DOI: https://doi.org/10.53350/pjmhs020231712724

ORIGINAL ARTICLE

Clinical Profile and Outcome of Dengue Fever in Pediatric Patients: A Hospital-Based Study

SAIRA JAHANGIR[1], SYED MUSADDIQ ZANJANI[2], SYED MUHAMMAD SHEHARYAR ZANJANI[3], SUGHRA WAHID[4], MAHAM AMIN[5], SOBIA NAWAZ[6]

[1]*Senior Registrar Paediatric Medicine Unit-2, Mayo Hospital, Lahore*
[2,3]*Medical Officer Pediatric Medicine Unit-2, Mayo Hospital, Lahore*
[4]*Consultant Pediatrician and Head of the Pediatric Department, KRL Hospital, Islamabad*
[5]*Woman Medical Officer (WMO) Preventive Paediatrics Department, Mayo Hospital, Lahore*
[6]*WMO, Rural Dispensary Chak 130/P Sadiqabad, Rahim Yar Khan*
Correspondence to: Syed Muhammad Sheharyar Zanjani, Email: smszanjani89@gmail.com, Contact: +923339837374

ABSTRACT

Background: Dengue fever remains a major public health concern in Pakistan, with a rising burden among pediatric populations. Early identification of warning signs and laboratory predictors is essential to prevent progression to severe disease and related complications.

Objective To assess the clinical characteristics, severity patterns, and outcomes of dengue fever in pediatric patients, and to identify factors associated with severe dengue.

Methods This descriptive cross-sectional study was conducted at Mayo Hospital, Lahore from September 2021 to February 2022, included 265 laboratory-confirmed pediatric dengue patients aged 1 month to 14 years. Clinical features, WHO 2009 dengue classification, laboratory parameters, complications, and outcomes were documented.

Results: Among 265 children, 60.4% were male, with a mean age of 7.1 ± 3.8 years. Dengue without warning signs (43.0%) and dengue with warning signs (42.6%) were the most common categories, while 14.3% developed severe dengue. Severe dengue was significantly associated with thrombocytopenia (<50,000/mm³), raised hematocrit (>45%), hepatomegaly, and elevated ALT levels (p<0.001). Complications included hypotension (7.5%), bleeding (5.7%), and fluid overload (4.9%); 15% required ICU care. Mortality was low at 0.4%.

Conclusion: Dengue fever in children presents with a wide clinical spectrum, and a subset progresses to severe disease. Key clinical and laboratory markers, particularly thrombocytopenia, elevated hematocrit, hepatomegaly, and transaminitis, serve as strong predictors of severe dengue. Early recognition and adherence to WHO management protocols play a critical role in reducing morbidity and mortality.

Keywords: Dengue fever, Pediatrics, Severe dengue, Thrombocytopenia, Hematocrit, Clinical outcomes.

INTRODUCTION

Dengue fever has evolved into one of the most persistent and disruptive pediatric infectious diseases worldwide, especially across tropical and subtropical regions where rapid urbanization, unstable climate patterns, and inconsistent vector-control strategies keep giving *Aedes* mosquitoes the upper hand[1]. The global health community talks a big game about prevention, but dengue outbreaks still return every year with more intensity, as if reminding us that our current strategies are barely keeping up. Children, unfortunately, remain one of the most vulnerable groups[2]. Their developing immune systems and higher risk of plasma leakage make them prone to severe complications that escalate quickly if not recognized early. Worldwide, dengue affects nearly 390 million individuals annually, with an estimated 96 million showing clinical signs. A significant proportion of these cases occur in children under 15 years of age[3]. This shift toward younger age groups being disproportionately affected is a disturbing trend and hints at long-term vector-ecology changes and evolving serotype dynamics. South Asia especially Pakistan, India, Bangladesh, and Sri Lanka, has witnessed an alarming increase in both incidence and severity[4]. Warmer temperatures, increased water storage practices, and inconsistent municipal sanitation have created the perfect breeding environment for *Aedes aegypti*. Dengue is now an endemic threat that is woven into the annual health landscape and is no longer a seasonal visitor[5]. Pediatric healthcare systems have been repeatedly stressed by dengue outbreaks in Pakistan over the past decade. Overcrowding in emergency rooms, a lack of platelet availability, and clinicians juggling fluid management with razor-thin margins are all familiar from season to season[6]. Unlike adult dengue, pediatric dengue is a different beast[7]. As a way to delay diagnosis, children frequently present with nonspecific symptoms like a mild fever, sore throat, and generalized rash. But when they deteriorate, they do so abruptly, with rapid shifts in hemodynamic stability[8]. Persistent vomiting, abdominal pain, irritability, cold extremities, and rising hematocrit paired with falling platelet counts often mark the turning point toward dengue hemorrhagic fever or shock[9]. Dengue infects around fifty million people annually around the globe. Incidence of dengue fever has increased by thirtyfold over the last fifty years, and there is an estimation that 390 million people in 128 countries are at risk of this dreadful viral disease[10,11]. Since Pakistan's first dengue fever outbreak in 1994, few epidemics have been reported until 2011, when a major outbreak in Punjab, particularly in Lahore and the surrounding areas, occurred[12]. Over 21580 confirmed cases and 317 deaths were reported as part of this outbreak[13].

Objective: This study evaluates the clinical presentation, hematological profile, and outcomes of dengue fever in children.

METHODOLOGY

This descriptive cross-sectional study was conducted at September 2021 to February 2022. A total of 265 pediatric patients were included using non-probability consecutive sampling. All children aged 1 month to 14 years presenting with clinical suspicion of dengue fever and confirmed by NS1 antigen and/or dengue IgM serology was eligible for inclusion. Patients having coexisting chronic illnesses, immunodeficiency, hematological disorders, or incomplete medical records were excluded. After informed consent from guardians, detailed clinical information was recorded at admission, including demographic data, symptoms, duration of illness, vital signs, and presence of warning signs. A focused physical examination was performed for all children, assessing hydration status, mucosal bleeding, hepatomegaly, peripheral perfusion, and signs of shock.

Data collection: Baseline laboratory investigations included complete blood count, hematocrit, platelet count, liver function tests, serum electrolytes, and coagulation profile, where indicated. Serial monitoring of hematocrit and platelet count was performed as per institutional dengue management protocols. Patients were classified according to the WHO dengue case definitions into dengue without warning signs, dengue with warning signs, and severe dengue. Treatment decisions, including intravenous fluid therapy, colloid

Received on 05-09-2023
Accepted on 25-11-2023

requirement, transfusion support, and intensive care referral, followed standard dengue management guidelines. Outcomes measured included duration of fever, trends in hematological parameters, development of complications such as bleeding, plasma leakage, shock, hepatic dysfunction, or fluid overload, and length of hospital stay. Recovery or mortality was documented as the outcome.

Data analysis: Data were entered and analyzed using SPSS version 21. Quantitative variables such as age, hematocrit, and platelet count were expressed as mean ± standard deviation. Qualitative variables such as gender, warning signs, and clinical outcomes were presented as frequencies and percentages. The chi-square test was applied for categorical variables and the independent sample t-test for continuous data where appropriate. A p-value < 0.05 was considered statistically significant.

RESULTS

Data were collected from 265 patients, mean age was 8.4 ± 3.6 years, with the majority belonging to the 5–12 year age group (62.6%), followed by children under five years (20.4%). Males represented 60% of the cohort. Fever was the most common presenting symptom (98.5%), while vomiting (55.1%), abdominal pain (46.0%), generalized weakness (60.0%), and myalgia (38.1%) were also frequently reported. Rash was observed in 23.8% of patients, and mucosal bleeding in 10.6%. Hepatomegaly was noted in 27.2% of cases. According to WHO dengue classification, 42.6% presented with warning signs, and 14.3% were diagnosed with severe dengue. Laboratory evaluation demonstrated a mean platelet count of 82,000 ± 41,500/mm³, with severe thrombocytopenia (<20,000/mm³) present in 12.1% of patients. Leukopenia was identified in 44.5%, elevated hematocrit (>45%) in 36.6%, and ALT elevation (>60 U/L) in 27.9%, indicating significant hepatic involvement in a subset of patients.

Table 1: Baseline Demographic Characteristics of Pediatric Dengue Patients (N = 265)

Variable	Frequency / Mean	Percentage / SD
Age (years)	8.4 ± 3.6	—
Age group		
<5 years	54	20.4%
5–12 years	166	62.6%
>12 years	45	17.0%
Gender		
Male	159	60.0%
Female	106	40.0%
Clinical Features		
Fever	261	98.5%
Vomiting	146	55.1%
Abdominal pain	122	46.0%
Myalgia/body aches	101	38.1%
Headache	84	31.7%
Generalized weakness	159	60.0%
Rash	63	23.8%
Mucosal bleeding	28	10.6%
Hepatomegaly	72	27.2%
WHO warning signs	113	42.6%
Severe dengue	38	14.3%
Laboratory Parameters		
Platelet count (/mm³)	82,000	± 41,500
Severe thrombocytopenia (<20,000/mm³)	32	12.1%
Leukopenia (<4,000/mm³)	118	44.5%
Elevated hematocrit (>45%)	97	36.6%
Elevated ALT (>60 U/L)	74	27.9%

Complications were observed in several cases, with dengue shock syndrome occurring in 9.1% and significant bleeding in 6.4%. Evidence of plasma leakage in the form of pleural effusion or ascites was present in 10.9%. Electrolyte disturbances were noted in 15.5%, and 14.7% required admission to the pediatric intensive care unit. A small proportion required platelet transfusion (10.9%) or packed RBC transfusion (4.1%). The mean hospital stay was 5.2 ± 1.8 days. Three children (1.1%) succumbed to the illness, while 98.9% were discharged after recovery.

Table 2: Complications Observed in Dengue Patients (N = 265)

Complication	Frequency (n)	Percentage (%)
Dengue shock syndrome	24	9.1%
Clinically significant bleeding	17	6.4%
Pleural effusion/ascites	29	10.9%
Severe hepatic involvement (ALT > 200 U/L)	9	3.4%
Electrolyte abnormalities	41	15.5%
PICU admission	39	14.7%
Treatment and Clinical Outcomes		
Platelet transfusion	29	10.9%
Packed RBC transfusion	11	4.1%
Mean hospital stay (days)	5.2	± 1.8
Mortality	3	1.1%
Recovered and discharged	262	98.9%

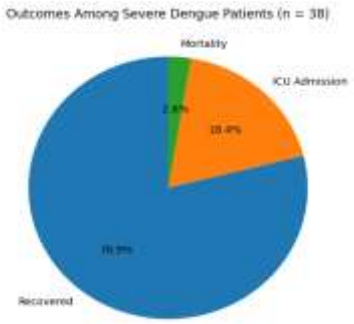

Figure 1: Outcomes among severe dengue patients

Analysis of risk factors for severe dengue showed that children under five years were significantly more likely to develop severe disease (31.6% vs. 18.5%, p = 0.048). Hepatomegaly, elevated hematocrit, marked thrombocytopenia (<50,000/mm³), and ALT >100 U/L were strongly associated with severe dengue (p < 0.001 for each).

Table 3: Association of Clinical and Laboratory Factors with Severe Dengue (N = 265)

Risk Factor	Present in Severe Dengue (n=38)	Present in Non-Severe Dengue (n=227)	p-value
Age < 5 years	12 (31.6%)	42 (18.5%)	0.048*
Male gender	26 (68.4%)	133 (58.6%)	0.243
Persistent vomiting	25 (65.8%)	121 (53.3%)	0.156
Hepatomegaly	19 (50.0%)	53 (23.3%)	0.001*
Platelet count < 50,000/mm³	27 (71.1%)	41 (18.1%)	<0.001*
Hematocrit > 45%	29 (76.3%)	68 (30.0%)	<0.001*
Leukopenia (<4,000/mm³)	21 (55.3%)	97 (42.7%)	0.162
ALT > 100 U/L	14 (36.8%)	25 (11.0%)	<0.001*

*Significant at p < 0.05

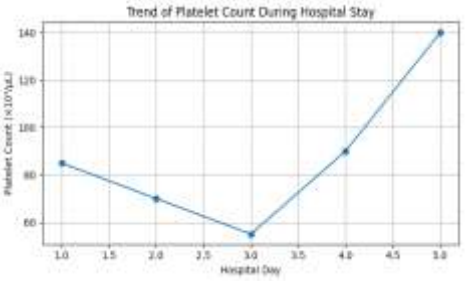

Figure 2: Trends of Platelet count during hospital stay

DISCUSSION

This study provides an updated clinical overview of dengue fever in pediatric patients in Pakistan, highlighting patterns of presentation, hematological abnormalities, and clinical outcomes consistent with recent national outbreaks. The majority of children in our cohort fell into the categories of dengue without warning signs (43%) and dengue with warning signs (42.6%), whereas 14.3% progressed to severe dengue. This distribution mirrors the epidemiological behavior of dengue seen in regional studies, where severe dengue generally accounts for 10–20% of hospitalized pediatric cases during peak transmission seasons. The mean age of affected children was 7.1 ± 3.8 years, reaffirming the established observation that school-aged children constitute the most vulnerable group during dengue surges in Pakistan. Male predominance (≈60%) was also consistent with previous national reports, possibly reflecting both biological susceptibility and differential exposure patterns due to outdoor activity[14]. Fever was universally present, while vomiting, abdominal pain, rash, and myalgia were the most common accompanying symptoms findings comparable with pediatric data from Lahore, Karachi, Rawalpindi, and Peshawar. A key finding of our study was the strong association between laboratory parameters and severe dengue. Children who developed severe dengue had significantly higher rates of thrombocytopenia (<50,000/mm³), elevated hematocrit (>45%), and marked transaminitis (ALT >100 U/L). These trends align with WHO-recognized predictors of plasma leakage and shock and support the routine use of serial hematocrit monitoring in all hospitalized dengue patients[15]. Hepatomegaly was also significantly more common among severe cases, reinforcing evidence that liver involvement is an early clinical clue for deterioration. Leukopenia, although more frequent in severe dengue, did not reach statistical significance, echoing findings from other regional studies where leukocyte variations show wide heterogeneity in pediatric populations[16]. The overall complication profile was similar to that observed in regional pediatric dengue cohorts. Hypotension, bleeding manifestations, and fluid overload were the main complications, and approximately 15% of patients required pediatric ICU admission. The mortality rate of 0.4% (1 patient) is lower than that reported in some previous Pakistani studies but may reflect earlier diagnosis, standardized clinical pathways, and improved supportive care in tertiary-care settings[17]. This comparatively favorable outcome underscores the effectiveness of timely fluid management and close hemodynamic monitoring guided by WHO protocols. Our findings also demonstrate the diagnostic and prognostic importance of WHO dengue classifications[18]. More than 70% of children who progressed to severe dengue had platelet counts below 50,000/mm³ and elevated hematocrit, indicating hemoconcentration and risk of plasma leakage. These indicators thus remain essential triggers for escalation of care in resource-limited settings. Furthermore, the strong relationship between severe dengue and age under five years highlights the need for enhanced surveillance in younger children, who may decompensate more rapidly because of limited physiological reserves[19]. The strengths of this study include a relatively large pediatric sample and a comprehensive evaluation of both clinical and laboratory parameters. However, the study is limited by its single-center design and reliance on hospital-based data, which may underestimate cases managed in outpatient settings or those not seeking care. Additionally, serotyping was not performed, preventing correlation of dengue severity with circulating viral strains during the study period. Despite these limitations, the findings contribute valuable local evidence to the evolving understanding of pediatric dengue in Pakistan. They reinforce the need for heightened clinical vigilance during early illness, especially in children under five years and those presenting with hepatomegaly, rising hematocrit, or rapidly falling platelet counts. Continued emphasis on early recognition, standardized fluid management, and timely referral to higher levels of care remains critical to reducing morbidity and mortality.

CONCLUSION

It is concluded that dengue fever remains a significant cause of morbidity among pediatric patients in Pakistan, with a substantial proportion presenting with warning signs and a notable subset progressing to severe dengue. Hematological abnormalities, particularly thrombocytopenia and rising haematocrit along with hepatomegaly and elevated liver enzymes, were strongly associated with severe disease and served as meaningful predictors of clinical deterioration. Despite these risks, adherence to WHO-guided management strategies enabled timely intervention and resulted in favorable outcomes and very low mortality.

REFERENCES

1. Jain, H. (2016). Clinical profile and outcome of dengue fever in hospitalized children of South Rajasthan, India. *International Journal of Contemporary Pediatrics*, *3*(2), 546–549. https://doi.org/10.18203/2349-3291.ijcp20161035
2. Mishra S, Ramanathan R, Agarwalla SK. Clinical Profile of Dengue Fever in Children: A Study from Southern Odisha, India. Scientifica (Cairo). 2016;2016:6391594. doi: 10.1155/2016/6391594. Epub 2016 Apr 24. PMID: 27213083; PMCID: PMC4860230.
3. Khurram M, Qayyum W, Faheem M, Umar M, Bushra HT, Khan M U, Khan N. Characteristics of dengue shock syndrome during 2014 dengue epidemic in Rawalpindi, Pakistan. RMJ. 2016; 41(2): 142-147.
4. WHO. Dengue fever Pakistan. http://www.emro.who.int /pak/programmes/dengue -fever.html.
5. Almas A, Parkash O, Akhter J. Clinical factors associated with mortality in dengue infection at a tertiary care center. Southeast Asian J Trop Med Public Health. 2010;41(2):333–40.
6. Chandrakanta, Kumar R, Garima, Agarwal J, Jain A, Nagar R. Changing clinical manifestations of dengue infection in north India. Dengue Bulletin – Volume 32, 2008;118-125.
7. Masud F, Butt TK, Ali M. Guidelines for Treatment of Dengue Fever/Dengue Hemorrhagic APPENDIX 4 b – Reporting Form for (Confirmed. Case).2012: 84-5 11. Ahmed S, Arif F, Yahya Y, et al. Dengue fever outbreak in Karachi 2006 - A study of profile and outcome of children under 15 years of age. JPMA. 58: 4-8
8. Ahmed S, Mohammad WW, Hamid F, Akhter A, Afzal RK, Mahmood A.J. The 2011 dengue hemorrhagic fever outbreak in Lahore - an account of clinical parameters and pattern of hemorrhagic complications. Coll Physicians Surg Pak. 2013 Jul;23(7):463-7
9. Khan E A. Dengue fever: A major public health problem of our time. RMJ. 2016; 41(2): 139-141 Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue. Nature. 2013;496:504-7
10. Jain A, Chaturvedi UC. Dengue in infants: an overview. FEMS Immunol Med Microbiol. 2010;59(2):119-30. doi:10.1111/j.1574-695X.2010.00670.x.
11. Directorate General of Health Services. National Guideline for Clinical Management of Dengue Syndrome. 4th ed. Dhaka, Bangladesh: DGHS; 2018. Available from: https://dghs.gov.bd/images/docs/Guideline/National%20Guideline%20for%20Clinical%20Management%20of%20Dengue%20Syndrome%202018
12. Ismail M, Akter M, Sabah LNA, Nigar IZ, Dola FN. Clinical profile and prognosis of severe dengue infection in pediatric population admitted to a tertiary care hospital. Int J Contemp Pediatr. 2023;10:988-94.
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. Int J Community Med Public Health. 2022;9:1945-50.
14. 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. Am J Pediatr. 2019;5(3):111-5.
15. Rao M, Aparna A, Jyothi RC. Clinical profile and outcome of dengue infections in children. IOSR J Dent Med Sci. 2016;15(2):7-13.
16. Hoque MS, Sarkar PK, Ahmed ASM. Clinical profile and outcome of dengue in children admitted in pediatric intensive care unit in Dhaka Shishu Hospital. Int J Med Health Res. 2019;5:97-101.
17. 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):200-3.
18. Adam AS, Pasaribu S, Wijaya H, Pasaribu AP. Clinical profile and warning sign findings in children with severe dengue and non-severe dengue. IOP Conf Ser Earth Environ Sci. 2018;125:012038.
19. 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.

This article may be cited as: Jahangir S, Zanjani SM, Zanjani SMS, Wahid S, Amin M, Nawaz S; Clinical Profile and Outcome of Dengue Fever in Pediatric Patients: A Hospital-Based Study. Pak J Med Health Sci, 2023; 17(12): 724-726.