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Original Article

SEROPREVALENCE OF CHICKUNGUNYA IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: Chickungunya is a mosquito borne, arboviral disease, causing abrupt onset of fever and severe arthralgia. It is transmitted by vector Aedes aegypti and Aedes albopictus. It has been an increasingly important health threat. The aim of the present study was to estimate the seroprevalence and magnitude of chickungunya in febrile cases in a tertiary care hospital Visakhapatnam.

Methods: A prospective study was conducted for a period of 2 y, from January 2022 to December 2023 from cases admitted for high fever, maculopapular rash, and severe joint pains. A total of 1044 blood samples were received for testing of chikunugunya IgM antibodies by ELISA in the Virology Laboratory, Department of Microbiology.

Results: 11.2% were seropositive for chikungunya IgM. Most affected gender and age group in the study were female [59%] and 26 to 30 y [30.1%]. Maximum cases in this study were recorded in the months of June 2022 [33.3%] and July 2023 [22.4%].

Conclusion: Continuous monitoring of fever cases will allow detection of chickungunya fever outbreaks and enables to establish effective preventive measures. Since there is no definitive treatment available, identifying ways to abolish mosquito population would be the most useful strategy to control the disease.

Keywords: Chickungunya, Aedes aegypti, Aedes albopictus, High fever, IgM ELISA

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INTRODUCTION

Chickungunya word was originated from "kungunyala" which means "that bends up the joints". It is an arboviral infection caused by single stranded RNA virus of family Togaviridae and genus Alphavirus. It is transmitted by daytime biting female mosquito, Aedes aegypti or "Tiger mosquito" Aedes albopictus of Culicidae family. Chickungunya was first described in the Makonde area of Southern Tanzania in the early 1950s [1]. In India, first case was recorded in Calcutta in 1963 and reemerged in 2006. The incubation period ranges from 2 to 10 y. The disease is characterized by high fever>101˚F, myalgia, polyarthralgia, maculopapular rash, headache, conjunctival injection, vomiting, diarrhoea. Arthritis is seen in joints like elbow, wrist, interphalangeal, ankle and feet. Severe cardiac and neurological manifestations in children like altered sensorium, seizures, retrobulbar neuritis, flaccid paralysis, fulminant hepatitis, may be seen as complications in very few cases [2]. Appropriate laboratory methods are mandatory for accurate diagnosis. Virus-specific IgM can be detected 4 to 5 y after the onset of illness since viremia and antigenemia typically occur between 2 to 3 y prior and after the onset of fever [3]. This study aims to analyze the prevalence of chickungunya infection in acute febrile cases, in a tertiary care hospital, visakhapatnam.

MATERIALS AND METHODS

This was a prospective study of 2 y, conducted from January 2022 and December 2023 at the virology laboratory, department of microbiology, in a tertiary care hospital, visakhapatnam. A total of 1044 blood samples were received from suspected inpatients. Cases positive for typhoid, malaria, dengue were excluded from the study. Serum was separated from blood samples by centrifugation @ 3000rpm for 10 min and stored at 2 to 8 °C till further processing. Male and female population of age group 20 to 40 y were studied. Seasonal occurrence of infection were recorded during 2 y. IgM capture ELISA (NIV, Pune, India) intended for qualitative detection of chickungunya virus-specific IgM antibodies in human serum, was performed. Biochemical test findings were also studied in all positive cases.

RESULTS

Out of the total 1044 samples received from suspected chickungunya infections, 117 (11.2%) were confirmed positive for IgM antibodies against chickungunya virus. Among the positive cases, 426 (41%) were males and 618 (59%) were females. Positivity was higher in 26 to 30 y group (30.1%). Maximum number of positive cases recorded in the study was during monsoon of June 2022 (33.3%) and July 2023 (22.4%) Tables 1,2,3. As far as the symptomatology was concerned, all the cases in the study (100%) presented with high fever>101˚F, headache, myalgia, polyarthralgia and arthritis table 4. Biochemical parameter study revealed elevated procalcitonin (100%), lymphocytopenia (89.7%) table 5 in majority of positive cases.

Table 1: Age group of the study, n=1044

Age group in years	Total cases	Percentage %
20-25	296	28.4
26-30	314	30.1
31-35	248	23.7
36-40	186	17.8

Table 2: Gender distribution, n=1044

Gender	Total cases	Percentage %
Male	426	41
Female	618	59

Table 3: Month wise distribution of cases

Month	Year 2022			Year 2023		
	Total tested	Total positive	Percentage %	Total tested	Total positive	Percentage %
January	145	28	19.3	10	0	0
February	44	05	11.4	63	7	11.1
March	14	01	7.1	42	2	4.8
April	06	00	0	28	0	0
May	12	01	8.3	41	1	2.4
June	102	34	33.3	26	4	15.3
July	82	07	8.5	49	11	22.4
August	48	03	6.2	32	5	15.6
September	30	01	3.3	14	1	7.1
October	109	03	2.7	22	1	4.5
November	47	01	2.1	28	1	3.6
December	38	0	0	12	0	0

Table 4: Clinical symptomatology of the study, n=117

Symptoms	Total cases	Percentage %
Fever>101˚F	117	100
Polyarthralgia/Arthritis	110	94
Myalgia	117	100
Maculopapular Rash	86	73.5
Vomitings	32	27.3
Diarrhoea	26	22.2
Headache	117	100

Table 5: Biochemical laboratory parameters, n=117

Laboratory parameter	Total cases	Percentage %
Elevated ALT	82	70.1
Elevated Procalcitonin	117	100
Elevated CRP	96	82
Lymphocytopenia	105	89.7
Leucopenia	78	66.7
Thrombocytopenia	08	6.8
RA Factor	42	35.9

DISCUSSION

This study was undertaken to record the prevalence of chickungunya among febrile cases seeking treatment in tertiary care hospital, visakhapatnam. Most of the patients had a history of travel to remote areas. 10 to 15 y prior to the onset of symptoms. Present study shows a rate of 11.2% [4] which is similar to study by AW Mwongula *et al.* common age group most affected was 26 to 30 y. Female preponderance was observed in this study. Highest prevalence seen during monsoon in two years of the study period. January 2023, December 2022 and 2023 recorded no positivity in this study. Major clinical symptoms of the study were high fever>101˚F, myalgia, headache and polyarthralgia and arthritis. Biochemical findings correlation was important for management of the cases. Testing of IgM antibodies is generally recommended due to its increased sensitivity and persistence. In this study, laboratory confirmed chickungunya cases among clinically suspected patients were diagnosed by serological IgM capture ELISA. Kit was supplied by ICMR-NIV Pune (India) for *in vitro* use only. Kit and reagents were stored at 2 to 8 °C only as per kit protocol [5]. Performance characteristics of the kit were diagnostic sensitivity of 95% and diagnostic specificity of 98%, respectively.

At 450 nm, OD (optical density) value of ≥ NC×3.0 was interpreted as positive and OD value ≤ NC×2.0 as negative. NC (negative control) value in this study was read at 100. Thus positive result was calculated as 300 and negative as 200. Absorbance more than 1.12 was read as positive by the ELISA programmer. Pipettes were calibrated as per NABL guidelines. Cross-reactivity between arboviruses occur due to similarities in amino acid sequences of homologous proteins found in different flaviviruses, especially dengue and chickungunya [6].

As there is no curative therapy like antiviral drugs for chikungunya infection, most of the positive cases were managed with rest, supportive therapy like oral antipyretics, NSAIDs, intravenous fluids to prevent dehydration. No complications no mortality was recorded in the study. Patients were discharged after 3 to 5 y based on symptom-relieving factor or severity. They were adviced to get tested for IgG antibody titres after 14th d of their discharge, but proposal was rejected by patients due to non-provision of the testing kit facility in our unit and cost-effectiveness in a private setting.

NCVBDC programme-National Vector Borne Disease Control Programee 2002 is an umbrella programme was designed by Government of India, for all states and union territories undertaken by Ministry of Health and Family Welfare for prevention, control and reduction of mortality by vector-borne diseases like Chickungunya, Dengue, Japanese Encephalitis and Malaria by 50% by 2010. Main function is supply of logistics, technical guidelines for the prevention and control of each diseases has been issued from time to time in this programme. Guidelines are issued to facilitate preparation of annual plans and monitoring the implementation of activities [7]. Chickungungya continues to remain an important health problem in rural and urban population despite major health facilities [8, 9].

CONCLUSION

Continuous monitoring of fever cases will allow detection of emerging arboviral outbreaks and enables establishment of effective preventive measures. Control measures targeting the vector population, personal protective measures against the mosquito bites should be instituted [10]. Travelers to areas of epidemicity should be informed of the risk of infection and of adequate protective measures to reduce contact with vectors [11, 12]. Unnecessary

water stagnation at household should be avoided to control mosquito breeding sites.

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CONFLICTS OF INTERESTS

There are no conflicts of interest

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