Estimation of Dengue Sero-Positivity Among Clinically Suspected Patients Attending a Tertiary Care Center in Bihar State

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Conflict of interest: Nil

Abstract

Aim: To estimate prevalence of dengue viral infection among suspected patients attending a tertiary care center in Bihar State.

Material & Method: Total 200 samples were tested for dengue sero-positivity. Data was recorded and analyzed. The present study is a retrospective study to observe prevalence of dengue infection, 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.

Results: Total 200 samples were tested during a period of one year. Out of which 63 (31.5%) showed laboratory evidence of dengue; either for NS1 Ag or IgMAb or for both. Maximum samples were received during monsoon and post-monsoon period i.e., August to November.

Conclusion: The present study confirms that dengue is mainly a disease of rainy season and also identifies certain vulnerable groups for effective planning of interventions.

Keywords: Dengue, IgM, NS1, Seasonal variation.

Introduction

Dengue virus infection is fastest spreading, mosquito borne viral disease in the world with an estimated 3.9 billion people at risk of infection. [1-2]

It is caused by dengue virus (DEN- 1 to DEN-4 serotypes) belonging to the family Flaviviridae, may present with wide variety of clinical illnesses ranging from mildly symptomatic dengue fever (DF) to more life-threatening dengue shock syndrome (DSS) and dengue hemorrhagic fever (DHF). [3, 4]

Principle vectors of transmission for Dengue infection are arthropods of the Aedes genre, especially *Aedesaegypti* and *Aedesalbopictus*. In tropical areas, maximum transmission of disease occurs in the months of rainfall [5] owing to increased breeding of vectors in various water collection sites like old tires, coolers, old earthenware pots, coconut shells etc. [6] Density of mosquito population will be high (3-4 female mosquitoes per house) during the rainy season as compared the dry season (1-2 female mosquitoes per house). [7]

Dengue is an acute arboviral infection with potential fatal complications. Dengue is an endemic disease worldwide. According to

estimates of the World Health Organization (WHO), around two fifths of the world's population in tropical and subtropical countries are at constant risk of contracting this infection. [8] Dengue is endemic in many parts of India and recently in the last few years many places have even experienced epidemics. [9, 10]

Diagnostic techniques like isolation of virus by cell culture and nucleic acid detection by reverse transcriptase polymerase chain reaction are time consuming and require costly laboratory setups.

Hence in resource limited settings, detection of NS1 antigen and IgM/ IgG antibodies specific to virus remains as important diagnostic parameters. [11]

Thus, we aim to estimate prevalence of dengue viral infection among suspected patients attending a tertiary care center in Bihar State.

Material & Methods:

The present study is a retrospective study in Department of Microbiology, ICARE Institute of Medical Science and Research and Dr Bidhan Chandra Roy Hospital, Haldia , West Bengal, India,

Total 200 samples were tested for dengue sero-positivity. Data was recorded and analyzed.The present study is a retrospective study to observe prevalence of dengue infection. 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.

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.

Statistical analysis:

Data was analyzed using WHO Epi info software version 3.5.4. Observations were presented as frequency and percentage distribution. Relevant descriptive statistics like frequency and percentage were calculated for presentation of data.

Results:

Total 200 samples were tested during a period of one year. Out of which 63 (31.5%) showed laboratory evidence of dengue; either for NS1 Ag or IgMAb or for both (Table 1).

Maximum samples were received during monsoon and post-monsoon period i.e., August to November. Dengue sero-positivity was found to be highest in post monsoon period i.e., October to November which was 8 and 14.5 respectively (Table 2).

Total 137 males and 63 females were tested for dengue sero-positivity; out of these 53 males and 10 females showed evidences of dengue infection being positive for NS-1Ag /IgMAb or for both (Table 3).

Table 1: Number of positive samples

No. of samples	NS1 Ag + IgMAb -	IgMAb + NS1 Ag -	NS1 Ag + IgMAb	Total positives
230	36	18	9	63 (31.5%)

Table 2: Month-wise distribution

Month	Total samples tested	Positive for dengue (NS1Ag/IgMAb)	Positivity rate (%)
January	6	1	0.5
February	5	0	0
March	2	0	0
April	1	0	0
May	10	1	0.5
June	14	3	1.5
July	12	1	0.5
August	36	5	2.5
September	17	2	1
October	34	16	8
November	51	29	14.5
December	12	5	2.5
Total	200	63	31.5

Table 3: Gender-wise distribution of samples

Gender	Total	Sero-Positivity
Males	137	53
Females	63	10
Total	200	63

Discussion:

Early laboratory diagnosis of dengue fever among patients with acute febrile illness is essential to prevent dengue related complications. Creating awareness among the public regarding mosquitoes causing dengue fever and its control measures and personal protective measures is essential for preventing epidemics of dengue and related mortality.

Most of the samples 161 (82.14%) were received during monsoon and post monsoon period June- November) with high positivity 27 (62.79%) for Dengue during post monsoon period October-November). Similar results were found in studies done by Gupta et al, Jain et al, Shastri et al. [12-14] This seasonality trend may be due to favorable environmental factors when infected vector mosquitoes are abundant due to presence of ample stagnant water sources for mosquito breeding following heavy rainfall, high humidity lengthens their lifespan and increased temperatures shorten the virus extrinsic incubation period. [15-16]

Dengue is an important and life threatening arboviral infection in tropical countries with an estimated 390 million infection and 96 million symptomatic infections occurring annually. [17] The early diagnosis of Dengue is of great importance to arrest the progression of Dengue related complications.

In the present study, overall seropositivity was 14.33%, this finding is in correlation with other studies conducted by Goswami et al, [18]Garg A et al, [19]Paramasivan R.et al [20] and ManishaPatankaret al. [21,22]

Conclusion:

The present study confirms that dengue is mainly a disease of rainy season and also identifies certain vulnerable groups for effective planning of interventions. Need to strengthen integrated vector control measures

during rainy season with special attention to personal protection measures among children.

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