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Research Article

EMERGENCE OF CHIKUNGUNIA FEVER IN WESTERN RAJASTHAN IN YEAR 2010-11

[*]Swami Taruna and B. P. Sharma
[*]Department of Microbiology, S.P. Medical College, Bikaner
**Author for Correspondence*

ABSTRACT
From October 2010 to December 2011 an unknown disease characterized by acute onset of fever, joint pain with or without swelling, and maculopapular rash along with fatigue was reported from Bikaner district of Rajasthan, India. Clinical examination of the symptomatic individuals undertaken. Based on the recorded chikungunya (CHIK) fever symptoms, a vector-borne viral disease was considered for provisional diagnosis. Blood samples were collected from 1100 symptomatic individuals; to confirm the diagnosis, sera were tested for anti-CHIK antibody (immunoglobulin M), which revealed 474 (43%) positivity. Gender wise 31.6% (150/474) and 68.4% (324/474) seropositivity in males and females respectively. 72% of positive cases were above 30 year age. The illness was managed with analgesics like paracetamol. No death was recorded due to the illness. The investigation documented circulation of CHIK in Rajasthan, India, and helped to take preventive steps in the area, with the suggested vector control measures.

Key Words: *Chikungunya, Fever, Immunoglobulin*

INTRODUCTION
Chikungunya (CHIK) is a re-emerging disease causing a large negative impact on global health and economics. Clinical manifestations of CHIK are non specific and difficult to differentiate from dengue hemorrhagic fever or other viral exanthema. CHIK symptoms include high grade fever, myalgia, severe arthralgia and erythematous maculopapular rash. It is quite difficult to differentiate CHIK from dengue hemorrhagic fever or other viral exanthema based solely on clinical manifestations Though mortality is rare with this disease morbidity and temporary disability do occur in larger proportions due to residual joint pain. The last reported epidemic of Chikungunya in India was in 1963-64 (Shah KV *et al.,* 1964) with an outbreak in Chennai in 1964 (Dandawate *et al.,* 1965 and Sharma *et al.,* 1965). An outbreak in India started during December 2005 and the country has so far experienced more than 11, 00,000 Chikungunya-infected cases (Mishra *et al.,* 2006). Chikungunya fever epidemics are characterized by explosive and unpredictable outbreaks involving large population simultaneously, interspersed by periods of disappearance that may last from several years to few decades (Mohan *et al.,* 2006). In Bikaner, outbreak of chikungunya began for the first time in 2010 affecting larger population. In order to understand the magnitude of the problem caused and the clinical signs and symptoms of chikungunya fever, present study was undertaken and cases are reported here.

MATERIALS AND METHODS
From OCTOBER 2010 - DECEMBER 2011 a total of 1100 sera were obtained from Patients of 339 males and 761 females who presented at PBM Hospital Bikaner with symptoms compatible with CHIK. The symptoms included fever, arthralgia or arthritis, skin rash and flu-like symptoms. Duration of illness reported by each patient was recorded at the time of serum collection. Serum samples were tested on weekly basis at Department of Microbiology, S.P. Medical College Bikaner by IgM ELISA Kits provided by NIV Pune for detection of IgM antibodies for CHIK. Samples were also tested by Rapid test kits based on the principles of Immunochromatography, One Step IgM antibodies to Chikungunyavirus Test (SD BIOLINE, Kyonggido, Korea).

Table 1: Symptoms of clinically diagnosed chikungunya fever cases (n=474) during the outbreak in Bikaner (2010-11)

Symptoms	No. of patientsNo. (%)
Fever	474(100.0)
Headache	455 (95.9)
Arthralgia	474 (100)
Myalgia	472(99.5)
Itch/Rash	423(89.2)

Table 2: Month wise distribution of Chikungunia cases

Month	Total tested	Positive
October 2010	20	02
November 2010	251	107
December 2010	549	240
January 2011	59	32
February 2011	69	38
March 2011	53	28
April 2011	19	05
May 2011	16	06
June 2011	19	07
July 2011	08	03
September 2011	05	01
October 2011	08	03
November 2011	09	nil
December 2011	07	01

The analytical sensitivity and specificity of the rapid assay according to the manufacturer's data is 97.1% and 98.9%, respectively, when using a commercial CHIK IgM capture ELISA as a gold standard.

RESULTS

A total of 1100 patient's samples; 339samples of males and 761 samples of females were screened .The major symptoms were fever (100%), headache (95.9%), arthralgia (100%), myalgia (99.5%) and itching with rash (89.2%). The arthralgia and myalgia were mainly peripheral, involving wrists, ankles, hands, foot and phalanges in all patients. Arthralgia, myalgia, itching, lethargy, weakness and distaste were reported to persist even after the fever subsided. A total of 474(43%) samples were found positive, 150 (31.6%) males and 324 (68.4%) females for IgM antibodies by IgM ELISA test. All the samples were found negative by Rapid test kit (SD BIOLINE, KOREA). Maximum positive 341(72%) were more than 30years, while only 17 (3.5%) cases were below 10 years of age. Out of total positive Indoor patients were 78 (16.4%) and 394(83.1%) were outdoor patients. A baby of 2 month age was found positive and mother was also positive. Of the cases who reported fever, onset was acute in 89.3% of cases and insidious in the remaining 10.7%. However, 325(68.5%) out of the 474 cases had high-grade and continuous fever with acute onset. Multiple joints were involved in 92.8% of cases. Joint swelling was present in 54.6% of cases and 56.2% of cases suffered from disability. Median duration for fever was three days and for joint pain was four days in the acute phase. No gender wise difference was observed for any of the symptoms, however in clinically diagnosed chikungunya cases the higher age group patients (>35 years) were found with higher rate of severity of symptoms like oedema, distaste, nausea and headache when compared with lower age group (1-35 yr). No death has been reported in our study although persistent joint pain after one year of infection was reported in 20% of patients. Maximum number of cases was reported during November and December 2010.

DISCUSSION

By testing blood samples according to guidelines by National Vector Borne Diseases Control Programme, Delhi we found 474 cases positive by IgM Elisa kit of NIV Pune. Confirming the outbreak during the present study fever, arthralgia, myalgia, headache, itch/rash and distaste were found in majority of the patients. Age seemed to play a significant role in the manifestation of symptoms with infants experiencing an abrupt onset of fever followed by flushing of the skin and a generalized maculo-papular rash and older children experiencing an acute fever, headache, myalgia, and arthralgia involving various joints (Mohan, 2006 and Ligon, 2006). Similar results were recorded in our study also. In India, during 2006 CHIKV epidemic more cases were reported in the adult age groups even though all age groups were affected (Mourya *et al.,* 2004). In Reunion 74% of victims were over 30 yr of age (Quatresous, 2006) in our study maximum cases (72%) were more than 30 year age and only 3.5% patients were found less than 10 year age. In Reunion, women (68%) were reported to be more affected than men, in our study similar results were observed females (68.4%) outnumbered males (31.6%). Intense arthralgia affecting mainly the extremities (ankles, wrists, phalanges) and the large joints have been reported; Similar feature was also observed in our study with affected people first describing their site of pain at the ankle, wrist and phalanges and latter in the large joints. Itching was observed in 89% of patients whereas in Kerala epidemic it was in 80% of patients. Bullous rashes and blisters were not reported from any patients. A baby of 2 month age was also found positive along with positive mother. In conclusion, the Chikungunya outbreak in our area was severe and the impact on human health generally long lasting particularly with reference to prolonged arthralgia or joint pain, but also due to certain other associated illnesses such as skin rashes, itching etc. chikungunya virus has clearly been responsible for disabling and persistent arthralgia, even then it is unresolved whether the symptoms are due to persistence of the virus or inappropriate immune response (Robinson, 1955; Schuffenecker, *et al.,* 2006). Chikungunya is a mosquito-borne infection and in our area it is yet to corroborate as to whether Ae. aegypti and Ae. Albopictus is involved in the transmission.

There is an immediate need of the research on chikungunya virus, for an effective vaccine besides strengthening the existing diagnostic laboratory facilities. A rapid, simple and reliable diagnostic assay is necessary for CHIK outbreak control especially in countries with insufficient access to well-equipped laboratory facility. As the samples were found negative by rapid test kit hence the rapid assay should not be used as a screening tool during the first week of CHIK due to its low sensitivity. The clinical sensitivity of the rapid test determined during a CHIK outbreak was significantly lower than that reported by the manufacturer similar results were reported by Prianantathavorn *et al.,* (The analytical sensitivity and specificity of the rapid assay according to the manufacturer's data is 97.1% and 98.9% respectively).

The limitation of this study was that the duration of symptoms were presumptively used to define the time between the onset of the disease and the time of specimen collection for diagnostic purposes.

However, the rapid test should not be used as a screening tool especially during the first few days of illness. The disease is considered to be self-limiting and benign in nature (Kannan, *et al.,* 2009).

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