

Original Article

## “Retrospective Study of Various Factors In Pediatric To Severe Dengue Infection”

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### Abstract

**Introduction:** Dengue epidemics are known to have occurred over the last three centuries in tropical, subtropical and temperate areas of the world. Annually a 100 million cases of Dengue fever and half a million cases of dengue hemorrhagic fever (DHF) occur in the world with a case fatality in Asian countries of 0.5%–3.5%. **Objective:** To assess the various factors in pediatric to severe dengue infection. **Methods:** A hospital-based Retrospective study was conducted at Department Of Paediatric, Mugda Medical College Hospital, Dhaka, Bangladesh from October to December 2023. Number of patients included in the study was 50. In children with high degree clinical suspicion of Dengue infection NS 1 antigen (who came within first 48 hours of fever) and/or Dengue antibody IgM, IgG (who came after five days of fever) were performed. Positive Dengue cases were taken written informed consent & interviewed on the risk factors of Dengue infection. Data related to patients demography, risk factors, clinical presentation, pattern of Dengue infection and outcome were documented on the pre-structured questionnaire. **Results:** The study was enrolled 100 patients of suspected dengue fever of whom 50 (50.0%) were serologically confirmed to have dengue infection. 30 (60%) patients were males and 20 (40%) were females. 38 (76%) patients had classic dengue fever while 12 (24%) fulfilled the criteria of dengue hemorrhagic fever. Of those patients with dengue hemorrhagic fever, 6 patients had developed dengue shock syndrome. Among the study 44 (88%) from urban and 6 (12%) rural area patients. All cases and is the most common symptom followed by headache, myalgia, vomiting etc. Hemorrhagic manifestations were seen that included petechiae, ecchymosis, gum bleeding, hematuria, malena, hematemesis and epistaxis. Most common complications were hepatic dysfunction, renal failure, multi organ failure, encephalopathy and ARDS. Among 50 suspected dengue cases 38 (76.0%) cases were serologically dengue positive. Among the 38 serologically dengue positive patients 17 (44.7%) were NS1 antigen positive, 13 (34.2%) IgM antibodies and 8(21.0%) both IgM and IgG antibodies positive. The distribution of the serologically dengue positive patients out of 50 clinically suspected cases. **Conclusion:** Dengue is one amongst the key causes of dedifferentiated fever. It presents as an extremely broad wellness and is hardly recognized as a clinical entity by primary health care physicians. This study highlights the practitioner the importance of break bone fever to clinicians within the areas of medical specialty, manifestations, complications and outcome of the wellness.

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**Keywords:** Various Factors, Paediatric, Severe Dengue Infection.

### Introduction

Dengue epidemics are known to have occurred over the last three centuries in tropical, subtropical and temperate areas of the world [1]. The first epidemic of dengue was recorded in 1635[2] in the French West Indies, although a disease compatible with dengue had been reported in China as early as 1992 AD [3]. During the 18th, 19th and early 20th centuries, epidemics of dengue-like diseases were described globally in the tropics as well as in some temperate regions. The World Health Organization (WHO) estimated that approximately 2.5 billion people living in dengue-endemic countries [4]. The virus serotypes are closely

related but antigenically distinct [5]. In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries [6]. Annually a 100 million cases of Dengue fever and half a million cases of Dengue hemorrhagic fever (DHF) occur in the world with a case fatality in Asian countries of 0.5%–3.5% [7]. Dengue is a severe public health problem in tropical countries, with attack rates among susceptible populations frequently ranging from 40 to 50%, or as high as 80–90% in some cases. Of the 500 000 cases of DHF that require hospitalization every year, death rates between 2.5 and 5% are recorded, but they can be as high as 20% in very young children if the appropriate treatment is not administered rapidly [8]. Dengue infections can result in a wide spectrum of disease severity ranging from an influenza-like illness (dengue fever; DF) to the life-threatening dengue hemorrhagic fever (DHF)/dengue shock syndrome (DSS), which, if left untreated, are associated with mortality as high as 20% [8-14]. Early diagnosis is essential and clinical suspicion is based on the frequency of symptoms in the population. The first confirmed report of dengue infection in Bangladesh dates back to 1960s, and since then more and more new states have been reporting the disease which mostly strikes in epidemic proportions often inflicting heavy morbidity and mortality [15]. Several fatal forms of the disease i.e., DHF, DSS have been reported in Bangladesh from time to time in different parts of Bangladesh. During all these epidemics infection occurred in active childrens in the age group of 16–60 years [16, 17]. The common signs and symptoms observed were fever, headache, myalgia, arthralgia and bleeding manifestations have also been observed.

### **Materials and Methods**

A hospital-based Retrospective study was conducted at Department of Paediatric, Mugda Medical College Hospital, Dhaka, Bangladesh from October to December 2023. Number of patients included in the study was 50. In children with high degree clinical suspicion of Dengue infection NS 1 antigen (who came within first 48 hours of fever) and/or Dengue antibody IgM, IgG (who came after five days of fever) were performed. Positive Dengue cases were taken written informed consent & interviewed on the risk factors of Dengue infection. Data related to patient's demography, risk factors, clinical presentation, pattern of Dengue infection and outcome were documented on the pre-structured questionnaire. Co-relation between the risk factors and mortality was also observed. All enrolled patients were treated according to the standard management protocol of national Dengue guideline (published in collaboration with WHO and Ministry of Health and Family welfare (MOHFW), Bangladesh).

### **Inclusion criteria:**

- a) Dengue patients admitted in medical and adolescent wards of Tertiary Care Hospital, Dhaka, Bangladesh.
- b) Patients of all age groups, showing a temperature of  $>38.5^{\circ}\text{C}$  for  $>24$  hours, and clinically diagnosed as having dengue fever.

### **Exclusion criteria:**

- a) Dengue cases with definite source of infection (e.g. respiratory or urinary tract infection, meningitis).
- b) History of bleeding tendency since birth.
- c) Immuno compromised patients.

The diagnosis of dengue fever, dengue hemorrhagic fever and dengue shock syndrome was based on the WHO (World Health Organization) criteria. Only those patients were included in the study with classical features of dengue – fever with chills, body ache, headache and rash, bleeding manifestations and thrombocytopenia and had a positive ELISA test. Patients who had malaria and enteric fever were excluded from the study. Detailed history and clinical examinations were done. Hematological profiles and biochemical investigations were done at the time of admission and were followed by daily (or bi-daily) investigations as required until discharge. Signs of plasma leakage were assessed by chest radiograph and abdominal ultrasonography. Specific investigations were performed in patients who presented with neurological involvement (cerebrospinal fluid analysis, neuroimaging, electro diagnostic studies or muscle biopsy) or hepatic failure (viral markers, peripheral smear and serology for plasmodium falciparum,

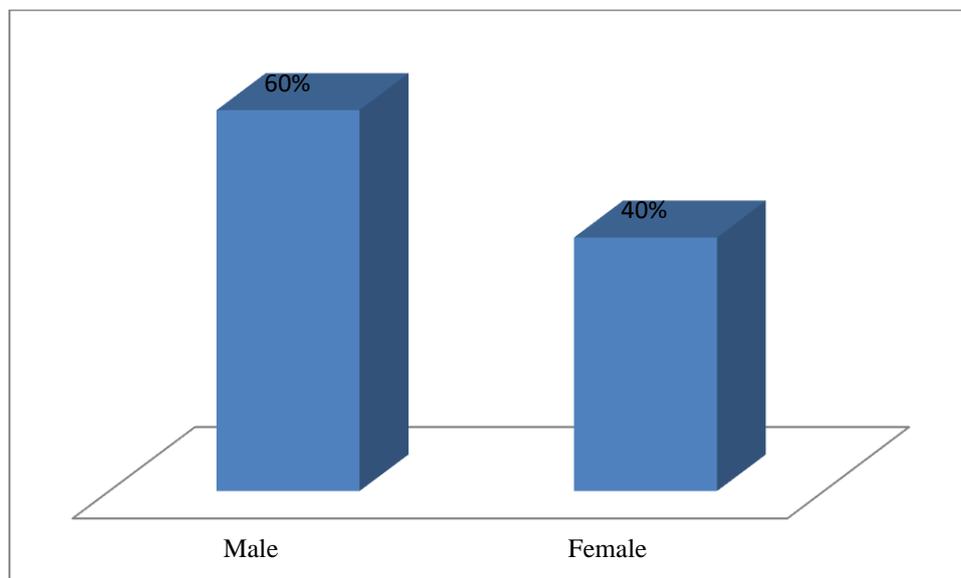
typhoid fever and leptospirosis). Statistical analysis was performed by Chi -Square test done by using the Statistical Package “SPSS” for Social Sciences, with  $p < 0.05$  taken as statistically significant.

**Results**

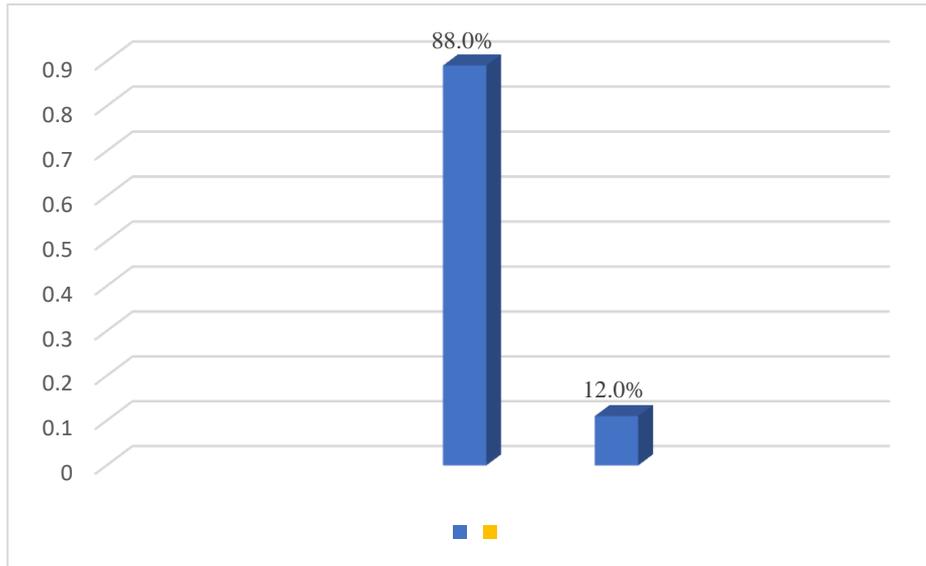
The study was enrolled 100 patients of suspected dengue fever of whom 50 (50.0%) were serologically confirmed to have dengue infection. 30 (60%) patients were males and 20 (40%) were females. 38 (76%) patients had classic dengue fever while 12 (24%) fulfilled the criteria of dengue hemorrhagic fever. Of those patients with dengue hemorrhagic fever, 6 patients had developed dengue shock syndrome. Maximum number of cases 22 cases (44%) was in the children age groups 5-10 yrs. (Table-1). Among the study 44 (88.0%) from urban and 6 (12.0%) rural area patients (Fig-2).

**Table 1:** Age distribution of patients with Dengue fever (n=50)

| Age (Years) | Male n=30 | Female n=20 | Total |
|-------------|-----------|-------------|-------|
| 1-5 Yrs.    | 08        | 07          | 15    |
| 5-10 Yrs.   | 14        | 08          | 22    |
| 10-15 Yrs.  | 08        | 05          | 13    |
| Total       | 30        | 20          | 50    |



**Figure-1:** Sex distribution of Patients.



**Figure-2:** Geographical distribution of the urban and rural patient.

**Table 2:** Symptoms and complications of dengue fever (n=50)

| Symptoms             | N  | %    |
|----------------------|----|------|
| Fever                | 37 | 74.0 |
| Headache             | 27 | 54.0 |
| Myalgia              | 19 | 38.0 |
| Vomiting             | 21 | 42.0 |
| Breathlessness       | 15 | 30.0 |
| Abdomen pain         | 13 | 26.0 |
| Bleeding tendency    | 11 | 22.0 |
| Skin rash            | 7  | 14.0 |
| <b>Complications</b> |    |      |
| Hepatic dysfunction  | 24 | 48.0 |
| Renal failure        | 19 | 38.0 |
| Encephalopathy       | 8  | 16.0 |
| Multi organ failure  | 5  | 10.0 |
| ARDS                 | 2  | 4.0  |

Table 2 fever was present in all cases and is the most common symptom followed by headache, myalgia, vomiting etc. Hemorrhagic manifestations were seen that included petechiae, ecchymosis, gum bleeding, hematuria, malena, hematemesis and epistaxis. Most common complications were hepatic dysfunction, renal failure, multi organ failure, encephalopathy and ARDS.

**Table 3:** Distribution of the serologically dengue positive patients (n=50)

| Dengue positive patients | Number | Percentage      |
|--------------------------|--------|-----------------|
| Total serology positive  | 38     | 76.0            |
| Total serology negative  | 12     | 24.0            |
| <b>Serological test</b>  |        | <b>Positive</b> |
| NS1 Ag                   | 17     | 44.7            |
| IgM                      | 13     | 34.2            |
| Both IgM and IgG         | 8      | 21.0            |

Among 50 suspected dengue cases 38 (76.0%) cases were serologically dengue positive. Therefore, 12 (24.0%) serologically dengue negative cases were excluded from the study. Among the 38 serologically dengue positive patients 17 (44.7 %) were NS1 antigen positive, 13 (34.2%) IgM antibodies and 8(21.0%) both IgM and IgG antibodies positive. The distribution of the serologically dengue positive patients out of 50 clinically suspected cases were shown in (Table 3).

## **Discussion**

Dengue is a very important emerging disease of the tropical and sub-tropical regions. The identification is by clinical features but they can present with varied manifestation. [13,14] This study describes the clinical profile, laboratory features and outcome of DF/DHF/DSS in children patients. The male to female ratio in this study was 2.04:1 respectively. The study revealed that majority of the cases was in the younger age group 22 cases (44%). The clinical profile of dengue revealed that fever was the most common presenting symptom (100%). Similar studies in past have also substantiated fever as being the most common presenting symptom. Abdominal pain and vomiting were due to the liver injury caused by the dengue virus. Other infections that cause fever and gastrointestinal symptoms such as typhoid, leptospirosis, and enteroviral infections are common in India and may often lead to a delay in the diagnosis of dengue. Complications observed in present study were hepatic dysfunction, renal failure, encephalopathy, multi organ failure, and ARDS. Deranged liver operate in dandy fever infection is a results of the direct impact of the virus on liver cells or the unregulated host response against the virus. Fulminant hepatic failure occurs because of acute severe hepatitis and massive necrosis of the liver, causing hepatic encephalopathy and even death. [15] As seen in Table 2 fever was present in all cases and is the most common symptom followed by headache, myalgia, vomiting etc. Hemorrhagic manifestations were seen that included petechiae, ecchymosis, gum bleeding, hematuria, malena, hematemesis and epistaxis. Most common complications were hepatic dysfunction, renal failure, multi organ failure, encephalopathy and ARDS. This has conjointly been documented in our study. Early clinical features of dengue infection are variable among patients, and initial symptoms are often non-specific; therefore, specific laboratory tests are necessary for an accurate diagnosis. [2, 16] It occasionally produces shock and haemorrhage, leading to death. Classic DF symptoms include fever, headache, retro-orbital pain, myalgias and arthralgias nausea, vomiting, and often a rash. Some DF patients develop the more serious form of the disease DHF with symptoms that include a decline in fever and presentation of hemorrhagic manifestations, such as microscopic hematuria, bleeding gums, epistaxis, hematemesis, melina, and ecchymosis. DHF patients develop thrombocytopenia and hemoconcentration; the latter is due to an increase in the concentration of blood cells resulting from the leakage of plasma from the bloodstream. These patients may progress into DSS, which can lead to profound shock and death if not treated. Advance clinical symptoms of DSS include severe abdominal pain, protracted vomiting, and a notable change in temperature from fever to hypothermia.[5] According to previous studies, there is a steady increase in the number of dengue patients over the past few years was noted. This is due to the rapid urbanization with unplanned construction activities and poor sanitation facilities contributing fertile breeding grounds for mosquitoes. Among 50 suspected dengue cases 38 (76.0%) cases were serologically dengue positive. Therefore, 12 (24.0%) serologically dengue negative cases were excluded from the study. Among the 38 serologically dengue positive patients 17 (44.7 %) were NS1 antigen positive, 13 (34.2%) IgM antibodies and 8(21.0%) both IgM and IgG antibodies positive. Due to an increase in the alertness among medical fraternity following the initial epidemic and the availability of diagnostic tools in the hospital have contributed to the increased detection of cases.[17] Dengue fever infection will have probably fatal consequences, and up to now, vector management strategies to forestall unfold of the virus are unsuccessful. Though there are promising immunizing agent candidates in development, additional studies are needed for a larger understanding of the body substance immune responses to dengue fever break bone fever infectious wellness infection and disease pathological process.

## **Conclusion**

Dengue is one amongst the key causes of dedifferentiated fever. It presents as an extremely broad wellness and is hardly recognized as a clinical entity by primary health care physicians. This study support additional

studies on applying intervention measures to boost the diagnostic accuracy and exactness at the first tending level in dandy fever endemic regions. This study highlights the practitioner the importance of break bone fever to clinicians within the areas of medical specialty, manifestations, complications and outcome of the wellness.

**Conflict of Interest:** None.

**Source of Fund:** Nil.

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