

# Seroprevalence of Chikungunya Virus from a Tertiary Care Hospital of Central India-A Major Public Health Problem

Suneel Kumar\*, Dharmendra Singh Rajput, Satakshi Manwani, Sweta Dohare, Anita Mutha

Department of Microbiology M.G.M. Medical College Indore Madhya Pradesh, India

## ABSTRACT

**Introduction:** Chikungunya (CHIK) fever is a viral disease characterized by abrupt onset of fever with severe arthralgia followed by constitutional symptoms including rash. The disease is re-emerging in various parts of the Southeast Asia including India. This study aimed at determining the seroprevalence of acute infections of chikungunya virus in central India. **Objective:** to find the seroprevalence of chikungunya in suspected cases.

**Materials and Methods:** This retrospective study was conducted in a department of Microbiology MGM Medical College and M.Y. Hospital, Indore from January 2017 to December 2017. All serum samples were received with details patients, clinical finding and were tested for CHIK Immunoglobulin M (IgM) antibodies by enzyme-linked immunosorbent assay. **Results:** A total of 245 serum samples from suspected cases of chikungunya infection were received during the period from January 2017 to December 2017, out of which 188 (76.7%) samples were positive for CHIK. **Conclusion:** Chikungunya virus appears to be actively circulating in the population. Need for continuous surveillance for disease burden using multiple diagnostic tests and also warrants the need for an appropriate molecular diagnostic for early detection of chikungunya virus.

**Key words:** Chikungunya, IgM antibodies, Sero-prevalence

**HOW TO CITE THIS ARTICLE:** Suneel Kumar, Seroprevalence of Chikungunya Virus from a Tertiary Care Hospital of Central India-A Major Public Health Problem, J Res Med Dent Sci, 2021, 9(10): 12-14

**Corresponding author:** Suneel Kumar  
**e-mail** ✉: drsk2311@gmail.com  
**Received:** 16/08/2021  
**Accepted:** 16/09/2021

## INTRODUCTION

Chikungunya is a self-remitting febrile viral disease which is transmitted to humans by infected Aedes mosquitoes. The name chikungunya refers to the 'stooped' appearance of those suffering from severe joint pain. It usually presented with fever and joint pains with chills, vomiting, nausea, headache and rashes [1]. It affects humans of all age especially in post monsoon season and is listed as category C priority pathogen under US National Institute of Allergy and Infectious Diseases (NIAID) [2] CHIKV was first detected in 1963 in West Bengal followed by epidemics in eastern coastal areas [3,4]. The disease was on decline as only few outbreaks were seen till 1973 and after this no cases were reported for over a period of 30 years. It reappeared in 2005 in the state of Andrapradesh and has spread to the whole country affecting millions [5]. The viral illness has many similarities to dengue viral illness and presence of Dengue epidemic in a country like ours it remains underdiagnosed. The present study aims to highlight the prevalence of Chikungunya in Central India.

## MATERIALS AND METHOD

The retrospective study was conducted department of Microbiology MGM Medical College and M.Y. Hospital, Indore from January 2017 to December 2017. All serum samples were received with details Patients, Clinical finding and investigation of patients from various districts of the state from January 2017 to December 2017 were included in the study. About 5–10 ml of whole blood sample was collected after 5 days of suspected Viral fever and transported by the staff of the medical college, district headquarters and other hospitals to the department of microbiology in an ice box maintained at 2–8 °C temperature within 24–48 hours serum was separated from whole blood by centrifugation and stored at –20 °C. The samples were tested for CHIK Immunoglobulin M (IgM) antibodies by enzymelinked immunosorbent assay.(NIV Chikungunya IgM Capture ELISA Kit, Manufacturer: National Institute of Virology, Pune ). The sensitivity and specificity for chikungunya IgM antibody capture ELISA are 95.00% and 98.00% respectively. All assays were performed according to the manufacturers' procedures.

## RESULTS

A total of 245 serum samples from suspected cases of Chikungunya infection were received during the period from January 2017 to December 2017, out of which 188 (76.7%) samples were positive for CHIK (Table 1).

**Table 1: Seroprevalence of Chikungunya in the patients of central India.**

Total samples tested	245
Positive	188 (76.7%)
Negative	57 (23.3%)

Males were predominantly affected as 104 (55.3%) (Table 2). Most common seropositive age group was 41 to 50 year as 32 (17%) and least common was 81-90 years (1.1%) (Table 3). The chikungunya infection was highest from Indore district as 147(78.2 %) followed by

Khargone 17 (9%), Khandwa 9 (4.8%), Barwani 5 (2.7%), Dhar 4 (2.1%), Jhabua 3 (1.6%) and Mandsaur 3 (1.6%) (Table 4). A seasonal peak for chikungunya was seen in the month of October as 82 (43.6%) (Table 5).

**Table 2: Gender based distribution of Chikungunya cases.**

Gender	Positive	Negative
Male	104	28
Female	84	29

**Table 3: Age wise distribution of chikungunya cases.**

	Age									
	0-1	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Positive	7 (3.7)	18 (9.6)	15 (8)	23 (12.2)	29 (15.4)	32 (17)	28 (14.9)	18 (9.6)	16 (8.5)	2 (1.1)
Negative	0 (0)	4(7)	10 (17.5)	8 (14)	9 (15.8)	9 (15.8)	10 (17.5)	4(7)	3 (5.2)	0 (0)

**Table 4: District wise distribution of chikungunya cases.**

	District						
	Indore	Barwani	Khargone	Khandwa	Dhar	Jhabua	Mandsaur
Positive	147(78.2)	5 (2.7)	17 (9)	9 (4.8)	4(2.1)	3 (1.6)	3 (1.6)
Negative	21	7 (12.3)	12 (21.1)	6 (10.5)	9(15.8)	2 (3.5)	0 (0)

**Table 5: Seasonal distribution of Chikungunya seropositive cases.**

	MONTHS											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Positive	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	2 (1.06)	42 (22.3)	33 (17.6)	82 (43.6)	26 (13.8)	3 (1.6)
Negative	0(0)	0(0)	0(0)	0(0)	1 (1.8)	0(0)	0(0)	22 (38.6)	14 (24.6)	12 (21.1)	6 (10.5)	2 (3.51)

## DISCUSSION

Arboviral infections are an important public health problem in India namely dengue and chikungunya. The Aedes mosquito-borne Chikungunya virus (CHIKV) is an enveloped, linear, single stranded positive sense RNA virus of the family *Togaviridae* transmitted in India, primarily by Aedes et al. [6,7]. The serosurvey conducted in Kolkata in 1994 showed sero-positivity only in 4.37% of the samples whereas cross-sectional study done in Anagaputhur in 2006 showed around 22.3% positivity [8,9]. In another study by Chatopaddhayay in 2016, seroprevalence was found to be 36.89% [10]. The

seroprevalence of chikungunya cases in our study was 76.7% which is comparatively higher compared to the other studies. The maximum number of positive cases was seen in 41-50 years age group followed by 31-40 years of age group. Children were least affected in this study. These are consistent with the findings reported by Cordel et al [11]. However, in another study conducted by Sharma et al., it was found that the population belonging to the age group 5–9 years had the highest percentage of morbidity (23.2%). The lowest percentage of morbidity was reported among infants (8.9%) [12].

In the present study, sero-positivity was more in males compared to females which is consistent with the findings of Sharma et al., it has been reported that the males were more frequently affected than females.[12] However in the study conducted by Balasubramaniam et al; females had more seropositivity compared to males. [9] Chikungunya is a disease of post monsoon season and authors found highest seroprevalence in the month of October followed by August comparable to the other studies were peak incidence was found in the month of August and September [10].

This suggests that this disease is not limited in the post monsoon season but covers both monsoon and post monsoon season as in our study the cases are seen from the month of July to December. This season corresponds with the presence of dengue in the community. There clinical presentation is similar and dengue chikungunya infection has been found to co-exist. Many cases of acute febrile diseases due to chikungunya are underdiagnosed and the circulation of these disease-causing arbo viruses may be much greater than reported. The clinicians need to be made aware of the re-emergence of Chikungunya in the community and simultaneously chikungunya should be investigated as a differential of Dengue fever. The present study indicates that the chikungunya infection has emerged as a major public threat in our community.

#### CONCLUSION

Continuous sero-surveillance needs to be maintained in outbreak and non-outbreak areas to have the baseline data in apparent CHIK infections. In addition, extra effort needs to be directed to find more cases in patients with Dengue sero positivity to understand the complete burden of the diseases.

#### CONFLICT OF INTEREST

None.

#### REFERENCES

1. Ray P, Ratagiri VH, Kabra SK, et al. Chikungunya infection in India: Results of a prospective hospital based multi-centric study. PLoS ONE 2012; 7:e30025.
2. [https://nhm.gov.in/images/pdf/media/publication/Annual\\_Report-Mohfw.pdf](https://nhm.gov.in/images/pdf/media/publication/Annual_Report-Mohfw.pdf)
3. Khan AH, Morita K, Parquet MD, et al. Complete nucleotide sequence of chikungunya virus and evidence for an internal polyadenylation site. J Gen Virol 2002; 83:3075-3084.
4. Ramana KV, Prakash GK. Mystery behind emergence and re-emergence of Chikungunya virus. Ann Trop Med Public Health 2009; 2:1-3.
5. Yergolkar PN, Tandale BV, Arankalle VA, et al. Chikungunya outbreaks caused by African genotype, India. Emerg Infect Dis 2006; 12:1580-1583.
6. Lahariya C, Pradhan SK. Emergence of chikungunya virus in Indian subcontinent after 32 years: A review. J Vector Borne Dis 2006; 43:151-160.
7. Mohan A, Kiran DH, Manohar IC, et al. Epidemiology, clinical manifestations, and diagnosis of chikungunya fever: Lessons learned from the re-emerging epidemic. Indian J Dermatol 2010; 55:54-63.
8. Neogi DK, Bhattacharya N, Mukherjee KK, et al. Serosurvey of chikungunya antibody in Calcutta metropolis. J Commun Dis 1995; 27:19-22.
9. Balasubramaniam SM, Krishnakumar J, Stephen T, et al. Prevalence of chikungunya in urban field practice area of a private medical college, Chennai. Indian J Community Med 2011; 36:124-127.
10. Chattopadhyay S, Mukherjee R, Nandi A, et al. Chikungunya virus infection in West Bengal, India. Indian J Med Microbiol 2016; 34:213-215.
11. Cordel H. Investigation Group. Chikungunya outbreak on Réunion: Update. Euro Surveill. 2006; 11:E060302.3.
12. Sharma HM, Shanmugam CA, Iyer SP, et al. Report on a random survey conducted to assess the prevalence of a dengue like illness in Madras city 1964. Indian J Med Res 1965; 53:720-728.