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Original Research Article.

Dengue Fever: Burden and Preparedness in Kolhan region of Jharkhand, India

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ABSTRACT

Dengue fever is emerging as a serious public health problem in India. In the SEAR, India accounts for 20 per cent of the cases.[8] Therefore an enhanced surveillance system is essential for planning and development of control/preventive measures against Dengue. The aim of the present study is to estimate burden of Dengue Fever in Kolhan region of Jharkhand. The seroprevalence data of last three years in samples obtained from suspected dengue (as per WHO definition) fever patients from M.G.M. Medical College, Hospital / IDSP were analysed. A total number of 1693 cases were studied. Out of 1693 samples tested for Dengue IgM antibody by MAC ELISA test, 581 (34.32 %) were found to be positive for IgM antibody against Dengue virus. In this study of Dengue fever burden a male preponderance were found and age group 21 – 30 Yrs. were mostly affected. Till now there is no effective antiviral agent against Dengue virus, therefore the vector control remains as the sole strategy for control and prevention of dengue. The case surveillance should have mandatory notification system that requires all medical practitioners to report clinically-suspected and laboratory-confirmed cases within 24 hours, which may help to find out focus of infection and thus to control the spread.

Keywords: Dengue Fever, Burden, Preparedness.

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INTRODUCTION

Dengue Fever is an acute arboviral infection with potential fatal complications. The word “dengue” is derived from the Swahili phrase Ki-dengapepo, meaning a sudden seizure by a demon. It is also called as ‘break-bone fever’. The term ‘break-bone fever’ was coined by Benjamin Rush during Philadelphia epidemic in 1780 because of symptoms of myalgia and arthralgia.[1]

Dengue virus belong to the family Flaviviridae, and there are four serotypes of the virus referred to as DV-1, DV-2, DV-3, and DV-4.[1] The 5th serotype, first reported from the forests of Malaysia in 2013, has not yet been isolated from India.[2] Dengue virus is a positive-stranded encapsulated RNA virus and is composed of three structural protein genes, which encode the nucleocapsid or core (C) protein, a membrane-associated (M) protein, an enveloped (E) glycoprotein and seven non-structural (NS) proteins. It is transmitted mainly by *Aedes aegypti* mosquito and also by *Aedes albopictus*. All four serotypes can cause the full spectrum of disease from a subclinical infection to a mild self-limiting disease, the dengue fever (DF), and a severe disease that may be fatal, the dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS).Classic dengue fever frequently presents with fever, headache, myalgia, arthralgia, nausea, and vomiting and maculopapular skin rash. According to the WHO report, the mortality in untreated cases of dengue fever was as high as 20% while in hospitalized patients the mortality rate was less than 1%.[4]

It is widely distributed throughout the tropic and subtropics. Dengue has been increasing worldwide over the last few decades and today ranks as the most important vector born disease, with about 2.5 billion people in 200 countries at risk.[1]The burden of dengue incidence has increased by 30-fold in the past five decades, mainly contributed by rapid urbanization, overcrowding, increased global travel and expansion of vector populations.

Dengue fever is emerging as a serious public health problem in India. In the SEAR, India accounts for 20 per cent of the cases.[8] India witnessed one of its largest outbreaks with 99,913 cases and 220 deaths in 2010.[3]

Therefore an enhanced surveillance system is essential for planning and development of control/preventive measures against Dengue.

Management of a dengue outbreak has two aspects: preparedness and response. Outbreak preparedness includes stringent larval and vector surveillance, institution of warning systems, supply of sufficient diagnostic kits, development of integrated vector control measures and community awareness. In the response process, particularly following an outbreak, it is important to develop an understanding of the strengths and weaknesses of prevention policies exercised in the field.

Due to its high mortality rapid diagnosis and treatment is very important as it can lead to saving precious lives by decreasing the mortality to less than 1%.[7] Dengue inflicts a significant health, economic and social burden on the populations of endemic areas. It may be of great help for policy and programmatic development by the Nation.

AIMS & OBJECTIVES

1. To estimate burden of Dengue Fever in Kolhan region of Jharkhand.
2. To help policy makers for formulatingappropriate control strategies against Dengue virus.

MATERIALS & METHODS

The present study was conducted at the Department of Microbiology, M.G.M. Medical College Hospital, Jamshedpur. The seroprevalence data of last three years in samples obtained from suspected dengue fever patients from M.G.M. Medical College, Hospital / IDSP were analysed. A total number of 1693 cases were studied. Blood samples were collected from clinically suspected cases of dengue virus infection, from outpatient departments, emergency services and admitted patients including samples referred from IDSP.The study population comprises clinically suspected Dengue fever cases of all age groups and both sex attending the referral Virology Laboratory of Department of Microbiology M.G.M. Medical College Jamshedpur. Cases were selected as per WHO criteria (An acute febrile illness with ≥ 2 of the following manifestations: headache, retro-orbital pain, myalgia, arthralgia, rash, and haemorrhagic manifestation).WHO criteria were followed for inclusion or exclusion of a case of dengue infection and their categorization as DF/DHF.

After taking consent 05 ml of blood sample was obtained by venepuncture from each patients referred by M.O. M.G.M. Medical College Hospital/IDSP under standard aseptic precautions and the serum was separated by centrifugation. Serum samples were tested for dengue IgM antibodies to diagnose dengue virus infection. Subjects not giving consent were kept out of this study. Sera exhibiting haemolysis, lipaemia and turbidity were rejected and also not included in this study. All the samples were processed for the presence of IgM antibody against Dengue virus using MAC ELISA test kits developed and supplied by NIV (National Institute of Virology), Pune.

In response to the potential threat of Dengue outbreak we conducted a survey with decision makers at local levels, who were involved with the response to the outbreak in Kolhan. The objectives of the survey were to better understand the preparedness and response measures undertaken during the outbreak.

DATA ANALYSIS & RESULTS

In this study a total number of 1693 cases were analysed. Different results which were obtained after study were as follows.

Fig 1 shows the monthly distribution of cases in different year. As the graph shows burden of Dengue fever is increasing every year and most of the cases occurring from June to December with a peak during August.

In 2015 (n= 23): Male- 78% (18) and Female- 22% (5). In 2016 (n=452): Male- 57% (259) and Female- 43% (193). In 2017 (n=1218): Male- 59 %(720) and Female- 41 %(498).(Fig 2)

Sex wise distribution showed that there was male preponderance. Out of total number of cases (1693), 58.89% (997) were males and 41.11% (696) were females.

A total number of 1693 cases were studied. The majority of Dengue fever cases belongs to age group 21 – 30 years (27.29 %) followed by age group 11 – 20 years (26.99 %).(Fig 3)

In 2015 (n = 23): Positive - 43.48 %(10). In 2016 (n = 452): Positive -35.18% (159). In 2017 (n = 1218): Positive - 33.83 %(412). (Fig 4)

Out of total 1693 cases, 581 (34.32 %) cases were found to be positive for IgM antibodies for Dengue virus.

Fig 1: Monthly distribution of cases in different year.

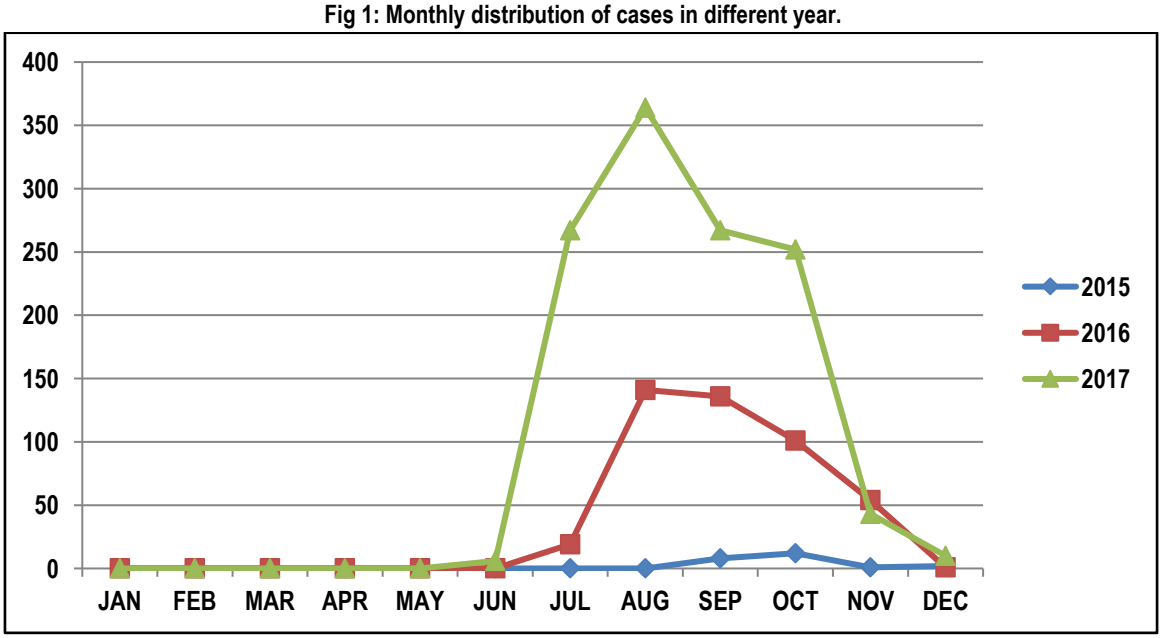


Fig 2: Distribution of cases according to sex.

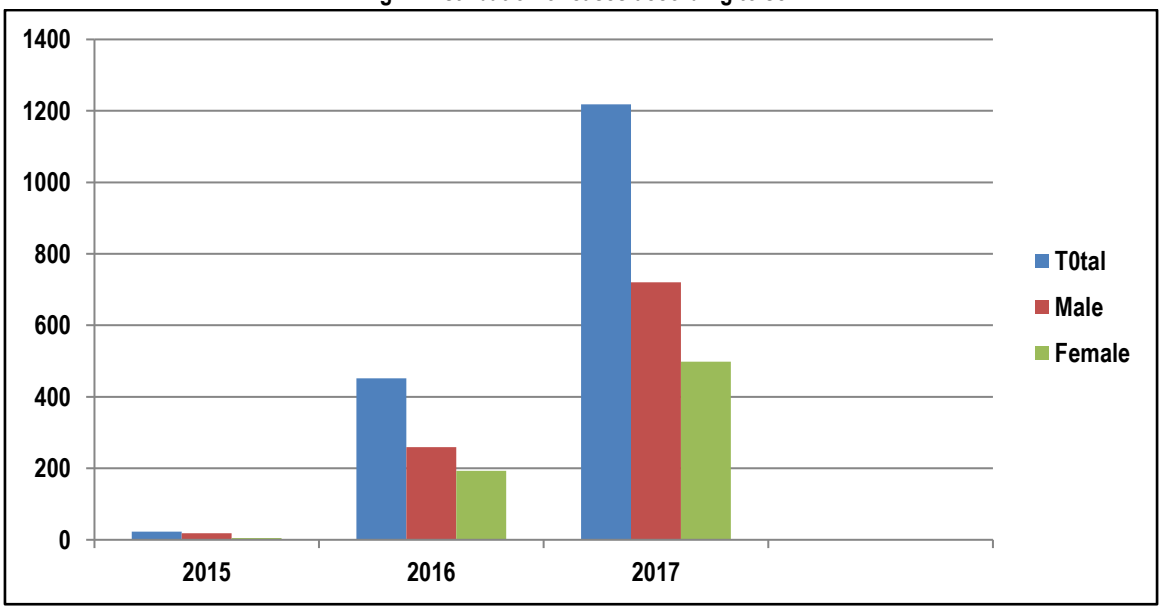


Fig 3: Distribution of cases according to age.

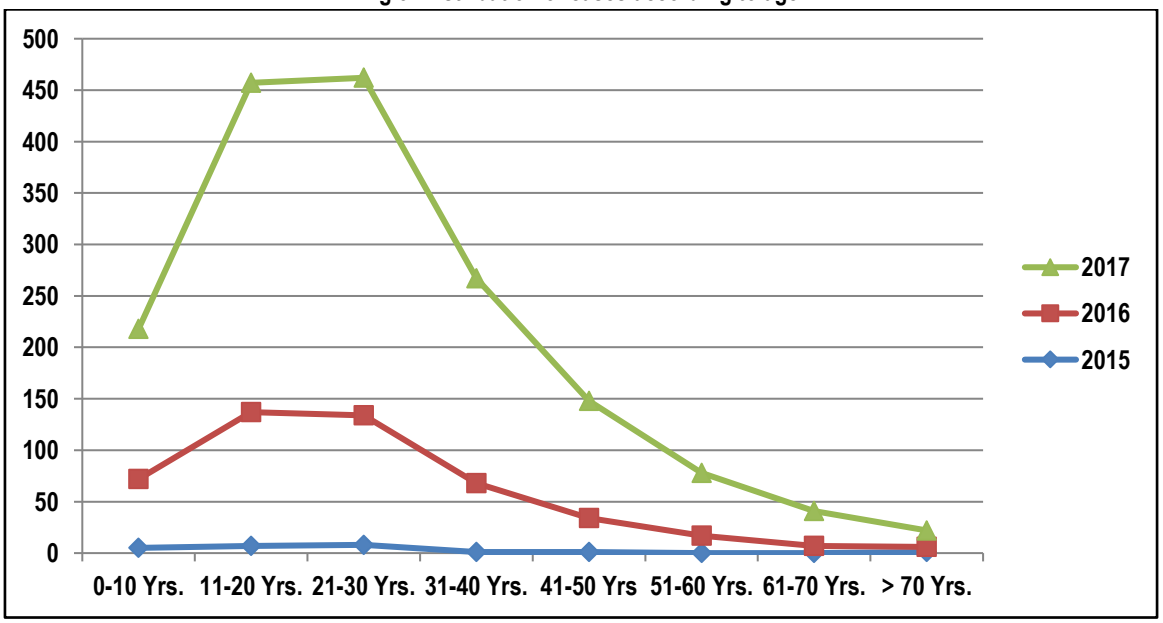
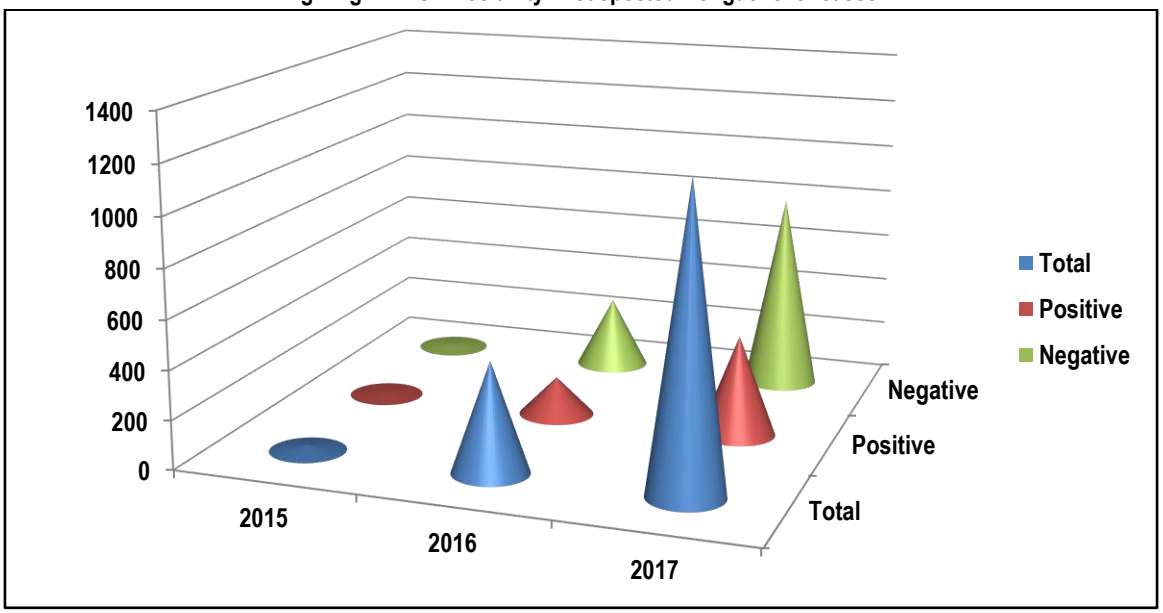


Fig 4: IgM ELISA Positivity in suspected Dengue fever cases.



DISCUSSION

A total no. of 1693 cases was selected by maintaining inclusion and exclusion criteria. Out of 1693 samples tested for Dengue IgM antibody by MAC ELISA test, 581 (34.32 %) were found to be positive for IgM antibody against Dengue virus.

In this study of Dengue fever burden a male preponderance were found and age group 21 – 30 Yrs. were mostly affected. This can be attributed to adults and usually males are being more involved in outside work. Till now there is no effective antiviral agent against Dengue virus, therefore the vector control remains as the sole strategy for control and prevention of dengue. Though the tetravalent vaccine (Dengvaxia®) have been discovered but it is approved recently only in a few countries.

The case surveillance should have mandatory notification system that requires all medical practitioners to report clinically-suspected and laboratory-confirmed cases within 24 hours, which may help to find out focus of infection and thus to control the spread.

Dengue is now one of the major public health problems during July to November every year which can be controlled with active participation of the community. Need is to organize health education programmes about dengue disease to increase community knowledge and sensitize the community to participate in integrated vector control programmes.[5,6]

CONCLUSION

The first priority in a suspected outbreak is to identify the causative agent so that appropriate public health measures can be taken and physicians can be encouraged to initiate appropriate acute illness management. Training of medical personnel involved in Dengue fever patient care, both at the primary level as well as at higher level of care should be mandatory to ensure early detection and identification of warning signs, and adequate and timely treatment. Early diagnosis of severe cases may be of great help to decrease mortality as till now there is no specific antiviral agent available for treatment of Dengue virus infection.

An early and accurate laboratory diagnosis is of paramount importance in the management of Dengue fever. Diagnosis must be done by nucleic acid methods in a well-equipped laboratory or by using an ELISA-based NS1 antigen detection kit for samples collected within 5 days of illness. If specimens are collected after 5 days of illness, IgM ELISA test for antibody detection must be the choice of test.

Dengue fever is endemic in Kolhan region of Jharkhand with a trend which doesn't appear to be waning. So, in the present scenario best way to control the disease is an effective surveillance system, rapid outbreak response, integrated vector control and community education. The findings of this study reinforce the perceived need for effective dengue virus surveillance to enhance dengue control strategies that need to be developed for future preparedness.

Extensive efforts are needed to tackle the disease spread which may be of great help to reduce the associated healthcare cost. Education and training are instrumental in controlling the outbreak, and early detection can be lifesaving.

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