

## Seroprevalence of dengue infection in a tertiary care hospital in Assam

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## ABSTRACT

**Background:** Dengue fever (DF) and dengue hemorrhagic fever (DHF) are important arthropod borne viral diseases. Dengue in India has dramatically expanded over the last few decades, with rapidly changing epidemiology. Dengue is emerging as major public health concern in northeast India and spreading with increased morbidity.

**Objective:** This study was carried out to determine the seroprevalence of Dengue infection among patients attending in Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam during the period 2013-2016.

**METHODS:** A retrospective study was done from the year 2013 to 2016. A total of 340 serum samples received in the department of microbiology FAAMCH, were tested for the confirmation of suspected cases of dengue. Dengue NS1 antigen and Dengue IgM antibody ELISA tests were performed for the confirmation of dengue cases. We estimated the incidence by applying age, sex and season adjusted dengue positivity.

**Results:** Out of 340 samples tested, 68 were positive either by NS1 antigen or for IgM antibody ELISA tests. These comprised all age groups of both sexes with higher incidence of cases in young males aged 26–60 years.

**Conclusion:** From this study, it is apparent that dengue surveillance and control should be enhanced by wider use of laboratory testing to confirm dengue as a cause of fever of unknown origin, especially during the local dengue transmission season.

**Key words:** Dengue, seroprevalence, IgM antibody, NS1 antigen, ELISA

## Introduction

Dengue is a mosquito-borne viral disease of global public health concern. The disease poses a threat to more than 1.8 billion people in the tropics and subtropical region infecting about 100 million people every year. [1] According to World Health Organization (WHO), Dengue is the fastest spreading tropical disease and represents a pandemic threat. [2] Dengue viral infection may be asymptomatic or may give rise to undifferentiated fever with or without other associated clinical manifestations, namely, Dengue fever (DF), Dengue hemorrhagic fever (DHF), or Dengue shock syndrome (DSS). [3] In India, dengue is endemic with history of disease outbreaks in big metropolitan cities and spreading on account of increased urbanization, deforestation, rapid population movement / increased air connectivity establishing foothold in areas hitherto free from the disease. As per national records there has been steady increase in cases every passing year. [4] In northeast India (22°4'–29°31'N lat; 89°48'–97°25'E long), it was in 2010 that for the first time, 237 dengue

cases and 2 deaths confirmed to be due to dengue infection were recorded in Assam state. [5] The states of Northeast have experienced an increased number of reported fever cases of unknown origin in recent years. The doctors rarely consider dengue as a differential diagnosis of an acute febrile illness. The signs and symptoms of dengue being non-specific, the physician must maintain a high index of suspicion if a clinical diagnosis of dengue is to be made. [6] Ever since 2010, patients assessed clinically to be dengue infection characterized by high fever, severe headache, muscle and joint pain, nausea, abdominal pain, respiratory distress, skin rashes and bleeding manifestations etc were subjected to dengue confirmatory test in the state sentinel sites established in the medical colleges and district civil hospitals with tertiary care facilities.

In the present study we report the seroprevalence of dengue infection among patients attending Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam.

## Materials and Methods

A retrospected study was performed at the Department of Microbiology, Fakhruddin Ali Ahmed Medical College and Hospital for the period 2013-2016. A total of 340 serum samples from suspected dengue cases attending OPD or admitted in the wards of Fakhruddin Ali Ahmed Medical College and Hospital were tested for the confirmation of Dengue. Cases included of adults as well as pediatric patients and the age group varied from one year to eighty years. A suspected case of dengue was considered a patient with acute febrile illness and signs and symptoms suggestive of Dengue; headache, retro-orbital pain, myalgia, arthralgia, rash and haemorrhagic manifestation, etc.<sup>[7,8]</sup> Serum samples from these patients were tested for either Dengue NS1 antigen using dengue NS1 antigen capture ELISA( PanBio Diagnostics) and dengue IgM antibody by dengue IgM capture ELISA( National Institute of Virology, Pune, India) for the confirmation of dengue cases. ELISA tests were performed as per

the manufacturer's instructions. Consent of the Institutional Ethical Committee was taken for the study.

## Results

A total of 340 persons, suspected to be suffering from dengue were investigated, of whom 68 (20%) were confirmed as having dengue infection either for NS1 antigen or for IgM antibody. These comprised all age groups of both sexes with higher incidence of cases in males and in the age group of 26–60 years (Table 1). Seasonal prevalence of dengue during the period 2013-2016 dengue shows appearance of cases at the beginning of May with the onset of pre-monsoon showers but cases were few far up until August, and majority of cases were recorded in post-monsoon season during September–December. The trend of distribution of cases during the period of study (2013-2016) is similar to other states in India as per the NVBDCP data.<sup>[9]</sup>

**Table 1: Distribution of dengue cases by Age and Gender**

Characteristics	Total cases	Dengue positive cases		Total +ve percentage
Age in years		NS1	IgM	
< 14	36	2	0	5.55%
14-25	125	26	4	24%
26-60	172	30	3	19.2%
61-80	7	2	1	42.8%
Gender				
Male	236	48	7	23.30%
Female	104	11	2	12.5%

**Table 2: Morbidity due to dengue**

Dengue +ve cases (%)				
Year	No. of clinical cases	NS1 Antigen +ve	IgM MAC Elisa +ve	Total (%)
2013	132	16	8	18.18
2014	1	0	0	0
2015	9	1	1	11.11
2016	198	42	*	21.21

\*cases in 2016 were subjected to only NS1 antigen test

## Discussion

Dengue presently threatens half of the world's population and is an important public health problem in many tropical regions of the world.<sup>[10]</sup> In the last three decades, the demographic and clinical features of dengue infections have changed rapidly.<sup>[11]</sup> To know the actual picture of the disease in a large scale, it is important to study the incidence of a particular disease in a region wise manner. This is an effort to find out the prevalence of dengue among the patients attending FAAMCH from the various sub-urban and rural areas in the district of Barpeta.

During the four years from 2013 to 2016, 340 suspected cases of dengue were tested for dengue NS1 antigen or Dengue IgM antibody. Among them, 20% were laboratory confirmed dengue cases. The incidence of laboratory-confirmed dengue was predominant in adults 26-60 years of age. Sex distribution shows a male preponderance (23.30%) in our study and this finding is in concordance with that of an earlier study.<sup>[12]</sup>

Dengue has traditionally been held to be a disease of high population density tropical urban areas.<sup>[13,14]</sup> However, increasing reports of dengue cases and outbreaks from rural areas were reported from northern, southern and western India.<sup>[15,16,17]</sup> The findings pertaining to the present study provide similar picture with other parts of the country. The epidemics of dengue have been commonly associated with the rainy season.<sup>[18]</sup> In a study conducted in Lucknow, India and Pakistan, it was observed that dengue transmission occurred round the year with peak incidence in the postmonsoon season.<sup>[11,12]</sup> Similarly, these studies found the highest proportion of dengue positive patients during post monsoon season. In the present study also most of the cases were found to report during post monsoon season during these four years with maximum number of cases from September-december. As the disease is currently spreading to semi-urban areas of other districts of Assam and adjoining states of northeast supported by serological evidence for circulating dengue virus serotypes,<sup>[19,20]</sup> this study has provided important insights into the incidence and epidemiology of dengue in the various semi-urban and rural areas in the district of Barpeta. From this study, it is

apparent that dengue surveillance and control should be enhanced by wider use of laboratory testing to confirm dengue as a cause of fever of unknown origin, especially during the local dengue transmission season. Control at source is one of the key for combating dengue fever and requires active participation from all sectors of the community. The present study also indicates that fever cases of unknown origin impose a considerable burden in the health care system.

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