

## Original Research Article

DOI: <http://dx.doi.org/10.18203/2349-3291.ijcp20200114>

# Clinico-laboratory profile and outcome of dengue fever among children attending a tertiary care hospital of rural Telangana, India

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Received: 21 November 2019

Revised: 25 December 2019

Accepted: 30 December 2019

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## ABSTRACT

**Background:** Dengue is a self-limiting, vector-borne disease transmitted by Aedes mosquito, causing a major public health threat globally. The objective of this study is to assess the clinical profile and outcome of the dengue infection in children less than 14 years of age September 2018 to August 2019 at the Pediatric Department of S.V.S. Medical College, the tertiary care hospital in Mahabubnagar, Telangana.

**Methods:** Prospective study of 82 hospitalized children of <14 years with the diagnosis of dengue illness. Children with diagnosis of dengue were classified further in to two groups as per WHO guidelines, Non-severe dengue fever (probable dengue, dengue with warning signs) and 'Severe Dengue' (Dengue Haemorrhagic Fever and/or Dengue Shock Syndrome (DHF/DSS). A separate questionnaire form used for documenting clinical history, laboratory parameters. Haematological parameters were noted, chest x-ray, ultra-sonogram in required cases was done. Children were managed as per WHO protocol. The outcomes of the cases were mentioned as discharge, left against medical advice and death.

**Results:** A total of 82 children with dengue were divided in to 55(67%) non severe dengue and 27(33%) severe dengue with males 56(68.2%) and females 26(31.7%). The most common age of presentation was between 6-10 years 34(41.5%). Fever 73(89%) was the most common presenting symptoms. Pleural effusion and hepatomegaly were the commonest clinical findings 28(34.1%) each, which were more among the severe dengue patients. Gall bladder edema 29(35.3%) was the most common ultra-sonogram finding. Significant elevation of transaminases (SGOT, SGPT) was seen in 39(47.5%). Severe thrombocytopenia was observed in 22(26.8%) children. Management was by administration of colloids and crystalloids.

**Conclusions:** Dengue is a global problem. Presenting features include high grade fever, vomiting, abdominal pain, skin rash. Early recognition of symptoms and proper management can reduce the mortality.

**Keywords:** Non-severe dengue, Severe dengue, Thrombocytopenia, Transaminases

## INTRODUCTION

Dengue is a vector-borne disease transmitted by Aedes mosquito, causing a major public health threat globally. WHO estimated that 50-100 million dengue infections occur annually, with a 30-fold increase in global incidence observed over the past 50 years (WHO, 2012).<sup>1</sup>

The total number of dengue cases has significantly increased in India since 2001.<sup>2</sup> In 2010, an estimated 33 million cases had occurred in the country. During 2016, the NVBDCP reported more than 100,000 laboratory confirmed cases of dengue.<sup>3</sup> India contributed to 34% of the 96 million apparent Dengue Virus (DENV) infections estimated to have occurred globally in 2010.<sup>4</sup>

There are four distinct dengue viruses sub-types (DENV1-4), and although infection with one type confers long-term immunity.<sup>5</sup> The revised 2009 WHO guidelines, according to the levels of severity has focused on recognized warning signs for early detection and timely intervention and reclassified dengue fever as “Dengue” without warning signs (D), “Dengue with Warning signs” (DW), and “Severe Dengue” (SD).<sup>6</sup> Dengue manifests in three stages: febrile phase, critical phase and recovery phase. Clinical manifestations vary with the stage of the illness.<sup>7</sup> The common symptoms and signs observed were fever, headache, myalgia, arthralgia, bleeding manifestations and shock.<sup>8</sup> The objective of the present study is to study the clinical profile, laboratory profile in children with dengue.

## METHODS

An observational prospective study was conducted in the Pediatric ward and Pediatric Intensive Care Unit (PICU) in a medical college and hospital over a period of one year (September 2018 to August 2019). Clinical complaints of fever, headache, rash, pain abdomen, bleeding manifestations, myalgia and joint pains with (either a positive Dengue NS1 antigen or a positive Dengue IgM) (J Mithra and Co Ltd) cases and classified as per WHO guidelines 2009 were included in study. Details like clinical signs and symptoms, laboratory investigations and treatment were recorded into a case proforma. The study period was for 1 year. Approval from hospital ethical committee and written consent of the parents were obtained.

### Inclusion criteria

- All the children from 1 month to 14 years of age with laboratory confirmed dengue.

### Exclusion criteria

- Children age less than 1 month and more than 14 years.
- Children with co-infections like malaria, enteric fever, rickettsial fever were excluded from the study.

Clinical history included duration fever, presence of vomiting, abdominal pain, myalgia, rash and bleeding manifestations were entered in a questionnaire sheet. Clinical examination details like temperature, pulse rate, respiratory rate, blood pressure and presence of organomegaly (liver and spleen), petechiae, purpura were recorded. Laboratory data like hemoglobin, hematocrit, Total WBC counts, and platelets, liver transaminases (SGPT, SGOT), coagulation profile (INR, aPTT) were documented. Chest X-Ray and ultrasound abdomen were performed wherever required. Patients were classified as non-severe dengue (dengue without warning signs, dengue with warning signs) or severe dengue (dengue hemorrhagic fever and dengue shock syndrome) according to the WHO classification 2009. Fluid

management of children was done according to WHO guidelines. Blood and Platelet products were given to patients with thrombocytopenia who has significant bleeding. Outcome of the children was studied as recovered, left against medical advice and death.

## RESULTS

In the present study, 82 confirmed cases were included with 56(68.2%) males and 26(31.7%) females. Among males, 39 were diagnosed with non-severe dengue, 17 were severe dengue cases and 16 among female were non-severe cases and 10 were of severe cases. In the present study, non-severe dengue cases were more among males and females. Male to female ratio in this study was 2.1:1 as shown in. The maximum number of cases, 34(41.4%) was seen in the group 6-10 years of age, followed by 29(35.3%) was seen in the more than 10 years age group. Among 6-10 years age group, 21(38.1%) children had non severe dengue (n=55) and 13(48.1%) were admitted with severe dengue (n=27). The mean duration of hospitalization was 4.74 days (Table 1).

**Table 1: Demographics of children with dengue fever.**

Parameters	Variables	Non Severe Dengue N=55; (%)	Severe Dengue N=27; (%)
Age	≤1 year	6(10.9)	2(7.4)
	1-5years	8(14.5)	3(11.1)
	6-10years	21(38.1)	13(48.1)
	>10 years	20(36.3)	9(33.3)
Sex	Male	39(70.9)	17(62.9)
	female	16(29.1)	10(37)
Day of admission after onset of fever	0-3 days	21(38.2)	10(37)
	4-6 days	32(58.2)	15(55.5)
	>6 days	2(3.6)	2(7.4)
Duration of hospital stay	0-3 days	13(23.6)	1(3.7)
	4-6 days	39(70.9)	23(85.1)
	> 6 days	3(5.4)	3(11.1)

Among the clinical symptoms, fever 73(89%) was the most common presenting feature, followed by vomiting in 43(52.4%) and Rash in 36(43.9%), abdominal pain in 23(28%), headache 22(26.8%), edema 13(15.8%) and petechiae 12 (14.6%). Significant bleeding was seen in 9 (8.5%) (Table 2).

In this study, hepatomegaly was present in 28(34.1%), gall bladder wall edema in 29(35.3%), and pleural effusion in 28(34.1) and 20(24.3%) children had ascites (Table 3).

Leukopenia (<4000/mm<sup>3</sup>) was observed in 37(45%) cases of study with 23 non-severe dengue cases and 14 severe dengue cases, while 1 child with non-severe dengue (1.2%) had leukocytosis (>11,000/mm<sup>3</sup>); whereas, normal leukocyte counts (4000-11000cells/mm<sup>3</sup>) were observed in 44(53.6%) cases among them, 31 cases were non-

severe dengue and 13 cases were severe dengue. During the height of illness, hematocrit values were found <36.5% in 40(48.7%) cases, among them 26 were of non-severe dengue and 14 were with severe dengue; 42 (51.2%) children were found to have hematocrit >36.5, among them 29 were of non-severe dengue and 13 were with severe dengue (Table 4).

**Table 2: Clinical symptoms and signs of dengue fever.**

Parameters	Non severe dengue n=55; (%)	Severe dengue n=27; (%)	Total n=82; (%)
Fever	50(90.9)	23(85)	73(89)
Vomiting	29(53)	14(51.8)	43(52.4)
Rash	22(40)	14(51.8)	36(43.9)
Headache	16(29)	6(22.2)	22(26.8)
abdominal pain	16(29)	7(25.9)	23(28)
muscle pain	7(12.7)	2(7.4)	9(10.9)
Petechiae	3(5.4)	9(33.3)	12(14.6)
GI bleed	0(0)	7(25.9)	7(8.5)
Edema	6(10.9)	7(25.9)	13(15.8)
Seizures	1(1.8)	2(7.4)	3(3.6)
loose stools	2(3.6)	4(14.8)	6(7.3)
Excessive cry	1(1.8)	1(3.7)	2(2.4)

**Table 3: Radiological evaluation and serology of patients with dengue fever.**

Parameters	Variables	Non severe dengue n=55; (%)	Severe dengue n=27; (%)
Pleural effusion	Yes	6(10.9%)	22(81.5%)
	No	49(89.1%)	5(18.5%)
Hepatomegaly	Yes	10(18.1%)	18(66.6%)
	No	45(81.8%)	9(33.3%)
GB Edema	yes	15(27.7%)	14(51.8%)
	No	40(72.7%)	13(48.1%)
Ascites	Yes	5 (9%)	15(55.5%)
	No	50(90.9%)	12(44.4%)
Dengue NS1+	Yes	49 (89%)	25(92.5%)
	No	6 (10.9%)	2(7.4%)
Dengue IGM +	Yes	29(52.7%)	22(81.5%)
	No	26(47.2%)	5(18.5%)
both IGM and NS1+	Yes	23(41.8%)	20(74%)
	No	22 (40%)	7 (25.9%)

In the current study, Platelet count <20,000 was seen in 2 (2.4%) children with severe dengue, between 20,001-50,000 was seen in 20(24.3%) children among them, 5 children had non-severe dengue and 15 had severe dengue, platelet count of 50,001-1 lakh was observed in 28(34.1%) cases among them, 24 cases were non-severe dengue and 4 of severe dengue and >1 lakh in 32(39%) cases among them, 26 were non severe and 6 were severe dengue (Table 4).

**Table 4: Laboratory parameters of patients with dengue fever.**

Parameters	Variables	Non-severe dengue n=55; (%)	Severe dengue N=27; (%)
TLC	WBC <4000 cells/mm <sup>3</sup>	23(41.8)	14(51.8)
	WBC 4000-11000/mm <sup>3</sup>	31(56.3)	13(48.1)
	WBC >11000 cells/mm <sup>3</sup>	1(1.8)	0
Haematocrit	>36.5%	29(52.7)	13(48.1)
	<36.5%	26(47.2)	14(51.8)
	>1,00,000	26(47.2)	6(22.2)
Platelet fall	50,001-1,00,000	24(43.6)	4(14.8)
	<50,000-20,001	5(9)	15(55.5)
	<20,000	0 ()	2(7.4)
SGPT	<50U	16(29)	5(18.5)
	51-250 U	30(54.5)	12(44.4)
	250-1000	9(16.3)	10(37)
SGOT	<50U	14 (25.4)	3(11.1)
	51-250 U	19 (34.5)	14(51.8)
	250-1000	10(18.1)	10(37)

**Table 5: Management of the patients with dengue fever in the present study.**

Management	Non severe dengue n=55; (%)	Severe dengue n=27; (%)
Supportive treatment (antipyretics, iv fluids)	55(100)	27(100)
Blood products transfusion received (SDP, fresh whole blood)	0	4(14.8)

Among the liver enzymes, SGOT and SGPT were severely elevated in 20 and 19 children respectively, whereas moderately elevation of SGOT and SGPT were observed in 33 and 42 children respectively. All the dengue patients were managed according to WHO guidelines, which include IV fluids and acetaminophen. Among 4 severe dengue cases, 3 cases received single donor platelets and 1 patient received fresh whole blood (Table 5).

**Table 6: Outcome of the patients with dengue fever in the present study.**

Outcome	Non severe dengue n=55; (%)	Severe dengue n=27; (%)	Total n=82; (%)
Recovered	52(94.5)	23(85.1)	75(91.4)
Lama	3(5.4)	3(11.1)	6(7.3)
Death	0	1(3.7)	1(1.2)

In this study, 75 children recovered, 6 children left against medical advice. One child died due to severe plasma leakage and organ failure (Table 6).

## DISCUSSION

In this study, author found the commonest age group was between 6-10 years 34 cases (41.4%) and male children were more among the admitted cases 56(68.2%) with a male to female ratio of 2.1:1, which is slightly higher than results found by Nagaram et al.<sup>9</sup>

In the current study, 47(57.3%) of children were admitted in the hospital during 4-6 days of onset of fever. Only 4 children were admitted after 6 days of onset of fever. 62(75.6%) of patients were hospitalized for 4-6 days with a mean duration of hospitalization was 4.74 days. Six (7.3%) children 3 each from non-severe and severe dengue were hospitalized for more than 6 days. The above results were at par with study done by Mishra et al.<sup>10</sup>

In this study, 55(67%) presented with non-severe dengue (both dengue with warning and without warning signs) and 27(32.9%) with severe dengue.

Fever was the commonest symptom seen in this study 73(89%) followed by vomiting 43(52.4%) and rash 36(43.9%) similar to the study conducted by Kumar SK et al. Seizures was seen in 3 children who were diagnosed as dengue encephalopathy similar to the study conducted by MJ Kulkarni.<sup>11</sup> Commonest bleeding manifestations were petechiae and purpura both in severe 9(33.3%) and non-severe dengue 3 (5.4%). Gastrointestinal bleed was seen in 7(25.9%) children with severe dengue. Similar findings were noticed by Mishra et al.<sup>10</sup>

Pleural effusion was observed in 28(34.1%) patients, 22(81.5%) children being severe dengue and rest 6(10.9%) were of non-severe dengue. Srinivasa et al, found a higher incidence of pleural effusion (46.5%) and ascites (37%) in their study (n=200).<sup>12</sup>

Gall bladder wall edema was seen in 29(35.3%) children among them non severe being 15(27.7%) and 14(51.8%) cases of severe dengue. 20(24.3%) children had ascites in total with 5(9%) among non-severe dengue and 15(55.5%) among severe dengue. 74 children were positive for dengue NS1Ag with 49(89%) among non-severe and 25(92.5%) among severe dengue. Similar findings were observed by Kumar SK et al.<sup>8</sup>

In the present study, leucopenia was observed in 45% of children while 44% of children had normal leukocyte count which is not similar to findings of Sunil Gomber et al, Haematocrit was raised >36.5% in 51% of cases, <36.5% in 48.7% which is almost similar to that of observations by kumar SK et al, (53 %; n=77).<sup>15</sup> Thrombocytopenia was found in all cases of severe Dengue. Severe thrombocytopenia (platelet count <20,000) in 2(2.4%) children, and platelet count between 1 lakh and 50,000 was

found in 20(24.3%) among them 15 (55.5%) were of severe dengue. These findings were at par with Kumar et al.<sup>8</sup> In the present study, 10(37%) patients each had severely deranged SGPT and SGOT. These findings were little high when compared with other studies.

All the children in this study were treated symptomatically, whereas 4(14.8%) children with severe dengue received blood products like single donor platelets and fresh whole blood which is very less in comparison to study done by Nagaram et al, (n=174).<sup>9</sup> In this study, 75(91.4%) children had a good recovery, whereas 6(7.3%) were left against medical advice; 1 (1.2%) child died due to severe dengue with shock which is at par with study done by Nagaram et al, (1.7%, n=174).<sup>9</sup>

## CONCLUSION

Dengue is a global problem; its incidence has increasing in recent times. It is one of the dreadful infectious diseases in pediatric age group. There is a male preponderance mostly due to more outdoor activities. Most of patients present with fever, vomiting, rash, malaise, hepatomegaly, abdominal pain, headache, petechiae and bleeding manifestation. In the present study, rise in AST/ALT levels, pleural effusion, hepatomegaly and gall bladder edema were significant findings in distinguishing severe from non-severe cases of dengue fever. Early diagnosis, monitoring and prompt supportive management can reduce mortality.

*Funding: No funding sources*

*Conflict of interest: None declared*

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

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**Cite this article as:** Shekar V, Kumar KP, Soren C, Reddy KV, Dharani N. Clinico-laboratory profile and outcome of dengue fever among children attending a tertiary care hospital of rural Telangana, India. *Int J Contemp Pediatr* 2020;7:382-6.