

Original Research Article

Clinical spectrum, complications and management outcomes in paediatric dengue: a retrospective analysis

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ABSTRACT

Background: The dengue fever remains a major cause of acute febrile illness among children in India. To provide region-specific data from central Maharashtra, this study evaluated the clinical spectrum, complications, outcomes and impact of steroid therapy in paediatric dengue patients.

Methods: This retrospective observational study was conducted at a tertiary care centre in Chhatrapati Sambhajnagar, Maharashtra covering the period of January 2021 to December 2025. A total of 355 children (<18 years) with serologically confirmed dengue (NS1/IgM positive) were included. Patients were classified into mild, moderate and severe dengue according to WHO guidelines. Clinical features, laboratory parameters, steroid use in context of complications, duration of hospital stay and outcomes were analysed.

Results: A total of 355 patients, 60.3% were males, with 49.0% aged 10–15 years. Mild dengue was seen in 55.8%, moderate in 38.6% and severe in 5.6% of cases. Fever was the most common symptom (98.03%), followed by abdominal pain (20.85%). Warning signs included fluid accumulation (10.70%) and mucocutaneous bleeding (9.57%). Severe manifestations such as shock (3.09%), ARDS (1.97%) and altered sensorium (1.69%) were uncommon. No cases of renal failure or major haemorrhage were observed in this cohort. Hospital stays increased with disease severity. Outcomes were favourable, with minimal mortality.

Conclusions: Paediatric dengue in this cohort was predominantly mild to moderate with low complication rates. Early diagnosis and standardized, WHO-guideline-based management contributed to favourable outcomes. The judicious use of steroids in moderate and severe cases appeared to reduce complications and improve outcomes, though its effect on hospital stay remains unclear. Thus, larger prospective studies are needed to confirm the role and timing of steroids in early dengue management.

Keywords: Complications, Duration of hospital stay, Dengue, Outcome, Steroid, Thrombocytopenia

INTRODUCTION

Dengue fever is one of the most common causes of undifferentiated tropical fevers in hospitalized children across India. The incidence of dengue has been found to be increasing from past few years, from a total of 1,24,493 cases in 2018 to 2,33,251 in 2022. The case fatality rate (CFR- deaths per 100 cases), however, has

declined from 3.3% in 1996 to 0.1% in 2019, which has been maintained at this level since then owing to early diagnosis of warning signs and effective medical management.¹ Every year during the period of July-Nov, an upsurge in the cases of dengue has been observed typically, the cases peak post monsoon duration. However, the states in southern and western parts of India report perennial transmission.¹ Dengue affects persons of all age groups, although the highest incidence is reported

in children aged 5 to 15 years and the infection can present with symptoms ranging from undifferentiated fever to severe forms as multiorgan dysfunction.² The most severe consequences of dengue virus infection include shock, haemorrhage and major organ failure; however, the frequency of these manifestations varies across different populations and healthcare settings. Despite the high burden of disease, there is limited region-specific data describing the clinical profile, complication spectrum and treatment outcomes of paediatric dengue, particularly from tertiary care centres in central Maharashtra.³ Also there are many controversies on role of steroids in dengue patient's management.⁴⁻⁶

Thus, in view of the evolving epidemiological trends and clinical variability of dengue, this retrospective observational study was conducted to systematically analyse the clinical and demographic characteristics, complication profile and therapeutic outcomes of serologically confirmed paediatric dengue cases presented to a tertiary care centre in central Maharashtra. Also, the analysis of the effect of steroids on complication, duration of hospital stays and outcome was conducted.

Objectives

Primary

To study Clinical Spectrum and to determine the Mortality Rate among paediatric patients with dengue fever admitted to a tertiary care centre.

Secondary

To evaluate the spectrum and frequency of complications in relation to disease severity and to assess the duration of hospital-stay among paediatric patients with dengue fever when treated with steroid as per institutional protocol.

METHODS

This retrospective observational study was carried out in the paediatric wards and paediatric intensive care unit (PICU) of a tertiary care centre in Chhatrapati Sambhajanagar, Maharashtra, over a period of five years, from January 2021 to December 2025. Prior approval was obtained from the Institutional Ethics Committee. All children below 18 years of age who were admitted with serologically confirmed dengue infection (NS1 antigen and/or IgM positive) were included in the study. Patients older than 18 years, those with only IgG positivity or those with clinically suspected but serologically negative dengue were excluded. In order to avoid confounding factors, children with pre-existing comorbid conditions such as renal, hepatic, cardiac or neurological diseases, as well as those with haemolytic anaemia, were also excluded. Patient were categorised at the time of admission into three different classes as per WHO

national guideline for clinical management of dengue and severe acute respiratory infection (2022)—dengue without warning signs (mild dengue), dengue with warning signs (moderate dengue) and severe dengue.⁷ The warning signs included persistent vomiting; abdominal pain/tenderness; lethargy/restlessness; sudden behavioural changes; bleeding manifestations (epistaxis, melena, haematemesis, excessive menstrual bleeding, haematuria); syncope/giddiness, clinical fluid accumulation (ascites, pleural effusion), hepatomegaly (>2 cm) and laboratory evidence of progressive haematocrit increase concurrent with rapid platelet decline. Severe dengue was identified by profound shock, significant bleeding with hemodynamic instability, severe metabolic derangement or organ impairment.

As per the institutional protocol, children diagnosed with dengue fever with warning signs or severe dengue were treated with intravenous dexamethasone at a dose of 8 mg/m²/day, given in two divided doses for three days, along with standard supportive management in accordance with WHO National guidelines for dengue (2009, 2022, 2023) and National Center for Vector Borne Diseases Control (NCVBDC) 2023 guidelines. The medical records of all eligible patients were reviewed in detail. Information regarding demographic profile, presenting complaints, clinical findings, laboratory parameters and the use of steroids was collected. Thrombocytopenia at presentation was assessed using the initial complete blood count (CBC) and categorized as mild, moderate or severe. Based on WHO criteria, patients were further classified into mild, moderate and severe dengue. Any complications developing during the course of hospitalization, especially in patients with warning signs or severe dengue, were noted. The duration of hospital stay was recorded for all patients and compared across different severity groups. Final outcomes were documented as either discharge or death.

Statistical analysis

The data was recorded in an excel sheet, since the values were categorical expressed as frequencies and percentages thus no statistical inference was calculated.

RESULTS

A total of 355 paediatric patients with serologically confirmed dengue fever were included in the study. Of these, 214 (60.3%) were males and 141 (39.7%) were females. The majority of patients belonged to the 10–15 years age group (174; 49.0%), followed by 5–10 years (28.2%) and 15–18 years (16.6%).

Severity distribution

Based on clinical classification, 198 patients (55.8%) had mild dengue, 137 (38.6%) had moderate dengue and 20 (5.6%) had severe dengue (Table 1, Figure 1). The highest number of severe cases was observed in the 10–

15 years age group (55%). Male predominance was noted across all severity categories.

Clinical presentation

Fever was the most common presenting symptom, observed in 348 patients (98.03%). Other frequently reported symptoms included abdominal pain (20.85%), persistent vomiting (12.95%) and fluid accumulation (10.70%). Muco-cutaneous bleeding was seen in 9.57% of cases. Severe clinical manifestations were less frequent, including shock (3.09%), ARDS (1.97%), altered sensorium (1.69%) and major bleeding (1.12%) (Table 2). Among patients with shock, overlapping complications were noted, with major bleeding (n=4), altered sensorium (n=3) and ARDS (n=1).

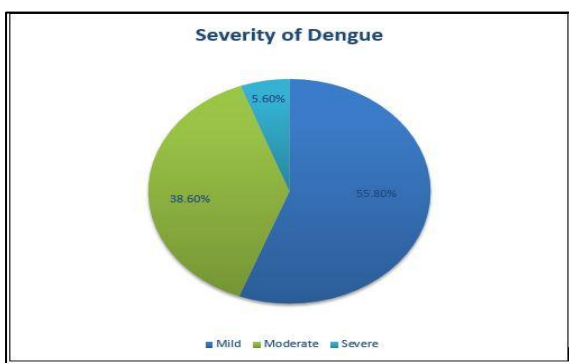


Figure 1: Distribution of dengue cases according to severity.

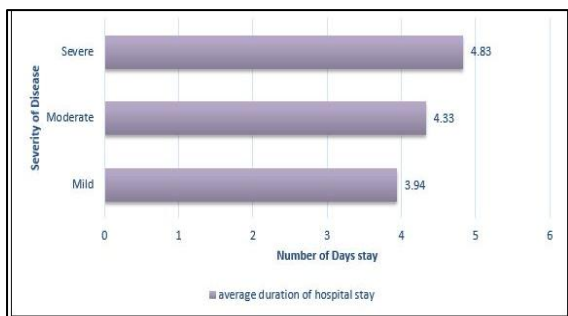


Figure 2: Average duration of hospital-stay by severity category.

Table 1: Age and gender distribution according to severity of dengue (n=355).

Variables	Mild N (%)	Moderate N (%)	Severe N (%)	Total N (%)
Gender				
Female	72 (36.4)	62 (45.3)	7 (35.0)	141 (39.7)
Male	126 (63.6)	75 (54.7)	13 (65.0)	214 (60.3)
Age group (in years)				
<1	1 (0.5)	0 (0)	1 (5.0)	2 (0.6)
1–5	18 (9.1)	2 (1.5)	0 (0)	20 (5.6)
5–10	56 (28.3)	40 (29.2)	4 (20.0)	100 (28.2)
10–15	90 (45.5)	73 (53.3)	11 (55.0)	174 (49.0)
15–18	33 (16.7)	22 (16.1)	4 (20.0)	59 (16.6)
Total	198 (55.8)	137 (38.6)	20 (5.6)	355 (100)

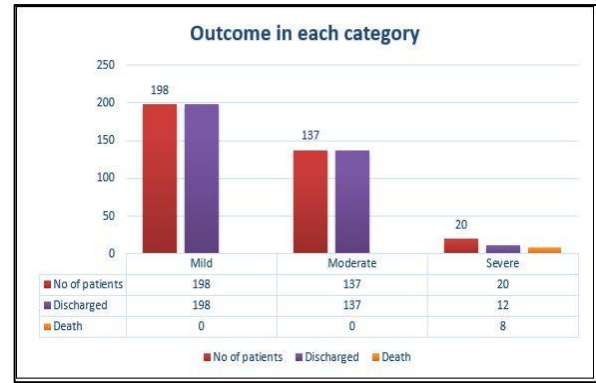


Figure 3: Outcomes of dengue cases by severity.

Haematological profile

At presentation, moderate thrombocytopenia (50,000–1 lakh/mm³) was the most common finding, seen in 152 patients (42.8%), followed by severe thrombocytopenia (<50,000/mm³) in 94 patients (26.5%) and mild/normal platelet counts in 109 patients (30.7%) (Table 3).

Complications

Among children with dengue and warning signs, severe complications were relatively infrequent. Shock was observed in 4 patients (2.9%), while ARDS and encephalopathy were each seen in 2 patients (1.5%). No cases of haemorrhage or renal failure were reported in this subgroup (Table 4).

Duration of hospital stay

The duration of hospital stays increased with disease severity, with patients in the severe dengue category requiring longer hospitalization compared to mild and moderate cases (Figure 2).

Outcome

The majority of patients had a favourable outcome with recovery and discharge across all severity groups. Outcomes stratified by disease severity are depicted in Figure 3. Mortality was minimal/negligible, reflecting effective early diagnosis and management.

Table 2: Presenting symptoms and signs in children with dengue fever (n=355).

Clinical features	Number of patients (N)	%
Fever	348	98.03
Abdominal pain	74	20.85
Persistent vomiting	46	12.95
Fluid accumulation (ascites/pleural effusion)	38	10.70
Muco-cutaneous bleeding	34	9.57
Shock*	11	3.09
ARDS	7	1.97
Altered sensorium (GCS <8)	6	1.69
Major bleeding	4	1.12

*Among patients with shock, 4 had associated major bleeding, 3 had altered sensorium and 1 had ARDS.

Table 3: Severity of thrombocytopenia at presentation (n=355).

Severity	Number of patients (N)	%
Mild/normal (>1 lakh/mm³)	109	30.7
Moderate (50,000–1 lakh/mm³)	152	42.8
Severe (<50,000/mm³)	94	26.5

Table 4: Severe complications during treatment course in children with dengue fever with warning signs.

Complications	Number of patients (N)	%
Shock	4	2.9
ARDS	2	1.5
Encephalopathy	2	1.5
Haemorrhage	0	0
Renal failure	0	0

DISCUSSION

The present study provides a comprehensive evaluation of the clinical profile, severity spectrum and outcomes of paediatric dengue in a tertiary care setting in central Maharashtra. The findings are largely consistent with existing literature while contributing valuable region-specific data.

A male predominance (60.3%) observed in this study is in agreement with several Indian studies, including those by Ahmed et al, which reported higher dengue incidence among males, possibly due to increased outdoor exposure and vector contact.⁸ The predominance of cases in the 10–15 years age group aligns with findings from multicentre paediatric studies, which identify school-aged children as the most affected demographic.⁹

In the present study, the majority of cases were classified as mild (55.8%), followed by moderate (38.6%), with only 5.6% progressing to severe dengue. This distribution is comparable to observations from the WHO 2009 dengue classification-based studies, which demonstrate that a smaller proportion of paediatric cases progress to severe disease when early intervention is implemented.¹⁰ The relatively low proportion of severe dengue in our cohort may reflect improved awareness, early diagnosis and adherence to standardized treatment protocols.

Fever was the most common presenting symptom (98.03%), consistent with global and Indian data where it was reported in nearly all dengue cases.¹¹ Gastrointestinal symptoms such as abdominal pain and persistent vomiting, observed in a significant proportion of patients in this study, are well-established warning signs of severe dengue, as highlighted in WHO guidelines and subsequent validation studies.^{10,12,13}

Severe manifestations such as shock (3.09%) and ARDS (1.97%) were relatively infrequent but clinically significant. Similar observations have been reported by Guzman MG et al, who emphasize that severe dengue constitutes a smaller proportion of cases but contributes disproportionately to morbidity due to plasma leakage and systemic inflammatory response.¹¹ The underlying pathophysiology, characterized by increased vascular permeability and cytokine-mediated injury, often results in overlapping complications such as shock, bleeding, encephalopathy and ARDS, reflecting the multiorgan involvement typical of severe dengue.^{14,15}

Thrombocytopenia was a common haematological finding, with moderate thrombocytopenia (42.8%) being the most frequent. This highlights the importance of clinical assessment and monitoring for warning signs, rather than relying solely on laboratory parameters.^{16,17} The incidence of severe consequences during treatment

period such as encephalopathy and ARDS was low and notably, no cases of renal failure or significant haemorrhage were observed. This contrasts with some reports from high-burden regions but may reflect early hospitalization and effective supportive care and use of steroid in treatment while treating dengue patients with warning signs, which are known to reduce progression to critical illness.¹⁵

The duration of hospital stays increased with disease severity, a finding consistent with studies by Mallhi et al, and other hospital-based analyses, which demonstrate longer hospitalization in patients with severe dengue due to the need for intensive monitoring and fluid management. But still in the present study, the duration of the hospital stay for mild and moderate dengue patients is comparable which can be due to early use of steroids in moderate and severe dengue patients.¹⁸

Importantly, the mortality rate in this study was minimal, aligning with the global decline in dengue-related deaths reported by the World Health Organization, where case fatality rates have fallen below 1% in well-managed settings.¹² This reflects advances in early recognition, timely fluid resuscitation and protocol-based management and inclusion of timely steroids in treatment which are critical determinants of survival in dengue.

Despite these findings, there remains significant variability in clinical presentation and outcomes across regions, emphasizing the need for region-specific epidemiological data, as highlighted in recent global burden analyses.¹⁹ The present study contributes to this need by providing insights from central Maharashtra. Also, this study emphasizes on role of steroids in treating dengue patients and support their use of if patient having severe dengue or warning signs of moderate dengue.

Limitations

Its retrospective, single-centre design may limit generalizability of the findings to other regions and healthcare settings. As the data were categorical and analysed descriptively as frequencies and percentages, no statistical inference or multivariate analysis could be performed to formally test associations between severity, steroid use and outcomes. As the role of steroids in dengue remains widely controversial in global literature, a retrospective analysis of this size is insufficient to conclusively recommend dexamethasone as a definitive standard of care which will require prospective multicentre trial validation. Long-term follow-up after discharge was not available, so post-discharge complications or sequelae could not be assessed.

CONCLUSION

This retrospective analysis provides a comprehensive data encompassing the clinical profile, severity spectrum and outcome of paediatric dengue from a single tertiary

care centre with a male predominance and a majority of mild severity dengue cases, the study shows that very few cases end up into severe variety with prompt early treatment interventions. It was noteworthy to have encountered no cases with renal failure or severe haemorrhage as the disease complications. The short hospital stays and minimal mortality adds region-specific real-world evidence suggesting a potential adjunctive benefit of judicious steroid use in dengue with warning signs or severe disease. A well-structured prospective multi-centre interventional trial will be required to prove conclusively the effect of use of early steroids in moderate dengue cases in reducing the hospital stay and complications. None-the-less our study effectively brings out the clinical profile of paediatric dengue contributing to the current literature in understanding region wise variations in the disease presentation and points to the need of studying the role of steroids in preventing complications in paediatric dengue.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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