

Seroprevalence of Chikungunya in dengue negative patients: A one year study

Authors:

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Abstract:

Chikungunya/Chikungunya fever and dengue/dengue fever/dengue haemorrhagic fever both are mosquitoes borne viral diseases with few similar symptoms. As per NVBDCP India guidelines fever, rash, chills, headache, arthralgia, nausea, vomiting etc are the common symptoms of Chikungunya and fever, rash, chills, headache, retro-orbital pain, myalgia, arthralgia, hemorrhagic manifestations etc are the common symptoms of dengue. As both the diseases having some common symptoms and due to availability of *Aedes* mosquito vector in the study areas (Ri-Bhoi, Sonapur and Morigaon) we tried to check the prevalence as well as positivity rate of chikungunya in dengue negative patients as no chikungunya evidence found in the study areas earlier and having evidence in neighboring areas. Blood samples were collected from the dengue suspected patients who reported to the physician for treatment. The study was conducted in 2018. A total 644 (Six hundred forty four) numbers of patients were provisionally diagnosed as dengue by treating physician. Out of this 644 (Six hundred forty four) provisionally diagnosed dengue 12 (twelve) numbers of patients were confirmed as dengue by NS1 ELISA and IgM ELISA. 3 (three) numbers of patients found equivocal for dengue. All the negative samples i.e. all 629 samples were tested for chikungunya by IgM ELISA. The result showed that chikungunya positivity rate was 0.63%. Two (2) years to sixty five (65) years all the age groups were infected. Patients were reported from the Kamrup-Metro, Morigaon district of Assam, India and Ri-Bhoi district of Meghalaya, India. Our study revealed that Kamrup-Metro (Sonapur) and Ri-Bhoi districts are prevailing and no positive chikungunya from Morigaon. There was no previous chikungunya record from Sonapur (Kamrup-Metro, Assam) and Ri-Bhoi (Meghalaya). Our study reported the first evidence in this locality. There may chances to spread the disease to new district or new neighboring areas. Government must take preventing measure to control and spreading the disease. Testing facilities may introduce to the local health institutions for proper treatment.

Keywords: NVBDCP, *Aedes*, IgM ELISA, Positivity rate, Evidence

Introduction:

Chikungunya or chikungunya fever is a mosquito borne or transmitting disease caused by the chikungunya virus (CHIKV), an arbovirus which belongs to Alphaviridae and under *Togaviridae* family. Again, Dengue is also a mosquito borne disease by same groups of mosquitoes i.e. *Aedes* species but dengue virus belongs to flavivirus. Both the diseases having some common symptoms like fever, headache, arthralgia, chills, rash etc. Dengue is

commonly found in northeastern states of India since 1992 but chikungunya is not common like dengue in this region ^[1]. Though the evidence of chikungunya is already proven in the region but there is no evidence of outbreak like dengue ^[2,3]. The first Chikungunya case reported in 2008 from Assam but there was no cluster of cases from the same locality ^[4]. As the both diseases having some common symptoms with evidence the northeast India we choosed the dengue suspected cases to study which were found negative for dengue by both NS1 & IgM ELISA to check prevalence and positivity rate of chikungunya in the study locality i.e. Sonapur (Kamrup-Metro), Morigaon of Assam and Ri-Bhoi district of Meghalaya. Where there was no study and evidence of chikungunya were reported earlier. Because of which there may be chances of misdiagnosis too. Our study tried to reveal that point too. Again, the spreading of chikungunya from one locality to another is also the one of the cause of our study ^[5]. Human and other primate vertebrates (like apes, monkeys) as well as strain adapting mosquito vector's living behavior may also the cause of epidemic transmit of the disease.

In India first chikungunya outbreak was reported in 1963 in Kolkata. Since that time cases were reporting time to time. In 2005 India reported 1.4 million cases of chikungunya from all over the states of country ^[6]. 13 lakh people were affected by chikungunya in 2006 from all over the India ^[7]. These data itself shows the burden and importance of chikungunya in India. High morbidity, economic losses due to loss of daily activity of patients and their guardians, medical expenditures etc affecting the nation ^[8]. That is why we tried to check the present situation of chikungunya where the testing facilities are not available in both government & non-government health institutions and notify to government by this research article.

Methodology:

Our study was conducted in 2018 including Sonapur (Kamrup-Metro district), Morigaon of Assam and Ri-Bhoi district of Meghalaya as no study on chikungunya was conducted in this locality earlier. The patients reported to the laboratory with physician's advice for dengue test were informed about the study. All age groups and both male and female sexes were included for the study. Only dengue suspected cases were included for the study as no chikungunya cases were suspected by physicians. The study was conducted at District Public Health Laboratory of Kamrup-Metro.

Blood samples were collected from the patients with prior permission in clean, sterile plain test tubes after proper labeling. Serum samples were obtained from the bloods and kept at -20⁰C till the test run. All the samples were tested by dengue NS1 ELISA (Erba) and IgM ELISA (NIV, Pune) based on onset as per protocol. All the dengue negative samples were tested for chikungunya by IgM ELISA (NIV, Pune).

Results:

The test results showed that the positivity rate of dengue in the study area was 1.87% (12/644) in 2018. The positivity rate of chikungunya was 0.63% (4/629) for the year 2018 which were misdiagnosed as dengue by the

health institution. The details comparisons showed that the difference of dengue and chikungunya positivity rate is not so high (Figure 1).

The chikungunya results revealed that all age groups and sex may affect by the disease. Two (2) years to sixty five (65) years age groups were found positive for chikungunya (Figure 2). The sex ratio showed that both male and female sex were equally affected by chikungunya (Figure3). No single chikungunya positive case of reported from the Morigaon district of Assam during our study but the first evidence of chikungunya positive cases reported from the Sonapur (Kamrup-Metro district of Assam) and Ri-Bhoi district of Meghalaya.

Figure:

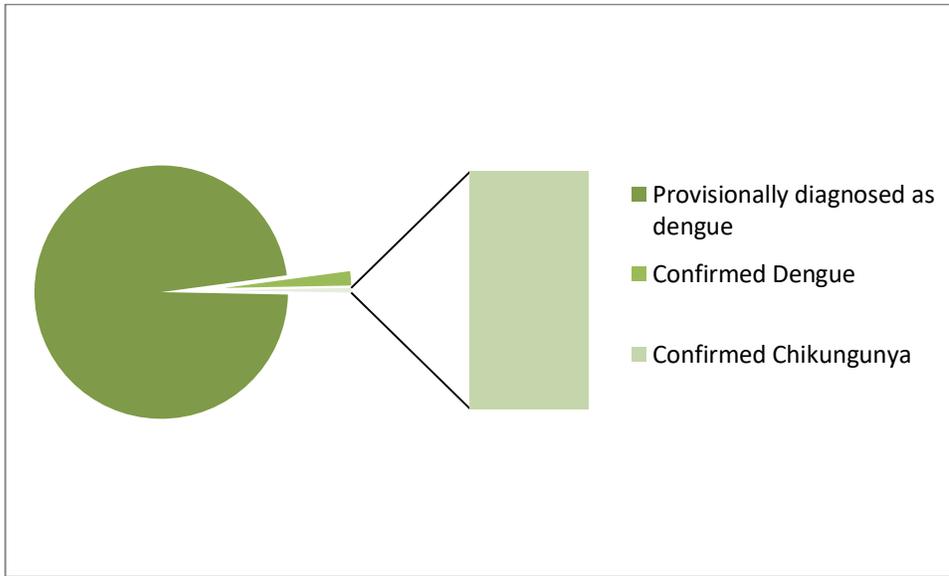


Figure 1: Dengue and Chikungunya positivity rate

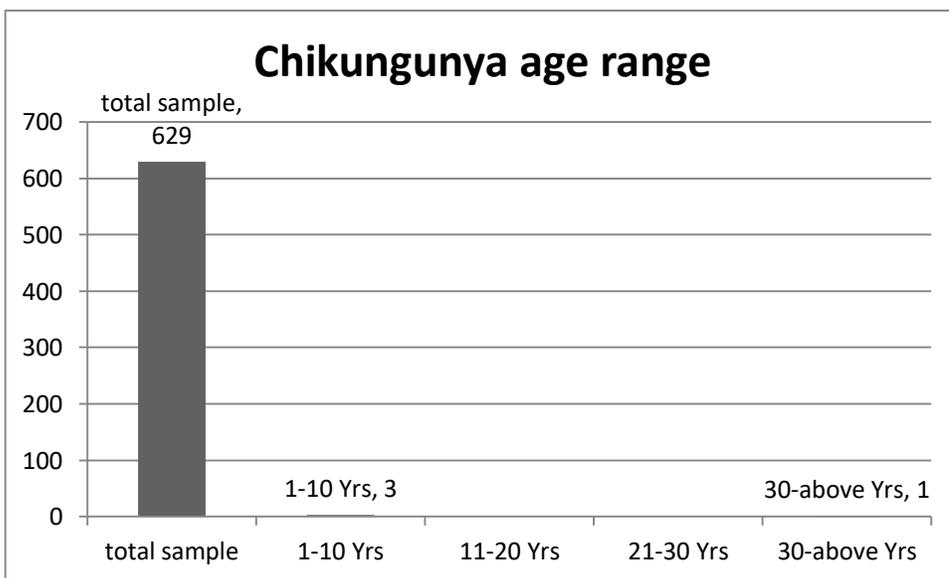


Figure 2: Chikungunya positive age range

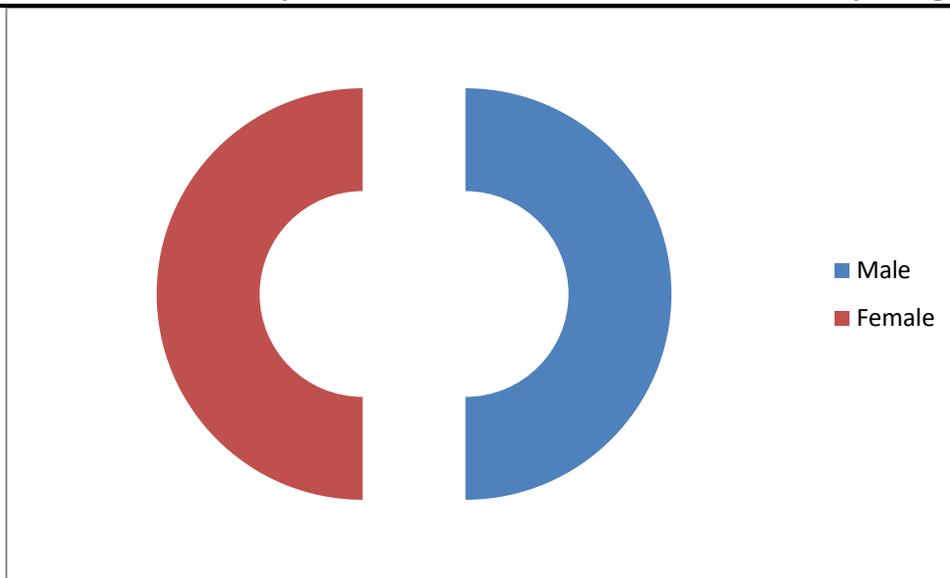


Figure 3: Chikungunya Positive sex distribution

Discussion:

In our study for the first time chikungunya evidence reported from Sonapur (Kamrup-Metro), and Ri-Bhoi. In 2009 also a study was conducted by Staples JE et al., also informed the causes of spreading the disease to novel locations ^[9]. Another surveillance study of Dutta P et al., revealed the presence of chikungunya from different areas of Assam, Tura (Meghalaya) and Pasighat (Arunachal Pradesh) where the some chikungunya positive patients were suspected as dengue, some of the chikungunya positive patients were suspected as PUO (Pyrexia/fever with unknown origin) and some of them were suspected as AES earlier ^[10]. Same way in our study also all the patients were suspected as dengue earlier. Mohan A et al, explained in their studies about the self-limiting of chikungunya and how to manage the cases ^[11]. In our study no chikungunya mortality reported. Our study showed positive cases age ranges were from 2 years to 65 years but the median age ranges reported by different in different studies like 20 years to 78 years by Sanyaolu A et al., in 2016 ^[12]. Climatic changes, environments impact on the disease ^[13]. Our study areas were included Ri-Bhoi (Meghalaya) fully hilly area, Sonapur (Kamerup-M, Assam) both hilly and plain and Morigaon (Assam) plain areas with different climates as well as environment.

Conclusion:

North eastern states of India are naturally favorable for Chikungunya virus survival. Ecological changes, road construction, minimum facilities in primary health centers, urbanization, global travel, living behavior etc. plays an important role in the transmission and prevention of disease. These are the factors of this disease burden ^[14]. To reduce the burden of this disease individual study of each factors are important. Government, NGOs, social workers, teachers all must play role to educate the communities, students about the disease transmission and prevention to minimize the risk. Anti-larval activities, entomological studies may also helps in vector control. Further studies and research are suggestive.

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Conflict of interest:

Nil

References:

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