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"SEROPREVALENCE OF CHIKUNGUNYA CASES IN A TERTIARY CARE HOSPITAL: A RETROSPECTIVE STUDY."

Dr. Komal Kanani* — 3rd Year Postgraduate Resident, Department of Microbiology, Government Medical College & New Civil Hospital, Surat, Gujarat, India. *Corresponding Author

Dr. Summaiya Mullan — Professor and Head, Department of Microbiology, Government Medical College & New Civil Hospital, Surat, Gujarat, India.

ABSTRACT

Purpose: The Chikungunya virus, an Alpha member of the Togaviridae family, is the cause of chikungunya and is spread via the Aedes aegypti and Aedes albopictus mosquito vector. A chikungunya (CHIK) outbreak resurfaced in several Asian countries in 2005–2006. A widespread outbreak of Chikungunya cases occurred in India in 2006, and the disease continues to be a serious public health concern today. India saw a significant epidemic in 2016, and with 27.3 thousand cases in 2021, Gujarat has the second-highest frequency. Due to the dengue outbreak in a country like India, the chikungunya viral infection is still remains underdiagnosed. Therefore, it is important to know the seroprevalence of chikungunya. **Materials & Methods:** A retrospective study was conducted in the Microbiology Department of Government Medical College, Surat from January 2022 to December 2022. Serum samples of 467 suspected cases of Chikungunya fever were tested for Chikungunya IgM antibodies by ELISA – IgM Capture ELISA. **Results:** Out of 467 samples, 79 (16.9%) samples were positive for Chikungunya IgM antibodies. Maximum incidence was seen in the late monsoon and post monsoon months, with females (52%) were more affected than males (48%). The most affected age group was 31-40 years. **Conclusion:** The seroprevalence of Chikungunya cases in our study was 16.9% with high prevalence in the late monsoon and post monsoon months. This reiterates the fact that Chikungunya is a serious health threat and highlights the need for effective measures to lessen the illness's severity and control vectors to prevent the transmission of infection.

KEYWORDS : Chikungunya, IgM antibodies, Seroprevalence

1. INTRODUCTION:

The Chikungunya (CHIK) is a viral infection caused by Chikungunya virus which is an arbovirus that belongs to the genus alphavirus under the Togaviridae family. Humans contract CHIK infection by mosquito bites, specifically from Aedes albopictus and Aedes aegypti. CHIK was 1st detected in 1963 in West Bengal and epidemics spread to the eastern coastal regions. The disease was on decline as only few outbreaks were seen till 1973 and and no new cases were documented for more than 30 years after that. It reappeared in 2005 in the state of Andra Pradesh and Millions of people have been impacted by its nationwide spread. Since 2005 many countries have been affected due to Chikungunya infection [1]. Over 13 lac persons were affected by one of the largest and most serious Chikungunya virus outbreaks that happened in India in 2006 [2]. The number of cases were declined in India after 2010, raising the question of whether this infection was at the end of its transmission wave in India. But in 2016, there was a severe outbreak in India, with 64,057 cases confirmed nationwide [17, 18]. With 27.3 thousand cases, Gujarat has the second-highest prevalence in 2021 [19]. The name "CHIK" is derived from the Makonde language, which is a language spoken by a population that lives in the Mozambique region, Makonde word which means "that which bends up". It describes the stooped posture due to arthritic feature of the disease [3, 4]. The clinical manifestations of CHIK infection include sudden onset of fever, joint pain, joint swelling, myalgia, backache, headache and rashes. Epidemics happen in the post-monsoon period, when there is a high vector density [5,6,7]. Several methods are used for the diagnosis of CHIK virus infection such as: Detection of CHIK virus antibodies in the serum by ELISA, Detection of RNA in the serum by Polymerase Chain Reaction (PCR) and Virus isolation [8]. However, the most frequently used test to diagnose the CHIK virus infection is by detection of antibodies against CHIK virus (IgM and IgG) in the serum. IgM antibody to CHIK virus is used as a marker for acute infection and can be detected in the serum five days after the onset of symptoms and may be detectable up to five months, whereas, IgG antibody to CHIK virus is used to study the previous exposure to CHIK infection and it may persist in the serum for many years after infection [9]. As a vector-borne illness, the disease is reemerging in several regions of Southeast Asia, including India. The viral illness resembles dengue fever in many ways and presence of Dengue epidemic in a country like India it remains underdiagnosed. Hence, this study was designed with the aim to determine the seroprevalence of CHIK infection, positivity rate based on age and gender, and seasonal trends of Chikungunya infection among seropositive patients in a tertiary care centre of South Gujrat.

2. MATERIALS AND METHODS:

2.1 Study Design & Site:

A retrospective observational study was conducted to find out Sero-prevalence and seasonal trends of Chikungunya from January 2022 to December 2022 at Microbiology Department, Government Medical College, Surat, Gujarat (India).

2.2 Sample Size with calculation:

467 serum samples. After Desk Review at Serology Laboratory of Microbiology department, total samples received from January, 2022 to December, 2022 for chikungunya IgM ELISA were 467. Therefore, sample size in this study was 467.

2.3 Inclusion criteria:

Samples received at Microbiology laboratory during the period of January, 2022 to December, 2022 for chikungunya test from suspected cases of chikungunya.

2.4 Exclusion criteria:

All samples received with Inadequate Quantity or Incomplete requisition form were excluded from the study. Unlabelled or mislabelled samples, leakage samples, Lipemic and haemolysed samples were excluded.

2.5 Methodology:

Study was conducted after obtaining ethical clearance from Institutional Ethics Committee. The test results of Chikungunya test, conducted during the study period meeting the inclusion-exclusion criteria were collected from Laboratory Information System (LIS) of the institute. Blood samples were processed in the laboratory for CHIK IgM

antibody as following methodology. Blood samples of OPD and IPD patients with suspected chikungunya fever were received to the Microbiology Department with duly filled requisition forms. Then serum was separated from the blood samples by centrifugation.

Further, the separated serum samples were used to detect for the presence of CHIK-IgM antibody using CHIK-IgM antibody capture ELISA kit supplied by National Institute of Virology, Pune, India. The tests were carried out following the manufacturer's instructions. The test results are stored in LIS with required demographic data. The sensitivity and specificity of chikungunya IgM antibody capture ELISA are 95% and 98% respectively.

The intensity of colour/optical density (OD) was monitored at 450 nm. OD values are directly proportional to the amount of CHIK virus specific IgM antibodies present in the sample. The sample was considered positive for IgM antibody if the OD value of the sample exceeds OD value of negative control by a factor 3.0 (sample OD ≥ negative control OD × 3.0). Both positive and negative controls were used to validate the test. The data acquired through LIS was entered into excel and analysed.

3. RESULTS:

A total of 467 serum samples from suspected cases of CHIK were received during the period from January 2022 to December 2022, out of which 79 (16.9%) samples were positive for Chikungunya IgM antibodies.

Majority of the seropositive patients were outdoor patients visiting OPD (81%). Only 19% of seropositive patients were indoor [Fig.1]. Out of the total number of affected cases, 52% were females and 48% were males [Fig.2]. Majority of the cases were from the age group of 31-40 years (30.3%) followed by 21-30 years age group (29.11%) [Fig.3]. A seasonal peak was seen in the months of September to December [Fig. 4].

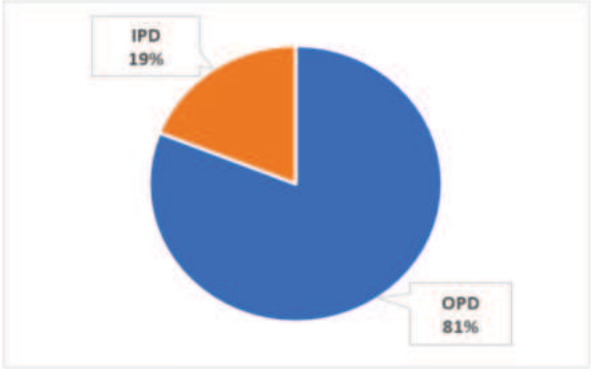

Fig. 1: Hospitalisation of Chikungunya seropositive patients

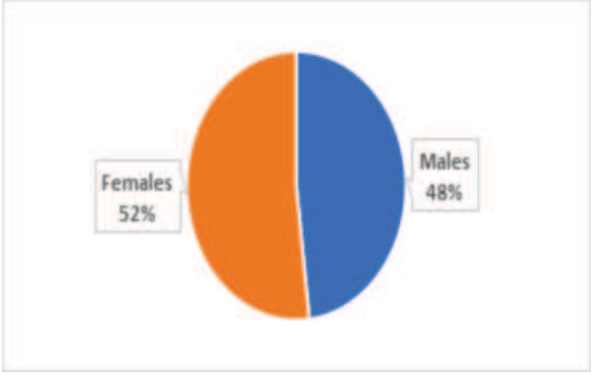

Fig. 2: Gender wise distribution of Chikungunya seropositive cases

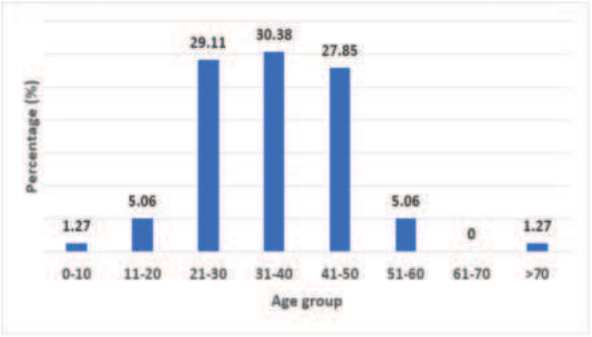

Fig. 3: Age wise distribution of Chikungunya seropositive cases

Fig. 4: Seasonal distribution of Chikungunya seropositive cases

4. DISCUSSION:

A total of 467 Chikungunya suspected serum samples were tested, of which 79 (16.9%) samples were positive for Anti - Chikungunya IgM antibodies. Similar seroprevalence was noted in the study conducted by Mudurangaplar B et al. at Vijayapur and Mita D et al. at Chamarajnagar in 2015-17[10,11]. However higher prevalence was noted in the studies conducted by Shaikh Mohd Habeeb et al and Krishna et al [12,13]. While if we take gender into consideration, female subjects were more affected (52%) compared with male subjects (48%). These findings were much similar to the pattern shown by Dwibedi et al. and Mohanty et al [14,15]. The most affected population belongs to the productive age group of 31-40 years (30.38%) followed by age group of 21-30 (29.11%), while in the study conducted by Mahesh Kumar et al most affected age group was 21-40 (47.37%) [16]. Number of cases were more during late monsoon and post monsoon months. This type of seasonal variation was seen in most of the studies, this could be because of the increased vector density during the rainy season [13,10].

5. LIMITATIONS:

The present study is for the duration of 12 months including patients attending the tertiary care hospital. Passive Case finding approach was done which might not be true population prevalence of the disease. Sample population only included tertiary care hospital of Surat.

6. CONCLUSION:

The seroprevalence of Chikungunya in the present study was 16.9% with high frequency in the late monsoon and post monsoon months and affecting the productive age group of the population. Screening for Chikungunya and other arboviral infections is necessary because though the clinical features are similar the outcomes and management may vary. Many cases of acute febrile diseases due to Chikungunya are underdiagnosed and the circulation of this disease-causing arboviruses must be much greater than reported. The clinicians need to be made aware of its re-emergence. Chikungunya continues to emerge as the major health concern and indicates the need for appropriate strategies for vector control to prevent the transmission of infection.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee. **No. GMCS/STU/ETHICS-3/ Approval/22842/23 dated 12/9/2023.**

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