Seroprevalence and Epidemiology of Chikungunya with It's Seasonal Trends Diagnosed at Tertiary Care Hospital, Ahmedabad.

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Abstracts: Background & Objectives: To know the seroprevalence, epidemiological and seasonal trends of Chikungunya infection diagnosed at tertiary care hospital, Ahmedabad, Gujarat, India. Methods: A retrospective observational study was conducted at tertiary care hospital, Ahmedabad. A total of 1460 blood samples from suspected cases of Chikungunya were received from different wards, nearby primary and community health centers and district hospitals from duration of September 2015 to mid-November 2016. Patients' medical records were screened for further information regarding the clinical presentation. All were tested for IgM antibody using ELISA at tertiary care hospital Ahmedabad. Results: Out of total 1460 cases, 241 (16.5%) were positive for IgM antibodies. Adults in the age group of 31years to 60 years (46.89%) were the mostly affected than any other age. Cases were presented with symptoms mainly of fever, joint pain, headache, body ache and joint swelling. Maximum cases were reported from duration of September to December, with female preponderance (63.9 %). Conclusion: Seroprevalence of Chikungunya is high in late monsoon season with middle age group and female preponderance. Although the Chikungunya disease is self limiting, treatment is symptomatic and supportive; morbidity can be very high resulting in a heavy social and economic toll. Proper diagnosis and prevention by educating the community & vector control measures appear to be the best approach at controlling Chikungunya fever. [Kinnari S NJIRM 2017; 8(2):20-22]

Keywords: Chikungunya, seroprevalence, epidemiology, IgM antibody

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Introduction: Chikungunya (CHIK) virus is an Arbovirus which belongs to the genus Alphavirus and family Togaviridae. CHIK is a viral disease that is spread by the bite of Aedes aegypti and Aedes albopictus mosquito. The name CHIK is derived from the Makonde word which means "that which bends up"describing the stooped posture due to arthritic features of the disease.[1] The infection has an acute onset with variable clinical features including the sudden onset of crippling arthralgia accompanied with fever, chills, headache, nausea, vomiting and low back pain.[2,3] The disease is often self-limiting and rarely fatal. The incubation period is usually 2-3 days. Arthralgias predominantly affect the joints of hands, wrists, and feet. Pregnant women can pass the virus on to their foetus.[1]

In India,National Institute of Virology (NIV), Pune, is a WHO collaborating center for arboviral disease, It is engaged in diagnosis, outbreak investigations and preparations of reagents for diagnosis of arboviral infections. The enzyme-linked immunosorbant assay (ELISA) test used in this study was provided by NIV, Pune. Laboratory diagnosis depends on the quality of sample and time of collection in the course of illness. In first 5 days, viremia is present and can be confirmed by antigen detection. CHIK IgM becomes detectable around 5 days of fever and persists for several months and IgG is present by 10-14 days. Serological diagnosis of CHIK by detecting IgM or IgG seroconversion is widely used because it is cheaper and easier to perform. The first outbreak of CHIK in India was reported in 1963 in Kolkata, and the last reported outbreak occurred in 1973 in Maharashtra. The present epidemic in India started during December 2005 and the country has so far experienced more than 1,100,000 CHIK infected cases from several Indian states including Andhra Pradesh, Maharashtra, Karnataka, Tamilnadu, Gujarat and Madhya Pradesh.[5,6] India has already had more than 14,656 suspected cases of Chikungunya over the end of first week of october this year , roughly half the total number in 2015, according to India's NVBDCP. The study was conducted in a tertiary hospital to know the prevalence of CHIK, symptomatic profile, and seasonal trends in the patients from tertiary care hospital, Ahmedabad.

Methods: The Retrospective study was conducted in the Department of Microbiology of a Tertiary care hospital Ahmedabad from September 2015 to mid-November 2016. Patients with acute febrile illness and joint pain with clinical suspicion of Chikungunya were included. 1460 patients with the above criteria were included in the study. Detailed clinical history of each patient was taken including age, sex, residential

address, days of fever, morning stiffness, and restriction of joint movement. Hematological investigations were recorded. About 5-10 ml blood sample is collected in plain vacutainer were collected from the patients of tertiary care hospital, Ahmedabad. Serum was separated and tested for Chikungunya IgM antibodies by ELISA.

Principle of IgM Capture ELISA for CHIK: IgM antibodies in the patient's sera are captured by anti-human IgM that are coated on to the solid surface (wells). In the next step, CHIK antigen is added, which binds to captured IgM, if the IgM and antigen are homologous. Unbound antigen is removed during the washing step. In the subsequent steps Biotinylated anti-CHIK monoclonal antibody (CHIK-B) is added followed by Avidin-Histidine rich protein (HRP). Then Substrare is added and monitored for development of color. The reaction is stopped by $1NH_2SO_4$. The optical density (OD) is 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 of the sample exceeds OD of negative control by a factor 4.0. Kit controls and in-house positive and negative controls were used to validate the test.

Result: Out of total 1460 cases, 241 (16.5%) were positive for IgM antibodies. Adults in the age group of 31-60 years (46.89%) were the mostly affected, followed by 16-30 years (36.9%). Cases were presented with symptoms mainly of fever, joint pain, headache and body pain. Seasonal peak was observed in duration of September to December [Table 2], with female preponderance (63.9 %)[Table 1].

Table 1: Age-sex distribution of the Chikungunya seropositive cases

Age groups	Males		Females		Total no. of samples tested positives(%)
	Total no. of samples tested	Tested positives	Total no. of samples tested	Tested positives	
0-15 years	84	14	63	7	21(8.71)
16-30 years	217	27	408	58	89(36.9)
31-60 years	246	40	351	77	113(46.89)
>60 years	35	6	56	12	18(7.46)
Total	582	87	878	154	241(100)

Table 2: Seasonal distribution of the Chikungunya seropositive cases

Months	Total no. of samples tested	Number of positive cases
Sep-Oct(2015)	116	10
Nov-Dec(2015)	49	5
Jan-Feb(2016)	59	2
March-april(2016)	35	0
May-June(2016)	26	0
July-Aug(2016)	61	1
Sep-Oct(2016)	660	112
Mid Nov(2016)	454	111
Total	1460	241

Fever and Joint pain was present in all the cases followed by body pain, headache. [Table 3]

Table 3: Clinical symptoms in the Chikungunya seropositive cases

Symptoms	No. of cases (%)
Fever	241(100)
Joint pain	241(100)
Headache	145(76)
Body pain	217(90)
Joint swelling	24(10)
Rashes	9(4)

Discussion: Murhekar et al. have reported normal platelet counts in patients with CHIK infection from south India.[10] **:** Chikungunya occurs in Africa, Asia and the Indian subcontinent. India had a major epidemic of Chikungunya during 1960s and 70s and the total number of cases rose to 1.39 million in 2006.Currently in 2016, epidemic due to Chikungunya is being going on in the capital city of Delhi and reporting increased number of cases from other states too. Fever and joint pain: In our study fever and joint pain were observed in all cases followed by body pain, headache, joint swelling and rashes. The Chikungunya polyarthropathy frequently involves the joint of knee, ankle, wrist.[7]

CHIK is usually abrupt and sudden in onset with high-grade fever for 4-5 days. Symptoms are self limiting.[8] Chikungunya IgM antibodies usually become detectable by 5 days of fever. In our study most of seropositive patients had fever of duration more than 7 days. In this duration IgM ELISA is diagnostic[9]. Hematological findings: Our study highlights minimal thrombocytopenia among CHIK patients.

Conclusion: Seroprevalence of Chikungunya is high in late monsoon season with middle age group and female preponderance. This year a sudden spike in Chikungunya cases are seen compared to last year in Tertiary care hospital, Ahmedabad . Although the Chikungunya disease is self limiting, treatment is symptomatic and supportive; In the present study there was no mortality but the morbidity was high with loss of work as the population most affected belonged to middle age group. Prevention programs and vector control strategies will be of crucial importance to prevent future CHIK outbreaks.

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