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Clinical and Laboratory Profile of Dengue Syndrome in Pediatric patients: Study in a Tertiary Care Hospital, Dhaka, Bangladesh

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Abstract

Introduction: Dengue fever is a mosquito-borne arboviral (arthropod-borne virus) disease which is of global concern. This fever is a benign syndrome caused by an arthropod-borne virus and is characterized by Biphasic fever, myalgia, arthralgia, rash, leukopenia, and lymphadenopathy. ***Aim of the study:*** This study aimed to evaluate the clinical and laboratory profile of dengue fever in children less than 15 years old admitted to an urban hospital. ***Methods:*** This retrospective study was conducted in the Department of Paediatrics of Anwer Khan Modern Medical College Hospital (AKMMCH), Dhaka, Bangladesh during the period from 4 April 2019 to 9 September 2019. They have followed up on the symptoms, platelet count and management of the patients. Data were analysed by using MS-Excel-2016. ***Result:*** In total 98 patients from both groups completed the study. In our study, we found a maximum of 54.08% were male, more than half 53(54.08%) patients were below five years of age, about 95(96.94%) of the patients had a fever. Maximum patients, 81(82.65%), were managed by I/V fluid, more than 72(73.47%) of the patients were managed by paracetamol. Others by antibiotics 16(16.33%), platelet transfusion 14(14.29%) and blood transfusion 12(12.24%). Other management also includes plasma, & dopamine. ***Conclusion:*** These study children about 0-15 years of age more commonly suffer from dengue fever. As the vaccine is not available in Bangladesh, these patients need a timely diagnosis and critical monitoring during the disease course to prevent severity and mortality.

Keywords: Dengue, fever, paediatric, febrile disease, mosquito-borne.

I INTRODUCTION

Dengue fever (DF) is caused by mosquito-borne viruses and clinically results in biphasic fever, myalgia, arthralgia, rash, leukopenia & thrombocytopenia, whereas Dengue Hemorrhagic fever (DHF) is severe often fatal febrile disease which results in increased capillary permeability, abnormalities of hemostasis and some cases, cause of Dengue Shock Syndrome (DSS) is considered to have immune-pathologic basis [1]. Dengue infects around fifty million people annually around the globe [2-4]. The incidence of dengue fever has increased by thirty folds over the last fifty years and there is an estimation that 390 million people in 128. Countries are at risk of this dreadful viral disease [5,6]. The first reported epidemics of dengue fever occurred in 1779-1780 in Asia, Africa, and North America; in South East Asia a global pandemic of dengue occurred after World war-II; the epidemic remained localized in this area till 1970 involving Thailand, Myanmar and other neighbouring countries; in 1980 and 1990, the epidemic DHF spread west India, Pakistan, Sri Lanka, Maldives. In Bangladesh, the first outbreak of dengue fever was documented in 1964 in Dhaka; the first epidemic of DHF occurred in mid-2000 when 5,551 dengue infections were reported from Dhaka, Chittagong and Khulna cities, occurring mainly among adults; the case fatality rate was reported 1.7%

with 93 deaths reported by Rahman M *et al.*, The 2019 dengue outbreak in Bangladesh is a nationwide occurrence of dengue fever in Bangladesh that began primarily in April 2019 and is still ongoing [7,8]. After the incubation period of 4-10 days, the infected Aedes aegypti mosquito is capable of transmitting the virus for the rest of its life The infection causes a flu-like illness and occasionally develops into a potentially fatal complication called severe dengue [7]. The global incidence of dengue has grown dramatically in recent decades[1]. About 3.9 billion people, in 128 countries, are at risk of infection with dengue viruses [9]. Even though most often dengue fever presents with self-limiting mild illness, severe dengue infection increases morbidity and a few of them succumb to serious complications and death. Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas [10,11]. Severe dengue is a leading cause of severe illness and death among children in some Asian and Latin American countries [10]. The exact clinical and laboratory profile is crucial for diagnosis as well as the successful management of the patients. The study aimed to review clinicopathological data of Dengue infection in pediatric patients.

II Objectives

General objective:

- To assess clinicopathological data of Dengue infection in paediatric patients

Specific Objectives:

- To review the clinical data of paediatric dengue fever patients.
- To review the laboratory data of paediatric dengue fever patients.

III METHODOLOGY & MATERIALS

This retrospective study was conducted in the Department of paediatrics of Anwer Khan Modern Medical College Hospital (AKMMCH), Dhaka, Bangladesh during the period from 4 April 2019 to 9 September 2019. A total of 98 patients participated in this study.

Inclusive criteria:

Febrile patients aged 0-15 year of both genders were included. The children suffering from fever 2-9 days with two or more symptoms (fever, headache, pain in the eye, myalgia, arthralgia, retro-orbital pain, loose motion, oral thrush, abdominal pain, rash, bleeding manifestations, respiratory distress, and irritability) and reduced urine output with positive dengue markers were included in the study. Patients with fever and two or more symptoms according to the reporting form were admitted to the pediatric ward. A blood complete picture was sent to the haematology department of the hospital. Based on leukopenia (Total Leucocyte Count <4000/cmm) or thrombocytopenia (Platelet <100,000/cmm) patients were classified as probable dengue fever.

Exclusive criteria:

Later on, the presence of dengue markers dengue serology (IgM and IgG antibody) and NS1 antigen were done in all patients. Patients with negative dengue serology were excluded.

Data collection:

Findings of observation and interview with the patient and attendants were recorded on prescribed data collection sheet that was fulfilled by the investigator.

Data Analysis:

Detailed clinical examination, serial monitoring of vital signs was done for all patients. All patients were admitted to the paediatric dengue ward and monitored for vital signs, urine output, and ultrasound chest/abdomen to rule out any evidence of plasma leak. They have followed up on the symptoms, platelet count and management of the patients. Data were analysed by using MS-Excel-2016.

Ethical consideration:

Prior to commencement of the study, the respective authority was approved the research protocol. All the patients included in this study were informed about the nature, risks and benefits of the study. Confidentiality was maintained. Proper permission was taken from the department and institution concerned for the study.

IV RESULT

This study included a total of 98 febrile patients, about 54.08% of them were male and 45.92% were female after confirmation of diagnosis headaches markers [Figure-1]. More than half 53(54.08%) patients were below five years of age, 37(37.76%) were 6-10 years and 8(8.16%) were 11-15, as the study patients were taken from 0-15 years [Figure-2].

Total study patients were 98 (100%) of the 68(69.39%) were dengue haemorrhagic fever(DHF) and 30(30.61%) had dengue shock syndrome (DSS) [Table-1]. From the data of the symptoms of the patients, about 95(96.94%) patients had a fever. Nausea or vomiting had 57(58.16%) patients. 32(32.65%) had abdominal pain, 31(31.63%) had headaches. 24(24.49%) had a skin rash. Others also had 18(18.37%) arthralgia, 15(15.31%) pain in the eye, 9(9.18%) loose motion, 7(7.14%) oral thrush, 6(6.12%) for both respiratory distress and bleeding [Table-2].

From the laboratory investigations, HB% maximum found more than 10% 71(72.45%), ESR mm1st hr. more than half of the patients 51(52.04%) found in >10, WBC/L(mm3) found in 4500-11000 range 74(75.51%), 49(50.00%) found 26-50% of the range of neutrophils, in lymphocytes percentages recorded in 26-50% and that was 51(52.04%), in platelet count (during admission) about 48(48.98%) have more than >100000 counts. On the dengue serology, Ns1 found 74(75.51%),

IgM found 6(6.12%) and IgG found 5(5.10%) and lastly UGA of W/A found a maximum of 52(53.06%) normal [Table-3].

Maximum patients 81(82.65%) were managed by I/V fluid, almost of more patients 72(73.47%) managed by paracetamol. Others are antibiotics 16(16.33%), platelet transfusion 14(14.29%) and blood transfusion 12(12.24%). Other management also includes plasma, & dopamine. [Table-4].

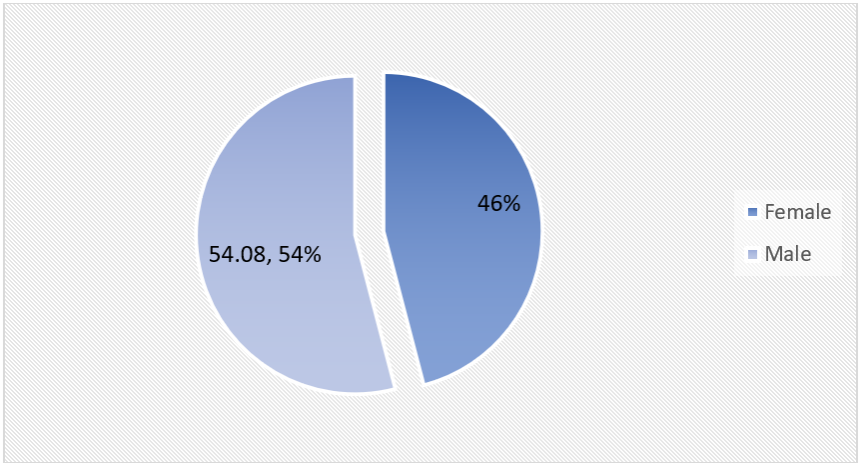

Figure-1: Distribute the study people according to Gender N=98

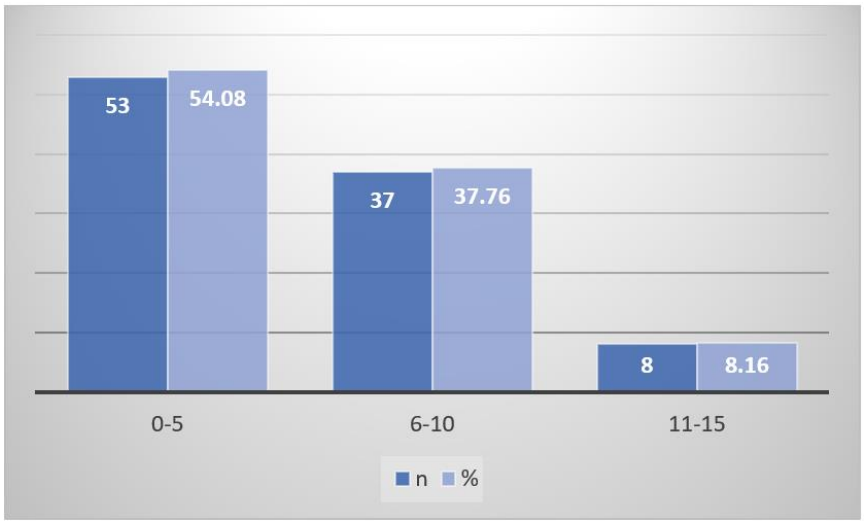

Figure-2: Distribute the study patients according to age N=98

Table-1: Study people classification of dengue fever N=98

Classification of Dengue	n	%
DHF	68	69.39
DSS	30	30.61
Total	98	100.00

Table-2: Presenting complaints of children with enrolled dengue fever cases (N=98)

Symptoms	n	%
Fever	95	96.94
Headache	31	31.63
Pain in eye	15	15.31
Arthralgia	18	18.37
Nausea/ Vomiting	57	58.16
Abdominal Pain	32	32.65
Skin rash	24	24.49
Loose Motion	9	9.18

Symptoms	n	%
Oral Thrush	7	7.14
Respiratory Distress	6	6.12
Bleeding	6	6.12

Table-3: Laboratory investigations of enrolled dengue patients N=98

Laboratory investigation		n	%
Hb%	**Less than 10**	27	27.55
	More than 10	71	72.45
ESR mm 1st hr.	**0-10**	47	47.96
	>10	51	52.04
WBC/L (mm3)	**<4500**	18	18.37
	4500-11000	74	75.51
	>11000	6	6.12
HCT (%)	**<30%**	11	11.22
	30%-45%	72	73.47
	46%-60%	10	10.20
	>61%	5	5.10
Neutrophils (%)	**0-25**	9	9.18
	26-50	49	50.00
	51-75	34	34.69
	76-100	8	8.16
Lymphocytes (%)	**0-25**	22	22.45
	26-50	51	52.04
	51-75	18	18.37
	76-100	7	7.14
Eosinophils (%)	**Less than 1**	51	52.04
	More than 1	47	47.96
Platelets Count (during admission)	**>100000**	48	48.98
	100000-50000	32	32.65
	<50000	18	18.37
Dengue Serology	**Ns1**	74	75.51
	IgM	6	6.12
	IgG	5	5.10
USG of W/A	**Normal**	52	53.06
	Pleural effusion	10	10.20
	Ascites	27	27.55
	Gallbladder wall thickness	9	9.18

Table-4: Management of the enrolled dengue patients (N=98)

Patients management	N	%
I/V fluid	81	82.65
Blood transfusion	12	12.24
Plasma	3	3.06
Platelet transfusion	14	14.29
Paracetamol	72	73.47
Dopamine	4	4.08
Antibiotics	16	16.33

V DISCUSSION

This study included a total of 98 febrile patients, about 54.08% of them were male and 45.92% were female after confirmation of diagnosis on dengue markers. Male suffered more according to our study. This study is similar to a study conducted in southern India where (77.31%) patients are male [14]. But in another study there found a maximum of 67 female patients [12].

More than half 53(54.08%) patients were below five years of age, 37(37.76%) were 6-10 years and 8(8.16%) were 11-15 as the study patients were taken from 0-15 years. In another study, 133 patients were included during six months of the epidemic in Rawalpindi [12]. They found two-thirds of the study population between 5-12 years of age. The same age group is found more affected from dengue infection in different studies conducted in Pakistan and India [13-15].

Total study patients were 98 (100%) of the 68(69.39%) were non-severe dengue fever and 30(30.61%) had severe dengue fever. From the data of the symptoms of the patients, about 95(96.94%) patients had a fever. Nausea or vomiting had 57(58.16%) patients. 32(32.65%) had abdominal pain, 31(31.63%) had headaches. A rash is one of the prominent clinical features of dengue also noted in 64.5% of patients in one study conducted in India [17]. But we found in our study24(24.49%) had skin rash. Others also had 18(18.37%) arthralgia, 15(15.31%) pain in the eye, 9(9.18%) loose motion, 7(7.14%) oral thrush, 6(6.12%) for both respiratory distress and bleeding. In another study, fever was present in 100% of patients followed by headache, vomiting, myalgia, abdominal pain, retro-orbital pain, sore throat, arthralgia, rash, cough and diarrhoea [12]. The frequency of symptoms are consistent with other studies [13,17]. Bleeding in dengue infection is a common event. Its causes are multifactorial. According to a study majority of the patients (88.7%) did not bleed during the illness which is contrary to the study conducted in Indonesia and Philippines [18,19].

From the laboratory investigations, Hb% maximum found more than 10% 71(72.45%), ESR mm1st hr. more than half of the patients 51(52.04%) found in >10, WBC/L(mm3) found in 4500-11000 range 74(75.51%), 49(50.00%) found 26-50% of the range of neutrophils, in lymphocytes percentages recorded in 26-50% of and that was 51(52.04%), in platelet count (during admission) about 48(48.98%) have more than >100000 counts. On the dengue serology, Ns1 found 74(75.51%), IgM found 6(6.12%) and IgG found 5(5.10%) and lastly UGA of W/A found a maximum of 52(53.06%) normal. Hepatomegaly was present in 36.8% in another study that is not as frequent as in a study done by Joshi R in Mumbai in which hepatomegaly is present in more than half (66%) patients [12,15]. Age less than five years, spontaneous bleed, Hepatomegaly, free fluid in serosal cavities, leukopenia less than 4000/mm and thrombocytopenia <50,000/mm are significant risk factors in pediatric patients suffering from DHF [2]. None of these findings were found significant in this study [20,21]. Non-structural protein 1(NS1) was the most frequent marker of dengue fever as compared to IgM for dengue fever. This observation is on par with the findings of different studies [16,21]. Pleural effusion and gallbladder wall oedema were the most frequent ultrasound findings in this study which is consistent with the study conducted in India [22].

Maximum patients 81(82.65%) were managed by I/V fluid, almost of more patients 72(73.47%) managed by paracetamol. Others are antibiotics 16(16.33%), platelet transfusion 14(14.29%) and blood transfusion 12(12.24%). Other management also includes plasma & dopamine. Normal Saline and dextran were found useful in dengue haemorrhagic fever and dengue shock syndrome patients [23,24]. The same was observed in severe patients in this study. Blood transfusion was done in 8.3% of patients in another study which is not comparable with one of the Indian study in which only 1.8% of children receive blood transfusion [12,25]. Early detection and timely management of the disease can prevent mortality.

Limitations of the study

Our study wasn't a blind study so patient bias was present along with observer bias in subjective recording and one of the limitations of this retrospective study is, because of the small sample size we could not do multivariate analysis.

VI RECOMMENDATIONS

As the vaccine is not available in Bangladesh, these patients need a timely diagnosis and critical monitoring during the disease course to prevent mortality. Dengue is best fought in community settings with the right knowledge of the disease, the right attitude towards the disease and the right practices against the disease must be made easily available and must be turned into a mandatory programme for endemic regions. This virus must be tackled at home in order to prevent any more outbreaks. Knowledge about these will help in better outcomes of dengue cases. We have to generate more information on this issue from similar hospitals to confirm the findings of the present study and take steps to prevent dengue outbreaks at hospitals.

VII CONCLUSION

This study depicts that children about 0-15 years of age more commonly suffer from dengue fever. Dengue is one of the dreaded fevers of the paediatric age group with variable presentations and complications. Understanding the knowledge of presentations and associated features would help to predict the severity of the disease. In our study, we listed all the probable clinical data and laboratory parameters that can help in establishing the severity of the fever. A rise in SGOT levels, pleural effusion, Hepatomegaly are significant findings in distinguishing severe from non-severe cases of dengue fever.

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Conflict of Interest: The authors declare that there are no conflicts of interest regarding the publication of this article.

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