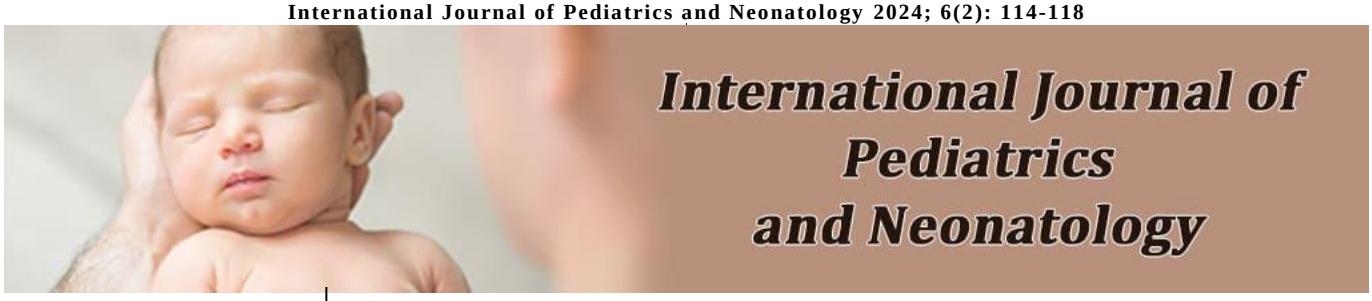

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Clinical profile of severe dengue pediatric patients: A tertiary care hospital experience in Dhaka, Bangladesh

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Abstract
Background: Severe dengue cases, particularly affecting children under five, can be fatal without timely treatment. Symptoms include fever, headache, joint pains, and rash. Severe cases progress through distinct phases and require hospitalization. Prevention focuses on mosquito bite avoidance. While a vaccine exists for some adolescents, none is universally available. Dengue's impact is substantial, with billions at risk annually, leading to millions of cases and deaths.
Aim of the study: This study aims to evaluate the clinical symptoms, laboratory findings, and outcomes of severe dengue fever in children.
Methods: The Department of Pediatrics at Shaheed Monsur Ali Medical College, Dhaka, Bangladesh, conducted a cross-sectional study from June 2021 to May 2022, focusing on 32 children diagnosed with severe dengue infection. Severity classification followed the 2019 national guidelines. Diagnosis relied on serological tests detecting dengue NS1 and/or IgM antibodies. Inclusion criteria encompassed children up to 14 years with positive dengue tests. Exclusion criteria included bacterial and parasitic illnesses. Data was collected through structured questionnaires administered by trained volunteers during the recovery phase. Statistical analysis used SPSS version 26.0, employing descriptive statistics for quantitative data presentation.
Result: Most children affected by severe dengue were aged 5-9 years (50.00%), with a slight male predominance (53.13%). Over half of the children had an average weight (53.13%), but there were notable percentages of overweight (15.63%) and obese (28.13%) children. Most patients were from urban areas (65.63%). Fever was nearly universal (96.88%), with common symptoms including abdominal pain and vomiting (78.13%), shock (62.50%), and pleural effusion (46.88%). Most patients (53.13%) were classified with DSS, followed by DHF (15.63%) and EDS (9.38%). Hospitalization lasted four days or more for 71.88% of patients, with ICU care required for many.
Conclusion: This study found that severe dengue in pediatric patients leads to significant morbidity, with prolonged hospital stays and intensive care needed. Most affected were children aged 5-9 years, with common symptoms including fever, abdominal pain, vomiting, and shock. Timely medical intervention resulted in most patients recovering within one to two weeks.

Keywords: Clinical profile, severe dengue, pediatric, NS1 and IGM

Introduction
Dengue is a viral disease typically spread through mosquito bites, primarily by female Aedes aegypti mosquitoes [1]. An estimated 500,000 people with severe dengue infection require hospitalization annually, and 90% of them are children <5 years of age. Without proper treatment, the case fatality rate in severe dengue is more than 20%, and with timely intervention, it can be reduced to <1% [2]. The first record of a case of probable dengue fever is in a Chinese medical encyclopedia from the Jin Dynasty (266–420), which refers to a "water poison" associated with flying insects [3]. Dengue fever may not show any symptoms, but if they do appear, they usually begin between 3 to 14 days after infection. Symptoms may include high fever, headache, vomiting, muscle and joint pains, and characteristic skin itching and rash. Recovery typically takes between two to seven days. However, in a small percentage of cases, the disease may progress to severe dengue, previously known as dengue hemorrhagic fever or dengue shock syndrome [4]. The infection progresses through three distinct phases: the febrile phase, the critical phase, and the recovery phase [5].

The febrile phase typically lasts two to seven days and is characterized by high fever (40 °C/104°F), general pain, and headache [6]. Complications that may arise after severe dengue fever include fatigue, drowsiness, headaches, difficulty concentrating, and memory problems [7]. Severe dengue is a life-threatening emergency requiring hospitalization and potentially intensive care [8]. The most effective way to prevent the disease is to avoid mosquito bites, especially in tropical areas. To avoid mosquito-borne diseases, taking precautions to protect yourself and reduce the mosquito population in your area is crucial. In 2019, the FDA approved Dengvaxia, a vaccine to prevent dengue in infected adolescents aged 9 to 16 [9]. No vaccine is available to prevent the general population from contracting it. WHO currently estimates that 3.9 billion people are at risk of dengue infection [10]. In 2013, there were an estimated 390 million cases of dengue fever globally, resulting in 25,000 deaths and 500,000 severe cases [11, 12]. Bangladesh is experiencing its worst dengue outbreak since 2000, with the infection affecting children, pregnant women, and older adults [13]. In children, 90% of dengue cases occur, and their risk of death in secondary attacks is 15 times higher than in adults [14]. This study aims to evaluate the clinical symptoms, laboratory findings, and outcomes of severe dengue fever in children.

Methodology & Materials

The Department of Pediatrics at Shaheed Monsur Ali Medical College, Dhaka, Bangladesh, conducted a cross-sectional study from June 2021 to May 2022. The study focused on 120 children diagnosed with severe dengue infection. Severity classification followed the national guidelines outlined in the 2019 Dengue Fever Bangladesh protocol [15]. Diagnosis confirmation relied on serological tests detecting the presence of dengue nonstructural glycoprotein 1 (NS1) and/or dengue IgM antibodies. All hospitalized children exhibiting dengue symptoms underwent serological confirmation.

Inclusion criteria

1. All children aged up to 14 years.
2. Children with positive dengue tests, either NS1 antigen, IgM antibody, or RT-PCR test with severe dengue fever.

Exclusion criteria

1. Children with other bacterial and parasitic illnesses.
2. Children who were positive for malaria, meningitis, and enteric fever.

Data collection and analysis

Data was gathered through structured questionnaires administered via face-to-face interviews by trained volunteers, including medical students and doctors, during the recovery phase of the illness. Statistical analysis utilized the Statistical Package for Social Sciences version 26.0 for Windows (SPSS). Descriptive statistics were employed for quantitative data, presenting the minimum and maximum values alongside the mean and standard deviation (SD) for normally distributed data.

Result

The age distribution indicates that most (50.00%) of the children affected fall within the 5-9 age group. The >10 years group follows this at 28.13% and children under five at 21.88%. Gender distribution shows a slight male predominance, with 53.13% of the patients being male and 46.88% female. More than half (53.13%) of the children have an average weight. However, there are notable percentages of overweight and obese children, 15.63% and 28.13%, respectively. A higher proportion of the patients come from urban areas (65.63%, n=21) compared to those from rural areas (34.38%, n=11) (Table 1). Fever was nearly universal among severe dengue pediatric patients (96.88%). Abdominal pain and vomiting (78.13%), shock (62.50%), pleural effusion (46.88%), ascites (34.38%), hepatomegaly (21.88%), rash (18.75%), and bleeding (18.75%) were common. Various gastrointestinal and respiratory symptoms were also noted (Table 2). Table 3 shows that most patients were classified with DSS at 53.13% upon hospitalization, followed by DHF at 15.63% and EDS at 9.38%. Combined classifications included DSS with DHF at 15.63% (n=5) and DHF with EDS at 6.25% (n=2). In terms of duration of hospitalization, 23(71.88%) of patients stayed for four days or more, while 9(28.13%) stayed for less than four days. ICU stays of less than four days were reported in 18(56.25%) cases, and 14(43.75%) required ICU care for four days or more. Additionally, the outcome of severe dengue pediatric patients in this study indicates that 59.38% (n=19) recovered within 1-7 days, while 34.38% (n=11) took 8-14 days to recover. A small fraction, 6.25% (n=2), were referred to other healthcare facilities for further management (Figure 1).

Table 1: Demographical characteristics of the study children (N=32).

Variables	Frequency (n)	Percentage (%)
Age in years		
<5	7	21.88
05-09	16	50.00
>10	9	28.13
Gender		
Male	17	53.13
Female	15	46.88
Weight (kg)		
Normal	17	53.13
Underweight	1	3.13
Overweight	5	15.63
Obese	9	28.13
Residence		
Rural	11	34.38
Urban	21	65.63

Table 2: Clinical presentation of the study children (N=32).

Clinical presentation	Frequency (n)	Percentage (%)
Fever	31	96.88
Abdominal pain and vomiting	25	78.13
Shock	20	62.50
Ascites	11	34.38
Pleural effusion	15	46.88

Hepatomegaly	7	21.88
Rash	6	18.75
Loose stool	6	18.75
Breathing difficulty	5	15.63
Cough	2	6.25
Headache	2	6.25
Myalgia and Arthralgia	1	3.13
Convulsion	1	3.13
Altered consciousness	1	3.13
Bleeding	6	18.75
Hematemesis and melena	5	15.63
Prick site bleeding	1	3.13
Gum bleeding	1	3.13
Menorrhagia	1	3.13

Table 3: Distribution of the study patients after hospitalization (n=32).

Variables	Frequency (n)	Percentage (%)
Classification		
Dengue shock syndrome DSS	17	53.13
Dengue hemorrhagic fever DHF	5	15.63
Expanded dengue syndrome EDS	3	9.38
DSS with DHF	5	15.63
DHF with ED	2	6.25
Duration of hospitalization (In days)		
<4 days	9	28.13
≥4 days	23	71.88
ICU stay (In days)		
<4 days	18	56.25
≥4 days	14	43.75

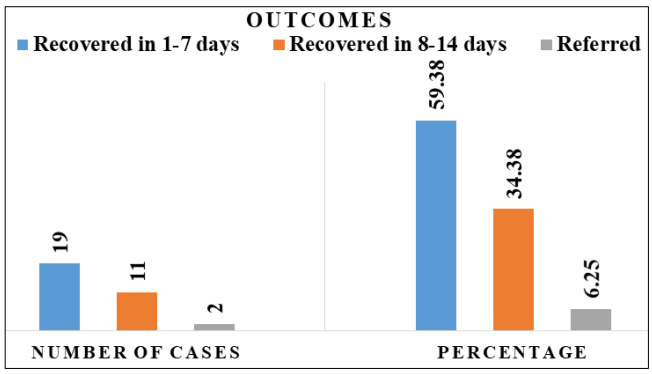

Fig 1: Outcome of the study children (N=32).

Discussion

The clinical presentation varies widely in severe dengue fever and their laboratory parameter. By identifying the common signs, symptoms, and frequency of deranged laboratory findings, we hope to improve our ability to predict and manage cases promptly and appropriately. In our study, cases were dominated by children 5-9 years old with 50.00%. A similar result was also found in different studies conducted in different locations [16-18]. With 53.13% of the patients being male and 46.88% female, the gender distribution reveals a little male predominance. Similar results were reported in the study by Pothapregada *et al*., who found that the mean age was 6.9±3.3 years, and the male: female ratio was 1.2:1 [19]. Among all, 53.13% have an average weight of more than half. Nonetheless, there are noteworthy rates of childhood obesity and overweight (15.63% and 28.13%, respectively). Patients from rural regions comprise 34.38% of the patient population, while patients from urban areas comprise 65.63%. Our findings are comparable with Ismail *et al*. and Fadilla *et al*. [20, 21]. Fever was the most common clinical feature and was present in 96.88% of patients, comparable to the earlier observations. In contrast, Aggarwal *et al*. found fever in 93% of patients [22], whereas Daniel *et al*. reported fever in 96.8%. Abdominal pain and vomiting were the second most common clinical features and were present in 78.13% of patients, which is like other reports [23]. Another study observed that abdominal pain was the second most clinical feature, followed by vomiting [24]. According to the study by Adam *et al*., shock (15.7%), mucosal bleeding (36.4%), clinical fluid accumulation (15%), shortness of breath (14.3%), and vomiting were commonly presented in SD. In contrast, mucosal bleeding and clinical accumulation of fluid were the most common warning signs in SD [25]. In this study, we found rash, loose stool in 6 cases (18.75%) each, and shock in 20 cases (62.5%), which were prominent features of SD. Srivastava *et al* observed shock in 70.8% of patients [26]. The most common bleeding manifestation was hematemesis and melena in 5 cases (15.63%). The study by Srivastava *et al*. reported 90%, and Ahmed *et al*. reported 61% had GIT hemorrhages [26, 27]. Pleural effusion was the most common physical finding seen in 15 cases (46.88%), followed by ascites in 11 cases (34.38%), and then 7 cases (21.88%) had hepatomegaly. However, other studies by Joshi *et al*. found that hepatomegaly was the most common physical finding [28]. In the present study, more than half (53.13%) of patients had DSS during admission, followed by 15.63% in DHF and 9.38% in EDS. 15.63% of patients with DSS progressed to DHF, and 6.25% of patients with DHF progressed to EDS after admission and during the hospital stay. Showed similar findings that severe vascular leakage occurred in 244 (90%), severe bleeding in 39 (14%), and severe organ dysfunction in 28 (10%) of 271 severe dengue patients. Another study also found similar findings [20]. The data indicates that most patients (71.88%) required hospitalization for four days or more. In contrast, a smaller proportion (28.13%) were hospitalized for less than four days. This distribution suggests that the severity of dengue in pediatric patients often necessitates prolonged hospital care. Several factors could contribute to the extended duration of hospitalization, including the severity of the disease at presentation, complications arising during illness, and the need for intensive monitoring and supportive care. For our study population, 56.25% of patients needed ICU care for fewer than four days and 43.75% for four days or longer. Similarly, Mishra *et al*. reported that 63.9% of patients were admitted to the ICU for 3–6 days [29]. According to the findings of our study, out of the pediatric patients with severe dengue, 19(59.38%) recovered in 1–7 days, whereas 11(34.33%) required 8–14 days. 2(6.25%) of

the patients received referrals to other healthcare facilities for further management. These outcomes reflect most children recovering within the first week of hospitalization. However, a significant portion required a more extended recovery, and a few needed specialized cares beyond the initial treatment facility.

Limitations of the study

The study has several limitations. Conducted in a single tertiary care hospital, it may not represent the broader pediatric population with severe dengue in Bangladesh. The small sample size of 32 patients may not capture all clinical variations. Reliance on serological diagnostic tests could lead to misclassification due to cross-reactivity with other flaviviruses. Additionally, the cross-sectional design limits the ability to establish causal relationships between observed variables and clinical outcomes.

Conclusion and Recommendations

In this study, we observed that severe dengue fever in pediatric patients presents significant morbidity, necessitating prolonged hospitalization and intensive care. The most affected age group was 5-9 years, with a slight male predominance. Common symptoms included fever, abdominal pain, vomiting, and shock, while pleural effusion and ascites were frequent complications. Most patients required extended hospital stays, and a substantial proportion needed intensive care. Despite these challenges, most recovered within one to two weeks, demonstrating the importance of timely and appropriate medical intervention in managing severe dengue in children.

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References

1. Zahoor MK, Rasul A, Zahoor MA, Sarfraz I, Zulhussnain M, Rasool R, *et al*. Dengue fever: A general perspective. Dengue fever: a resilient threat in the face of innovation. 2019 Jan 30;1.
2. Faridi MM, Aggarwal A, Kumar M, Sarafrazul A. Clinical and biochemical profile of dengue haemorrhagic fever in children in Delhi. Tropical doctor. 2008 Jan;38(1):28-30.
3. Gubler DJ. Dengue and dengue hemorrhagic fever. Clinical microbiology reviews. 1998 Jul 1;11(3):480-96.
4. Alejandria MM. Dengue haemorrhagic fever or dengue shock syndrome in children. BMJ Clinical Evidence. 2015;2015.
5. Simmons CP, Farrar JJ, Van Vinh Chau N, Wills B. Dengue. New England Journal of Medicine. 2012 Apr 12;366(15):1423-32.
6. Chen LH, Wilson ME. Dengue and chikungunya infections in travelers. Current opinion in infectious diseases. 2010 Oct 1;23(5):438-44.
7. Wong PF, Wong LP, AbuBakar S. Diagnosis of severe dengue: Challenges, needs and opportunities. Journal of infection and public health. 2020 Feb 1;13(2):193-8.
8. Seet RC, Quek AM, Lim EC. Post-infectious fatigue syndrome in dengue infection. Journal of clinical virology. 2007 Jan 1;38(1):1-6.
9. Kariyawasam R, Lachman M, Mansuri S, Chakrabarti S, Boggild AK. A dengue vaccine whirlwind update. Therapeutic Advances in Infectious Disease. 2023 Apr; 10:20499361231167274.
10. Dehghani R, Kassiri H. A review on epidemiology of dengue viral infection as an emerging disease. Research Journal of Pharmacy and Technology. 2021;14(4):2296-301.
11. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, *et al*. The global distribution and burden of dengue. Nature. 2013 Apr 25;496(7446):504-7.
12. Jing Q, Wang M. Dengue epidemiology. Global Health Journal. 2019 Jun 1;3(2):37-45.
13. Sarkar PK, Ghosh K, Akand N, Rahman M, Afroz S. Clinical profile of dengue among children in Bangladesh: observation from a single pediatric hospital. International Journal of Community Medicine and Public Health. 2022 May;9(5):1.
14. Guzmán MG, Kouri G, Bravo J, Valdes L, Susana V, Halstead SB. Effect of age on outcome of secondary dengue 2 infections. International journal of infectious diseases. 2002 Jun 1;6(2):118-24.
15. Malaria and Vector Borne Diseases Control Unit, Diseases Control Directorate, Directorate General of Health and Family Welfare and World Health Organization. National Guidelines for Clinical Management of Dengue Syndrome, Bangladesh 2019.
16. Khan MA, Al Mosabbir A, Raheem E, Ahmed A, Rouf RR, Hasan M, *et al*. Clinical spectrum and predictors of severity of dengue among children in 2019 outbreak: a multicenter hospital-based study in Bangladesh. BMC pediatrics. 2021 Dec;21:1-0.
17. Widiyati MM, Laksanawati IS, Prawirohartono EP. Obesity as a risk factor for dengue shock syndrome in children. Paediatrica Indonesiana. 2013 Aug 31;53(4):187-92.
18. Pone SM, Hökerberg YH, Oliveira RD, Daumas RP, Pone TM, Pone MV, Brasil P. Clinical and laboratory signs associated to serious dengue disease in hospitalized children. Jornal de pediatria. 2016;92(5):464-71.
19. Pothapregada S, Kamalakannan B, Thulasingham M, Sampath S. Clinically profiling pediatric patients with dengue. Journal of global infectious diseases. 2016 Jul 1;8(3):115-20.
20. Ismail M, Akter M, Sabah LN, Nigar IZ, Dola FN. Clinical profile and prognosis of severe dengue infection in pediatric population admitted to tertiary care hospital. Int. J Contemp Pediatr. 2023 Jul;10:988-4.
21. Fadilla AN, Husada D, Utomo B. Epidemiology of children with severe dengue infection in Dr. Soetomo General Hospital. Journal of the Indonesian Medical Association-Majalah Kedokteran Indnesia. 2020;70(4):41-7.
22. Aggarwal A, Chandra J, Aneja S, Patwari AK, Dutta AK. An epidemic of dengue hemorrhagic fever and dengu shock syndrome in children in Delhi. Indian pediatrics. 1998 Aug 1;35:727-32.
23. Daniel R, Philip AZ. A study of clinical profile of dengue fever in Kollam, Kerala, India.
24. Bhave S, Rajput C, Bhave S. Clinical profile and outcome of dengue fever and dengue haemorrhagic

fever in paediatric age group with special reference to WHO guidelines (2012) on fluid management of dengue fever. Int J Adv Res. 2015;3(4):196-201.
25. Adam AS, Pasaribu S, Wijaya H, Pasaribu AP. Clinical profile and warning sign finding in children with severe dengue and non-severe dengue. InIOP Conference Series: Earth and Environmental Science 2018 Mar 1 (Vol. 125, No. 1, p. 012038). IOP Publishing.
26. Srivastava VK, Suri S, Bhasin A, Srivastava L, Bharadwaj M. An epidemic of dengue haemorrhagic fever and dengue shock syndrome in Delhi: a clinical study. Annals of tropical paediatrics. 1990 Jan 1;10(4):329-34.
27. Ahmed S, Arif F, Yahya Y, Rehman A, Abbas K, Ashraf S, *et al*. Dengue fever outbreak in Karachi 2006--a study of profile and outcome of children under 15 years of age. JPMA. The Journal of the Pakistan Medical Association. 2008 Jan 1;58(1):4.
28. Joshi R, Baid V. Profile of dengue patients admitted to a tertiary care hospital in Mumbai. The Turkish Journal of Pediatrics. 2011 Dec 25;53(6):626-31.
29. Mishra S, Ramanathan R, Agarwalla SK. Clinical profile of dengue fever in children: A study from Southern Odisha, India. Scientifica. 2016;2016(1):6391594.

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