

Clinico-social Profile of Chikungunya Cases Reported in 2016 at a Tertiary Care Hospital in New Delhi

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Abstract

Background: Chikungunya epidemic is a public health problem in South-East Asian countries. There was an epidemic of chikungunya in the year 2016 in New Delhi. Therefore, this present study was planned to understand the epidemiological profile of Chikungunya cases attending fever clinic in a tertiary care hospital in New Delhi.

Objective: To study epidemiological and clinical profile of Chikungunya cases attending fever clinic in Safdarjung Hospital.

Methods: A total of 200 patients with fever of up to 7 days duration were enrolled at fever clinic of VMMC and Safdarjung Hospital, New Delhi from May 2016 to October 2016. Total number of 47874 fever cases were reported in fever clinic from May 2016 to October 2016. A preformed semi-structured, interviewer administered questionnaire was used for data collection. Serum specimens were screened for chikungunya infection by serology (IgM). Chikungunya infection was detected in 16.5% patients by anti-CHIKV IgM antibodies by ELISA.

Results: Among these 200 suspected cases of chikungunya, fever (96.0%), joint pain (81.0%), Myalgia (77.5%) and lower backache (57.5%) were the major clinical features. Major joints involved were knee joint (45.5%), wrist (32.5%), hand (phalanges) (34.5%) and ankle joints (31.0%). Myalgia, rashes, joint pain and joint swelling was frequently observed among chikungunya confirmed cases ($p < 0.05$). All group of ages, both gender and all class of socioeconomic scale were equally susceptible to chikungunya infection.

Conclusion: Chikungunya virus had a wide spectrum of clinical features and all age groups, gender and socioeconomic status people were equally susceptible to Chikungunya infection. All acute febrile illness patients with joint pain should be screened in the laboratory for both Chikungunya IgM antibodies. Predictability of chikungunya is more in presence of joint pain and swelling, myalgia and rashes. This study emphasizes the need for a continuous surveillance on the disease burden.

Keywords: Chikungunya, CHIKV, Vector Borne Disease, Epidemiological Profile

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Introduction

Chikungunya is a public health problem in Asian, African and Latin American countries. Chikungunya is caused by a virus which is labeled as CHIKV, an enveloped positive-strand RNA virus belonging to genus Alphavirus of the family Togaviridae.¹ Chikungunya disease presents with fever, skin rash and incapacitating arthralgia.² Mortality rate in chikungunya disease is low³ and is sometimes confused with Dengue.⁴ Typical features of the disease include acute, massive outbreaks with a high attack rate⁵ followed by slow decline of cases as herd immunity develops.^{6,7} The clinical onset of Chikungunya is acute, with high fever, headache, back pain, myalgia and arthralgia after a short incubation period of 2–4 days.⁸ The symptoms generally resolve within 7–10 days, except for joint stiffness and pain. Fever and arthralgia have been reported in all patients with Chikungunya in India.^{9,10}

In India, the first Chikungunya outbreak was recorded in Calcutta¹¹ in 1963, after which multiple epidemics were recorded in different parts of the country till 1973.^{12,13} After 1973 there were no cases of Chikungunya reported so it was postulated that the Chikungunya virus had disappeared from the Indian subcontinent and from South-East Asia.¹⁴ However, in the year 2005–2006 several outbreaks were reported in different states.¹⁵ Thailand, Indonesia, Malaysia and Philippines^{16,17} also experienced a re-emergence of Chikungunya.

In Delhi, according to National Vector Borne Disease Control Programme (NVBDCP) there were a total of 4649 cases reported till September in 2016. In previous years there were 18, 08 and 64 number of Chikungunya cases reported in the year 2013, 2014 and 2015 respectively. Therefore, in comparison to past three years the number of cases reported in the year 2016 is much higher. There is paucity of literature on epidemiological profile of Chikungunya in Delhi. Therefore, we planned this study to understand the epidemiological profile of Chikungunya cases attending fever clinic in a tertiary care hospital in New Delhi.

Materials and Methods

Study site and population

Vardhman Mahavir Medical College & Safdarjung Hospital is a tertiary care hospital in Delhi which caters to the population from Delhi as well as adjoining states like Haryana, Uttar Pradesh and Rajasthan etc. It has a bed strength of 1531 and an average annual inpatients admissions of around 1.5 lakh. The study was conducted in specially established fever clinic in Safdarjung hospital where patients with fever reported. Total number of 47874

fever cases were reported in fever clinic from May 2016 to October 2016. All fever cases who were advised serological test for chikungunya were included.

Study design and duration

A cross sectional study was designed to observe the cases for 6 months who reported in the fever clinic from May 2016 to October 2016

Sample size

Assuming prevalence of disability among Chikungunya patients as 50% the sample size calculated using the formula $(Z_{1-\alpha/2})^2 / d^2$ at 95% Confidence interval and absolute precision of 15%, and including 10% non-response rate as 195 cases, however 200 cases were recruited out of 47874 cases which were reported in fever clinic in six months.

Data collection

A preformed semi-structured, interviewer administered questionnaire was used for data collection. (Annexure-1). Several aspects of chikungunya were assessed by the questionnaire such as socio demographic characteristics of the respondents and clinical profile of patients (n=200) like signs and symptoms and their duration, examination and assessment of functioning of joints. Detailed examination of joints regarding number of joints involved, any swelling, tenderness and restriction of movements of joints was carried out on each patient.

Laboratory based diagnostics of Chikungunya viruses

All serum specimens were screened for CHIKV specific IgM antibodies by ELISA using commercial kits supplied by National Institute of Virology, Pune. Sensitivity and specificity of this ELISA kit was 95% and 98% respectively.

Case definition (National Vector Borne Disease Control Programme)

Chikungunya should be suspected when epidemic occurs with the characteristic of abrupt onset of fever, arthralgia and myalgia, with or without rash.

Probable or suspected case

A patient meeting the clinical criteria only.

Confirmed (definitive) case

A patient meeting both the clinical and laboratory criteria.

Clinical criteria

Acute onset of fever and severe arthralgia/ arthritis with or

without skin rash and residing or having left an epidemic area 15 days prior to onset of symptoms.

Laboratory criteria

Presence of virus specific IgM antibodies in single serum sample collected in acute or convalescent stage.

Statistical Analysis

The data was entered in Microsoft Office Excel sheet and analyzed using a licensed version of SPSS 21. Data is summarized by calculating proportions, mean and standard deviation. Difference between proportions was assessed using chi square test/Fishers exact test and quantitative data was analyzed using un-paired t test. The p value of less than 0.05 was taken as significant.

Ethical issues

Approval was obtained from the administrative authorities and Institutional Ethics Committee. Written voluntary informed consent was taken from all the participants after explaining the purpose of the study. In case of children, the written consent was obtained from family member or relative.

Results

Socio demographic characteristics

A total of 200 cases were studied. Majority of the study subjects 112 (56%) were in the age group of 20 -40 years. Mean age of study subjects was 35.6 years. The study subject's age ranged between a minimum age of 13 years and maximum age of 80 years. According to modified B.G Prasad Socio-economic scale (modified in January 2017), 61 (30.5%) and 60 (30.0%) of study subjects were in the middle and lower middle class respectively, followed by 31 (15.5%) in upper middle class. 27 (13.5%) belong in lower class. Regarding level of education among the study subjects, 63 (31.5%) of them were illiterate and only 5 (2.5%) were educated up to post graduation level. Among the study subjects, 91 (45.5%) were housewives, 30 (15.0%) were unemployed, 25 (12.5%) were semi-skilled workers and 31 (15.5%) were skilled workers. Professional and clerical workers were 3 (1.5%) and 7 (3.5%) respectively. Most of the patients 165 (82.5%) belonged to Hindu religion and majority of them 142 (71.0%) were married. 50 (25.0%) and 25 (12.5%) of patients had similar complaints in family members and neighbourhood respectively.

Table 1. Distribution of suspected chikungunya cases according to symptoms during illness (N=200)

Symptoms	Number [§]	Percentage (%)
Fever*	192	96.0%
Joint pain	162	81.0%
Myalgia	155	77.5%
Lower backache	114	57.0%
Chills/ Rigors	86	43.0%
Headache	85	42.5%
Appetite	72	36.0%
Rash	47	23.5%
Swelling of joints	40	20.0%
Itching	40	20.0%
Conjunctivitis	31	15.5%
Cough	31	15.5%
Vomiting	31	15.5%
Pain in abdomen	14	7.0%
Watery eyes	10	5.0%
Loose motions	09	4.5%
Running nose	08	4.0%

*8 cases were not having fever at the time of presentation to fever clinic and investigated serologically for Chikungunya virus

§ Multiple responses

Clinical features among suspected chikungunya patients

Table 1 lists distribution of clinical features among

200 patients who came to fever clinic in which test of chikungunya was indicated. Among the study subjects, 200 (100%) had history of fever but 192 (96.0%) had present complain of fever, 162 (81.0%) had pain in their joints and

155 (77.5%) complained of myalgia which are the main presenting complain in case of chikungunya patients. Only 10 (5.0%), 9 (4.5%) and 8 (4.0%) complained of watery eyes, loose motion and running nose respectively.

Laboratory based diagnostics of Chikungunya viruses (CHIKV)

CHIKV infection was tested for the presence of anti- CHIKV IgM antibodies by ELISA in Microbiology department of VMCC and Safdarjung hospital after taking blood sample

in fever clinic by a team of experts. Out of 200 subjects serologically tested, 33 (16.5%) were found positive for anti- CHIKV IgM antibodies by ELISA.

Joint involvement in suspected cases of CHIKV

Table 2 is showing joint involvement in patients suspected of CHIKV. Among the patients knee joint was involved in 45.5% of cases. Other main joints involved were wrist(32.5%), hand (phalanges)(34.5%) and ankle joints (31.0%).

Table 2. Distribution of suspected chikungunya cases according to joint involvement (N=200)

Joint involved	Number	Percentage (%)
Knee	91	45.5%
Joints of hands	69	34.5%
Wrist	65	32.5%
Ankle	62	31.0%
Shoulder	44	22.0%
Elbow	35	17.5%
Joints of foot	25	12.5%
Spine	16	8.0%
Hip	12	6.0%

Table 3. Distribution of socio-demographic characteristics according to CHIKV-positivity in the study population (N=200)

Variables (N)	Chikungunya cases		P value
Age	Confirmed n=33 (%)	Notconfirmed n=167 (%)	
< 20 (23)	4 (17.4%)	19 (82.6%)	0.958
20 – 60 (161)	26 (16.1%)	135 (83.9%)	
>60 (16)	3 (18.8%)	13 (81.2%)	
Gender			
Male (96)	16 (16.7%)	80 (83.3%)	0.951
Female (104)	17 (16.3%)	87 (83.7)	
Socioeconomic status			
Upper (87)	18 (20.6%)	69 (79.3%)	0.195
Middle (91)	14 (15.3%)	77 (84.6%)	
Lower (22)	1(4.5%)	21(95.4%)	
Level of education			
Illiterate (64)	56(87.5%)	8(12.5%)	0.723
Primary school (18)	12(66.7%)	6(33.3%)	
Middle school (30)	26(86.6%)	4(13.3%)	
Secondary school (34)	29(85.3%)	5(14.7%)	
Senior secondary (28)	23(82.1%)	5(17.9%)	
Graduate (21)	17(81.0%)	4(19.0%)	
Post graduate (5)	4(80.0%)	1(20.0%)	
Type of occupation			
Housewife (91)	77(84.6%)	14(15.4%)	0.790
Unemployed (30)	24(80.0%)	6(20.0%)	
Unskilled (7)	5(71.4%)	2(28.6%)	
Semi-skilled (25)	22(88.0%)	3(12.0%)	
Skilled (31)	24(77.4%)	7(22.4%)	
Clerical (7)	6(85.7%)	1(14.3%)	
Semi-Professional (6)	6(100%)	0(0.0%)	
Professional (3)	3(100%)	0(0.0%)	

Socio demographic characteristics of Chikungunya cases

Socio-demographic characteristics were not significantly

associated with CHIKV-positivity. Confirmed cases of Chikungunya were found in all socio-demographic groups (Table 3).

Table 4. Distribution of clinical features according to CHIKV-positivity in study population (N=200)

Clinical features (Number of patients having the clinical features)	Chikungunya Cases		P value
	Confirmed n=33 (%)	Not Confirmed n=167 (%)	
Fever (200)	33 (17.2)	167 (82.8%)	0.19
Chills (86)	16 (18.6%)	70 (81.4%)	0.48
Myalgia (155)	30 (19.4%)	125 (80.6%)	0.04
Joint pain (162)	31 (19.1%)	131 (80.9%)	0.03
Joint swelling (40)	12 (30.0%)	28 (70.0%)	0.01
Lower backache (114)	20 (17.5%)	94 (82.5%)	0.64
Headache (85)	17 (20.0%)	68 (80.0%)	0.25
Rash (47)	20 (42.6%)	27 (57.4%)	0.001
Itching (40)	10 (25.0%)	30 (75.0%)	0.10

Association of clinical features with CHIKV laboratory diagnosis

Comparison of clinical features between chikungunya positive and negative patients demonstrated Myalgia, joint pains, joint swelling and rashes to be significantly associated with CHIKV confirmed cases ($p < 0.05$) whereas differences for other symptoms were not found significant. (Table 4)

Discussion

The present study confirms and extends the findings of recent reports from India and other parts of world indicating a re-emergence of severe chikungunya disease which is becoming a major public threat in India.

In our study among the patients who came to fever clinic there was not much difference in susceptible to chikungunya disease according to gender which was 48% male and 52% female which is similar to findings in other studies,^{18,19,20} while study done by Bhagwati C et al in Rajkot more number of females were affected than males with chikungunya virus infection.²¹ Suryawanshi et al. have reported 60% cases in the age group of 20–30 years from Nagpur in 2006.²² Chandra et al. in 2008 from Mangalore have seen patients affected maximally in the age group of 47–56 years (22.8%).²³

In our study, all cases of CHIK were in the age group of 13–80 years and we found almost same percentage of people affected in < 20 years, 20–60 years and > 60 years. The possible explanation is due to more virulent nature of virus this time affecting all ages.

In other studies, the common presenting symptoms were only fever and joint pain, followed by vomiting and rashes.^{24,25} In our study, more patients had fever, headache, myalgia and joint pain, which showed that headache may be the presenting symptom with fever and joint pain.

Rash was seen only in very few patients 2.38% in a study conducted by Bhagwati C et al in Rajkot²¹ while in our study we reported 23.5% of patients had rash. The reason for this difference is that earlier studies were done in 2013 so due to changing pattern of virus in last three years and also there is possibility of confection with dengue virus leading to change in clinical presentation. In a study done by Ray P et al in year 2011²⁶ there was no confirmed cases of chikungunya was found but in our study 16.5% of patients had confirmed diagnosis by IgM ELISA.

Chandra et al. from Mangalore in 2008 have reported the involvement of ankle (72.2%) followed by knee (60%) and wrist (45%) in patients with CHIKV.²³ Similarly in our study main joints that were involved were knee, wrist, ankle.

Our study has confirmed the findings of various other studies that certain symptoms like Myalgia, rashes, joint swelling and joint pain are significantly associated with chikungunya infections.^{27,28}

In current study ELISA test confirmed only 16% of the suspected cases. This is reported that tests to detect anti-CHIKV IgM antibodies may not be sufficient due to its low sensitivity particularly in acute phase.²⁹ Antigen based test would be much better for early detection of epidemic. Due to cost and technology constraints clinical criteria based screening should be explored.³⁰

Conclusion

Chikungunya infection has a wide spectrum of clinical features and affects all age groups, gender and socioeconomic status. Among clinical features myalgia, joint pains, joint swelling and rashes were significantly more present in CHIKV confirmed cases and can be used for diagnostic criteria. Such cases may be screened with both Chikungunya IgM antibodies which would be giving more yield. A continuous epidemiological and laboratory surveillance would be

beneficial to assess the disease burden and characteristics of CHIKV so that better preventive and control measures could be adopted in the country.

Conflict of Interest: None

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