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Clinical Pattern and Outcome of Dengue in Hospitalized Children

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Abstract | **Original Research Article**

Background: Dengue is a mosquito-borne viral disease in children, ranging from mild fever and rash to severe complications like hemorrhage and shock. Pediatric cases often show gastrointestinal symptoms and hematological abnormalities. This study assesses the clinical patterns, laboratory findings, and outcomes of hospitalized children to guide early recognition and management. ***Methods:*** This observational study included 75 children aged 1–15 years with confirmed dengue at Zilla Sadar Hospital, Lakhmipur (May–October 2024). Data on clinical features, laboratory and ultrasonographic findings, treatments, hospital stay, and outcomes were collected, and patients were classified as DF, DHF, or DSS using WHO criteria. ***Results:*** Among 75 hospitalized children with dengue, most were aged 1–5 years (50.7%), male (65.3%), and urban residents (74.7%). Common symptoms included fever (100%), lethargy (77.3%), headache (68%), gastrointestinal complaints, and musculoskeletal or mucocutaneous features. Thrombocytopenia (54.7%), leukopenia (32%), anemia (17.3%), and elevated hematocrit (28%) were frequent; ultrasonography showed ascites (17.3%), pleural effusion (13.3%), hepatomegaly (12%), and splenomegaly (8%). Supportive management included fluids (82.7%), paracetamol (73.3%), platelet (14.3%) and blood transfusions (12.2%), plasma (3.1%), and antibiotics (16%). Most cases were DF (69.3%), followed by DHF (21.3%) and DSS (9.4%), with a mean hospital stay of 5.1 ± 2.3 days. ***Conclusion:*** Dengue in hospitalized children showed fever, gastrointestinal symptoms, and thrombocytopenia, with some cases progressing to DHF or DSS. Supportive care, especially fluids, resulted in short hospital stays and favorable outcomes, highlighting the importance of early recognition and timely management.

Keywords: Dengue, Hospitalized Children, Clinical Pattern, Dengue Severity

INTRODUCTION

Dengue fever is a mosquito-borne viral disease that has caused recurrent epidemics for more than two centuries across Asia, the Atlantic and Gulf coasts of the United States, and the Caribbean, with widespread outbreaks reported during World War II in the Pacific and Asian regions [1]. Globally, approximately 2.5 billion people are at risk of dengue infection, with an estimated 50 million infections and 500,000 cases of dengue hemorrhagic fever occurring annually, resulting in around 22,000 deaths [2]. Children under 15 years of age represent a significant proportion of affected individuals, making dengue an important cause of pediatric morbidity in endemic countries [3].

Clinically, dengue infection commonly presents with acute fever, headache, myalgia, arthralgia, rash, and mild bleeding manifestations, while severe disease may be associated with abdominal pain, persistent vomiting, plasma leakage, hemorrhage, and shock [4]. Among hospitalized children, dengue exhibits a wide spectrum of clinical severity, ranging from uncomplicated dengue fever to dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). In Bangladesh, gastrointestinal symptoms such as vomiting and abdominal pain are frequently observed in pediatric dengue cases, which may pose challenges in the early identification of severe disease [5]. Hematological abnormalities, including thrombocytopenia and elevated hematocrit, are commonly reported laboratory findings in children with dengue and are important indicators of disease severity [5]. Laboratory diagnosis of dengue is based on detection of the NS1 antigen in the early phase of illness, serological tests for IgM and IgG antibodies, and molecular detection of viral RNA by reverse transcription polymerase chain reaction, allowing confirmation of infection at different stages of the disease [6].

Previous studies from dengue-endemic regions have described the clinical and laboratory characteristics of dengue in children. Abdominal pain and thrombocytopenia have been reported as common features among pediatric dengue patients in hospital settings [7]. Hospital-based studies from Southeast Asia have documented varying proportions of dengue fever, DHF, and DSS among admitted children, reflecting the diverse clinical presentation of the disease [8]. In Bangladesh, pediatric dengue cases have been reported predominantly among young children, with common clinical and laboratory findings including warning signs, leukopenia, thrombocytopenia, and NS1 antigen positivity [9,10]. Dengue infection among children has also been reported from different regions of the country, indicating a consistent burden across geographic areas [11].

Despite the growing number of pediatric dengue cases in Bangladesh, data describing the detailed clinical patterns, laboratory findings, and short-term outcomes among hospitalized children remain limited. The present study was therefore undertaken to assess the clinical pattern and outcome of dengue infection in hospitalized children and to generate evidence that may support early recognition and appropriate management of pediatric dengue in hospital settings.

METHODOLOGY

Study Design and Setting:

This was a hospital-based observational study conducted among children admitted with dengue infection at Zilla Sadar Hospital, Lakhmipur, in Bangladesh. The study was carried out from May to October 2024.

Study Population:

The study included 75 hospitalized children aged 1–15 years who were clinically and/or laboratory diagnosed with dengue infection. Children of both sexes were enrolled consecutively during the study period.

Inclusion Criteria

- Children aged 1–15 years
- Hospitalized with a diagnosis of dengue fever, dengue hemorrhagic fever, or dengue shock syndrome
- Diagnosis confirmed by clinical features and supported by laboratory investigations (NS1 antigen and/or serology)

Exclusion Criteria

- Children with coexisting chronic illnesses (e.g., chronic liver disease, renal disease, hematological disorders)
- Patients with incomplete clinical or laboratory records
- Children with other confirmed febrile illnesses mimicking dengue

Data Collection: Data were collected using a structured case record form, which included:

1. Sociodemographic characteristics
2. Dengue exposure history
3. Detailed clinical manifestations
4. Laboratory and ultrasonographic findings
5. Treatment modalities administered during hospitalization

Duration of hospital stay and outcome:

Clinical examination findings and laboratory results were recorded from patient files and hospital records. Ultrasonography of the abdomen was performed where clinically indicated to assess plasma leakage and organ involvement.

Classification of Dengue Severity:

Patients were classified into dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS) based on clinical presentation and laboratory parameters, following established WHO criteria.

Statistical Analysis:

Data were entered and analyzed using appropriate statistical software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Results were summarized using tables and figures for clarity.

RESULT

Table-1 shows the the sociodemographic characteristics and dengue exposure history of 75 hospitalized children. The majority were aged 1–5 years (50.7%), with fewer children in the 5–10 years (29.3%) and 11–15 years (20%) age groups, indicating that younger children were more commonly affected. Male children predominated (65.3%) compared to females (34.7%), and most resided in urban areas (74.7%), reflecting a higher dengue burden in cities. A history of previous dengue infection was reported in 10.7% of children, while 32% had other family members recently affected, suggesting possible household exposure. Table-2 shows the clinical manifestations of 75 hospitalized children with dengue. All children (100%) presented with fever, while general symptoms such as lethargy (77.3%) and headache (68%) were also common. Musculoskeletal complaints, including arthralgia (45.3%), and muco-cutaneous features like mouth sores (58.7%) and itching (34.7%) were noted. Gastrointestinal symptoms were highly prevalent, with constipation (85.3%), vomiting (80%), decreased appetite (77.3%), abdominal pain (78.7%), and loose motion (78.7%) reported. Hemorrhagic manifestations occurred in 42.7% of children, though severe bleeding such as nasal bleeding (4%) and melena (2.7%) was less

frequent. Neurological symptoms, including confusion (14.7%) and blurring of vision (21.3%), were relatively uncommon. Other systemic features included pallor (29.3%), dehydration (24%), and palpitation (24%).

Table-3 shows the laboratory and ultrasonographic findings of 75 hospitalized children with dengue. Hematological abnormalities were common, with thrombocytopenia observed in 54.7% of children, leukopenia in 32%, lymphocytopenia in 25.3%, and neutropenia in 16%. Anemia (low hemoglobin) and elevated hematocrit were seen in 17.3% and 28% of patients, respectively. Renal dysfunction was uncommon, with only 5.3% showing abnormal serum creatinine levels. Ultrasonographic evaluation revealed evidence of plasma leakage and organ involvement, with ascites in 17.3% of children, pleural effusion in 13.3%. Table 4 presents the distribution of dengue types among 75 hospitalized children. The majority of cases were classified as Dengue Fever (DF), accounting for 69.3% of patients. Dengue Hemorrhagic Fever (DHF) was observed in 21.3% of children, while Dengue Shock Syndrome (DSS), the most severe form, was relatively uncommon at 9.4%. Most children required supportive management during hospitalization (Figure Ⅰ). Intravenous fluid therapy was administered to 82.7% of patients. Platelet transfusion was required in 14.3%, while blood transfusion was given to 12.2% of cases. Plasma transfusion was administered in 3.1% of patients. Paracetamol was used for symptomatic management in 73.3% of children. Antibiotics were prescribed in 16.0% of cases, primarily for suspected secondary bacterial infections. The duration of hospital stay varied among patients (Figure II). More than half of the children (56.7%) were hospitalized for 4–7 days, while 30.0% were discharged within 3 days. Prolonged hospitalization exceeding 7 days was required in 13.3% of cases. The mean duration of hospital stay was 5.1 ± 2.3 days.

Table-1: Sociodemographic and Dengue Exposure Characteristics of Hospitalized Children (N = 75)

Variable	N	Percentage
Age		
1-5 years	38	50.7
5-10years	22	29.3
11-15 years	15	20
Gender		
Male	49	65.3
Female	26	34.7
Residence		
Urban	56	74.7
Rural	19	25.3
Previously dengue affected		
Yes	8	10.7
No	67	89.3
Other family members affected dengue recently		
Yes	24	32
No	51	67

Table -2: Clinical Manifestations of Hospitalized Children with Dengue (N = 75)

Clinical Feature	n (%)
General manifestations	
Fever	75 (100)
Lethargy	58(77.3)
Headache	51 (68)
Backache	28 (37.3)
Retro-orbital pain	32(42.7)
Muco-cutaneous manifestations	
Itching	26 (34.7)
Mouth sores	44 (58.7)
Rash	21 (28)
Musculoskeletal manifestations	
Arthralgia	34 (45.3)
Gastrointestinal manifestations	
Vomiting	60 (80.0)
Decreased appetite	58 (77.3)

Constipation	64 (85.3)
Abdominal pain	59 (78.7)
Loose motion	59 (78.7)
Hemorrhagic manifestations	
Any hemorrhage	32 (42.7)
Nasal bleeding	3 (4)
Melena	2 (2.7)
Neurological manifestations	
Confusion	11 (14.7)
Blurring of vision	16 (21.3)
Other systemic manifestations	
Pallor (anemia)	22 (29.3)
Dehydration	18 (24)
Palpitation	18 (24)

Table-3: Laboratory and Ultrasonographic Findings of Hospitalized Children with Dengue (N = 75)

Parameter	n (%) / Mean ± SD	Abnormality (%)
Hematology		
Hemoglobin (g/dL)	11.2 ± 1.8	13 (17.3)
Hematocrit (%)	38.5 ± 5.4	21 (28.0)
Total WBC (×10³/µL)	5.4 ± 2.1	24 (32.0)
Neutrophils (%)	55.3 ± 12.4	12 (16.0)
Lymphocytes (%)	38.1 ± 11.2	19 (25.3)
Platelet count (×10³/µL)	78 ± 42	41(54.7)
Renal function & Electrolytes		
Serum creatinine (mg/dL)	0.5 ± 0.2	4 (5.3)
Ultrasonography (USG) Abdomen		
Ascites	0.17 ± 0.38	13 (17.3)
Pleural effusion	0.13 ± 0.34	10 (13.3)
Hepatomegaly	0.12 ± 0.33	9 (12.0)
Splenomegaly	0.08 ± 0.27	6 (8.0)

Table-4: Distribution of Types of Dengue among Hospitalized Children (N = 75)

Type of Dengue	N	Percentage (%)
Dengue Fever (DF)	52	69.3
Dengue Hemorrhagic Fever (DHF)	16	21.3
Dengue Shock Syndrome (DSS)	7	9.4
Total	75	100

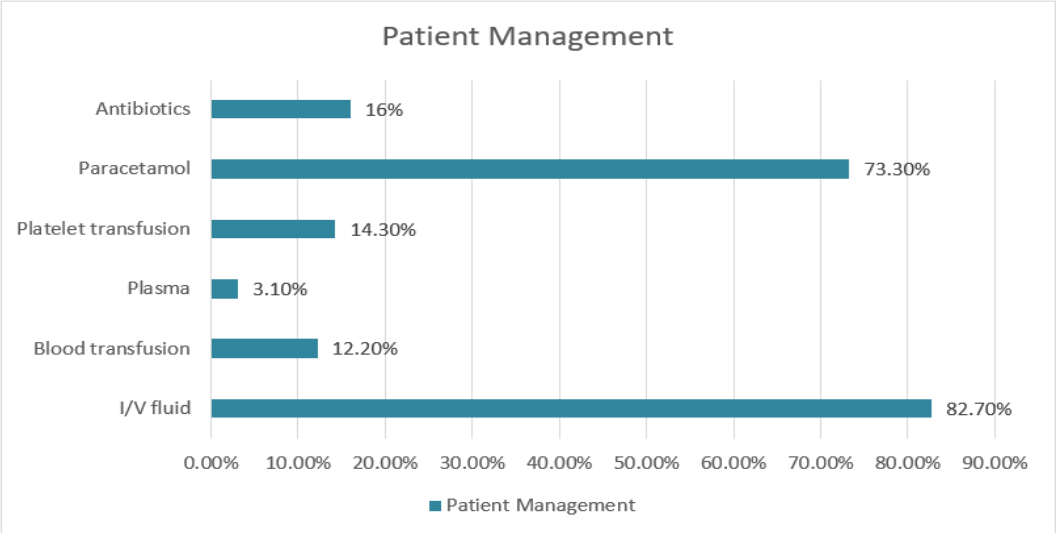

Figure Ⅰ: Management of Enrolled Dengue Patients (N = 75)

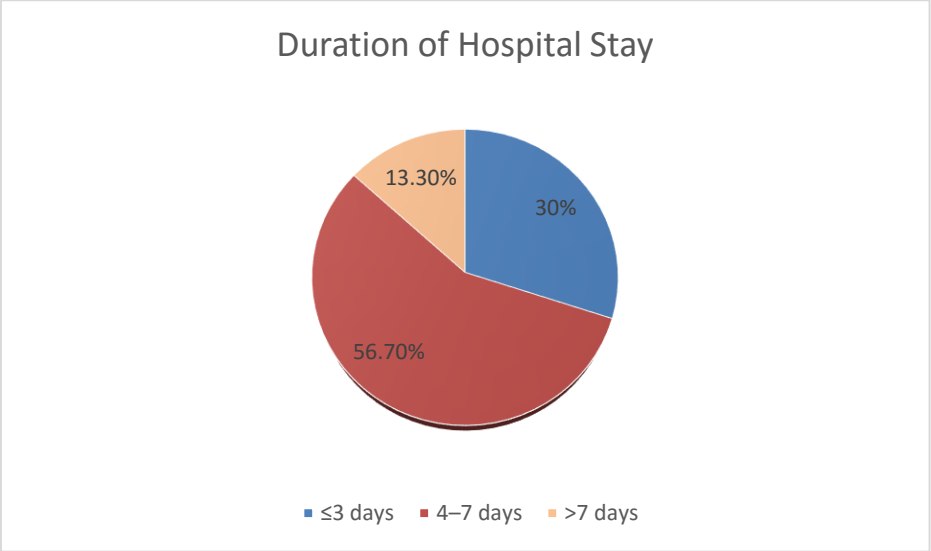

Figure Ⅱ: Duration of Hospital Stay Among Hospitalized Children with Dengue (N = 75)

DISCUSSION

In this study of 75 hospitalized children with dengue, the majority were aged 1–5 years, indicating that younger children were predominantly affected. This is consistent with Shultana K *et al.,* (2019), who reported 51.7% of pediatric cases in the 0–5-year age group. Male predominance (65.3%) was observed, aligning with the slightly higher male-to-female ratio reported in Dhaka [10]. Most children resided in urban areas (74.7%), highlighting the higher dengue burden in cities, consistent with Acharya A *et al.,* (2005), who reported over 70% urban cases [12]. In our cohort, prior dengue infection (10.7%) and recent dengue in household members (32%) were more frequent than the 1.6% and 7.2% reported by Khan MA *et al.,* suggesting higher secondary infection and peridomestic transmission [5].

Fever was universal, confirming its role as a cardinal symptom, comparable to 93.8% in Souza *et al.,* Headache (68%) was slightly lower than the 80.2% reported by Souza *et al.,* while retro-orbital pain (42.7%) was similar to 40.6% in the same study [13]. Lethargy (77.3%) and backache (37.3%) were comparable to prior pediatric reports (~78% and ~37%), indicating consistent clinical patterns [14]. Muco-cutaneous manifestations, including mouth sores (58.7%), rash (28%), and itching (34.7%), as well as arthralgia (45.3%), were higher than reported by Biswas *et al.,* in Nicaraguan children (mouth sores 20%, rash 15%, itching 12%, arthralgia 30%) [15], suggesting either greater disease severity or regional differences.

Gastrointestinal involvement was prominent, with vomiting, decreased appetite, constipation, abdominal pain, and loose motion reported more frequently than in Selvan *et al.,* (vomiting 70%, decreased appetite 65%, abdominal pain 60%, and diarrhea 55%) [16]. Hemorrhagic manifestations were observed in 42.7% of children, higher than the 35% reported by Sirivichayakul *et al.,* though severe bleeding such as nasal bleeding and melena remained rare [17]. Neurological symptoms, including confusion (14.7%) and blurring of vision (21.3%), were slightly higher than previous reports (<10%), while systemic features like pallor, dehydration, and palpitations were consistent with prior studies.

Hematological abnormalities were common. Thrombocytopenia (54.7%) was slightly lower than 60% reported by Palanivel *et al.,* while leukopenia (32%), lymphocytopenia (25.3%), neutropenia (16%), anemia (17.3%), and elevated hematocrit (28%) were comparable to prior studies [18]. Renal dysfunction was rare (5.3% vs 4% in Palanivel *et al.,*). Ultrasonography revealed ascites (17.3%), pleural effusion (13.3%), hepatomegaly (12%), and splenomegaly (8%), similar to Palanivel *et al.,* indicating plasma leakage and organ involvement [18]. These findings underscore the importance of routine hematological monitoring and ultrasonography in hospitalized pediatric dengue.

Supportive management was the mainstay. Intravenous fluids were given to 82.7% of children, paracetamol to 73.3%, and antibiotics to 16%, consistent with Rajapakse *et al.,* who reported 80–85% fluid therapy and 15–18% antibiotic use [19]. Platelet transfusion (14.3%) and blood transfusion (12.2%) were slightly lower than Nusrat *et al.,* who reported 18% and 15%, emphasizing that transfusions are reserved for active bleeding or hemodynamic instability [20].

Most children were classified as dengue fever (69.3%), with dengue hemorrhagic fever (21.3%) and dengue shock syndrome (9.4%) less common. This distribution is comparable to Souza *et al.,* (DF 70%, DHF 22%, and DSS8%) and Palanivel *et al.,* (DF 68%, DHF 24%, and DSS 8%) [13, 18], reflecting the efficacy of early supportive care in preventing severe disease

progression. The mean hospital stay was 5.1 ± 2.3 days, consistent with Mallhi *et al.,* who reported 4.88 ± 2.74 days, indicating that timely intervention leads to favorable short-term outcomes [21].

Overall, our findings highlight that dengue predominantly affects younger male children, and presents with gastrointestinal, systemic, and hematological manifestations. The higher prevalence of some symptoms compared to other studies may reflect regional epidemiology, case severity, or hospitalization criteria. Early recognition of warning signs, supportive management, and judicious transfusion practices remain crucial to prevent disease progression and improve outcomes in pediatric dengue.

Conclusion & Recommendation

This study highlights the diverse clinical presentation and outcomes of dengue infection among hospitalized children. Fever was universally present, with gastrointestinal manifestations, particularly vomiting and decreased appetite, being the most prominent clinical features. Hematological abnormalities, especially thrombocytopenia, were common, and ultrasonographic evidence of plasma leakage was observed in a subset of patients. Although the majority of children were diagnosed with non-severe dengue fever, a considerable proportion developed dengue hemorrhagic fever and dengue shock syndrome, emphasizing the potential for disease progression in pediatric patients. Most children required supportive management, including intravenous fluid therapy, and the overall hospital stay was relatively short, reflecting favorable outcomes with timely intervention. Early recognition of clinical warning signs and appropriate supportive management are crucial to reducing disease severity and improving outcomes in pediatric dengue. The findings of this study provide valuable insight into the clinical pattern and hospital outcomes of dengue in children and may assist clinicians in early diagnosis and effective management in similar settings.

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