"Clinical Profile of Dengue Fever in Children: A study in dhaka shishu(children) hospital, Dhaka, Bangladesh"

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Abstract: *Dengue is a mosquito-borne viral disease that has rapidly spread in all regions of world health organization (WHO) in recent years. Dengue virus is transmitted by female mosquitoes mainly of the species Aedes aegypti and, to a lesser extent, Aealbopictus. Children are the usual victim of dengue infection, there is paucity of published data regarding dengue infection in children in our country. We conducted a cross sectional descriptive study in the Dept. of paediatrics, Dhaka shichu(children) hospital, Dhaka Bangladesh during the period from January 2018 to November 2018 among the children having Dengue infection and who were admitted in the selected hospital. Eighty two (82) patients were enrolled in our study by using a purposive sampling technique. A detailed history was taken; clinical examinations and relevant investigations were done in every patient. The mean age of the patients was 6.5±3.5 years with almost similar male and female ratio. Among eighty two (82) patients, 41.47% presented with dengue fever (DF), the rest (58.53%) presented with dengue haemorrhagic fever (DHF). Most of the patients presented with high grade continued type of fever (71.95%), followed by vomiting (64.63%), abdominal pain (59.75%), Itchy rash was the most important characteristic signs (69.51%). Flushed appearance observed in 56.09%, subconjunctival haemorrage was (29.26%). Platelet count less than $100X10^9/L$ were found in 37.80% patients. Tourniquet test was positive in 37.80% of cases. All of the patients had packed cell volume (PCV) less than 45%. Raised serum alanine aminotransferase (ALT) was observed in 45.12% of children. IgM or/with IgG antibodies for dengue virus were positive in 100% patients. Majority (97.56%) of the patients completely recovered from the disease and only 2.44% died. High grade continued fever, vomiting with abdominal pain and itchy skin rash (with normal platelet count) were the presenting features.*
Key words: *Dengue fever (DF), Dengue haemorrhagic fever (DHF), Paediatrics, Subconjunctival haemorrage*

I. Introduction

Dengue is a mosquito-borne viral disease that has rapidly spread in all regions of world health organization (WHO) in recent years. Dengue virus is transmitted by female mosquitoes mainly of the species Aedesaegypti and, to a lesser extent, Aealbopictus. Dengue is the most important arthropod-borne viral disease, and it is a major public health problem in subtropical and tropical regions. The virus is transmitted to humans by the bite of infected female mosquitoes of the genus Aedes. The global resurgence of dengue is thought to be due to failure to control the Aedes populations, uncontrolled urbanization, population growth, climate change, and increased airplane travel[1]. Dengue is a serious mosquito-borne viral disease which in recent years has become a major international public health concern. It is the most serious viral haemorrhagic fever in the world with an annual incidence of 100 million cases per year[2]. Of them 250,000 to 500,000 cases are reported as dengue haemorrhagic fever (DHF) (because of the presence of haemorrhagic manifestations, thrombocytopenia and signs of plasma leakage) with an estimated death of about 12,000. The magnitude of dengue fever was largely unknown until it took a heavy toll in 2000 (5555 cases and 93 deaths were reported[3]. Nearly 90% of the dengue infections occur in children with risk of dying during a secondary attack is nearly 15-fold higher than that of adults[4]. Although children are the main group affected by dengue, little published data are available regarding dengue infections in children living in South Asia. In the context of Bangladesh, data of dengue infection in children are even scarce. Most infections in children under 15 years are asymptomatic or minimally symptomatic; a study of school children in Thailand found only 13% of those infected missed more than one

day of school because of illness[5]. Classic dengue is more commonly seen among older children, adolescents, and adults. They are less likely to be asymptomatic. Dengue is abrupt in onset, typically with high fever accompanied by severe headache, incapacitating myalgia and arthralgia, nausea and vomiting, and rash. Rash, typically macular or maculopapular, often becoming confluent and sparing small islands of normal skin, has been reported in over half of infected people. Other signs and symptoms include flushed facies, sore throat, cough, cutaneous hyperaesthesia, and taste aberrations. Recovery may be prolonged and include depression[6].The present study was carried out in order to document the clinical manifestations of dengue infections in children in Bangladesh.

II. Objective
a)   General objective:
To document clinical features of dengue in children in Bangladesh
b)   Specific objectives:
To know more about changing features of dengue in Bangladesh
To assess the mortality rate of dengue in children in Bangladesh

III. Materials and Methods
This cross sectional descriptive study in the Dept. of paediatrics, Dhaka shichu(children) hospital, Dhaka Bangladesh during the period from January 2018 to November 2018 among the children having Dengue infection and who were admitted in the selected hospital. Eighty two (82) patients were enrolled in our study by using a purposive sampling technique. In every patient a detailed history was taken, clinical examinations and relevant investigations were done. After obtaining informed consent from the parents a total of 82 children were selected consecutively based on clinical features mentioned in National Guidelines for Clinical Management of Dengue Syndrome, Bangladesh 2000[5]. Patient with any identified specific infection or febrile illness more than two weeks were excluded from the study. Demographic variables, presenting complaints and examination findings were recorded on a structured questionnaire. Tourniquet test was done in predicting feature of bleeding manifestations. NS1 test (at 4th day) was done for all subjects initially. All NS1 positive cases were also positive for IgM. So, NS1 test is very important for detecting dengue virus earlier. White blood cell count (WBC count), platelet count, PCV, ALT, IgM and IgG antibodies for dengue virus were investigated as supporting evidence for dengue infection. Chest X-ray and ultrasonography of whole abdomen were done in selected patients where clinical findings were suggestive. The WHO classification and case definitions were used to classify disease as DF and DHF[3]. DHF was further divided into four grades (I, II, III and IV) as per National Guidelines[7]. The test statistics used to analyze the data were descriptive statistics, chi-square (χ^2) test.

IV. Results
Among 82 patients 40 were male and 42 were female. Age ranged from 6 months to 15 years with a mean of 6.5 ± 3.5 years. About sixty two (61.91%) of them was more than 5 years old in male group and about 55% was more than 5 years in female group. Sixty eight (68.29) percent of children complained of fever >5 days with continued type of fever being predominant 71.95%. Sixty five (64.63%) patients had vomiting and (59.75%) patients had abdominal pain then 47.56% myalgia, 18.29% headache, 15.85% arthalgia, 12.19% retro-orbital pain, 10.97% loose stool and 6.09% runny nose/cough. Among the signs, rash with itching was a salient feature (69.51%) followed by flushed appearance (56.09%), Haemorrhage(58.53%), subconjunctival haemorrhage (29.26%), Pleural effusion (25.60%),hepatomegaly(23.17%), Ascites (15.85%) Melaena (15.85%). About one-third (37.80%) of the patients had positive tourniquet test. Around eighty two (81.70%) had low WBC count. One-third (37.80%) of patients platelet count with $> 100 \times 10^9$/L, 30.48% with $51- 100 \times 10^9$/ L, 12.9% with $21-50 \times 10^9$/L and 12.19% with $<20 \times 10^9$/L. AII children exhibited a packed cell volume (PCV) of less than 45% and over 45.12% had raised serum alanine aminotransferase (ALT). Majority (97.56%) of the patients completely recovered from the disease and only 2.44% died. All death cases had both IgM and IgG positive that means they were affected by dengue 2nd time.

Figure 1: Age and sex distribution of the study participants **(n=82)**

	< 5 years	5-10 years	10 years and more
Female(%)	38.09	26.19	35.71
Male(%)	45	20	35
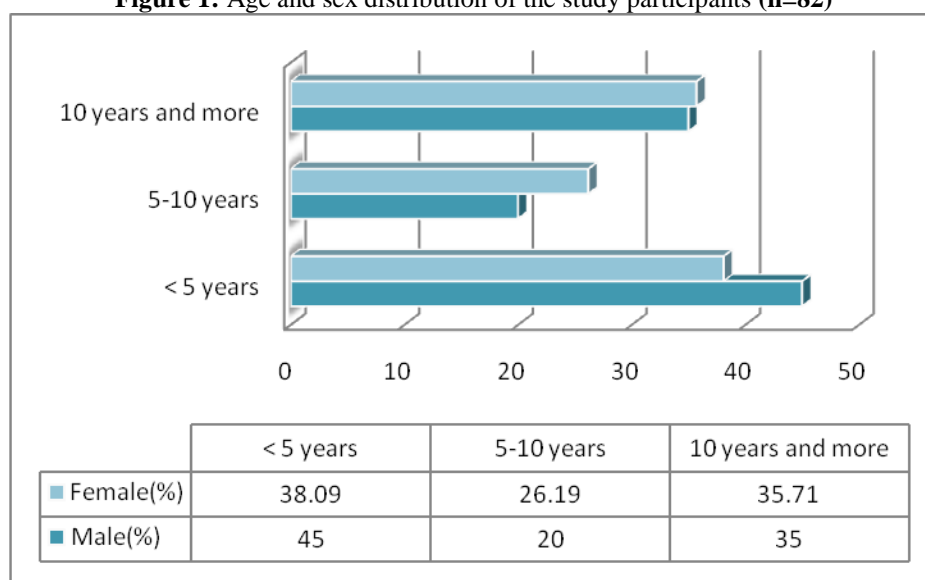
Mean age of the study participants was 6.5±3.5 years

Table 1: Clinical characteristics of the study participants (n=82)

Clinical Features	Frequencies (%)
Duration of fever (days)	
<5 days	26 (31.70)
>5 days	56(68.29)
(mean 5.37 ± 4.3days)	
Type of fever	
Continued	59 (71.95)
Intermittent	15 (18.29)
Remittent	05 (6.09)
Biphasic	03 (3.65)
Body pain	
Myalgia	39 (47.56)
Arthalgia	13(15.85)
Headache	15(18.29)
Retro-orbital pain	10(12.19)
Runny nose/cough	05 (6.09)
Loose stool	09 (10.97)
Vomiting	53 (64.63)
Abdominal pain	49 (59.75)
Signs/symptoms	
Rash with itching	57 (69.51)
Flushed appearance	46 (56.09)
Signs of shock	09(10.97)
Haemorrhage	48 (58.53)
Gum bleeding	10(12.19)
Subconjunctival haemorrhage	24(29.26)
Petechiae	06 (7.31)
Haematemesis	09(10.97)
Melaena	13(15.85)
Pleural effusion	21(25.60)
Hepatomegaly	19(23.17)
Splenomegaly	03 (3.65)
Ascites	13 (15.85)

Table 2: investigations of the study participants (n=82)

Investigations		Frequencies (%)
Tourniquet test		
	Positive	26 (37.80)
	Negative	56 (68.29)
Low WBC (<4x10^9/l)		67 (81.70)
Platelet count		
	> 100X10^9/L	31(37.80)

51-100X10^9/L	25 (30.48)		
21-50X10^9/L	16 (19.51)		
< 20X10^9/L	10 (12.19)		
PCV <45%	82 (100)		
Raised ALT	37(45.12)		
ICT for dengue	**Positive**		**Negative**
NS1	82(100)	00	
IgM	82(100)	00	

Outcome	Number	Percentage
Recovered	80	97.56
Death	2	2.44

V. Discussion

This cross sectional study was done to document the clinical findings in dengue infection in Bangladeshi children. It seems to be one of the preliminary efforts of this kind in Bangladesh. The mean age of the patients was 6.5 ± 3.5 days with age range of 6 months to 15 years. Male female ratio was 1:1. Similar results were reported by Malavige et al[7] and Ahmed et al[8], Malavige GN et al [8] found mean age of the patients 7.9±2.9 years and their age range was from 1 month to 12 years[8] while Ahmed et al. found mean age 9.0±2.8 years with a age range of 2.5-12 years[8]. A male preponderance with a male female ratio of 3:2 was observed by Ahmed et al[8]. Sixty eight (68.29) percent of children complained of fever >5 days with continued type of fever being predominant (71.95%). Sixty(59.75%) of patients had abdominal pain, 64.63% vomiting, 47.56% myalgia, 18.29% headache, 15.85% arthalgia, 12.19% retro-orbital pain, 10.97% loose stool and 6.09% runny nose/cough. These findings were completely different from that of Rahman et al[8]. Rahman et al had reported headache as the most predominant symptom (91%) followed by myalgia/ arthralgia (85%) and vomiting (64%). Malavige et al had reported runny nose in 20% of patients. Ahmed FU et al found headache in 85%, myalgia in 73%, retro-orbital pain in 27% & vomiting in 15% of children[7]. Diaz et al had reported abdominal pain precede the onset of plasma leakage in approximately 6% of adults and children with DHF[9]. Rash with itching was a salient feature (69.51%) followed by flushed appearance (56.09%), Haemorrhage(58.53%), subconjunctival haemorrhage (29.26%), Pleural effusion (25.60%),hepatomegaly(23.17%), Ascites (15.85%) Melaena (15.85%). Sharply contrasting with these findings, Ahmed FU et al found skin rash in only 12% of children. They also found bleeding manifestations as gum bleeding (16%), haematemesis (19%), epistaxis (12%), melaena (8%) and subconjunctival haemorrhage (4%). Rahman et al described spontaneous bleeding in 25% of patients with DF[8]. A haemorrhagic tendency could be elicited by tourniquet test. In the present study, about 37.8% of the patients had positive tourniquet test. At the initial investigation, most of the cases showed low WBC (leukopenia), representing 81.70% of all cases. All of the patients had packed cell volume (PCV) <45% and raised alanine aminotransferase (ALT) in over 40% of the cases. Platelet count <100x10^9/L were found in 62.20% children. In another study, the tourniquet test was positive in 47.5% and raised ALT in 49% of children[8]. Ray et al demonstrated alanine aminotransferase (ALT) was abnormal in 50% of patients[12]. Ahmed et al described 38% of the children with positive tourniquet test and 19% with low WBC[8]. In our study, twenty two (58.53%) presented with dengue fever (DF) remaining 38.56% with dengue haemorrhagic fever (DHF). Among them, 35.18% grade-l, 34.24% grade-ll, 15.50% grade-Ill and 15.08 % grade-IV. Malavige GN et al showed 17.3% children with DHF. Of the DHF, 39.5% of patients had grade-l, 26.7% grade-ll, 31.4% grade-Ill and 2.3% grade IV[8].

VI. Limitations of the study
This is a single centre study with a limited number of samples which can't reflect the scenarios of whole country.

VII. Conclusion and Recommendation
Most of the children with dengue fever presented with high grade continued fever with vomiting and abdominal pain. Flushed appearance with itchy skin rash and subconjunctival haemorrhage were striking features in our study. Rash with itching was observed as distinctive feature of dengue infection in children. Studies on patterns of paediatric dengue infection in different regions would help clinicians and health administrators to make more informed and evidence-based health planning decisions.

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