

Seroprevalence of chikungunya fever in a tertiary care hospital in North Karnataka

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Abstract

Introduction: Chikungunya disease is caused by Chikungunya virus, an Alpha virus under the family Togaviridae, transmitted through the vector *Aedes* spp. mosquitoes. The sudden onset of very high fever along with rash and severe arthralgia are the main symptoms. It's a major public health problem similar to other arboviral diseases like Dengue and Japanese B encephalitis infections.

Materials and Methods: A cross sectional study was conducted at a tertiary care hospital in north Karnataka. Serum samples of 555 suspected cases of Chikungunya fever were tested for Chikungunya IgM antibodies by ELISA (from NIV, Pune) over a period of 4 years, from January 2013 to December 2016.

Results: Of the 555 serum samples tested, 128 (23.06%) were positive for Chikungunya IgM antibodies. The most affected age group was 21 to 30 years 35 (27.34%), followed by 31 to 40 years 26(20.31%). Male to female ratio was 1:1.56. Of the seropositive cases, all the cases presented with the history of fever and joint pain. The maximum number of cases were seen during the monsoon i.e. June 32 (25%), followed by the post monsoon period September 26 (20.31%).

Conclusions: The seroprevalence of Chikungunya cases in the present study is 23.06% with high prevalence in the monsoon and post monsoon months affecting the productive age group of the population. This reiterates the fact that Chikungunya continues to be a major health concern in our setting and indicates the need for appropriate strategies to reduce the severity of disease.

Keywords: ELISA, Serology, Joint pain, Tagoviridae, IgM.

Introduction

Chikungunya disease is a vector born infection caused by Chikungunya virus a single-stranded RNA Alpha virus from the family Togaviridae, the vector being *Aedes* species mosquitoes.¹ Chikungunya virus Isolated in humans and *Aedes aegypti* mosquitoes in Tanzania in 1952.² The name CHIK is derived from the Makonde word which means "that which bends up" describing the stooped posture due to arthritic feature of the disease.² The present epidemic in India started during December 2005 and the country has so far experienced more than 11,00,000 Chikungunya cases from several Indian states including Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu and Madhya Pradesh.^{3,4} Resurgence of Chikungunya has been attributed to various factors including globalization, increase in the mosquito population, loss of herd immunity and the mutation A226V in the E1 gene causing a significant increase in Chikungunya viral infectivity for *Aedes Albopictus*.⁵ Chikungunya disease has no animal reservoirs.² The Chikungunya fever presents with triad of symptoms fever, arthralgia and rashes. Diagnosis of Chikungunya fever is mainly based on the Clinical findings whereas the confirmation of the infection is done only by the laboratory investigations. Serodiagnosis is the most common approach for the diagnosis of the Chikungunya infection where the IgM antibodies against Chikungunya Virus are detected. Other reliable modes of laboratory diagnosis include the molecular methods like RT-PCR.

In the view of changing trends in the seroprevalence of Chikungunya disease with respect to the geographical area, successive years of the study period, seasonal variations, severity of the patients and need for hospitalization, this study has been under taken to know the seroprevalence of Chikungunya disease in the tertiary care centre of north Karnataka.

Materials and Methods

A cross sectional study conducted over a period of four years from January 2013 to December 2016 at a tertiary care centre in north Karnataka, Karnataka Institute of Medical Sciences Hubballi. Serum samples of patients clinically suspected to have Chikungunya infection were subjected to IgM Capture ELISA for the detection of IgM Anti - Chikungunya antibodies using IgM antibody capture ELISA kit produced by National Institute of Virology, Pune (Arbovirus Diagnostic NIV, Pune, India). The tests were carried out following the manufacturer instruction.

Results

A total of 555 serum samples were tested, of which 128 (23.06%) of the samples were positive for Anti - Chikungunya IgM antibodies. Highest occurrence of Chikungunya cases was seen in the year of 2013 (33.08%), least being in 2016 (08.57%) (Image I). All the age groups from 0-90 years were affected, of which the most affected age group was 21-30 years 35 (27.34%), followed by 31 to 40 years 26 (20.31%) (Table

I). Male to female ratio is 1:1.56. Males 50 (39.06%), females 78 (60.94%) (Table II).

The maximum number of cases were seen during the monsoon season, i.e. 32 (25%) cases in the month of June, followed by the post monsoon period, 26 (20.31%) in September (Image II). Among the districts of north Karnataka the most affected was Dharwad 83 (64.84%) followed by Haveri 21 (16.41%) (Table III). Increased in the hospitalisation of cases was seen during the study period as very few samples were received from the Out Patient Departments (Table IV).

Discussion

A total of 555 Chikungunya suspected serum samples were tested, of which 128 (23.06%) samples were positive for Anti - Chikungunya IgM antibodies. Similar seroprevalence was noted in the study conducted by Shaikh Mohd Habeeb *et al* and Krishna *et al*.^{6,7} However lower prevalence was noted in the studies conducted by Mudurangaplar B *et al*. at Vijayapur and Mita D *et al*. at Chamarajnagar.^{8,9} The decreasing trend of prevalence of Chikungunya infection was seen from 2013 to 2016 i.e. 33.08 %, 30.72 %, 15.89 % and 8.57 % in 2013, 2014, 2015 and 2016 respectively in the present study.

There was no mortality but morbidity was high as the most affected population belongs to the productive

age group of 21-40 years (47.37%). Less affected were the paediatric age groups and least affected are the elderly ones. The low prevalence of Chikungunya infection among the extremes of age groups could be due to the reduced outdoor activities and over protected living. Females were more affected than males. Male to female ratio is 1:1.56. Similar trend was seen in the study conducted by Mudurangaplar. B *et al*.⁷ The present study included the serum samples of patients from 4 different districts of north Karnataka, namely; Dharwad, Gadag, Haveri and Koppal along with 1 coastal district i.e. Uttara kannada of Karnataka state. Among these 5 districts the maximum number of samples were received from Dharwad district and the same is most affected 83 (64.84%) followed by Haveri 21 (16.41%). Number of cases was more during monsoon month, June (29.74%). 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.^{7,8} Majority of the patients required hospitalization; whereas 13.64% of the patients in 2013 and 37.26% in 2014 and 44.44% in 2016 were treated on Out Patient basis (Table IV). All the patients presented with fever, joint pain and headache which are the commonest symptoms of Chikungunya fever. Whereas altered sensorium was seen in 2.34% of the seropositive cases.

Fig. 1: Seropositivity of Chikungunya of 4 years

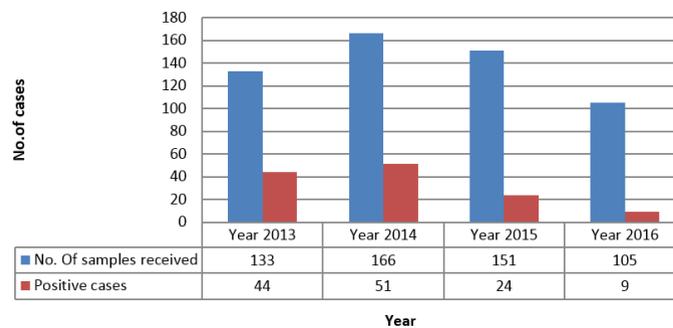


Fig. 2: Seasonal distribution of Chikungunya seropositive cases

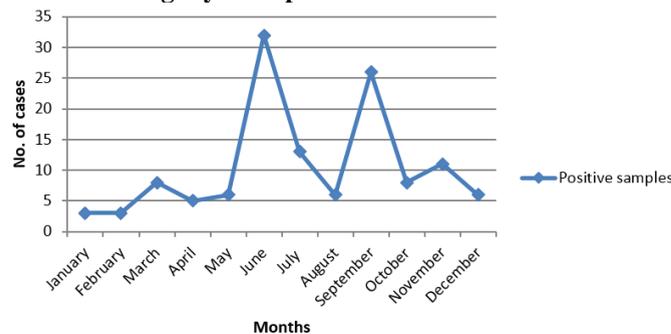


Table 1: Age wise distribution of Chikungunya seropositive cases

Age group	2013	2014	2015	2016	Total positive
0-10yrs	05	01	3	02	11 (8.59%)
11-20yrs	04	05	1	01	11(8.59%)
21-30yrs	08	16	9	02	35 (27.34%)
31-40yrs	07	14	3	02	26 (20.31%)
41-50yrs	09	07	2	01	19 (14.84%)
51-60yrs	07	05	3	01	16 (12.5%)
61-70yrs	04	02	2	00	08 (6.25%)
71-80yrs	Nil	01	0	00	01 (0.78%)
81-90yrs	0	0	1	00	01 (0.78%)
Total	44	51	24	09	128

Table 2: Gender wise distribution of Chikungunya seropositive cases

	2013	2014	2015	2016	Total Positive
Male	23(52.27%)	13(25.49%)	11(45.83%)	03(33.33%)	50(39.06%)
Female	21(47.73%)	38(74.51%)	13(54.17%)	06(66.67%)	78(60.94%)

Table 3: District wise distribution of Chikungunya seropositive cases

District	2013	2014	2015	2016	Total
Dharawad	15 (34.1%)	43 (84.31%)	19 (79.17%)	06 (66.67%)	83 (64.84%)
Gadag	12 (27.27%)	05 (9.8%)	00	00	17 (13.28%)
Haveri	11 (25%)	03 (5.88%)	04 (16.67%)	03 (33.33%)	21 (16.41%)
Uttarakannada	06 (13.64%)	00	00	00	06 (4.69%)
Koppal	00	00	01 (4.17%)	00	01 (0.78%)
Total	44	51	24	09	128

Table 4: Hospitalisation of Chikungunya seropositive patients.

	2013	2014	2016	Total
Hospitalised cases	38(86.37%)	32(62.75%)	05(55.56%)	75(58.59%)
OPD cases	06(13.64%)	19(37.26%)	04(44.44%)	29(41.41%)
Total	44	51	09	104

Conclusion

The seroprevalence of Chikungunya in the present study was 23.06% with high frequency in the 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. Chikungunya continues to be the major health concern and indicates the need for appropriate strategies for vector control to prevent the transmission of infection.

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