

## A Hospital-Based Assessment of the Clinical Spectrum of Dengue: an Observational Study

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### Abstract

**Aim:** The aim of the present study was to study clinical spectrum of dengue patients admitted in a tertiary care hospital in Bihar.

**Methods:** The present study was conducted in the Department of Medicine, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India for the period of one year. A total of 100 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study out of which 70 patients were males (70%) and 30 patients were females (30%).

**Results:** Mean age of presentation was 38.52 years (18-65years). Maximum number of cases was found in age group 30-40 years. Mean time of presentation was 7 days (4-14 days). Patient mainly belongs to low socioeconomic status. Out of 100 cases with distribution in antigenic presentation, 55% patients were NS1 positive, IgM positive in 30% of cases, NS1 & IgM positive in 10% patients, IgM and IgG positive in 3% of case which indicated secondary cases and 2 cases with all NS1, IgM, IgG for Dengue positive.

**Conclusion:** With the rise in incidence in dengue fever, there is necessity to understand dengue fever, now more than ever, and this study brings out the intricacies of symptomatology, platelet counts relation with bleeding, complications and antigen antibody variation with regard to dengue.

**Keywords:** Dengue, inpatients, NS1 Antigen, Petechie, Platelet Count

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### Introduction

Dengue or “bone breaking fever,” an acute febrile disease transmitted by the bite of an *Aedes aegypti* mosquito infected with any one of the four dengue viruses, is common in tropical and subtropical regions around the world. Dengue fever (DF) is characterized by fever, headache, muscle and joint pains, rash, nausea, and

vomiting. It can lead to “classical” DF, dengue hemorrhagic fever (DHF) without shock, and DHF with shock. [1]

DF, with its severe manifestations, DHF and Dengue Shock Syndrome (DSS), has emerged as a great public health concern in the recent years. [2] Over 2.5 billion people – over 40% of the world’s

population – are now at risk from dengue. The WHO currently estimates there may be 50–100 million dengue infections worldwide every year. [3] It is of particular importance in South East Asia, which bears a high burden of dengue. [1] The disease is prevalent throughout India in most of the metropolitan cities and towns with outbreaks reported from rural areas of Haryana, Maharashtra, and Karnataka. [3]

Although the majority of infections are self-limiting, a small subset of patients develops severe complications, needing intensive care. These complications including organ failure, occur relatively late in the disease, potentially providing a window of opportunity to identify the group of patients likely to progress to these complications. However, due to non-specific presentation it is difficult to identify patients, who will require intensive care.

The first reported case of dengue like illness in India was in Madras in 1780, the first virologically proved epidemic of Dengue fever (DF) in India occurred in Calcutta and Eastern Coast of India in 1963-1964. [4] Since mid-1990s, epidemics of dengue in India have become frequent, especially in urban zones, and have quickly spread to regions, such as Arunachal Pradesh, Mizoram and Odisha. [5] In early 2000s, dengue was endemic in a few southern and northern states, recently it had spread to a number of new states and union territories. [6] It has also spread from urban to rural regions. [6]

Dengue is transmitted by bite of female. *Aedes mosquito*, *Aedes aegypti* and *Aedes albopictus* main vectors in India. [7] The Transmission usually occurs in rainy season. Etiology for dengue viral infections are viral replication, primarily in macrophages and immunological and chemical-mediated mechanism induced by host-viral interaction. [8] Humoral, cellular, and innate immunity of host are implicated in the progression of the illness.

Dengue is clinically characterized by acute onset of biphasic, high-grade fever lasting for 3 days to 1 week, associated with symptoms of malaise, vomiting, cough, headache (retro-orbital), muscle ache, joint pain, vomiting and stomach-ache. [9,10] Of patients with DF, 50-82% report with a peculiar cutaneous rash. [11,12] Severe clinical presentation during the infection course does not correlate with a high viral load. [8] Dengue infection is diagnosed clinically but confirmed by laboratory test. Virus segregation in cell cultures, nucleic acid demonstration by polymerase chain reaction (PCR), and serological detection of viral antigens (such as NS1) or particular antibodies are the preferred microbiological assays.

The aim of the present study was to study clinical spectrum of dengue patients admitted in a tertiary care hospital in Bihar.

## Methods

The present study was conducted in the Department of Medicine, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India for the period of one year. A total of 100 hospitalized patients (Age >15 years) diagnosed as dengue were enrolled in our study out of which 70 patients were males (70%) and 30 patients were females (30%).

## Inclusion Criteria

Patients of more than 15 years of age who had fever and were found to be positive for NS1 antigen (Micro ELISA, J. Mitra) and dengue IgM (antibody) with or without IgG positive for Dengue were included in study.

## Exclusion criteria

Any patient with concomitant existing bleeding disorders, hemoglobinopathies, and infections like malaria, scrub typhus, enteric fever, tuberculosis and other viral illness were excluded from our study.

Total of 100 patients (age>15years) were enrolled during the outbreak of disease. A detail clinical history, systemic examination routine haematological examination i.e. haemoglobin (Hb), total leukocyte count(TLC),platelet count(PC), Liver Function Test(LFT), Renal Function Test(Serum Urea, Creatinine),Fasting Blood Sugar(FBS), PT, INR, Stool for Occult Blood, Urine Routine and Microscopy, malarial antigen Test(MP ICT), slide test for malaria parasite, IgM antibodies for typhoid and Widal test for typhoid, Chest X ray PA View,

Ultrasonography of Abdomen and Pelvis was performed. Patients who were suffering from diabetes, hypertension and other correlated disease were excluded from our study. All subjects were classified according to WHO guidelines. Thrombocypopenia was taken as platelet count less than 1 lakh/mm<sup>3</sup> and leuopenia as white blood cells (WBC) <5000 cells/mm<sup>3</sup>.

Data were entered and analysed in SPSS version 20 statistical software.

## Results

**Table 1: Distribution of age**

Age at presentation	N	%
15-20	5	5
20-30	20	20
30-40	35	35
40-50	25	25
50-60	8	8
>60	7	7

A total of 100 hospitalised patients (Age >15 years) diagnosed as dengue were enrolled in our study out of which 70 patients were males (70%) and 30 patients were females (30%). Mean age of presentation was 38.52 years (18-65years).

Maximum number of cases was found in age group 30-40 years. Mean time of presentation was 7 days (4-14 days). Median duration of stay in hospital was 7 days. Patient mainly belongs to low socioeconomic status.

**Table 2: Antigenic/ Antibody presentations of dengue cases**

Antigen/ Antibody detected	N
NS1 Antigen	55
IgM Antibody	30
NS1 Antigen +IgM Antibody	10
IgM Antibody+IgG Antibody	3
NS1 Antigen +IgM Antibody+IgG antibody	2

Out of 100 cases with distribution in antigenic presentation, 55% patients were NS1 positive, IgM positive in 30% of cases, NS1 & IgM positive in 10% patients, IgM and IgG positive in 3% of case which indicated secondary cases and 2 cases with all NS1, IgM, IgG for Dengue positive.

**Table 3: Clinical manifestations**

Clinical manifestations	N (%)
Fever	100 (100)
Myalgia and backache	75 (75)
Headache	50 (50)
Loose Motion	15 (15)
Abdominal Pain	20 (20)
Retro orbital pain	5 (5)
Rashes	15 (15)

Bleeding manifestation	40 (40)
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In our series in clinical manifestations, all cases (100%) presented with fever, myalgia(75%), headache(50%), rashes in 15% cases others clinical features are nausea, pain abdomen(20%) loose motion(15%), puritus etc. None of our patient have visual complains. Retro-orbital pain was noted in 5 patients (5%). Bleeding manifestations in any form was seen in 40% cases.

**Table 4: Spectrum of bleeding manifestation**

Spectrum of bleeding manifestation	N (%)
Purpura /Petechie	25 (25)
Malena	20 (20)
Hematemesis	2 (2)
Epistaxis	5 (5)
Hematuria	1 (1)
Gum Bleeding	3 (3)
Ophthalmic bleed	7 (7)

In spectrum of bleeding manifestations bleeding in skin manifestations' like Purpura or Petechie predominates (25%). Gastro-intestinal bleeding like malena (20%) and hematemesis in 2% cases and

other bleeding features like epixtaxis in 5% cases ,Gum bleeding in 3%, Hematuria in1%, and Ophthalmic bleeding like sub conjunctival hemorrhage, intravitreal hemorrhage in 7% cases.

**Table 5: Complications**

Complications	N (%)
Hepatopathy	50 (50)
Nephropathy	5 (5)
Ascites	10 (10)
Pneumonia	8 (8)
DSS	5 (5)
MODS	4 (4)
DHF	15 (15)
EDS	3 (3)

Complications and organ involvements are found, and commonest organ involvement is Liver (hepatopathy) in 50% cases. Other complications like nephropathy in 5% cases, ascites 10%, pneumonia in 8%.

Dengue shock syndrome (DSS)in 5%,MultiOrgan Dysfunction (MODS) in 4%,Dengue Hemorrhagic fever in 15% and Extended Dengue Syndrome in 3% cases were observed.

**Table 6: Correlation of bleeding to platelet count**

TPC	N	Cases with bleeding manifestation
<25000	25	18
>25000-50000	30	12
>50000- 100000	22	6
>100000-150000	20	4
>150000	3	0
Total	100	40

Out of 100 cases 40 cases were having any form of bleeding manifestation. Correlation to bleeding manifestation was done according to platelet count and observed that lower the platelet count more no of patients were having bleeding

manifestation. It was observed that 18 Patients with less than 25000 platelet, 12 patients with platelet count 25000-50000, 6 of patient with platelet count 50000-100000, 4 of patients with platelet count 100000 to 150000 and no patients with

platelet count more than 150000 were found to be having any bleeding manifestations.

### Discussion

Dengue is emerging as a serious public health problem globally, 50 million dengue infections occurring annually. The expanding geographical distribution of both the virus and the mosquito vector is leading to increased frequency of epidemics, and the emergence of DHF in new areas may be due to climatic changes and the failure to control the mosquito vector. [13,14]

The natural history of dengue fever has three phases: febrile phase (3–7 days), a defervescence phase when complications are seen, and the spontaneous recovery phase. As per the WHO dengue classification, patients are now classified as having either dengue or severe dengue. Patients having any of the following conditions are designated as having severe dengue: plasma leakage resulting in shock, accumulation of serosal fluid to cause pulmonary oedema, severe bleeding; and severe organ impairment. [15-17]

Dengue affects humans of all age groups. In our series the mean age of presentation is 34 years which is similar to other studies with a male preponderance which is a common observation. [18-20] In our study 55% were NS1 positive and 30% had IgM positive for Dengue. NS1 and IgM positive in 10% patients, IgM and IgG positive in 3% of case which indicated secondary cases and 2% cases with all NS1, IgM, IgG for Dengue positive. Mehta et al, found NS1 antigen was positive in 88% of cases, dengue IgM antibodies in 21% of cases, and IgG in 20% of cases also by Chakravarti and Kumaria's study in Delhi where 57.36% were confirmed as serologically positive, out of which 22.28% cases were positive for dengue-specific IgM antibodies indicating primary infection, and IgG antibodies alone were also detected in 35.05% cases. [21,22]

These were GI manifestations like loose stools (15%) and abdominal pain (20%). Rash, mostly of maculo-papular variety, rarely pruritic, seen in extremities and trunk was found in 15 cases (15%). Gupta et al, reported a similar results with 100% presenting with fever, but a higher incidence of rash (36%) and retro-orbital pain(40%).<sup>13</sup> Ashwin kumar on the other hand reported 98% presentation with fever, a similar incidence of rash (19.1%) but a lower incidence of headache.(31%). [8]

There were 40 cases (40%) who presented with any form of bleeding manifestations. Purpura and petechiae, a common manifestations of dengue was found 25% of cases. However, Melena was found in 20% cases. Bleeding from other sites like Epistaxis 5%, Gum bleeding 3%, Ophthalmic Bleeding like subconjunctival hemorrhage was observed only in a few cases. Sreenivas et al, found that 26% of cases had melaena, 20% had petechiae, 8% had haematemesis, 4% had epistaxis and 2% had gum bleeding. [23] Various types of complications were seen during course of disease. These were hepatopathy, acute renal failure (nephropathy), ascites, Pneumonia, dengue hemorrhagic fever (DHF), Dengue complicated with shock (DSS), multi-organ dysfunction syndrome and extended dengue syndrome. Hepatopathy was the most common seen in cases 50% patients. This was mostly witnessed as jaundice and/or transaminitis. It has been reported by Ashwin Kumar that pleural effusion was their most common complication. [24]

With regard to the platelet counts, TPC was done at least twice every day in patients with ongoing bleeding. Mostly the haematocrit was initially low, but in patients of DHF or DSS had high hematocrit values; although the lower values of hematocrit can be attributed to Iron deficiency anemia and malaria, which is vastly prevalent in this part of the India. While 39% of all patients had bleeding, 61% of patients with platelet count less

than 25000 had bleeding manifestations. and no bleeding was seen in patients with platelet counts of more than 1,50,000. It was observed that 95.8% of patients with platelet counts between 20,000-50,000/cu.mm developed haemorrhage according to Sreenivasa et al, While Joshi et al, Sunil Gomber et al, and Dhooria et al, reported poor correlation between thrombocytopenia and bleeding manifestations. [23,25-28]

### Conclusion

With the rise in incidence in dengue fever, there is necessity to understand dengue fever, now more than ever, and this study brings out the intricacies of symptomatology, platelet counts relation with bleeding, complications and antigen antibody variation with regard to dengue. NS1 antigen is most commonly detected and while the pathophysiology of dengue is yet to be clearly understood, bleeding manifestations relate to platelet count, which should aid in diagnosis and treatment. Considering the spread of the disease and its complications, it is recommended that special preventive strategies should be planned during the monsoon period. More attention should be given to patients with comorbid conditions. Early recognition, precise assessment with WHO revised classification, and appropriate treatment have reduced the mortality.

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