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Original Research Article

Changes in severity of clinical pattern of dengue infection and its management: a cross-sectional study in a tertiary care hospital

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ABSTRACT

Background: Dengue fever is a debilitating viral disease, transmitted by mosquitoes, and causes sudden fever, and acute pain in the joints. Aedes Aegyptus mosquitos are responsible for dengue fever. More than 500,000 people are affected by dengue fever each year. In Bangladesh, over 15,000 cases of dengue are reported each year. It is high time to take some measures to control this viral disease. The aim of the study was to investigate the clinical manifestation of dengue fever in tertiary care hospitals.
Methods: It is a prospective cross-sectional study that was carried out in the pediatric department of Dhaka medical college hospital (DMCH) over one year and was conducted with 106 patients.
Results: The finding had females dominant over males. Minimum and maximum ages were 1 and 14 respectively. All patients (106, 100%) had fever. Around one-third of the patients (34,32%) had headaches. Patients had experienced rash and vomiting. The Tourniquet test came out positive for about one-fifth of the patients (21, 19.8%). About half of the study population (50, 47.2%) had dengue fever, around two-fifth of the patients (44, 41.5%) experienced dengue hemorrhagic fever (DHF) and only 12 patients (12, 11.3%) were diagnosed with dengue shock syndrome (DSS). The majority of the patients (102, 96.22%) were given isotonic fluid. Ns1 antigen for dengue 65 cases and IgM & IgG for dengue 32 cases were positive.
Conclusions: Dengue is a rapidly emerging pandemic disease in many parts of the world, especially in Bangladesh. There is no accurate treatment to treat dengue patients. However, more illness and death could be prevented if countries regularly monitor the circulation of viruses in the mosquitos and take control measures before there are consequential outbreaks.

Keywords: Dengue, Mosquito, Symptoms, DSS, Treatment

INTRODUCTION

Dengue is a viral infection transmitted to humans through the bite of infected mosquitoes, named Aedes.[1] Aedes aegypti is a mosquito that can spread dengue fever, chikungunya, Zika fever, yellow fever viruses, and other disease agents.[2] Severe dengue results in shock, internal bleeding, and even death. Infants and pregnant women are more likely to develop severe dengue.[3] There are 3 types of dengue; dengue fever, DHF, and DSS. Dengue fever sometimes causes a high fever of -104^0 F and has a headache, muscle, bone, or joint pain, nausea, vomiting, pain behind the eyes, swollen glands, rash, etc. Some common symptoms of dengue in children are high fever, a possibility as high as -105^0F, pain behind the eyes, muscle pain, severe headache, rash over the whole body, mild bleeding from the nose or gums, bruising, etc.[4] DHF is known as plasma leakage resulting from increased vascular permeability and it is a severe form of dengue.[5] DSS is the last stage of the most rigorous occurrence of dengue fever, DHF, and is fatal without prompt treatment.[6] According to the prospect of Bangladesh, children older than 6 years of age are more likely to be infected by this mosquito-borne pathogen as they like to spend most of their time in crowded places, such as schools, parks, etc. In the household area, the appearance of ornamental potted plants, and potential breeding grounds for mosquitos were grounded to grow the risk of

dengue infection.[7] World health organization estimates that approximately 500,000 people evolve severe diseases every year and about 1,250 people die. At the current time, 390 million people are disclosed to the dengue virus.[8] Bangladesh is a country hyperendemic for dengue infection. Currently, Bangladesh alleged an advance in vector-borne diseases such as dengue outbreaks in Bangladesh, especially in Dhaka.[9] In Bangladesh, dengue was first identified in 1964. In recent years, Bangladesh has reported over 15,000 dengue cases and almost 57 deaths since January 2021.[10] Dengue induced major public health and clinical issues, following an unexpected epidemic that causes around 5,551 cases and 93 deaths happened in the country.[11] Dengue fever results in a drop in white blood cell and platelet counts. The normal platelet count in the body ranges from 1.5 to 4 lacs, this may go down to as low as 20,000 to 40,000 in the case of dengue patients. There is no specific medicine to treat dengue. The aim of the study was to investigate changes in severity of clinical patterns of dengue infection and its management, a cross-sectional study in tertiary care hospital.

METHODS

A Prospective cross-sectional study was carried out in the pediatric department of Dhaka medical college hospital (DMCH) from June 2021 to October 2021. A total of 106 patients (n=106) over the period of one year were enrolled in this study following the inclusive criteria. Data were collected using the predesigned semi-structured questionnaire and all laboratory tests were carried out in the laboratory of DMCH. were measured in hospital lab. Patients were confirmed as dengue cases based on the guidance of 'the national guideline for clinical management of dengue syndrome, Bangladesh'.[13] Verbal consent was taken before recruiting the study population. The information was kept confidential only to be used for the study purpose.

Inclusion criteria

Confirmed dengue patients who aged less than 18 were included in the study.

Exclusion criteria

Patients with malignant diseases or organ failure and patients who showed unwillingness to participate in the study were excluded from the study.

Data analysis

The study coordinators performed random checks to verify data collection processes. Completed data forms were reviewed, edited, and processed for computer data entry. The data analysis was performed using statistical package for the social sciences (SPSS) version 25.0.

RESULTS

Among the study population, half of the study population were female and the percentage was 52.8% (56, 52.8%) and the percentage of the male was 47.1% (50,47.1%), and the mean age of the patients was 8±SD (Table 1). All patients (106, 100%) had fever, around one-third of the patients (34, 32%) had headaches, about one-sixth of the patients (17, 16%) had rashes all over the body surface, 24.52% of patients (26, 24.52%) had vomiting. The Tourmiqel test was done by patients and the result came out positive for one-fifth of the patients (21,19.8%). 15 patients (15, 14.1%) blood pressure was nonrecordable (Table 2). About half of the study population (50, 47.2%) had dengue fever, around two-fifth of the patients (44, 41.5%) experienced DHF and only 12 patients (12, 11.3%) were diagnosed with DSS (Figure 1). The mean pulse was 100.10±SD, and only 6 patients (6, 5.66%) had feeble. Mean systolic and diastolic pressure was 86.8±SD and 59±SD respectively and sixty-four patients (64, 60.3%) had hypotension. Platelet counts varied from 7,000 (minimum) to 450,000 (maximum) in patients. Whereas the mean ± SD of the pulse pressure was 28.01±SD and the minimum and maximum pulse pressure found in the patients was 10 and 50 respectively (Table 3). The majority of the patients were treated with isotonic fluid (102, 96.22%), and only a few patients (15, 14.15%) needed blood. Thirty-nine patients were given colloid (39, 36.79%). Patients with DSS were initially treated with isotonic fluids. Colloid was administered to the patients with DSS who`s symptoms of shock were not improved with isotonic fluid replacement. Patients whose hematocrits were decreasing gradually required blood transfusions (Table 4).

Table 1: Distribution of study population based on characteristics, (n=106).

Characteristics	N (%)
Male	50 (47.1)
Female	56 (52.8)
Age (Years)	
Mean age	8±SD
Minimum age	1
Maximum age	14

Table 2: Distribution of study population based on symptoms of patients, (n=106).

Characteristics		N (%)
Headache		34 (32)
Rash		17 (16)
Fever		106 (100)
Vomiting		26 (24.52)
Tourniquet test positive		21 (19.8)
Blood pressure	Non-recordable	15 (14.1)
Dengue IgM and dengue IgG positive		32 (30.1)

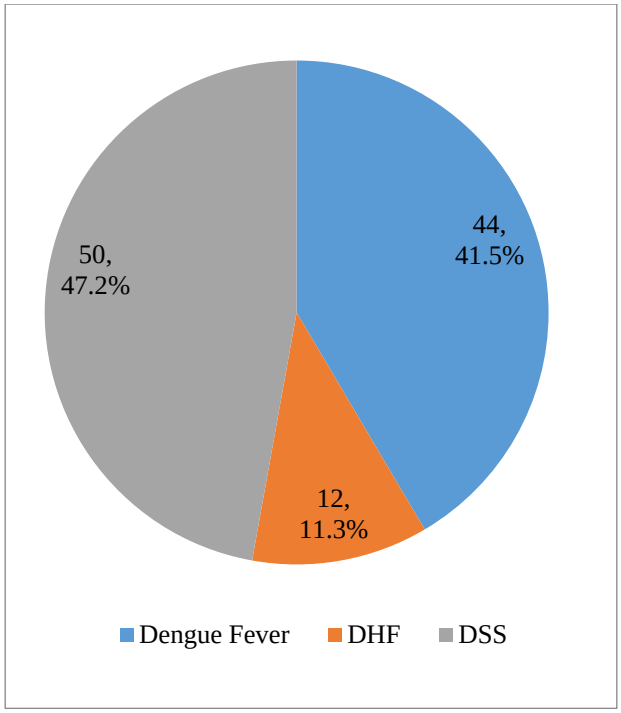

Figure 1: Distribution of study population according to diagnosis, (n=106).

Table 3: Distribution of study population based on clinical features, (n=106).

General features	N (%)
Mean pulse	100.10±SD
Feeble	6 (5.66)
Non-recordable	12 (11.3)
Hypotention	64 (60.4)
Mean systolic BP	86.8±SD
Mean diastolic BP	59±SD
Platelet count	113562±SD,
	Minimum-7000/cmm
	Maximum-450000/cmm
Pulse pressure	28.01±SD
	Minimum-10
	Maximum-50

Table 4: Distribution of study population based on treatment given, (n=106).

Characteristics	N (%)
Oral fluid	46 (43.39)
Isotonic fluid	102 (96.22)
Colloid	39 (36.79)
Blood	15 (14.15)

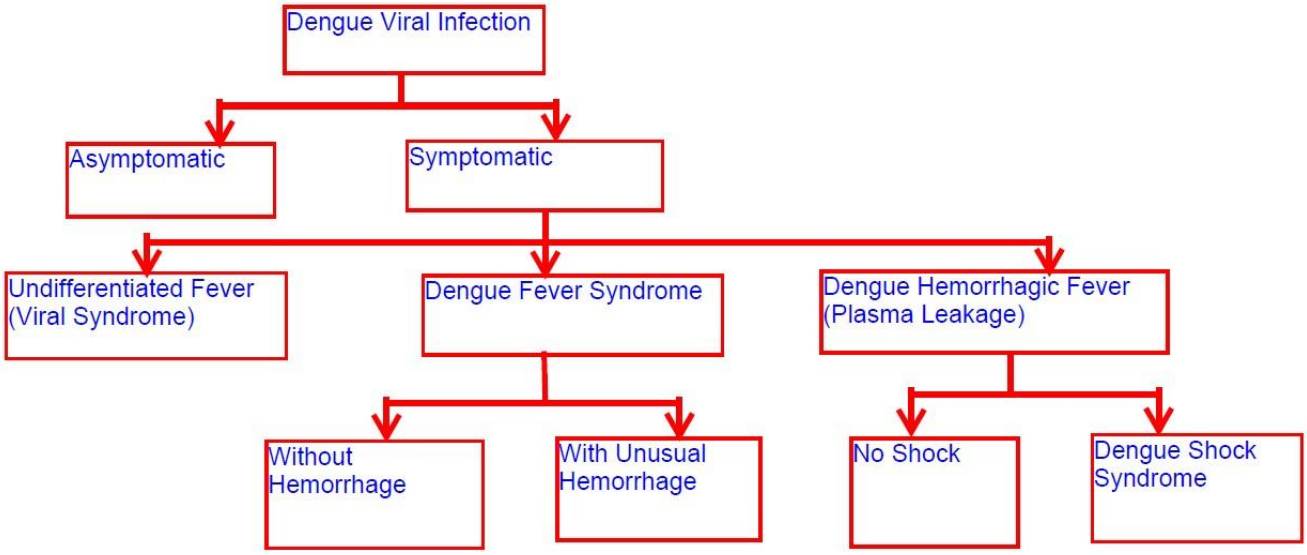

Figure 2: WHO classification of symptomatic dengue infection.[16]

DISCUSSION

In the current study majority of the population was female (56, 52.8%). There was a study conducted by Hasan et al revealed that 63% of the study population were male.[14] Different studies found that there is a higher incidence of dengue fever in males in comparison with the female gender.[15] In the present study, 100% of the study population had fever, 32% of patients experienced headaches, and 16% of patients had rashes. There was a study conducted at the dengue corner of Sheikh Hasina burn and plastic surgery institute, in Dhaka medical college, hospital, revealed that 100% of people had a fever and 1.6% of patients had rashes.[15] The 19.8% of patients had tourniquet test positive in the present study. Perhaps, another study by Hasan et al found that 10.5% of patients were tourniquet test positive. Dengue IgM and IgG positive was 30.1% of the study population (32, 30.1%). Hasan et al found that 25% of patients were hypertensive and dengue IgM positive was 80%, IgG positive was 59.4% of patients.[15] In our recent findings, 41.5% of patients had dengue fever, 11.3% of patients had DHF, and 47.1% had DSS.

WHO classification of dengue diseases is often not feasible in many countries because of a lack of trained health professionals, and adequate laboratories. Facilities to detect DHF by using hematocrit and plasma leakage sign signs are not available in many underdeveloped countries. Successful dengue management depends on symptom recognition and careful fluid management.[16,17]

Mahmood et al conducted a study and 11.1% study population was diagnosed as DHF.[14] Throughout the dengue outbreaks from 2000 to 2019 patients with dengue demonstrated diverse presentations and the symptoms were imprecise.[18] Dengue virus interacts with host cells and causes the release of various cytokines and stimulates immunologic mechanisms, vascular endothelial changes, infiltration of mononuclear cells, and perivascular edema. Various atypical manifestations were also noticed along the passage of time. Thus, dengue viral infection has become a major public health issue in Bangladesh which is fronting dengue outbreaks every year, and mortality morbidity due to dengue is emerging at a recklessly high rate with each outbreak. An increased frequency of diarrhea and abdominal pain in dengue patients was observed over the last decades. Abdominal pain was more likely to occur in DEN-3 serotypes than in DEN-1 and DEN-2.[19] As DEN-3 serotype more prevalent in recent years in Bangladesh.[2]

In the current study, sixty-four children were hypotensive (64, 60.4%). Fifteen patients' blood pressure was nonrecordable (12, 11.3%) and six patients had feeble pulse (6, 5.6%). Hasan et al revealed in their study that, the most common clinical sign of their study population was hypotension (25.04%). This plasma leakage indicates one-fourth of the study population had DSS. Whereas, in the present study more than half of the study population had Hypotension (64, 60.4%).[15] Thus, the prompt development of shock was not detected in the previous year in comparison with the present study might denote the shelving in the aggressiveness of the disease.[21] DSS is the most severe syndrome that can be fatal. Dengue fever is most commonly a self-limited sickness that has no definite antiviral treatment. Mostly supportive care, fluid replacement, and bed rest are adequate. There is no specific medicine that can be used to prevent dengue. Severe dengue management involves special awareness of fluid management and proactive treatment of hemorrhage. Virus-specific treatment is not yet accessible. Besides, primitive recognition of warning signs of DHS or DSS and immediate intervention with supportive treatment with close monitoring is of utmost importance to reduce case fatality rate.[19] In Bangladesh, national guideline for clinical management of dengue syndrome has been developed and is being followed in dengue case management at all levels of health care levels of facilities. So, training on dengue guidelines for health care professionals including doctors and nurses throughout the year especially prior to dengue season may contribute to better management of dengue cases.

CONCLUSION

Prevention of dengue in Bangladesh cannot be successfully done only by government effort. Multi-disciplinary approaches are needed. As dengue is considered an endemic disease in the country. The dengue epidemic can only be prevented if control measures and case-management protocols are developed in a country-specific way.

Recommendations

People should use mosquito repellant, and wear long-sleeved shirts and long pants. Mosquitos should be controlled inside and outside the home. Frequently checking and removing stagnant water in household and office premises is beneficial. Awareness should be created to strengthen the early detection of dengue at all healthcare facilities. A simple classification scheme of dengue diseases based on symptoms and signs is needed to improve case management and reduction of death. Public health management like vector control programs, awareness regarding prevention, and regular surveillance is essential.

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