Original Research Article

A study of clinical profile of dengue in children in the age group of 6 months to 12 years

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Abstract

Background: The global prevalence of dengue has grown dramatically in recent decades. Since the last 20 years, there is a global increase in frequency of Dengue infection. Worldwide 50-100 million cases are being reported annually. Each year approximately 500000 cases of dengue hemorrhagic fever require hospitalization, including 90% children less than 15 years of age **Aims and objectives:** To study the clinical profile of dengue in children in the age group of 6 month to 12 years admitted in tertiary care institute **Materials and Methods:** In the present study children in age group 6 months to 12 years hospitalized with clinical manifestation and/ or lab investigations supporting dengue fever were enrolled. Clinical and laboratory data was recorded in all the selected patients. The collected data was recorded in a prestructured proforma and entered in Microsoft excel. The data was analysed and presented with appropriate graphs and tables. **Results:** Out of total 100 cases of dengue, 33 were suffering from dengue fever, 39 were suffering from dengue hemorrhagic fever and 28 were suffering from dengue shock syndrome. Majority of the cases were 6 years to 12 years of age. Male to female ratio was 1.2:1. The most common presenting symptom was fever (100%) and was followed by vomiting (69%), rash (51%), Bleeding stool (57%) and Abdominal pain (57%). Pallor (58%), tachypnea (45%) and rash (36%) were the common signs observed. Among the cases of dengue fever pallor and tachypnea was the most common presenting sign. In dengue hemorrhagic fever along with pallor and tachypna; petechiae (51.58%), melena (51.28%), Pedal edema (30.77%), Periorbital edema (38.46%) and rash (25.64%) were also observed. Among the cases of dengue shock syndrome signs of shock (100%), rash (85.71%) and pallor (64.29%) and tachypnea (75%) were the most common presenting signs. On clinical examination hepatomegaly and abdominal tenderness were the most common clinical findings observed. On CNS examination disoriented state was observe in 38.46% and 50% patents of DHF and DSS respectively. On respiratory examination crepitations were observed in 57.14% of DSS patients whereas 5.13% patients of DHF were having crepitations. No patient of DF and DHF was suffering from pleural effusion. X-ray features were confirmed with USG abdomen. **Conclusion:** Endemicity of dengue fever is on the rise with increased incidence among children. Fever, hepatomegaly, vomiting, bleeding tendencies, erythematous rash, distention of abdomen, ascites and pleural effusion, respiratory distress are suggestive of a more severe course. Laboratory investigations reveal thrombocytopenia, elevated liver enzymes, and leucopenia, haemoconcentration. Predictive markers for DHS/DSS are younger age, rash, melena, petechiae, tender abdomen, fluid collection in abdomen, hepatomegaly, pleural effusion, thrombocytopenia and secondary infections.

Key Words: Dengue, children, clinical features.

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INTRODUCTION

Dengue virus is now the most common cause of arboviral disease in the world, with an estimated annual occurrence of 100 million cases of dengue fever and 2, 50,000 cases of dengue haemorrhagic fever and a mortality rate of 25,000 per year.[1] The global prevalence of dengue has grown dramatically in recent decades.[2,3] Since the last 20 years, there is a global increase in frequency of Dengue infection. 2.5-3.0 billion people are currently at risk worldwide. Worldwide 50-100 million cases are being reported annually. Each year approximately 5, 00,000 cases of dengue hemorrhagic fever require hospitalization, including 90% children less than 15 years of age. Mortality of Dengue hemorrhagic fever is approximately 5% with 25,000 deaths reported each year. Usually it is considered as an urban disease but now spreading its tentacles in rural areas also. Dengue virus infection has been reported in more than 100 countries,

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with 2.5 billion people living in areas where dengue is endemic.[4] The first recorded outbreak of dengue fever in India was in1812.[5] In 1960 DEN-1 was isolated in Vellore, without any association with bleeding diathesis.[6] Most cases of dengue haemorrhagic fever are reported from Asia, where it is a leading cause of hospitalization and death among children. In Latin America, dengue haemorrhagic fever was a rare disease before 1981.[7] The 1980s and 1990s saw a dramatic geographic expansion of epidemic dengue fever and dengue haemorrhagic fever from Southeast Asia to the South Pacific Island, the Caribbean and Latin America, with region changing from non endemic (no serotype present) to hypo-endemic (one serotype present) or hyper-endemic (multiple serotypes present).[1] The world health organization (WHO) classifies dengue as a major international public health concern because of the expanding geographic distribution of both the virus and the mosquito vector, the increased frequency of epidemics, the co-circulation of multiple virus serotypes, and the emergence of dengue haemorrhagic fever in new areas.[1,7]

MATERIALS AND METHODS

The present hospital based observational study conducted in the department of pediatrics of MIMSR Medical College, Latur during October 2013 to September 2015. Children in age group 6 months to 12 years hospitalized with clinical manifestation and/ or lab investigations supporting dengue fever certain criteria present in the history and clinical examination had been defined from standard references for uniformity in data collection and to decrease the fallacies in the research work. Clinical data was recorded in all the selected patients. Laboratory investigation carried out in these patients included haemoglobin, total and differential count, haematocrit, platelet count, SGPT, serum electrolytes, chest x-ray and ultrasonography of the chest and abdomen, CSF analysis was done in patients with altered sensorium. Heart rate, respiratory rate, blood pressure, platelet count and haematocrit were monitored daily for first five days of admission. The collected data was recorded in a prestructured proforma and entered in Microsoft excel. The data was analysed and presented with appropriate graphs and tables.

RESULTS

Table 1: Distribution of cases according to type of presentation

Presentation of dengue	No. of cases
Dengue fever	33
Dengue hemorrhagic fever	39
Dengue shock syndrome	28
Total	**100**

It was observed that out of total 100 cases of dengue, 33 were suffering from dengue fever, 39 were suffering from dengue hemorrhagic fever and 28 were suffering from dengue shock syndrome.

Table 2: Age wise distribution of cases

Age group	DF (n=33)	DHF(n=39)	DSS (n=28)	Total
6 months to 2 yrs	12	4	4	20
2yrs to 6 yrs	10	14	14	38
6 yrs to 12 yrs	11	21	10	32
Male	19	18	17	54
Female	14	21	11	46

It was seen that majority of the cases were 6 years to 12 years of age. There were 54 male and 46 female cases in the present study. The male to female ratio was 1.2:1.

Table 3: Distribution of cases according to presenting symptoms

Symptom	Age group			Total (n=100)
	6 months -2 yrs (n=20)	2 yrs -6 yrs (n=38)	6 yrs-12 yrs (n=42)	
Fever	20 (100.00%)	38 (100.00%)	42 (100.00%)	100
Rash	2 (10.00%)	23 (60.53%)	8 (19.05%)	33
Vomiting	9 (45.00%)	37 (97.37%)	23 (54.76%)	69
Refusal to feed	11 (55.00%)	14 (36.84%)	13 (30.95%)	38
Headache	1 (5.00%)	17 (44.74%)	33 (78.57%)	51
Retro orbital pain	0	7(18.42%)	29(69.05%)	36
Back pain	0	8 (21.05%)	18 (42.86%)	26
Body ache	0	6 (15.79%)	7 (16.67%)	13
Arthralgia	0	4 (10.53%)	10 (23.81%)	14
Myalgia	0	9 (23.68%)	18 (42.86%)	27
Bleeding nose	2 (10.00%)	3 (7.89%)	3 (7.14%)	8
Bleeding mouth	1 (5.00%)	2 (5.26%)	2 (4.76%)	5
Bleeding gums	2 (10.00%)	4 (10.53%)	2 (4.76%)	8
Bleeding stool	10 (50.00%)	24 (63.16%)	23 (54.76%)	57
Abdominal pain	4 (20.00%)	22 (57.89%)	31 (73.81%)	57
Abdominal distention	3 (15.00%)	11 (28.95%)	18 (42.86%)	32
Convulsion	0	1 (2.63%)	0	1

The most common presenting symptom was fever (100%) and was followed by vomiting (69%), rash (51%), Bleeding stool (57%) and Abdominal pain (57%). Older children also came with complaints of headache (78.57%), myalgia (42.86%), arthralgia (23.81%) and back pain (16.67%).

Table 4: Distribution of cases according to presenting Signs

FINDINGS	DF (n=33)	DHF(n=39)	DSS (n=28)	Total
Tachypnea	8 (24.24%)	16 (41.03%)	21 (75.00%)	45
Pallor	19 (57.58%)	21 (53.85%)	18 (64.29%)	58
Icterus	0	2 (5.13%)	3 (10.71%)	5
Lymphadenopathy	3 (9.09%)	2 (5.13%)	2 (7.14%)	7
Pedal edema	3 (9.09%)	12 (30.77%)	12 (42.86%)	27
Periorbital edema	6 (18.18%)	15 (38.46%)	7 (25.00%)	28
Anasarca	3 (9.09%)	11 (28.21%)	7 (25.00%)	21
Petechiae	0	20 (51.28%)	10 (35.71%)	30
Purpura	0	4 (10.26%)	2 (7.14%)	6
Ecchymoses	0	0 (0.00)	1 (3.57%)	1
Erythema	0	1 (2.56%)	2 (7.14%)	3
Gum bleeding	0	3 (7.69%)	5 (17.86%)	8
Epistaxis	1 (3.03%)	6 (15.38%)	1 (3.57%)	8
Haematemesis	0	1 (2.56%)	2 (7.14%)	3
Melena	1 (3.03%)	20 (51.28%)	12 (42.86%)	33
Rash	2 (6.06%)	10 (25.64%)	24 (85.71%)	36
Torniquet test	1 (3.03%)	5 (12.82%)	4 (14.29%)	10
Sign of shock	0	0	28 (100.00%)	28

It was observed that pallor (58%), tachypnea (45%) and rash (36%) were the common signs observed in the study cases. Among the cases of dengue fever pallor and tachypnea was the most common presenting sign. Whereas in cases of dengue hemorrhagic fever along with pallor and tachypna; petechiae (51.58%), melena (51.28%), Pedal edema (30.77%), Periorbital edema (38.46%) and rash (25.64%) were also observed. Among the cases of dengue shock syndrome signs of shock (100%), rash (85.71%) and pallor (64.29%) and tachypnea (75%) were the most common presenting signs.

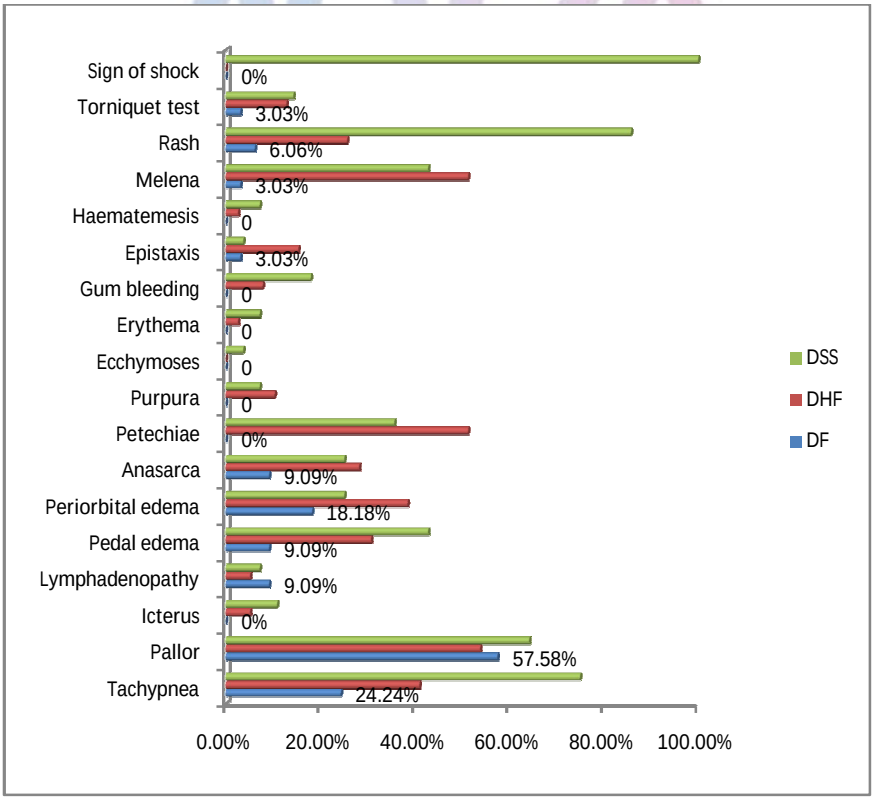

Figure 1: Distribution of cases according to presenting symptoms

Table 5: Distribution of patients according Systemic examinations findings

Examinations findings		DF	DHF	DSS	Total
Per abdomen	Abdominal tenderness	*20(60.61%)*	35 (89.74%)	27 (96.43%)	82
	Hepatomegaly	18(54.55%)	34 (87.17%)	27 (96.43%)	79
	Splenomegaly	3 (9.09%)	5 (12.82%)	5 (17.86%)	13
	Fluid collection	0	11 (28.21%)	21 (75.00%)	32
CNS	Conscious	32(96.97%)	25 (64.10%)	12 (42.86%)	69
	Disoriented	0	15 (38.46%)	14 (50.00%)	29
	Unconscious	0	0	2 (7.14%)	2
	Crepitations	0	2 (5.13%)	16 (57.14%)	18
Respiratory system	Unilateral effusion	0	0	5 (17.86%)	5
	Bilateral effusion	0	0	2 (7.14%)	2
	Respiratory distress	0	0	7 (25.00%)	7

It was seen that on clinical examination hepatomegaly and abdominal tenderness were the most common clinical findings observed. On CNS examination disoriented state was observe in 38.46% and 50% patents of DHF and DSS respectively. On respiratory examination crepitations were observed in 57.14% of DSS patients whereas 5.13% patients of DHF were having crepitations. No patient of DF and DHF was suffering from pleural effusion.

Table 6: Distribution of patients according radiological findings

Findings		DF	DHF	DSS	Total
On X-ray	Pleural effusion	3 (9.09%)	17 (43.59%)	17 (60.71%)	37
	Left sided effusion	0	5 (12.82%)	3 (10.71%)	8
	Right sided effusion	3 (9.09%)	12 (30.77%)	13 (46.43%)	28
	bilateral effusion	0	0	1 (3.57%)	1
	pulmonary edema	0	0	7 (25.00%)	7
USG	Hepatomegaly	18(54.55%)	35 (89.74%)	27 (96.43%)	80
	Fluid in abdomen	7 (21.21%)	19 (48.72%)	22 (78.57)	48
	Gall bladder edema	0	9 (23.08%)	20 (71.43%)	29
	Pleural effusion	6 (18.18%)	18 (46.15%)	21 (75.00%)	45
	Left pleural effusion	1 (3.03%)	5 (12.82%)	4 (14.29%)	10
	Right pleural effusion	5 (15.15%)	13 (33.33%)	15 (53.57%)	33
	Right and left effusion	0	0	2 (7.14%)	2

After the clinical examination, X-ray features were confirmed with USG abdomen. Pleural effusion was diagnosed in 37% cases on X-ray whereas on USG it was diagnosed in 45% cases. Hepatomegaly was the most common (80%) finding on USG followed by fluid in abdomen (48%) and pleural effusion (45%).

DISCUSSION

Dengue fever is usually a benign syndrome caused by an arthropod borne virus. This study reviewed the common clinical and radiological features in cases of dengue. The study was conducted over a period of two years. In this study, a total of 100 dengue positive cases were enrolled, out of which 33% patients had DF, 39% patients had DHF and 28% patients had DSS. Similar findings in the study by Prathyasha CV *et al*[8] (32%) were diagnosed DF, (40%) cases DHF and (28%) were DSS. In the study by Joshi *et al*[9] DF(61%), DHF(23%) and DSS(16%) was observed whereas Kabra SK *et al*[10] reported DF (10%), DHF (42%) and DSS (47%).Incidence of DHF and DSS slightly higher when compared to Joshi *et al*[9] and Incidence of DF higher in our study compared to Kabra SK *et al*[10] Thus DHF and DSS are more common in the subgroups of dengue due to secondary infection and the wide spread of the dengue virus. The study showed that in the age group 6 months to 2 years 20% cases, in the 2years to 6years group 38% cases and in the 6years to 12years group 42% cases were found. Thus it was seen that majority of cases were in the 6-12 years of age. Similar age distribution was reported by Prathyasha CV[8] and Joshi *et al*[9]. In the sex distribution, a male preponderance was seen. Male to female ratio was 1.2:1, which was similar to Kashinkanti MD *et al*[11], 1.2:1. Whereas in studies of Shahidul Alam ABM *et al*[7] and Kamath *et al*[12] the male: female ratio was 1:1. This was probably due to more importance being given to male child. Majority of the cases were admitted in the rainy and winter (post monsoon) season, that is from June to December. A peak was seen in the month of October with 29 cases similar to Kamath *et al*.[12] In the present study, all patients had complaints of fever and which was high grade in most of the cases. Vomiting was observed in 69% patients, abdominal pain in 57%, black colour stool in 57% and headache in 51%. Refuse to feed (38%), rash(33%), abdominal distension (32%), myalgia (27%),

back pain (26%), arthralgia (14%), body ache (13%) bleeding gum and nose (8%), mouth bleeding (5%) and convulsion (1%) were also observed. Where as in the study by Shrinivasa S,[13] chief presentation was with fever (100%), vomiting (72%), abdominal pain (46%), and rash (10.5%). In the Richard *et al* study[14] fever (100%), headache (96.7%), vomiting (47.8%), abdominal pain (39.1%), back/bone pain (39.1%), rash (26%), convulsion (17.4%) and retro orbital pain (13%). In Agarwal *et al*[15], fever (100%), abdominal pain (49%), vomiting (68%) and convulsion (8%).Bleeding in dengue is multifactorial. Reduced platelets and fibrinogen are the two most prominent haemostatic defects responsible for bleeding in DHF. In this study various types of bleeding presentations were seen. Bleeding is one of the dreaded complications. Clinical manifestations of bleed are highly variable from simple skin bleeds like petechiae, purpura to severe bleeds like gastrointestinal bleeds and fatal intracranial bleeds. In our study tourniquet test was positive in 10% of cases. Melena (33%), petechiae (30%), gum and nose bleeding 8% and purpura (6%), erythema (3%), and ecchymoses (1%). In Joshi *et al*[9] melena (68.6%), skin bleeding (31.8), haematemesis (27.2%) epitaxis (18.2%). In Agarwal *et al*[15] presented with haematemesis (39%), epistaxis (36%), skin bleeds (33%) and 66 tourniquet test positive (32%) cases. In another study of predictors of spontaneous bleeding by Shivbalan *et al*[16] petechiae was the most frequent (46.6%) followed by haematemesis (26%), melena (21.6%), subconjunctival haemorrhage (6.6%).There is poor sensitivity of tourniquet test in the diagnosis of DHF.[17] On systemic examination, abdominal tenderness (82%), hepatomegaly (79%), ascites (32%) and altered sensorium (31%) were the common findings. It was seen that hepatomegaly and abdominal tenderness were the most common clinical finding observed. On CNS examination disoriented state was observe in 38.46% and 50% patient of DHF and DSS respectively. Crepitations were observed (57.14%) in DSS and (5.13%) in DHF. On clinical examination no patient of DF and DHF was suffering from pleural effusion. In the study of Ira Shah *et al*[18] ascites (35.8%), splenomegaly (30.8%) and Agarwal *et al*[15] showed hepatomegaly in (72%) and splenomegaly in (19%) of cases. Ultrasonography and radiography can reliably detect the presence of pleural effusion and ascites in children with DHF.[7] In the present study, on systemic examination ascites was seen in 32% and pleural effusion in 7%. Whereas on chest x-ray pleural effusion was found in 37% and on ultrasonography, ascites was seen in 46% and pleural effusion in 45% and gall bladder edema in 29%. In the study Balasubramanian *et al*[19] Chennai, ascites (70.76%), pleural effusion (67.69%), gall bladder changes (64.6%), on ultrasonography were reported. In the study Srivastava *et al*[20] 66.7% patients showed edematous gallbladder (GB) wall thickening, 64.5% patients showed ascites, 50% patients had pleural effusion.[21] Also Mia *et al*[22] shows that 41% had ascitis and 42% pleural effusion. Ultrasound was found to be superior when compared with chest x-ray to detect plasma leakage.[19] In the present study after the clinical examination X-ray features were confirmed by USG abdomen hepatomegaly was the most common finding on USG (80%) cases followed by fluid in abdomen (48%) and pleural effusion (45%). The low sensitivity of radiograph is because of the fact that x-ray films are not ideal for detecting small amounts of effusion while ultrasound is highly helpful. An earlier study from Indonesia also reported such discrepancies in findings related to these investigations. Ultrasound is ideal owing to its safety and that it is non-ionising and would assist in detecting plasma leakage even before it clinically manifests. Similar findings have been reported earlier from Indonesia.[23,24] Thus findings in the study were similar to many other studies on dengue fever, dengue hemorrhagic fever and dengue shock syndrome.

CONCLUSION

Endemicity of dengue fever is on the rise with increased incidence among children. Fever, hepatomegaly, vomiting, bleeding tendencies, erythematous rash, distention of abdomen, ascites and pleural effusion, respiratory distress are suggestive of a more severe course. Laboratory investigations reveal thrombocytopenia, elevated liver enzymes, and leucopenia, haemoconcentration. Predictive markers for DHS/DSS are younger age, rash, melena, petechiae, tender abdomen, fluid collection in abdomen, hepatomegaly, pleural effusion, thrombocytopenia and secondary infections.

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