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# A study from a Tertiary Health Centre on prevalence of Chikungunya Infection in the North-Eastern Region, India

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**Abstract**

Chikungunya Virus causes chikungunya infection. It belongs to the family Togaviridae. Typical symptoms of chikungunya infection are fever, headache, fatigue, rashes and arthralgia. It is transmitted by Aedes mosquitoes. Diagnosis is by ELISA and RT-PCR. The study was done in a tertiary health centre, NEIGRIHMS, located in Meghalaya. In this study 401 blood samples were collected. 58 samples were IgM positive and 3 were RT-PCR. This gives a prevalence rate of 14.4%. Proper diagnosis of viral diseases is important to avoid misdiagnosis. This is achieved with improvement in laboratoiry techniques and awareness on its challenges.

**Keywords:** Chikungunya Infection, Aedes Mosquitoes, ELISA, RT-PCR

## Introduction

Chikungunya Virus is an arbovirus belonging to the genus Alphavirus of the family Togaviridae [1, 2, 3]. Three strains of Chikungunya Virus are known: Asian-West African, East- Central and South African [2]. The symptoms of chikungunya infections are fever, headache, fatigue, rash and arthralgia. Arthralgia after chikungunya infection can sometimes persist for weeks to years [1]. The vectors for chikungunya virus are Aedes agypti and Aedes albopictus, and are abundantly found in the tropical and subtropical areas [1, 4]. India has witnessed many arboviruses outbreaks especially of Dengue and Chikungunya and is endemic for both of these viruses [4]. Diagnosis of chikungunya infection is by RT-PCR for serum collected during the viremic phase (1-7 days from symptom onset) and IgM detection after 5 days from symptom onset [1].

The aim of the study is to determine the prevalence of chikungunya infection in North-East region, India.

## Materials and Methods

This study was conducted during 2023 and 2024 in a tertiary health centre, NEIGRIHMS, located in Meghalaya, India. Patients having fever of unknown infection are selected for the study. 401 blood samples were then collected from each patient after receiving their consent. Serum separated from the blood samples are then use for detection of Chikungunya Virus specific IgM by ELISA and RT-PCR. NIV CHIKUNGUNYA IgM Capture ELISA (National Institute of Virology, Pune, Maharashtra, India) was used for IgM detection by following the instruction provided in the Kit. For RT-PCR, samples were transported to NIV, Pune due to unavailable of Kit in the institute and shortage of fund.

## Results

Out of 401 samples 58 were IgM positive by ELISA. Meanwhile, 3 samples have shown amplification by RT-PCR.

## Discussion

The study has given 14.4% prevalence rate of chikungunya infection. As describe before, the viremic phase of Chikungunya virus lasted for about 1-7 days, after which RT-PCR cannot detect the viral genome [1]. Patients may have visited health care facilities after the viremic phase hence, the number of RT-PCR positive samples are less.

Cross-reactivity, although rare, but it cannot be omitted. There has been reported of cross-reactivity of CHIKV (chikungunya Virus) and DENV (Dengue Virus) serocomplexes, despite belonging to different families [4]. In a study by Araceli Posadas-Mondragón *et al*, they reported that anti-CHIKV antibodies has a cross reactivity with anti-DENV2 (DENV serotype2) antibodies [3]. India is known to be endemic to all the serotype of DENV [4], hence, the IgM positivity in this study might be of cross reactivity. Due to this cross-reactivity, designing proper diagnostic techniques must be considered to avoid misdiagnosis [3]. Not only with DENV, cross-reactivity between alphaviruses was also reported previously [3, 6], therefore, infection of unknown origin should be subjected to all alphaviruses diagnosis to avoid misdiagnosis and also to avoid the possibility of co-infection going undetected [3]. Multiplex PCR can differentiate between the various viruses and can be set up for proper diagnosis. However, most people seek medical care after the viremic phase has subsided and RT-PCR is no longer effective [1].

Moreover, Monique da Rocha Queiroz Lima *et al*, analysed sensitivity and specificity of the ELISA test (Anti-Chikungunya IgM ELISA, Euroimmun). As per the manufacturer's instruction, the sensitivity and specificity of the Kit is 98.1% and specificity of 98.9%, respectively. However, the study shows that the kit has a sensitivity of 100% and specificity of 25.3% due to the cross-reactivity with DENV [5]. Therefore, should all diagnostic kit used in diagnostic laboratories be analysed for their sensitivity and specificity to better understand any percentage of possible cross-reactivity? By knowing the challenges, care for the public health can be improved towards maximum satisfaction.

## Conclusion

Every year the incidence of chikungunya as well as dengue infection increases after the monsoon and early winter period. India being a country that is endemic to many arboviruses, and with the symptoms of viral illnesses being similar, it is challenging for clinical diagnosis [4, 7]. Therefore, proper laboratory diagnosis is important. Moreover, several reports on cross-reactivity of serocomplexes between alphaviruses and even between chikungunya and dengue have been found. Hence, simultaneous testing for DENV, CHIKV and other alphaviruses infection is important. This is because the main treatment for CHIKV is NSAIDs (Nonsteroidal anti-inflammatory drugs) meanwhile for dengue infection use of NSAIDs is rather avoided [2]. Hence, a proper diagnosis is significant to avoid potential morbidity and mortality.

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