

Clinical Profile and outcome of Dengue Fever in Under 5 Children Admitted at a Tertiary Care Hospital, Dhaka.

TAHMED^a, J NAHAR^b, F MOHSIN^c, N ISLAM^d, S JASIM^e

Abstract:

Background: Dengue has become a major public health problem in Bangladesh with gradually increasing infectivity and severity. Most vulnerable population are children especially children below 5 years of age. However, data regarding dengue among this age group is limited. The objectives of this study were to see the clinical and laboratory profile of dengue fever (DF) in children below 5 years of age and their outcome.

Methods: This cross – sectional observational study was carried out in the department of Paediatrics, BIRDEM General Hospital from May 2023 to September 2023. One hundred eighty nine confirmed dengue cases were enrolled in the study. Their clinical profile and laboratory findings including haemoglobin (Hb%), haematocrit (Hct), total count of white blood cells (TC), platelet count (PC), serum alanine aminotransferase (S. ALT), serum aspartate aminotransaminase (S. AST), prothrombin time (PT), international normalized ratio (INR), activated partial thromboplastin time (aPTT), serum calcium and serum sodium level were documented and analyzed.

Results: Among 189 children 57(30.1%) were infants and 132(69.8%) patients were aged 1 to 5 years. Depending

upon the severity of dengue 98(51.8%) were classical dengue fever, 65(34.3%) and 14(7.4%) presented with dengue shock syndrome (DSS) and dengue haemorrhagic fever (DHF) respectively. Fever was present in all children, other common features were vomiting (34.9%), cough (25.9%), dehydration (26.9%), pleural effusion (34.3%), ascites (23.2%) and skin rash (18.5%). Shock were present in 41.1% cases. Warning signs like restlessness, lethargy, altered level of consciousness, convulsion was present in 16.4%, 9.5%, 2.6% and 11.6% respectively. All the children were improved and discharged.

Conclusion: In this study dengue presented classically in most of the children. Dengue shock syndrome and dengue haemorrhagic fever were below 10%. The outcome was excellent with no modality. Early reporting to hospital appeared important.

Key word: Dengue shock syndrome, pleural effusion, convulsion.

(J Bangladesh Coll Phys Surg 2023; 41: 25-28)

DOI: <https://doi.org/10.3329/jbcps.v41i40.69679>

Introduction:

Dengue fever has gradually become an emerging vector born infection in Bangladesh. The virus responsible for causing dengue is called dengue virus (DENV), which belongs to the Flaviviridae family. Four distinct but closely related serotypes cause dengue (DENV-1, DENV-2, DENV-3, and DENV-4).¹ Its consequences or diversity in risk is influenced by local rainfall, humidity, temperature, and urbanization.² The first recorded epidemic outbreak

occurred in 2000 in Bangladesh. From 1 January to 7 August 2023, the Ministry of Health and Family Welfare of Bangladesh reported a total of 69 483 laboratory-confirmed dengue cases. Among them about 19% were children. Mortality was 327, with a case fatality rate (CFR) of 0.47%.³

Dengue fever presents with diversity of clinical presentation from asymptomatic or mild clinical features to high-grade fever with viral syndrome or in the most severe forms as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) which can even be fatal. Classical dengue patients usually present with fever, arthralgia, myalgia, retro-orbital pain, and rash. Dengue cases also present with hemorrhagic manifestation (e.g. sub-conjunctival hemorrhage, gum bleeding, epistaxis, petechiae, purpura, etc.) with or without shock. Respiratory symptoms, gastrointestinal disorders, reduced platelet count, and abnormal liver function tests are also evident as presenting features of dengue. Multiorgan involvement is also noticeable during recent outbreaks as expanded dengue syndrome.⁴

In children, clinical features are variable and often confused with other infectious diseases. DHF/DSS and

- Dr Tasnima Ahmed, Assistant Professor, Department of Paediatrics, BIRDEM general Hospital
- Professor Jebun Nahar, Unit Head, General Paediatric Unit, Department of Paediatrics, BIRDEM general Hospital
- Prof Fauzia Mohsin, Head of the department & Unit Head, Paediatric Endocrine Unit, Department of Paediatrics, BIRDEM general Hospital
- Dr Nasreen Islam, Assistant Professor, Department of Paediatrics, BIRDEM general Hospital
- Dr Sabrina Jashim, Resident Physician, Department of Paediatrics, BIRDEM general Hospital

Address of Correspondence: Dr Tasnima Ahmed, Assistant Professor, Department of Neonatology & Paediatrics, BIRDEM General Hospital.

email: tasnima695@gmail.com, Phone no- 01845017199

Received: 15 Oct., 2023

Accepted: 19 Oct., 2023

DSS alone are more prevalent in infants, followed by in children and then in adults.⁵ Manifestations such as convulsions and hepatic dysfunction more commonly affect infants than older children, and the fatality rate is four times higher in infants. It was also observed that infants and children aged 5–7 years are at significant risk for severe dengue than in adolescents and adults.⁶

Though children are most prone to this infection, little published data are available on dengue infection in children living in South Asia. A better understanding of common clinical patterns among children in dengue endemic zones like Bangladesh, would help better management for future outbreaks in these regions. Besides, patients with DSS & DHF can be predicted by clinical profile, laboratory parameters and warning signs in case of children, who can be saved by early interventions. Therefore, the present study is aimed at assessing the common clinical symptoms of dengue fever in under 5 children as well as their outcome.

Methodology:

This cross-sectional observational study was conducted in Department of Paediatrics, BIRDEM General Hospital, Bangladesh. Children aged below 5 years admitted with suspected dengue infection starting from May 2023 till September 2023 were enrolled in this study. Clinically suspected cases of dengue were approached based on the national guideline for clinical management of dengue Syndrome, Bangladesh 2018.⁷

Suspected cases of dengue were considered whenever children presented with fever along with vomiting, rash and any warning signs of dengue, such as abdominal pain, persistent vomiting, mucosal bleeding, restlessness or lethargy. Whereas patients presenting with clinical features of suspected case associated with presence of NS1 antigen and/ or positive anti dengue IgM were considered as confirmed cases of dengue. A total of 462 children with confirmed dengue cases were admitted during this study period. Among them 189 (40.9%) were under 5 years old children. Their detailed clinical history, examination and investigation were recorded after obtaining informed consent from their parents. Demographic variables, presenting complaints and examination findings were recorded on a standard questionnaire. Laboratory investigations such as complete blood count, hematocrit, alanine transaminase (ALT) and Aspartate transaminase (AST) and other laboratory assays were performed when relevant to clinical

investigation. All laboratory investigations were performed at the study site. Leukopenia was defined as total white blood cell count $<5000/\text{mm}^3$; Thrombocytopenia was defined as a total platelet count $<150000/\text{mm}^3$, and elevated ALT and AST was considered when the lab value was >50 IU/L. Regarding hematocrit 20% rise or fall from the baseline was taken as significant. Ethical approval for the study was obtained from the ethical review committee of BADAS.

Statistical analysis

The statistical analysis was carried out using the Statistical Package for Social Sciences version 25.0. Descriptive statistics were done as mean \pm SD (standard deviation) for quantitative normally distributed data, while it was done for qualitative data as number and percentage.

Results:

A total of 189 confirmed dengue cases, whose age was less than 5 years were enrolled in this study. Among them 57(30.1%) were infants (<1 years) and 132(69.8%) patients were aged 1 to 5 years. Out of these children 85(44.9%) were male and 104 (55.0%) were female. Depending upon the severity of dengue 98(51.8%) presented with classical dengue fever, 65(34.3%) and 14(7.4%) presented with DSS and DHF respectively. (Table I).

Table-I

Demographic profile of dengue patient (N-189)

Variables	N	Percentage
Infant	57	30.1
1-5years	132	69.8
Male	85	44.9
Female	104	55.0
Day of illness at presentation	2.3 \pm 1.7days	
Classical Dengue	98	51.8
DSS	65	34.3
DHF	14	7.4
Expanded Dengue Syndrome	12	6.3

On analysis of the frequency of symptoms, the most common feature was fever (100%), followed by vomiting, dehydration, cough, ascites, and skin rash. Mild to moderate pleural effusion was noticed in 34.3% of children. Warning signs like restlessness, lethargy, altered level of consciousness, convulsion was also observed. (Table II).

Table-II*Clinical characteristics of Dengue fever (N-189)*

Variables	N	Percentage
Fever/ H/o fever	189	100
Headache	33	17.4
Abdominal pain	28	14.8
Vomiting	66	34.9
Diarrhoea	31	16.4
Ascites	44	23.2
Dehydration	51	26.9
Oedema	15	7.9
Oliguria	46	24.3
Cough	49	25.9
Respiratory distress	26	13.7
Pleural effusion (mild to moderate)	65	34.3
Pallor	37	19.5
Skin rash	35	18.5
Mucosal bleeding	21	11.1
Raised Capillary refilling time (CRT)	78	41.2
Low pulse volume	69	36.5
Low pulse pressure	65	34.3
Restlessness	31	16.4
Lethargy	18	9.5
Altered level of consciousness	5	2.6
Convulsion	22	11.6

Regarding laboratory profile of these group of dengue patient thrombocytopenia, leucopenia, altered liver function along with coagulation parameters were observed. (Table III). All children in this study group improved and discharged. (Table IV)

Table-III*Laboratory profile of dengue patients*

Variables	Number	Percentage
Leukopenia $d^{\prime}5000/cu\ mm$	77	40.7
Thrombocytopenia $<150000/cu\ mm$	118	62.4
Raised Hct $>20\%$ from baseline	11	5.8
Decreased Hct $<20\%$ from baseline	5	2.6
Low haemoglobin level ($<11\ gm/dl$)	55	29.1
Raised AST ($>50\ IU/L$)	131	69.3
Raised ALT ($>50\ IU/L$)	22	11.6
Prolonged PT	31	16.4
Prolonged INR	52	27.5
Prolonged aPTT	52	27.5
Low serum albumin level	42	22.2
Low serum calcium level	20	10.5
Hyponatraemia	12	6.3

Table-IV*Outcome of dengue patient (N-189)*

Duration of hospital stay	6.9 \pm 2.3 days
Need PICU admission	26 (13.6%)
Discharged	189 (100%)
Death	0

Discussion:

We had studied under 5 children who presented with dengue fever during this endemic period. This age group are the most vulnerable group and are at risk of developing severe dengue. Also, there is a wide variation of clinical features of dengue fever among this group of children. The laboratory parameters are also variable. Here among 189 under 5 years of children, 30.1% were infant. Male: female ratio was 1:1.2. Most of the children came to the hospital on 2.3 \pm 1.7 days of illness. Among these children 51.8% presented with classical dengue, 34.3% presented with DSS and 7.4% with DHF. During illness 12(6.3%) developed expanded dengue syndrome. Though there is no such article addressing dengue fever in under 5 children but several studies among children found that about 35% of under 5 children suffer from dengue fever each year.^{8,9} In a study which was done in a tertiary care hospital at Dhaka, Bangladesh found the mean age of their study was 5.56 \pm 3.57 years with male predominance. In their study 52% of patients were present with DSS, 17.3% was DHF and 10.7% was EDS which is consistent with our study.⁸ Another study done at tertiary care children hospital at Dhaka also found similar results.⁹

All children were presented with fever or history of fever in our study as it is the most common feature of dengue and which is comparable to the earlier observations.^{8,9,10} Other common features like vomiting (34.9%), dehydration (26.9%), cough (25.9%), skin rash (18.5%) and abdominal pain (14.8%) were also present. In a similar study among 89 children, along with fever they observed rash in 48.3%, nausea/vomiting in 37%, abdominal pain in 23.6%, and headache in 12.6% cases; correlate to existing study.¹⁰

Plasma leakage in dengue fever evident by pleural effusion and ascites. Children are more vulnerable to the development of pleural effusion and ascites. Early recognition of plasma leakage is crucial for management of dengue fever. Here, 34.3% of children developed mild to moderate pleural effusion who clinically presented

with cough, chest tightness and respiratory distress and confirmed by radiology and ultrasound imaging. A significant number of children developed ascites (23.2%) during the critical phase of their illness. A study done in a tertiary care children hospital, found that right-sided effusion was most seen which 42.7% followed by left-sided effusion in 6.7% of cases.⁹ Similar results observed in several other studies.^{10,11}

Neurological manifestations like altered level of consciousness, restlessness, and convulsion is rare in dengue patients. In this existing study we observed some children with dengue presented with febrile seizure (11.6%). Children with severe dengue such as extended dengue syndrome presented with altered level of consciousness (2.6%) and restlessness (16.4%) which is consistent with other studies.^{10,11} In this study, hematological abnormalities like thrombocytopenia, leucopenia and raised hct levels were seen; that are comparable to several other studies.^{9,10,11,12} Hepatic involvement is observed in children with dengue, especially in the case of severe dengue in the form of altered serum transaminases and coagulation profile. Like other studies our study also found the same result.^{11,12,13,14}

Low serum calcium level (10.5%) and hyponatremia (6.3%) were found in some of the patients with DSS. A study done at Bangalore, India found significant correlation between difference in serum sodium and potassium levels with severity of dengue fever.¹⁵

In this study, the duration of hospital stay was 6.9±2.3 days. Twenty-six (13,7%) children needed PICU support. Indication of PICU support were decompensated shock, hemorrhagic manifestations and respiratory distress. All children were managed according to national guideline for management of dengue fever, recovered and were discharged with advice. Fortunately, there was no mortality in this age group in this study period.

Conclusion:

Variation of clinical features and presentations of dengue fever in under 5 children cause diagnostic dilemma. Early recognition and prompt management is crucial for this group of children to overcome DSS, DHS. Lab parameters like altered liver enzymes and coagulation profile help to determine the severity of dengue. Pleural effusion is a dominant feature of severe disease. A significant number of under five children with DSS need PICU support. Management of dengue fever according to national guideline is important to save this vulnerable group of children.

Conflict of interest: None declared.

Funding: No funding sources

References:

1. Chen R, Vasilakis N. Dengue-quo tu et quo vadis? *Viruses*. 2011;3(9):1562-608.
2. Islam S, Haque CE, Hossain S, Hanesiak J. Climate Variability, Dengue Vector Abundance and Dengue Fever Cases in Dhaka, Bangladesh: A Time-Series Study. *Atmosphere*. 2021;12(7):905.
3. DGHS Bangladesh- daily dengue bulletin accessible at <https://old.dghs.gov.bd/index.php/bd/home/5200-daily-dengue-status-report>
4. World Health Organization (11 August 2023). Disease Outbreak News; Dengue in Bangladesh. Available at: <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON481>
5. Hammond S.N., Balmaseda A., Pérez L., et al. (2005) Differences in dengue severity in infants, children, and adults in a 3-year hospital-based study in Nicaragua. *Am J Trop Med Hyg* 73: 1063–1070.
6. Jain A, Chaturvedi UC. Dengue in infants: an overview. *FEMS Immunol Med Microbiol*. 2010 Jul 1;59(2):119-30. doi: 10.1111/j.1574-695X.2010.00670.x. Epub 2010 Mar 17. PMID: 20402771; PMCID: PMC7110389.
7. National Guideline for Clinical Management of Dengue Syndrome, 4th ed. Dhaka, Bangladesh. Directorate General of Health Services; 2018. Available at: <https://dghs.gov.bd/images/docs/Guideline/National%20Guideline%20for%20Clinical%20Management%20of%20Dengue%20Syndrome%202018>.
8. Ismail M, Akter M, Sabah LNA, 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; 10:988-4.
9. Sarkar PK, Ghosh K, Akand N, Rahman M, Afroz S. Clinical profile of dengue among children in Bangladesh: observation from a single pediatric hospital. *Int J Community Med Public Health* 2022; 9:1945-50.
10. Shultana K, Rahman AZM, Baki AA, Khan MSI, Deb B, Chowdhury D, et al. Dengue Infection in Children: Clinical Profile and Outcome in Dhaka City. *American Journal of Pediatrics* 2019;5(3):111-15. 2.
11. Rao M, Aparna A, Jyothi RC. Clinical profile and outcome of dengue infections in children. *IOSR* 2016; 15 (2): 7-13.
12. Hoque MS, Sarkar PK, Ahmed ASM. Clinical profile and outcome of dengue in children admitted in pediatric intensive care unit in Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh. *International Journal of Medical and Health Research*. 2019; 5:97-101.
13. Khan S, Baki MA, Ahmed T, Mollah MAH. Clinical and laboratory profile of dengue fever in hospitalized children in a tertiary care hospital in Bangladesh. (*BIRDEM Med J* 2020; 10(3): 200-203.
14. Adam AS, Pasaribu S, Wijaya H, Pasaribu AP. Clinical profile and warning sign finding in children with severe dengue and non-severe dengue. *IOP Conf Series Earth Environ Sci*. 2018; 125:012038.
15. Shankar P, Nithya E, Kavya C. Study on electrolyte disturbances in dengue fever in a tertiary care centre. *Int J Contemp Pediatr*. 2019; 6:2504-8.