



CHIKUNGUNYA OUTBREAKS IN JHARKHAND: A MAJOR PUBLIC HEALTH DISASTER

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ABSTRACT

Since its re-emergence in 2005, chikungunya virus (CHIKV) transmission has been documented in most Indian states. Chikungunya virus (CHIKV) has caused several major epidemics globally over the last two decades and is quickly expanding into new areas. **Aim:** To study different demographic variables in the outbreaks of Chikungunya infection in Jharkhand from January 2017 to December 2020. **Methods:** Surveillance data were collected monthly, as a part of the Integrated Disease Surveillance program, India. The clinical definition of cases and outbreak was used for the surveillance rates and outbreaks. Chikungunya outbreaks were analyzed in different districts of Jharkhand for a period of 4 years (2017 - 2020) and trends were analyzed according to age, sex, residency and seasonality. **Results:** Two, three, three and one outbreaks occurred in 2017, 2018, 2019 and 2020 respectively which caused ten, five hundred and thirty, thirty three and four cases respectively altogether in Jharkhand . In 2020, due to SARS-CoV2 infection, the cases were not reported from all over the districts of Jharkhand. There was minor difference in occurrence among genders. A seasonal pattern was also observed with the outbreaks occurring maximum in the months of August to October. The age group of patients who were maximum affected were of 31-40 years followed by 21-30 years. **Conclusion:** The study findings will be useful to improve the public health preparedness in tackling future outbreaks in regions with a high susceptibility for CHIKV.

KEYWORDS : Chikungunya; Surveillance; Outbreaks; India;

INTRODUCTION :

Chikungunya fever is an acute febrile illness (AFI) caused by an arthropod-borne alphavirus, chikungunya virus (CHIKV). CHIKV is transmitted by the bite of infected *Aedes* mosquitoes.[1] The disease presents with sudden onset of fever, joint pain, muscle pain, headache, nausea, fatigue and rash.¹ Chikungunya symptoms are usually clinically indistinguishable from dengue fever and co-infections are common.[1,2] Most patients recover completely, however, joint pain may persist for several months or even years in some patients.[2]

Globally, 1.3 billion people living in 94 countries are estimated to be at risk of chikungunya virus (CHIKV) infection.[3] In India, the first wave of CHIKV outbreaks, from the Asian lineage of the virus, was reported from 1963 to 1973.[1] There were no published reports of CHIKV during the period from 1974 to 2004. CHIKV reappeared in 2005, with explosive outbreaks in the southern Indian states of Andhra Pradesh, Karnataka, Tamil Nadu, and Kerala, which affected nearly 1.4 million people, before spreading to western and northern states.[4] It was estimated that during the 2006 epidemic, 25588 disability adjusted life-years were lost, with an overall national burden of 45.26 disability-adjusted life-years per million.[5] These outbreaks were caused by the Indian Ocean Lineage of the East-Central South African CHIKV genotype, which continued to circulate in India as of 2018.[6]

In India, the National Vector Borne Disease Control Program (NVBDCP) conducts surveillance for Chikungunya in sentinel hospitals while the Integrated Disease Surveillance Program (IDSP) conducts surveillance for chikungunya as a part of surveillance for outbreak-prone diseases.

Sero surveys done during outbreaks in Jharkhand, highlights the high burden of asymptomatic CHIKV infections. Periodic surveys can supplement the health system by providing the information of different demographic details of different districts in Jharkhand.

Our main objectives of this study was to describe the distribution of Chikungunya infections in Jharkhand region between 2017 -2020 and study the various demographic variables

METHODS:

Case Definition For the purpose of this study : the clinical diagnosis was taken as the case definition a febrile illness with sudden onset of fever, joint pain, muscle pain, headache, nausea, fatigue and rash.[1]

Outbreak was defined as ≥ 5 chikungunya cases that are related in place and are epidemiologically linked .

VRDLs received samples from district public health authorities for laboratory confirmation of disease clusters (suspected outbreaks) as well as collected samples through active surveillance from the suspected outbreaks .

Blood samples received in our laboratory were tested for anti-CHIKV IgM antibody by ELISA.

RESULTS :

Table 1. Number of outbreaks every year

Year	2017	2018	2019	2020
No. of outbreaks	2	3	3	1*

* Due to Covid, there was less reporting

During a four-year period, from January, 2017 to December, 2020, in Jharkhand region we reported two outbreaks , three outbreaks, three outbreaks and one outbreak respectively.

Table 2. Number of cases every year

Year	2017	2018	2019	2020
No. of cases	10	530	33	4*

* Due to Covid, there was less reporting

During a four-year period, from January, 2017 to December,

2020, in Jharkhand region we reported ten cases , five hundred and thirty cases, thirty three cases and four cases respectively

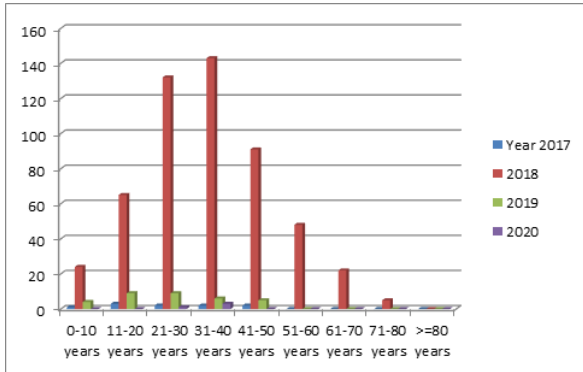


Figure 1 : Distribution of number of cases in different age groups from Year 2017-2020

Distribution of cases by age : In 2017, the maximum number of cases occurred in age group of 11-20 years. In 2018, the maximum number of cases occurred in age group of 31- 40 years followed by 21-30 years, 41-50 years and 11-20 years of age group .In 2019, maximum cases occurred in 11-20 years of age group and 21-30 years, followed by 31-40 years and 41-50 years of age group. In 2020, maximum cases occurred in 31-40 years of age group.

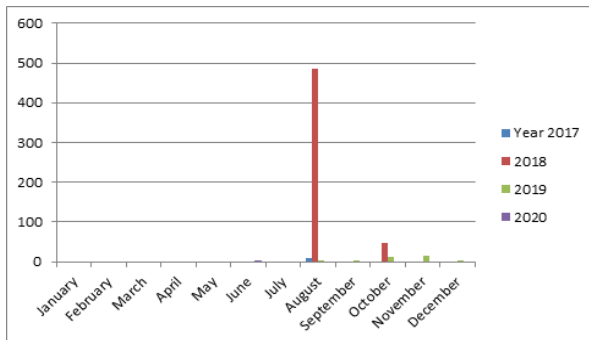


Figure 2 : Distribution of number of cases in different months of Year 2017-2020

Distribution of cases were from the months of August to October

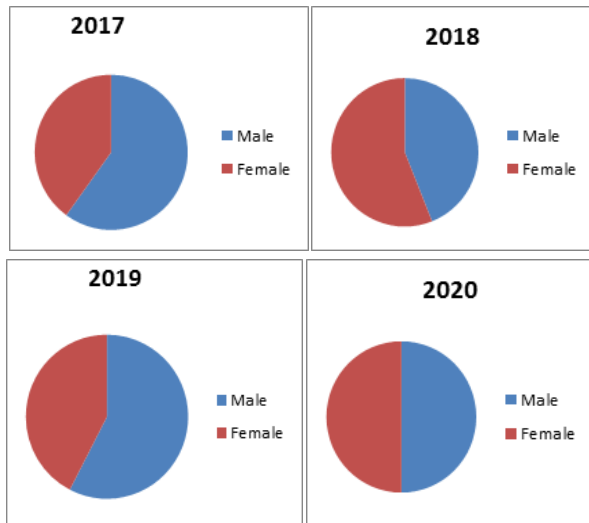


Figure 3 : Distribution of number of cases among male and female Year 2017-2020

The male to female ratio was 1.5 in 2017, 0.784 in 2018, 1.35 in 2019 and 1.0 in 2020.

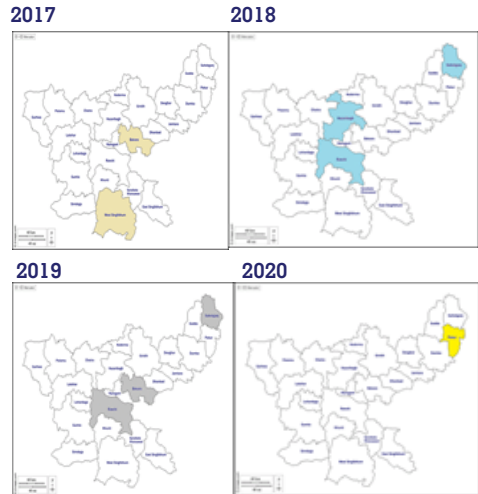


Figure 4 : Distribution of cases among different district of Jharkhand in the Year 2017-2020

DISCUSSION

As per literature, chikungunya virus is reported from nearly 40 countries, and listed as a category C priority pathogen of US National Institute of Allergy and Infectious Diseases (NIAID) in 2008.[7] Earlier it was not considered as a life threatening infection but recent epidemiological evidence has shown the case fatality rate of around 0.1%.[8] After a quiescence of about three decades, outbreak of Chikungunya is being reported from different parts of India. The present study confirms and extends the findings of recent reports from India and other parts of world indicating a re-emergence of severe chikungunya disease which is becoming a major public threat. Prevalence of chikungunya in the present study is 9.4% which is well correlated with other studies. While some other studies have reported higher seroprevalence. [9,10, 11,12 ,13 ,14,15,16,17,18]

In our study in 2017, the maximum number of cases occurred in age group of 11-20 years. In 2018, the maximum number of cases occurred in age group of 31- 40 years .In 2019, maximum cases occurred in 11-20 years of age group and 21-30 years . In 2020, maximum cases occurred in 31-40 years of age group similar to the findings of other studies. This may be explained with the fact that this age group of people either go for education or work at day time and the main vector (*Aedes aegypti*) has day biting habit.

The male to female ratio was 1.5 in 2017, 0.784 in 2018, 1.35 in 2019 and 1.0 in 2020. Various other studies conducted worldwide have shown inconsistencies on gender bias to disease susceptibility with few studies reporting both genders to be equally susceptible.[13,19,20,21]

Seasonal trend of chikungunya infection were analyzed by the month wise data of samples. In India the first CHIKV outbreak in 1963 was observed during July to December, coinciding with the monsoon and post monsoon seasons. In our study also the outbreak cases were maximum during the month of August to October. This may be increased breeding of both mosquitoes, *Aedes aegypti* and *Aedes albopictus*.

CONCLUSION

Chikungunya is a major health concern in Jharkhand. The present study shows the high number of cases occurring mainly during rainy season which causes high number of cases among different districts of Jharkhand. As there is no specific drug for Chikungunya disease , this causes a large amount of economic burden.

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