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A Retrospective Study of Seroprevalence of Dengue Cases in MGM Medical College, Jamshedpur a Tertiary Care Hospital Of Kolhan Region of Jharkhand

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ABSTRACT

Background: Dengue fever and Dengue Haemorrhagic fever is an acute viral disease caused by Dengue virus. The infection is transmitted by female mosquito- *Aedes aegypti*. The present study was undertaken to investigate the trend of Dengue and the seasonal effect associated with it. During late August 2010, outbreak of dengue symptomatic patients was admitted to MGM Medical college hospital Jamshedpur. ELISA for anti-dengue antibodies confirmed the case as Dengue.

Objective: This retrospective study was done to analyze the circulating dengue virus seroprevalence and seasonal trend among the patients of the disease who attended to MGM Medical College, Jamshedpur, A tertiary care hospital during 2010 to 2015.

Methods: It was a hospital-based retrospective study conducted from September 2010 to December 2015. A total of 342 consecutive non-repetitive patients, satisfying the clinical case definition of Dengue as per the WHO guidelines, were included in the study. Serum samples were tested for Dengue specific IgM antibodies by NIV Dengue IgM Capture ELISA Kit.

Results: Of the 342 patients attended, 110(32.16%) cases were positive for Dengue IgM antibodies. There was a significant reduction in the Dengue positivity rate from 31% in 2010 to no cases in 2015. The majority of cases occurred during the monsoon and post-monsoon season.

Conclusions: A declining trend of Dengue was seen in this study, however further research work needs to be done to look for non-Dengue causes of Dengue fever. Surveillance should be carried out regularly for early detection of an impending outbreak and to initiate timely preventive and control measures.

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INTRODUCTION

Dengue virus is an Arbovirus which belongs to the genus flavivirus. Dengue is a viral disease that is spread by the bite of *Aedes aegypti* and *Aedes albopictus* mosquito.[1,2] *Aedes albopictus* breeds resting occurs in outdoors and biting occurs both in outdoor as well as indoor.[3] Flavivirus has four antigenically distinct serotypes (DENV1, DENV2, DENV3, DENV4).[4] Dengue virus infections can cause a wide clinical spectrum of disease, from a mild febrile illness known as 'dengue fever through to dengue hemorrhagic fever (DHF), which is characterized by capillary leakage leading to hypovolemic shock organ impairment and bleeding complications. The clinical features caused by the four serotypes are almost similar. The treatment is mainly symptomatic. There is no specific treatment for dengue, but in a early stage detection and proper medical care can lower fatality rates. Dengue prevention and control depends on effective vector control measures. Dengue virus is endemic throughout the tropical and subtropical area. However, in most countries there is a distinct seasonal pattern, with increased transmission usually associated with the rainy season and the cases generally increase after the monsoons. Dengue is endemic in India, Bangladesh, Thailand, Maldives and many other countries of South East Asia. In India, Dengue is a major public health concern.

National Institute of Virology (NIV), Pune, is engaged in diagnosis, outbreak investigations and preparations of reagents for diagnosis of arboviral infections. The enzyme-linked immunosorbent assay (ELISA) test used in this study was developed in-house by NIV, Pune.

DEN IgM becomes detectable around 5 days of fever and persists for several months and Immunoglobin G (IgG) is present by 10-14 days. Serological diagnosis of DEN by detecting IgM or IgG seroconversion is widely used because it is cheaper and easier to perform.

In India, the first epidemic of clinical dengue-like illness was recorded in Madras (now Chennai) in 1780 and the first virologically proved epidemic of dengue fever (DF) occurred in Calcutta (now Kolkata) and Eastern Coast of India in 1963-1964.the disease was later reported from Vishkapattanam (1964), Vellore (1968), Ajmer (1969), Kanpur (1969), Jalore of Rajasthan (1985), Chandigarh (2002), Mumbai (2004), Ludhiana (2007), New Delhi (1996, 2003, 2006, 2010), Chennai +(2006-2008) and Kerala (2008).[5-7] Odisha State in 2010 enrolled its name for the first time in the list of States showing mortality due to dengue virus infection, with the reporting of 25 cases and five deaths.[8] Since then several outbreaks of dengue fever have been reported from India from time to time. All the four serotypes have been isolated in India.

As there was a seasonal distribution of Dengue, it was necessary to find out this distribution of Dengue to prevent epidemic. There were very few studies on this matter and no such study were done in Kolhan region of Jharkhand

OBJECTIVE

This retrospective study was done to analyze the circulating dengue virus seroprevalence and seasonal trend among the patients of the disease who attended to MGM Medical College, Jamshedpur, A tertiary care hospital during 2010 to 2015.

MATERIALS AND METHODS

Present study was conducted retrospectively in the Virology unit, Department of Microbiology, MGM Medical College, Jamshedpur, Jharkand. A total of 342 Dengue cases were received over a period of five years from September 2010 to December 2015 was included in the study.

Serum samples received in the virology unit, Department of Microbiology from various districts of Kolhan region including, rural, tribal, and urban areas during outbreak were included in the study. Records of five years were reviewed.

The inclusion criteria included the clinical case definition of Dengue as per WHO guidelines. Probable dengue fever (DF) is defined as acute myalgia, arthralgia, headache; retro-orbital pain, bleeding, skin rash, altered sensorium, shock, haemorrhagic manifestations, and leucopenia or low platelet count were included in the study. Confirmed DF is a case confirmed by laboratory criterion.

Study Setting and Place: Patients Attending Virology unit, Microbiology Department of MGM Medical College, Jamshedpur. The blood samples were collected from patient with details of the patient, clinical findings, and investigations done. About 05ml of whole blood sera were collected from the patients and stored and maintained at 2-8°C according to standard guideline.

Sample Processing: Blood sample was separated by centrifuging blood at 3000 rpm for five minutes and processed immediately. Detection of IgM antibody done by IgM capture ELISA test (NIV Pune). The Positive Control (PC) and Negative Control (NC) from the test kit were put up and results were read according to manufacturer's literature provided. Available data were analysed and the trend of Dengue infection was observed during the study period.

Data Analysis: Data were entered in the Microsoft Excel software and was analyzed by and Microsoft Excel 2007.

Permission: Necessary Permission was sought prior to the conduction of the study.

Table: 1: Distribution of Dengue cases in year 2010

Period from September 2010 to December 2010	No. of Samples
Dengue Positive cases	12(31%)
Dengue Negative cases	27(69%)
Total cases	39

Table: 2: Distribution of Dengue cases in year 2011

Period from August 2011 to December 2011	No. of Samples
Dengue Positive cases	001(0.97%)
Dengue Negative cases	102(99.03%)
Total Cases	103

Table: 3: Distribution of Dengue cases in year 2012

Period from August 2012 to December 2012	Samples no.%
Dengue Positive cases	59(78.66%)
Dengue Negative cases	16(21.34%)
Total Cases	75

Table: 4: Distribution of Dengue cases in year 2013

Period from January 2013 to December 2013	Samples no.%
Dengue Positive cases	38(34.24%)
Dengue Negative cases	73(65.76%)
Total Cases	111

Table: 5: Distribution of Dengue cases in year 2014

Period from July 2014 to December 2014	Samples no.%
Dengue Positive cases	00
Dengue Negative cases	11(100%)
Total cases	11

Table: 6: Distribution of Dengue cases in year 2015

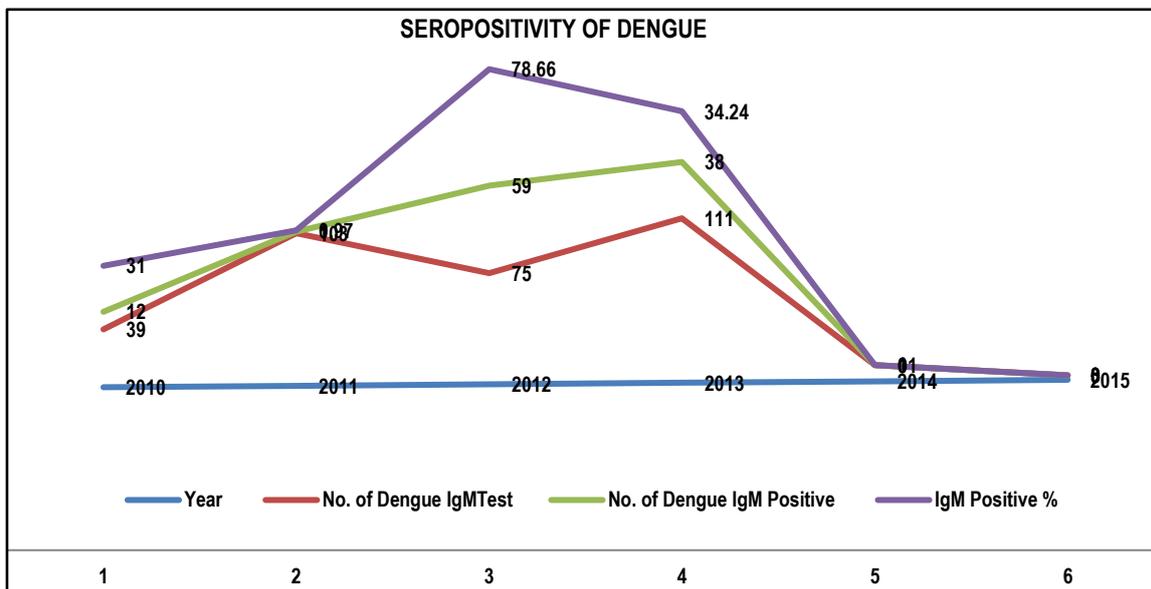| Period from January 2015 to December 2015	Samples no.%
Dengue Positive cases	00
Dengue Negative cases	03(100%)
Total cases	03

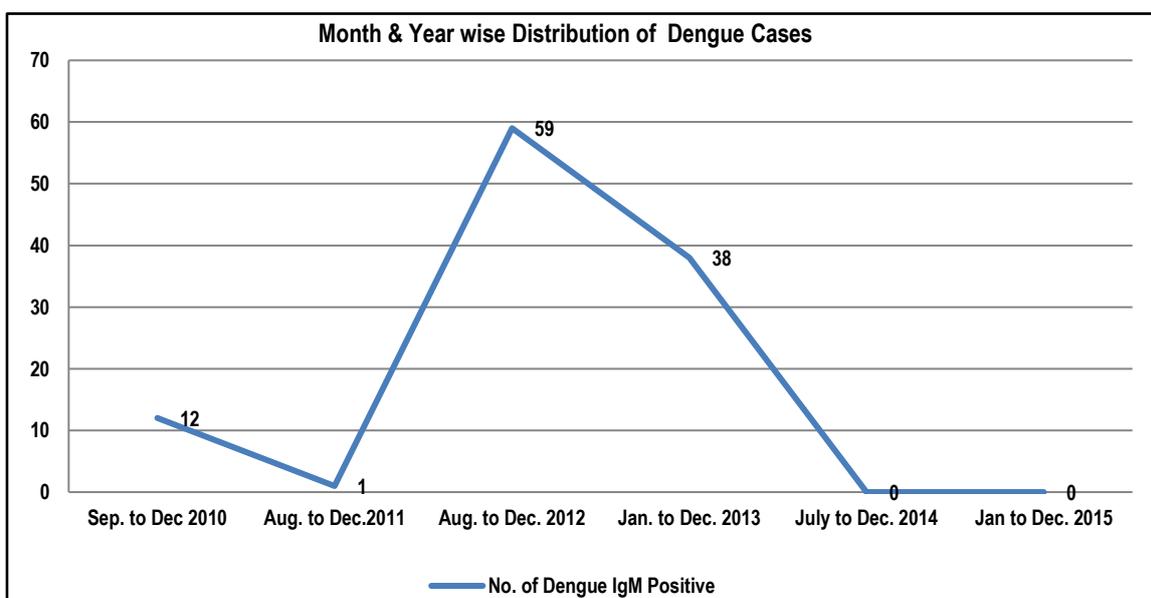**Figure 1: Seropositivity of Dengue Cases.**

Figure 2: Month & Year wise distribution of Dengue cases

RESULTS

Table 1 showed that In September 2010 to December 2010 total 39 cases were reported out of which 31% were found positive and 69% were negative approximately (Figure-1). Most of the Dengue cases occurred at monsoon and post-monsoon period. (Figure-2)

Table 2 showed that In August 2011 to December 2011 total 103 cases were reported out of which 0.97% were found positive and 99.03% were negative (Figure-1). Most of the Dengue cases occurred at monsoon and post-monsoon period. (Figure-2)

Table 3 showed that In September 2012 to December 2012 total 75 cases were reported out of which 78.66% were found positive and 21.34% were negative (Figure-1). Most of the Dengue cases occurred at monsoon and post-monsoon period. (Figure-2)

Table 4 showed that In January 2013 to December 2013 total 111 cases were reported out of which 34.24% were found positive and 65.76% were negative (Figure-1). Most of the Dengue cases occurred at Pre monsoon, monsoon and post-monsoon period. (Figure-2)

Table 5 showed that In July 2014 to December 2014 total 11 Asymptomatic dengue cases were reported out of which 100% were negative during this period. No patients were reported in dengue positive. (Figure-2)

Table 6 showed that In January 2015 to December 2015 total 03 Asymptomatic dengue cases were reported out of which 100% were negative (Figure-1) during this period. No patients were reported in dengue positive. (Figure-2)

DISCUSSION

From this study, we have observed that over the period of six years, the Dengue positivity rate has significantly reduced from 31% in 2010 to no cases found in 2015.

In the present study, 32.16% patients were serologically positive for dengue infection. Similar results were found in other studies such as done by PM Ukey et. al.[9] The dengue infection from Nagpur was reported earlier in 1965.[10] In Maharashtra, the dengue outbreak was reported from Parbhani[11] and Dhule.[12] In

India, the outbreak of dengue was reported from Bangalore[13], Punjab[14] and Delhi.[15] The present dengue cases mostly occurred during the post monsoon season, i.e., from August to December, which is similar to most of the previous outbreaks in India.[14,15] Only year 2013 dengue cases found summer, pre & Post monsoon season. It may be because this season is very favourable for high breeding of the vector (Figure-2), i.e., Aedes aegypti. This seasonal outbreak of disease transmission is very important at local level for effective control measures.

It was more common in middle age group and in male than female. In some parts of the world, it is mainly a paediatric public health problem.[16] It is attributed to the changes in locations where disease transmission takes place. The higher prevalence of dengue infection was noted among male patients than female patients unlike other reports in which both the sexes were equally affected.[11] In this study, majority of the dengue-positive patients were from the urban areas of Jamshedpur. This suggests that dengue infection is no more a rural area infection but it is also extending outside of Jamshedpur, which may become a cause for concern to health authorities. This study calls for a careful vigil to prevent the possible transportation of the vector between different areas.

CONCLUSION

Dengue is becoming an emerging problem in India. It demands early investigation and careful management. IgM capture ELISA was used in this study. Dengue cases were found more during September to November in the post monsoon season which is useful to plan special preventive strategies. The study draws attention toward the male, young adult age group. Dengue infection is no more an urban area infection but it has penetrated in rural areas also. A declining trend of Dengue was seen in this study, however further research work needs to be done to look for non-Dengue causes of Dengue fever. So early diagnosis is very important to reduce mortality rate. Surveillance is prerequisite for monitoring the dengue situation in the area and should be carried out regularly for early detection of an impending outbreak and to initiate timely preventive and control measures.

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