International Journal of Medical and Pharmaceutical Research
Website: https://ijmpr.in/| Print ISSN: 2958-3675 | Online ISSN: 2958-3683
NLM ID: 9918523075206676
Volume: 4 Issue:4 (July-Aug 2023); Page No: 390-397

Original Article

Clinical Profile of Dengue Fever In Children: A Hospital-Based Study

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ABSTRACT

Background: Dengue is a mosquito-borne arboviral disease that has become a global public health challenge, causing epidemics in tropical and sub-tropical countries during the rainy season. This study aimed to assess the clinical profile of dengue infection in children under 12 years of age and to evaluate the outcome of dengue fever.

Methods: The prospective observational study was conducted at Kanyakumari medical collegeon children with dengue fever admitted from 2020 to 2021. Demographics, clinical profiles, and outcomes of the children with dengue fever were studied. Based on the severity of the disease,children were categorized into three groups; group A has dengue fever. Group B; has dengue fever with warning signs, and group C; has severe dengue.

Results: A total of 63 children were enrolled in the study, with a male predominance (54%) and a highly affected age group of >8 years (65.1%). Fever, vomiting, and abdominal pain were the most common presenting complaints in children. Hepatomegaly was the most common clinical finding .Pleural effusion was reported in 5 children from group B and fourchildren from group C, with significant differences based on the severity of dengue. Most children required 8-10 days of hospitalization, and treatment of antipyretic and intravenous fluids was majorly used. All children recovered from dengue with no mortality.

Conclusion: Early recognition of danger signs clinically and appropriate treatment can reduce mortality and improve patient outcome.

Key Words: *Dengue fever, Dengue outbreak, Prospective study, Tertiary care, Dengue management*

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INTRODUCTION

Annually around 100 million dengue cases are reported throughout the world.[1]Dengue fever is a mosquito-borne arboviral disease caused by the dengue virus. There are four serotypes of dengue virus DENV-1, DENV-2, DENV-3, and DENV-4. The primary vectors that transmit the disease are Aedesaegypti mosquitoes and to a lesser extent, Aedesalbopictus. In India first dengue case was reported from Vellore in 1956. [2]

In India, dengue is endemic in almost all states and is a leading cause of hospitalization. [2] Around 4000 dengue cases were recorded in Tamil Nādu during the year 2021. Dengue has varied clinical presentations ranging from asymptomatic cases to severe life-threatening conditions such as dengue hemorrhagic fever and dengue shock syndrome. The World Health Organization classifies dengue into two major categories: Dengue (with or without warning signs) and severe dengue. Clinical features of dengue include symptoms such as; severe headache, retro-orbital pain, myalgia, arthralgia, nausea, vomiting, or rashes. Dengue fever occurs in three phases; febrile phase, critical and recovery phase.[1] [3]

The critical phase usually occurs 3-7 days after the onset of the illness. Capillary leakage is the pathognomic hallmark of the beginning of the critical phase causing hemoconcentration and decreased blood pressure. Warning signs such as vomiting, abdominal pain, bleeding of gums, restlessness, hematemesis, melena, rapid breathing, fatigue, and hepatomegaly can occur. Early identification of warning signs during the critical phase and appropriate management of dengue fever leads to early recovery and reduces fatality. Recovery from one infection doesnotprovide lifelong immunity. Still, it confers only transient and partial protection against heterologous infections, and sequential conditions may increase the risk of more serious disease. Due to immunological phenomena, Dengue reinfection is more severe in children. [4]The data of 2010 from Odisha reported 25 cases of dengue fever with five deaths. [5]

This study aimed to assess the clinical profile of dengue infection in children under 12 years of age and evaluate dengue fever's outcome in southern Tamilnadu, where dengue outbreaks are rampant.

MATERIALS AND METHODS

The prospective study was conducted at the Kanyakumari Medical College among children admitted with dengue fever from 2020 to 2021. Ethical approval was taken before the initiation of the study, and patient consent was taken before enrollment. Patient demographic details, clinical profile, and outcomes were assessed. The diagnosis of children for dengue was confirmed using serological markers; dengue non-structural glycoprotein (NS1) or dengue IgM antibodies. Follow-up was conducted daily with an assessment of clinical and laboratory parameters, including blood parameters, hematocrit, liver function test, and total leucocyte count . Children were further stratified based on clinical grading; Group A children with dengue fever, children with dengue fever and warning signs (Group B), and severe dengue (Group C).

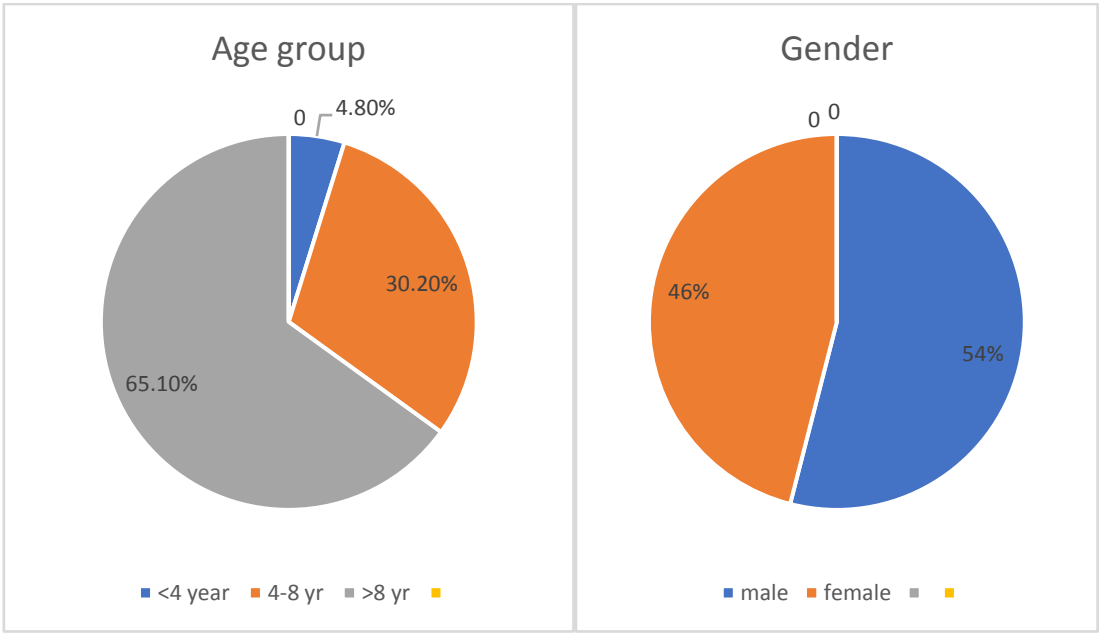
The children were treated as per WHO dengue guidelines with oral paracetamol, intravenous fluids, blood products and inotropic agents. The patient outcome was recorded as assessed, including recording various signs and symptoms. Data were tabulated and added in excel for assessment. Data from the study has been represented in tables, frequencies, and percentages.

RESULTS

A total of 63 children have been included in the current study.41 children werein the age group >8 years,(65.1%), the age group of 2-8 years with 19 children (30.2%). Three children with age <4 years were reported with dengue in the current study (4.8%) [Table 1].

Table 1 – Age distribution of patients

		Frequency	Percentage (%)
Age group	<4 years	3	4.8
	4-8 years	19	30.2
	>8 years	41	65.1
Gender	Male	34	54.0
	Female	29	46.0



A male predominance was reported in the current study, with 34 males (54.0%) and 29 females (46.0%) were reported with dengue fever [Table 1].

A majority of the children presented with fever; 19 children (30.2%), followed by fever, abdominal pain, and abdominal pain in 10 children(15.9%), and fever and vomiting in 9 children (14.3%). The complete set of complaints is demonstrated in Table 2.

Table 2 – Presenting complaints of patients

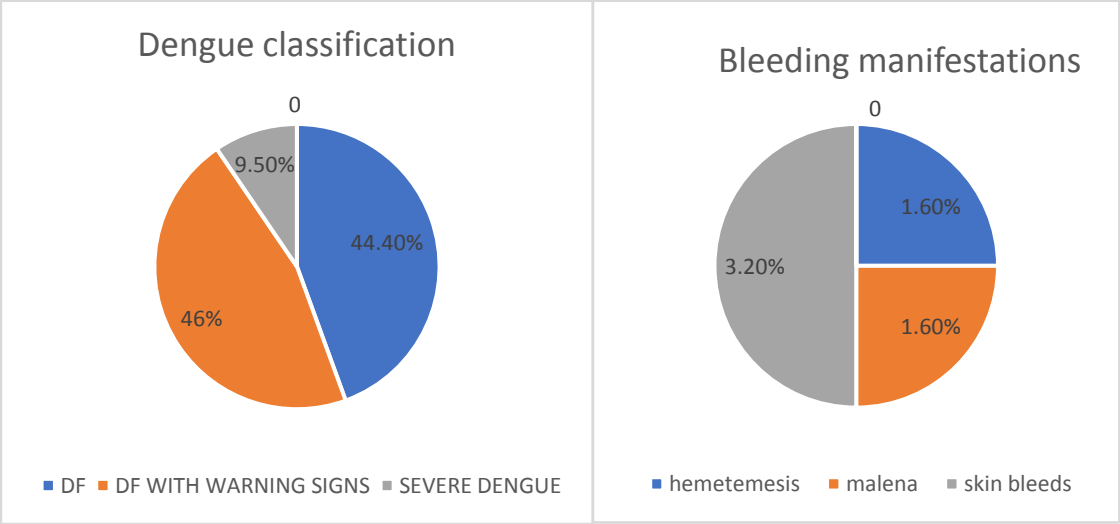
Presenting complaints	Frequency	Percentage
Fever	19	30.2
Fever and headache	3	4.8
Fever and myalgia	5	7.9
Fever, myalgia, and vomiting	1	1.6
Fever, myalgia, loose stools, and headache	1	1.6
Fever and vomiting	9	14.3

Fever, vomiting, loose stools, and abdominal pain	1	1.6
Fever, vomiting, and abdominal pain	10	15.9
Fever, vomiting, and headache	3	4.8
Fever, vomiting, and the bleeding manifestation	1	1.6
Fever and loose stools	3	4.8
Fever, loose stools, and abdominal pain	1	1.6
Fever and abdominal pain	3	4.8
Fever, abdominal pain, and loose stools	1	1.6
Fever and seizure	1	1.6
Total	63	100.0

Of 63 children, 29 presented with dengue fever and warning signs (46.0%), followed by dengue fever alone in 28 children(44.4%), and severe dengue was reported in 6 patients (9.5%). Petechiae was reported in 2 children (3.2%), whereas Malena and hematemesis were reported in one children each (1.6%). [Table 3].

Table 3 – Dengue classification in children

Clinical observation	Frequency	Percentage
DF	28	44.4
DF WITH WARNING SIGNS	29	46.0
SEVERE DENGUE	6	9.5
Total	63	100.0
Bleeding manifestations		
Hematemesis	1	1.6
Malena	1	1.6
Skin bleeds(petechiae)	2	3.2
Total	4	6.3



Leukopenia was prevalent in group A (Dengue fever), comprising 17 children(48.6%), followed by 14 children (40.0%) in group B (dengue fever with warning signs), and fourchildren(11.4%) in group C. A normal TLC count was reported in group A; 11 Children (40.7%), group B; 15 children(55.6%); and one child of group C. In addition, leucocytosis was reported in one child of group C [Table 6]. A significant difference was reported between the TLC to count for the three groups with p-value = 0.020. A platelet count between 1L to 1.5L was observed in 23 children (54.8%) in group A , followed by 18 children(42.9%) in group B and one child (2.4%) in group C. A total platelet count between 1L to 50,000 was reported in 3 children (21.4%) of group A, followed by eightchildren (57.1%) of group B and threechildren(21.4%) of group C. Platelet counts between 50,000 to 25,000 was reported in 2 children groups A, B, and C, respectively. Only one child in group B was reported with a platelet count <25,000. A significant difference was reported between the three groups in platelet count with p-value = 0.05 [Table 4]. Most of the children were positive with the IgM dengue test comprising 28 children in group A, 28 in group B and 6 in group C. In addition, one childwastestedpositive for IgM and NS1 test in group B.

Table 4 – Laboratory parameters

Parameter		Group A	Group B	Group C	P-value
Dengue Serology	IGM	28	28	6	0.551
	IGM and NS1	0	1	0	
Total leukocyte Count	Leukopenia	17	14	4	0.020
	% within TLC	48.6	40.0	11.4	
	Normal	11	15	1	
	% within TLC	40.7	55.6	3.7	
	Leucocytosis	0	0	1	
	% within TLC	0.0	0.0	100.0%	
	Total Count	28	29	6	
	% within TLC	44.4	46.0	9.5	
platelet count on admission	1 L to 1.5 L	23	18	1	0.050
	% within	54.8	42.9	2.4	
	1 L to 50,000	3	8	3	
	% within	21.4	57.1	21.4	
	50,000 to 25,000	2	2	2	
	% within	33.3	33.3	33.3	
	<25,000	0	1	0	
	% within	0.0	100.0	0.0	
	Total count	28	29	6	
Lowest platelet value	1 L to 1.5 L	**7**	3	0	0.005
	% within	70.0	30.0	0.0	
	1 L to 50,000	16	10	0	
	% within	61.5	38.5	0.0	
	50,000 to 25,000	5	10	4	
	% within	26.3	52.6	21.1	
	<25,000	0	6	2	
	% within	0.0	75.0	25.0	
	Total Count	28	29	6	
	% within	44.4	46.0	9.5%	
Liver enzyme elevations	Elevated SGOT	1	3	0	0.184
	% within	25.0	75.0	0.0	
	Elevated SGPT	17	21	6	
	% within	38.6	47.7	13.6	
	Both	10	5	0	
	% within	66.7	33.3	0.0	
	Total Count	28	29	6	
	% within count	44.4	46.0	9.5	

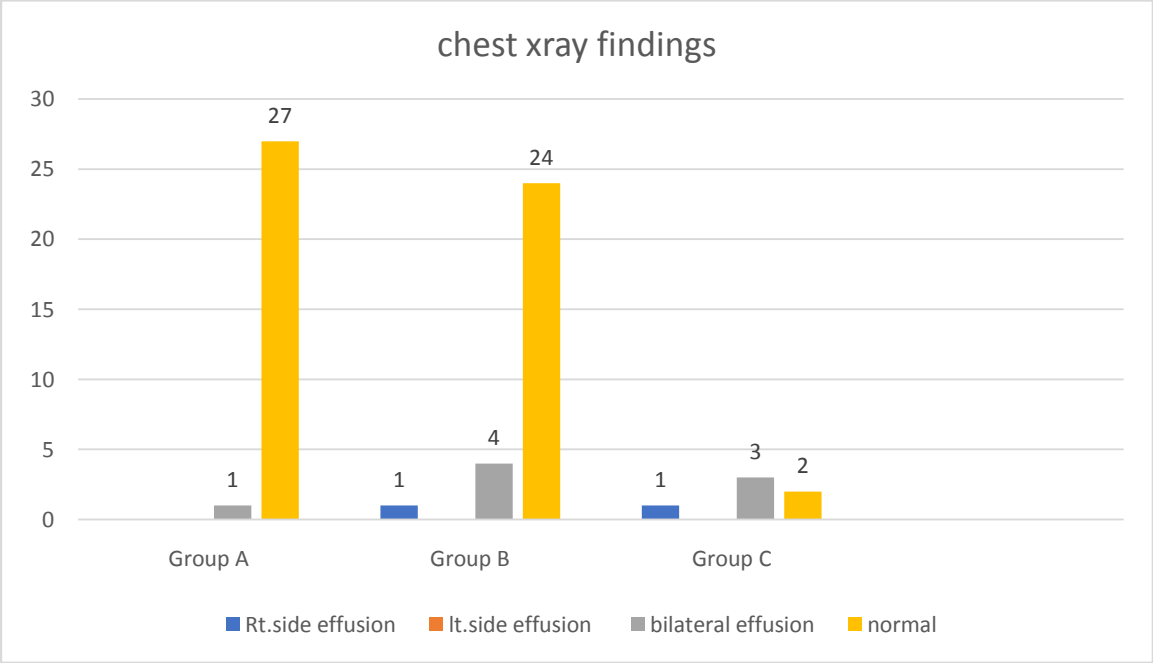
Elevated SGOT was reported in one child of group A and threechildren of group B. Further to this, an elevated SGPT was reported in 17 children (38.6%) of group A, followed by 21 children (47.7%) in group B, and sixchildren(13.6%) of group C. A total of 10 children (66.7%) in group A and five children (33.3%) were seen with elevated levels of SGOT and SGPT, respectively [Table 4]. The study did not observe a significant difference between elevated liver enzymes and the clinical presentation of dengue in the three groups.

Chest x-ray findings revealed a right-side effusion in one child in groups B and C, followed by right-and-left-sided effusion in 1child from group A, four in group B, and three in group C. A significant difference was observed between the chest x-ray findings and the three groups (p-value 0.004) [Table 5].

Table 5 – Radiological findings

Chest X-ray observations	Group A	Group B	Group C	P value
Right-sided effusion	0	1	1	0.004
% within	0.0	50.0	50.0	
Left-sided effusion	0	0	0	

% within	0	0	0	
Both	1	4	3	
% within	12.5	50.0	37.5	
Normal	27	24	2	
% within	50.9	45.3	3.8	
Total	28	29	6	
% within	44.4	46.0	9.5	
USG abdomen				
Hepatomegaly, ascites, and GB wall edema	3	2	0	0.006
% within	60.0	40.0	0.0	
Hepatomegaly and GB wall edema	1	5	5	
% within	9.1	45.5	45.5	
Ascites and GB wall edema	0	2	0	
% within	0.0	100.0	0	
GB wall edema	11	9	1	
% within	52.4	42.9	4.8	
Normal	12	10	0	
% within	54.5	45.5	0.0	

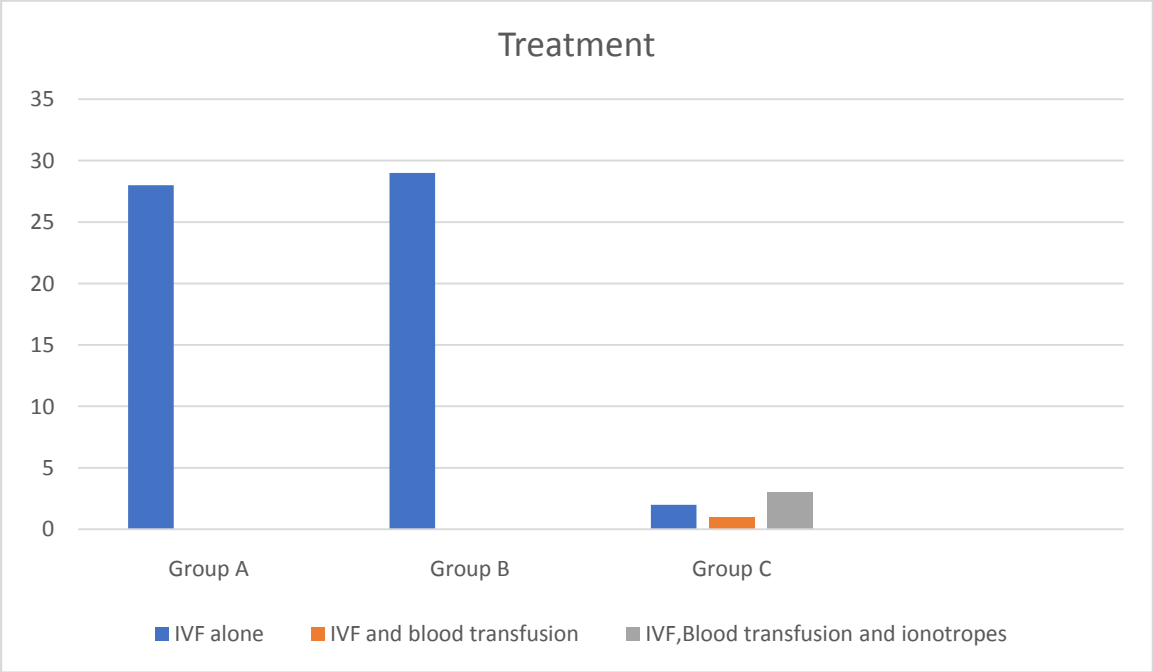


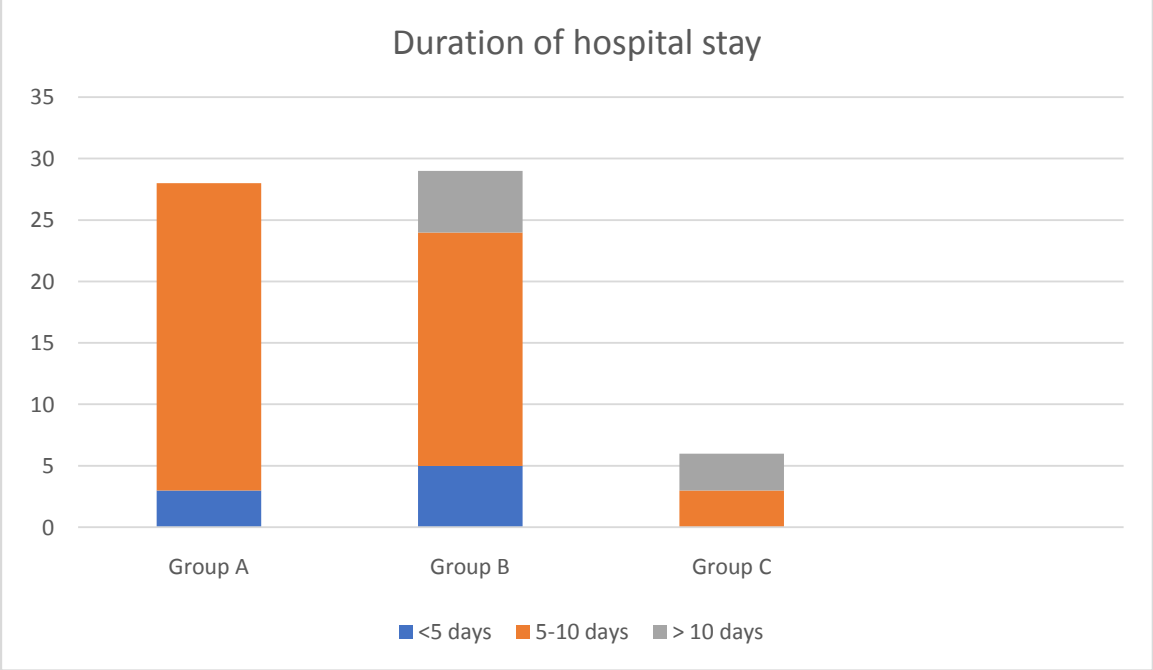
USG abdomen findings revealed that gall bladder wall (GB) edema and it was prevalent in 11 children from group A, ninefrom group B, and one in group C. A total of 3 children in group A were reported with hepatomegaly, ascites, and GB wall edema, along with twochildren in group B. Hepatomegaly and GB wall edema were prevalent in groups B and C, with fivechildren in each group. [Table 5] A significant difference was reported in children with different USG findings and the three groups (p-value = 0.006).

Table 6 – Patient outcomes

Patient management	Group A	Group B	Group C	P value
Antipyretic and IVF	28	29	2	0.000
% within	47.5	49.2	3.4	
Antipyretic, IVF, and blood transfusion	0	0	1	
% within	0	0	100	
Antipyretic, IVF, blood transfusion, and inotropes	0	0	3	
% within	0	0	100	
Duration of stay				
<5 days	3	5	0	0.009
% within	37.5	62.5	0.0	
5-10 days	25	19	3	
% within	53.2	40.4	6.4	

>10 days	0	5	3	
% within	0.0	62.5	37.5	
Outcome				
Recovered	28	29	6	NA
% within	44.4	46.0	9.5	





28 children from group A, 29 from group B, and two from group C were managed with intravenous fluids and antipyretics. One child in group C required additional blood transfusion, and three children from group C required additional blood transfusion and ionotropic agents. A significant difference was reported between the management of dengue based on the clinical severity (p-value = 0.000). Most children required a hospital stay between 5-10 days comprising 25 from group A, 19 from group B, and three from group C. Five children from group B were hospitalized for more than ten days, also reported in 3 children from group C. A hospital stay of <5 days was seen in 3 children from group A and fivechildren from group B. A significant difference was reported based on the clinical severity and duration of hospital stay (p-value 0.009). [Table 6]. All children from the three groups recovered from dengue with a 100% recovery rate.

DISCUSSION

Dengue fever is a common arboviral infection in tropical countries. Dengue fever's global prevalence has risen considerably in the last decade. [6] The current study classified dengue severity based on three major criteria; group A,childrenwith dengue fever (44.4%). Group B; children with dengue fever and warning signs (46.0%), and group C; children with severe dengue (9.5%). Majority of children were in the age group of >8 years, including 41 children(65.1%), followed by 19 children (30.2%) in the age group of 2-8 years.

Similar findings were reported by Mishra et al., with a 34.02% prevalence of dengue in the age >11 years, whereas the prevalence between 8-11 years was 27.8% and 22.6% in the age group of 4-7 years. [7] Children older than four years were most affected due to the diurnal adaption of the Aedes mosquito in stored water or repeated attacks by the mosquito. Our study also reported a significant male predominance with 54.0% and 46.0% of females, parallel to the finding of Basuki et al., who reported a male-to-female ratio of (3.4:1). [8] However, a male predominance was reported by Mishra et al. [7]

Fever was the most prevalent complaint in 19 children out of 63 (30.2%), followed by fever, abdominal pain, and vomiting in 10 children (15.9%), and fever with vomiting in 9 children (14.3%). This was similar to the findings of Mishra et al. and Ahmed et al. [7] [9] Most commonly seen bleeding manifestation in dengue is petechiae, ecchymosis, and purpura; however, gastrointestinal bleeding has been reported in severe cases of dengue. Hematemesis has also been reported as the most common manifestation in the Indian population. Dengue and seizures were also reported in a few cases. [10]In our study, hematemesis and Malena were present in one child and petechiae was reported in two children. The contributing factor for dengue bleeding can be decreased platelet function, fibrinogen consumption, and vasculopathy. [11] The current study observed similar findings with one child experiencing fever and seizures, which were also reported by Mishra et al. in two patients. [7]

Prevalence of leucopenia was reported in 17 children with dengue fever, 14 with warning signs and dengue fever, and four with severe dengue. Further to this, leukocytosis was reported in one child with severe dengue. The study reports a significant difference between the TLC and dengue severity. Mishra et al. also reported a high prevalence of leukopenia (26.19%) and leukocytosis in 2 patients with severe dengue. [7]Elevated levels of SGPT were highly prevalent in groups A (38.6%) and B (47.7%). In addition, tenchildrenwere reported with high levels of SGPT and SGOT with dengue fever, and fivechildren diagnosed with dengue fever and warning signs. However, no significant difference was observed between liver enzymes and the clinical severity of dengue. Literature has reported that elevated levels of SGOT are more associated with the severity of dengue, which was also reported by Mishra et al. and Kalayanarooj et al. [7] [12]. The severity of dengue can also be analyzed based on high levels of liver enzymes. [13]

Pleural effusion (right and left) sided was also prevalent in 4 children in group B, 3 with severe dengue, and one in group A. A significant difference was reported between the radiological findings and the severity of dengue (p-value 0.004). A similar radiological observation was also reported by Joshi et al., where effusion was the most common finding, with 15.46%. [10] Mishra et al. reported similar results with a significant difference in radiological findings and severity of dengue. Twelve cases of dengue with pleural effusion were recovered in the study; however, one patient expired due to intractable shock. [7] Hepatomegaly and gall bladder edema was the prevalent finding in our study which was parallel to the result of Mishra et al., Ahmed et al., and Joshi et al. [7] [9] [10]

The current study included the management of dengue by antipyretics and intravenous fluids in mostchildren. However, blood transfusion was used in one child with severe dengue, and inotropes were used in 3 children with severe dengue. All the children in our study recovered with no mortality due to early detection of dengue severity and appropriate management.

CONCLUSION

Dengue can present with varied clinical severity in the pediatric age group.Severe dengue leads to life threatening complications Hence it is essential to detect the warning signs earlier to initiate appropriate treatment and prevent further complications.. The study emphasizesthe need for timely management of dengue to prevent complications and reduce mortality.

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