

A Hospital Based Prospective Estimation of Prevalence of Dengue Viral Infection among Clinically Suspected Patients

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Abstract

Aim: The purpose of the present study is to estimate prevalence of dengue viral infection among suspected patients attending a tertiary care centre.

Methods: The present study is a retrospective study to observe prevalence of dengue infection, conducted at the Department of General medicine, BMIMS, Pawapuri, Nalanda, Bihar, India. Patients clinically suspected of having dengue infection and advised for dengue investigation for establishing the diagnosis were enrolled in the study, irrespective of their age or sex, over one-year period. Total 200 samples were tested for dengue seropositivity.

Results: Out of 200 dengue patients 120 (60%) were male patients and 80 (40%) were female patients. Out of 200 dengue patients, 140 (70%) patients were from urban area and 60 (30%) from rural area. In our study dengue infection was observed more (30%) in the age group 20 to 30 years followed by 10 to 20 years (24%) and 30 to 40 years (20%). All dengue positive patients in our study had fever of 2 to 7 days. The most common presenting symptoms of dengue were fever with body ache (45%), headache (36%), nausea (34%) and vomiting (22%). Out of 200 dengue cases fever with rash was observed in 14 cases (7%).

Conclusion: For estimation of true burden of dengue in India and its geographical mapping to control further disease transmission; laboratory-based active surveillance systems are required along with passive surveillance and control programs.

Keywords: Dengue virus infections, Immunoglobulin M antibodies, Mosquito borne diseases, Non-structural protein antigen.

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Introduction

Dengue fever is one of the emerging tropical diseases that appear primarily in rainy seasons. It affects people of all ages and sex, mostly living in endemic areas of warm and moist climates. [1-3] Severe headache, myalgia, arthralgia, retro-orbital pain, nausea and vomiting are the common symptoms [2,4-6] requiring hospitalization. [7]

Dengue viruses belong to genus Flavivirus and family flaviviridae, are mosquito borne viruses. Principal vector *Aedes aegypti* is a day biting mosquito of public importance that breeds in natural or artificial waters. Dengue illnesses are caused by any one of the four serologically related viruses, designated as DEN-1, DEN-2, DEN-3 and DEN-4. Infection by anyone of the serotypes mostly causes a

mild, self-limiting febrile illness (classical dengue fever) however a few cases develop severe life-threatening dengue haemorrhagic fever and dengue shock syndrome. [8] Classical dengue fever is seen 4 - 6 days after an infective mosquito bite, with sudden onset of fever (biphasic often), severe headache, chills, generalized pains in muscles and joints, often is associated with maculopapular rash. There is leukopenia, relative lymphocytosis, thrombocytopenia and haemorrhagic manifestations may occur. [9]

Viral Isolation by cell culture and subsequent detection by immune fluorescence, though the gold standard tests for identification of dengue infection are not within the reach of peripheral and even most tertiary care laboratories. [10] For a long time, detection of dengue specific IgM/IgG has been the main stay of diagnosis of dengue infection. Antibody detection is an indirect method of diagnosis and therefore is prone to false positive as well as false negative results. [11] NS1 antigen is detectable from day 1 of fever both in primary and secondary infections. NS1 is shown to be highly specific viral marker making it extremely reliable parameter for diagnosis of dengue infection from day 1 of fever. [12] Dengue is notifiable disease in India, but real

number of cases could not be identified many times due to the under-reporting or misdiagnosis of cases. [13-15]

The purpose of the present study was to estimate prevalence of dengue viral infection among suspected patients attending a tertiary care centre.

Materials and Methods

The present study is a retrospective study to observe prevalence of dengue infection, conducted at the Department of General medicine, BMIMS, Pawapuri, Nalanda, Bihar, India. Patients clinically suspected of having dengue infection and advised for dengue investigation for establishing the diagnosis were enrolled in the study, irrespective of their age or sex, over one-year period. Total 200 samples were tested for dengue seropositivity.

Blood samples (3 ml) from suspected patients, were collected in a plain vial with aseptic precautions. Serum was separated and was analyzed for Dengue virus specific IgM antibodies and NS1 antigen by immuno-chromatographic method as per manufactures protocol. No intervention was done for the present study.

Data was recorded and analysed.

Results

Table 1: Number of positive samples

No. of samples	NS1 Ag + IgM Ab -	IgM Ab + NS1 Ag -	NS1 Ag + IgM Ab +	Total positives
500	140	40	20	200 (40)

Total 500 samples were tested during one year of study period; out of which 200 (40%) showed laboratory evidence of dengue; either for NS1 Ag or IgM Ab or for both.

Table 2: Demographic profile of patients

Variables	N%
Gender	
Male	120 (60)
Female	80 (40)
Age groups in years	
Below 10	20 (10)
10-20	48 (24)
20-30	60 (30)
30-40	40 (20)

40-50	16 (8)
Above 50	16 (8)
Area	
Rural	60 (30)
Urban	140 (70)

Out of 200 dengue patients 120 (60%) were male patients and 80 (40%) were female patients. Out of 200 dengue patients, 140 (70%) patients were from urban area and 60 (30%) from rural area. In our study dengue infection was observed more (30%) in the age group 20 to 30 years followed by 10 to 20 years (24%) and 30 to 40 years (20%).

Table 3: Clinical profile of dengue patients

Variables	N%
Fever + myalgia	24 (12)
Fever + rash	14 (7)
Fever + headache	72 (36)
Fever+ nausea	68 (34)
Fever + vomiting	44 (22)
Fever + arthralgia	30 (15)
Fever + bodyache	90 (45)
Fever + itching	28 (14)

All dengue positive patients in our study had fever of 2 to 7 days. The most common presenting symptoms of dengue were fever with body ache (45%), headache (36%), nausea (34%) and vomiting (22%). Out of 200 dengue cases fever with rash was observed in 14 cases (7%).

Discussion

Dengue is currently the most important mosquito-borne, human viral disease in terms of both morbidity and mortality. It is a major public health concern in many tropical and sub-tropical regions around the world. [16] Since the mid-1990s, epidemics of dengue have become more frequent in India, especially in urban zones, and have spread to new regions, where dengue was historically non-existent. [17] India became endemic for dengue due to sustained transmission during the inter-epidemic periods and recurring dengue epidemics resulted in the establishment of hyperendemic areas. [18,19]

Dengue affects both the sexes of all age groups. In the present study males were

more affected than females and these results were consistent with the recently done studies done by Rao et al, Swain et al, Murhekar et al, Shastri et al. [13,20-22] This may be explained by the difference in the nature of occupation, travel exposure and health seeking behaviour. More males may be reporting to the hospital for illness, as compared to females. However, in one study done by Dar et al, females were more affected than males. [23] These findings indicate the importance of working place and travel on dengue prevalence, which needs further exploration.

In our study, out of 200 dengue patients, 140 (70%) patients were from urban area and 60 (30%) from rural area. similar results were by S. Fayaz Ahammad et al. (2016), out of 100 cases, 75 were from urban area whereas 25 cases were from rural area. [24] According to their report the rural broaden of dengue infection is comparatively a recent phenomenon which is supposed to be linked with the shortage of water in rural areas, designing of schemes for water supply to the rural areas

and development of newer water transport system in the rural places.

In our study dengue infection was observed more (30%) in the age group 20 to 30 years followed by 10 to 20 years (24%) and 30 to 40 years (20%). Mahesh Kumar et al in their study observed maximum dengue cases in age group 10-20 years (31.58%) and 21 to 30yrs. (15.78%). [25] Kale et al, observed commonest age group affected was between 11-15 years. [26] Some Indian studies have reported that dengue infection is more common in children. [27,28] All dengue positive patients in our study had fever of 2 to 7 days. The most common presenting symptoms of dengue were fever with body ache (45%), headache (36%), nausea (34%) and vomiting (22%). Out of 200 dengue cases fever with rash was observed in 14 cases (7%). Similar clinical presentation was observed by Mahesh Kumar et al, fever was present in almost all cases (n=380) followed by, headache (n=274), joint pain (n=243), myalgia (n=144), retro-orbital pain (n=141), backache (n=95), skin rash (n=80). [25]

Serological tests are most commonly used in most of the laboratories. Dengue virus specific IgM antibodies tend to appear as early as 3 days after infection and remains in circulation for 30 to 60 days. IgG antibodies arise at about 7 days, they reach a peak at 2-3 weeks and persists for life long. [28] NS1 detection has been a promising test to diagnose dengue in its early febrile stage. The NS1 protein was found to be highly conserved in all dengue serotypes, circulating in high levels during the first few days of illness. It correlates with the development of Dengue Fever. There is no cross reaction of the dengue NS1 protein with those of other related flavivirus. [12,29] One of the WHO diagnostic criteria for DHF is Thrombocytopenia: <1 lakh/mm³. Platelet count less than 1, 00,000/ml was noticed in 220 cases (68.75%), report published by R D Kulkarni et al. [30,31]

Conclusion

Dengue is endemic in India. For estimation of true burden of dengue in India and its geographical mapping to control further disease transmission; early recognition, prompt management, vector surveillance and control strategies must be intensified. Along with passive surveillance and control programs; laboratory-based active surveillance systems are required. Properly designed and well conducted, large, population-based studies are needed to identify the population at increased risk, to plan and implement effective public health prevention and control measures.

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