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SEROPREVALENCE OF CHIKUNGUNYA INFECTION IN A TERTIARY CARE HOSPITAL IN MUMBAI

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ABSTRACT Chikungunya is an arboviral infection, caused by chikungunya virus and is transmitted by Aedes aegypti mosquito. The most significant symptom consists of a painful arthralgia which may persist for months to years.

In a prospective study (September 2016 to March 2017) in a tertiary care hospital in Mumbai, a total of 418 sera from suspected Chikungunya cases were tested using the Chikungunya IgM capture ELISA.

The seroprevalence of Chikungunya infection was 26.31%. Maximum positive cases, (73.63%) were among middle age group(15 to 45 years). Male to female ratio among positive cases was 0.96 with only slight preponderance of female cases.. All cases presented with fever followed by joint pain (95.5%),bodyache (89.09%), headache (80.9%), vomiting (7.27%) and rash (2.7%) in that order.

Chikungunya continues to remain an important health problem in our setup.

KEYWORDS : Chikungunya, seroprevalence, arthralgia

INTRODUCTION:

Chikungunya is an arboviral infection, caused by the chikungunya virus, which is a single-stranded RNA virus of family Togaviridae and genus Alphavirus and it is transmitted by Aedes aegypti mosquito.[1] Chikungunya was first detected in 1952 in Makonde, United Republic of Tanzania. Subsequent epidemics were noted in the Philippines, Thailand, Cambodia, VietNam, India,Myanmar and Srilanka.[2,3] In India, chikungunya virus was first isolated in Calcutta in 1963. This was followed by epidemics in Tamil Nadu, Andhra Pradesh and Maharashtra in 1964–65. Subsequently it seems to have disappeared from India. But the virus re-emerged in 2006 to cause an explosive outbreak affecting 13 states including Maharashtra, affecting all ages and both sexes. The virus isolates belonged to the African genotype different from the viruses circulating in 1963–1973, which belonged to the Asian genotype.[3,4,5]

The incubation period ranges between 2 and 10 days. The disease is characterized by acute fever with or without chills, headache, nausea, abdominal pain, photophobia, conjunctival injection, skin rash, and disabling arthralgia. The most significant symptom consists of a painful arthralgia that occurs in almost 100% of patients. The patient develops a stooped posture because of severe arthritis, typically affecting the wrists, hands, ankles, and feet. Chikungunya originated from the word “kungunyala” (meaning “that which bends up”). The disease is usually non-fatal ,fever and skin rash are short-lasting, but the joint pains may recur or last for months to years.[6,7] The serological studies have repeatedly demonstrated the presence of antibodies in human sera.[8,9,10]

The disease usually affects adults, but children, if affected, are at maximum risk for severe manifestations of the disease which include neurological manifestations, i.e. seizures, altered levels of consciousness, blindness due to retrobulbar neuritis and acute flaccid paralysis.[11]

In this study, we aim to analyse the seroprevalence of chikungunya infection in a tertiary care hospital in Mumbai.

MATERIALAND METHODS

This was a prospective study conducted from September 2016 to March 2017 at the Department of Microbiology in a tertiary care hospital in Mumbai, India. A total of 418 serum samples received from suspected chikungunya cases attending the OPD and IPD were included in the study following the inclusion criteria. Exclusion criteria for testing included haemolytic, lipaemic or visibly contaminated sera, quantity not sufficient for testing, blood samples sent in EDTA vacutainers, mislabelled specimens.

With aseptic precautions a single blood sample was collected from each suspected case by venipuncture in a plain vacutainer. The sample was allowed to clot at least for 30 minutes. Serum was separated by centrifugation at a speed of 3000 rpm for 10 minutes and stored up to 72 hours at 2-8^0 C.

The serum sample was then processed for Chikungunya IgM Ab detection using the Chikungunya IgM capture ELISA kit supplied by National Institute of Virology(NIV), Pune, India. Testing was performed as per kit literature.[12]

RESULTS

A total of 418 serum samples from suspected chikungunya cases were tested over a period of seven months (September 2016 to March 2017). Out of those, 110 (26.31%) were positive for IgM antibodies against chikungunya virus. Among positive cases, 2 (1.81%) were aged less than 15 years, 81 (73.63%) were among middle age group of 15 to 45 years and 27 (24.54%) were older than 45 years. Male to female ratio among positive cases was 0.96 with only slight preponderance of female cases. Maximum number of positive cases was seen in the month of November, the total number of samples screened also being highest in the same month. However % positivity was seen maximum in the month of January. As far as symptomatology was concerned, all cases presented with fever followed by joint pain (95.5%),bodyache (89.09%), headache (80.9%), vomiting (7.27%) and rash (2.7%) in that order.

TABLE: 1 Gender wise distribution of positive cases of chikungunya

	TOTAL TESTED	POSITIVE	% PREVALENCE
MALE	208	54	25.96
FEMALE	210	56	26.66
TOTAL	418	110	26.31%

TABLE: 2 Month wise distribution of positive cases of chikungunya

MONTH	TOTAL TESTED	POSITIVE	% PREVALENCE
SEPTEMBER	5	0	0
OCTOBER	14	3	21.4
NOVEMBER	205	61	29.75

DECEMBER	55	13	23.64
JANUARY	51	17	33.33
FEBRUARY	41	7	17.07
MARCH	47	9	19.15

TABLE: 3 Symptoms of positive cases of chikungunya

SYMPTOM	POSITIVE CASES
FEVER	100%
JOINT PAIN	95.5%
BODYACHE	89.09%
HEADACHE	80.9%
VOMMITING	7.27%
RASH	2.7%

FIGURE: 1 Age wise distribution of positive cases of chikungunya

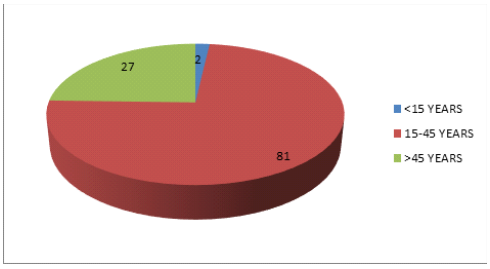
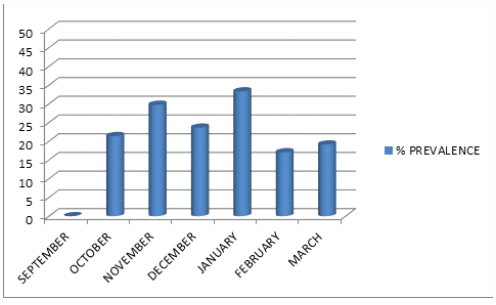


FIGURE: 2 Month wise distribution of positive cases of chikungunya



DISCUSSION

This study was carried out in the Department of Microbiology of a tertiary care hospital to calculate seroprevalence of chikungunya infection from September 2016 to March 2017.

Out of 418 serum samples tested by Chikungunya IgM Capture Elisa, 110 (26.31%) were positive for IgM antibodies against chikungunya virus. Similar studies across India have shown prevalence of 22.3%13, 24.75%10, 33.01%7. Maximum prevalence was seen in the month of January 2017 (33.33%), followed by November 2016 (29.75%).

In our study, maximum number of positive cases (73.63%) were seen in the middle age group (15-45 years). This correlates with other studies which have shown similar findings. [1,7,13,14]

Male to female ratio was 0.96, female (26.66%) being affected slightly more as compared to male subjects (25.96%).Most of the studies[1,7,10,13,14] have shown a greater prevalence in females compared to males. However, in the study conducted by Sharma et al, males were affected more than female population.[15]

All cases presented with fever followed by joint pain (95.5%),bodyache (89.09%), headache (80.9%), vomiting (7.27%) and rash (2.7%) in that order. Similar pattern was observed in studies conducted by Sakhiya et a[17], Selvavinayagam et a[11] and Balasubramaniam et al.[13]

Though chikungunya can affect any age group, the population most frequently affected is middle age group. Though mortality is rare, considerable morbidity is seen with loss of work due to excruciating joint pain which might last for many months. Virus continues to spread to different geographical areas as there is no herd immunity to virus.[7] In developing countries like India, various predisposing factors like overcrowding, low socioeconomic conditions, poor sanitary conditions contribute to spread of chikungunya infection to wider areas. Since 2006, the Chikungunya virus has re-emerged in India affecting different states.[3]

Therefore, screening of all suspected cases is very important for early detection of presence of infection so that appropriate measures could be taken to reduce severity of the disease and spread of infection to other areas.

CONCLUSION:

The seroprevalence of Chikungunya infection in our study was 26.31% which indicates that Chikungunya continues to remain an important health problem in our setup. Early detection of infection is important to reduce morbidity associated with the disease. Detection of IgM antibodies by Elisa plays an important role in the diagnosis of this infection.

CONFLICT OF INTEREST: None

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