involvement. The mean serum creatinine level was 0.96 ± 0.42 mg/dL and mean serum bilirubin was 0.82 ± 0.38 mg/dL. The mean random blood sugar level was 153 ± 38 mg/dL, while the mean serum albumin level was 4.0 ± 0.5 g/dL among the study patients (*Table IV*).

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**Table IV: Hematological and Biochemical Parameters of the Patients**

| Parameter | Mean ± SD | Minimum | Maximum |
|---|---|---|---|
| Hemoglobin (g/dL) | 10.0 ± 1.6 | 7.2 | 13.5 |
| Hematocrit (%) | 42 ± 6 | 32 | 54 |
| Total WBC (/mm$^3$) | 4000 ± 1300 | 1800 | 7200 |
| Platelet count (/mm$^3$) | 160000 ± 65000 | 22000 | 310000 |
| Neutrophils (%) | 47 ± 11 | 25 | 72 |
| Lymphocytes (%) | 20 ± 8 | 8 | 40 |
| SGPT (U/L) | 64 ± 28 | 22 | 156 |
| SGOT (U/L) | 78 ± 35 | 25 | 210 |
| Serum Creatinine (mg/dL) | 0.96 ± 0.42 | 0.5 | 2.4 |
| Serum Bilirubin (mg/dL) | 0.82 ± 0.38 | 0.3 | 2.1 |
| Random Blood Sugar (mg/dL) | 153 ± 38 | 86 | 248 |
| Serum Albumin (g/dL) | 4.0 ± 0.5 | 3.0 | 4.8 |

IgM antibody was the most commonly positive test (61.7%), followed by NS1 antigen (56.7%) and IgG (36.7%). Secondary dengue infection occurred in 36.7% of patients (*Table V*).

**Table V: Dengue Diagnostic Test Results (*n*=60)**

| Diagnostic Test | Frequency | Percentage (%) |
|---|---|---|
| NS1 antigen positive | 34 | 56.7 |
| IgM antibody positive | 37 | 61.7 |
| IgG antibody positive | 22 | 36.7 |
| Secondary dengue infection | 22 | 36.7 |

Hepatitis was the most frequent complication (76.7%), followed by acute kidney injury (31.7%) and dengue shock syndrome (28.3%). ARDS and multi-organ failure occurred in 11.7% of patients each (*Table VI*).

**Table VI: Complications Among Dengue Patients (*n*=60)**

| Complication | Frequency | Percentage (%) |
|---|---|---|
| Dengue shock syndrome | 17 | 28.3 |
| Acute respiratory distress syndrome (ARDS) | 7 | 11.7 |
| Acute kidney injury | 19 | 31.7 |
| Hepatitis | 46 | 76.7 |
| Myocarditis | 1 | 1.7 |
| Encephalopathy | 3 | 5.0 |
| Multi-organ failure | 7 | 11.7 |

Despite the severity of complications, the recovery rate was high (98.3%), with only 1 death (1.7%) *Table VII*.

**Table VII: Dengue Diagnostic Patient Outcomes (*n*=60)**

| Outcome | Frequency | Percentage (%) |
|---|---|---|
| Recovered | 59 | 98.3 |
| Death | 1 | 1.7 |

## DISCUSSION

This study evaluated the spectrum of clinical presentations among 60 dengue patients admitted to a dengue referral center, providing an overview of demographic characteristics, symptom profiles, warning signs, laboratory findings, complications, and treatment outcomes. The findings highlight the clinical burden of dengue in hospitalized patients and align with previous studies in Bangladesh and other dengue-endemic regions. Regarding sociodemographic characteristics, the largest proportion of patients (45%) were aged 50–60 years, followed by 40–50 years (35%), indicating that middle-aged and older adults predominated among hospitalized cases. Increasing age has been associated with more severe manifestations and higher hospitalization rates. Hossain et al. (2025) similarly reported that adults predominated in the 2022 Bangladesh outbreak, with hematological severity increasing with age [14]. Males accounted for 70% of the population, females 30%, producing a male-to-female ratio of 2.3:1, consistent with Islam et al. (2022), who reported male predominance among 336 hospitalized dengue patients in Dhaka City [15]. Anker and Arima (2011) noted a male excess across six Asian countries in patients aged ≥15 years, attributing it to occupational and outdoor exposure during peak Aedes aegypti biting hours [16]. Urban residence was reported in 75% of patients, reflecting the vector's preference for densely populated areas with stagnant water and inadequate waste management. Hossain et al. (2023) observed similar urban predominance across 22 years of dengue outbreaks in Bangladesh [17]. The clinical symptom profile demonstrated typical dengue manifestations. Fever and headache were present in all patients (100%), with arthralgia and fatigue (93.3%), nausea (91.7%), and myalgia (81.7%) also common. These findings correspond with the WHO (2009) case definition, which identifies fever with at least two additional symptoms such as nausea, rash, musculoskeletal pain, leukopenia, or warning signs [18]. Islam et al. (2022) reported similar patterns, with fever universal and musculoskeletal symptoms frequent in Dhaka's cohort [13].

Diarrhea occurred in 68.3%, higher than in many series, likely reflecting severe cases admitted to a referral center. Rash and retro-orbital pain were each present in 20%, lower than classical descriptions, possibly due to the older age of the cohort, as rash is more common in younger patients with primary dengue infection. Regarding warning signs and hemorrhagic manifestations, rising hematocrit with rapid platelet fall occurred in 85%, representing a key indicator of plasma leakage and progression to severe dengue per WHO (2009) [18]. Clinical fluid accumulation (ascites, pleural effusion) was present in 63.3%. Mucosal bleeding was noted in 30%, mainly epistaxis (20%) and gum bleeding (18.3%), while petechiae were rare (1.7%). Persistent vomiting and lethargy/restlessness were each reported in 16.7%, and hepatomegaly in 10%, reflecting systemic inflammation and organ involvement. These findings align with WHO recommendations emphasizing hemoconcentration, fluid accumulation, and mucosal bleeding as critical warning signs [18]. Laboratory findings showed typical dengue-related derangements. Mean hemoglobin was 10.0 ± 1.6 g/dL, and mean platelet count 160,000 ± 65,000/$mm^3$, with a minimum of 22,000/$mm^3$. Mean total WBC count was 4,000/$mm^3$, indicating leukopenia, a hallmark of dengue [18]. Liver enzymes were elevated, with mean SGOT (78 ± 35 U/L) exceeding SGPT (64 ± 28 U/L). Swamy et al. (2021) reported similar elevations in 74.2% of 120 patients, attributing higher SGOT to skeletal muscle involvement in addition to hepatocyte injury [19]. Samanta and Sharma (2015) also confirmed this biochemical pattern due to viral tropism for hepatocytes and myocytes [20]. Mean serum creatinine was 0.96 ± 0.42 mg/dL, with maxima of 2.4 mg/dL, indicating acute kidney injury in severe cases. Serology revealed IgM positivity in 61.7%, NS1 antigen in 56.7%, and IgG in 36.7%, with secondary infection in 36.7%. NS1 detection is useful in the early febrile phase, while IgM appears later, as per WHO (2009) [18]. Secondary infections are significant due to antibody-dependent enhancement, associated with more severe thrombocytopenia and higher risk of dengue shock syndrome, as noted by Islam et al. (2022) [13]. Complications were frequent, reflecting severe referral-center cases. Dengue hepatitis occurred in 76.7%, consistent with Swamy et al. (2021) (74.2%) and mechanistically explained by Samanta and Sharma (2015) [19, 20]. Acute kidney injury occurred in 31.7%, similar to 35.1% reported by Wang et al. (2023) [21]. Dengue shock syndrome affected 28.3%, ARDS and multi-organ failure each 11.7%, encephalopathy 5%, and myocarditis 1.7%, reflecting multi-organ involvement in severe dengue. Hossain et al. (2023) similarly reported increasing severe complications over successive outbreak years in Bangladesh [17]. Despite severe complications, 98.3% of patients recovered, with only one death (1.7%). This supports the WHO (2009) guidance that timely supportive care, early recognition of plasma leakage, and organ support reduce case fatality to <2% [18]. Islam et al. (2022) similarly reported high survival in tertiary centers with adherence to WHO protocols [13]. The single mortality highlights the continued risk of multi-organ failure, particularly in older adults, emphasizing the importance of experienced referral centers in managing severe dengue.

## LIMITATION

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

## CONCLUSION

Dengue infection presents with a wide range of clinical manifestations among hospitalized patients. In this study, fever, headache, myalgia, and arthralgia were the most common presenting symptoms. Notably, gastrointestinal manifestations were prominent, with diarrhea emerging as one of the most frequent clinical features, while cutaneous manifestations such as rash were observed less frequently. This pattern is consistent with recent observations in Bangladesh suggesting a shift toward gastrointestinal-predominant presentations of dengue infection. Warning signs such as rising hematocrit with declining platelet counts were also observed and may indicate risk of disease progression. Hepatic involvement and acute kidney injury were among the common complications identified. Despite these complications, most patients recovered with appropriate supportive management. These findings highlight the importance of recognizing diarrhea as a common clinical manifestation of dengue, even in the absence of classical features such as rash, to facilitate early diagnosis and timely management.

## RECOMMENDATION

Strengthening early diagnostic facilities, improving surveillance systems, and ensuring timely referral to specialized centers are essential for better dengue management. Healthcare professionals should closely monitor warning signs such as rising hematocrit, thrombocytopenia, and fluid accumulation to prevent progression to severe dengue. Public health initiatives focusing on vector control, community awareness, and urban sanitation are also necessary to reduce dengue transmission and disease burden in endemic regions.

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