

AN EXPLORATORY STUDY OF CLINICO-EPIDEMIOLOGICAL FEATURES OF CHIKUNGUNYA OUTBREAK IN A RURAL AREA OF ANDHRA PRADESH, INDIA

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ABSTRACT: INTRODUCTION: Chikungunya is a self-limiting viral infection usually characterized by sudden onset of high fever; skin rash and joint pain with or without swelling caused by an Arbo virus and is transmitted by Aedes mosquitoes (*Aedes aegypti*). **STUDY OBJECTIVES:** 1. To study the frequency of various signs and symptoms among the Chikungunya cases. 2. To study the distribution of disease with reference to some epidemiological variables. **METHODOLOGY:** A descriptive epidemiological study of the Chikungunya epidemic which occurred in Bagepalli village, Andhra Pradesh was carried out. The entire village was surveyed by house-to-house visits by trained observers to elicit clinical signs and symptoms after obtaining informed consent. **STATISTICAL ANALYSIS:** The observations were recorded in a pretested proforma. Frequencies, proportions and Chi-square test were used to interpret the data. **RESULTS:** The overall prevalence of Chikungunya was 6.64%, being slightly higher in females as compared to males (7.73% vs. 5.55%). 100% of the cases had both fever and joint pains. The other symptoms observed were body ache (28.39%) chills (24.69%), headache (22.22%), conjunctival congestion (19.75%), rash (7.40%) and other non-specific symptoms like chest pain, weakness etc (14.81%). It was observed that 86.42% had high grade fever and 13.58% had mild grade fever and that 27.16% of the cases had biphasic fever and 72.84% had continuous fever. In 59.25% of the total cases joint pains preceded the onset of fever whereas in 40.75% the fever preceded the joint pains. The time interval between the onset of fever and joint pains ranged from 0 to 20 days. **CONCLUSION:** We found that there is substantial morbidity associated with the present Chikungunya epidemic and that fever and arthralgia were the most dominant symptoms. High prevalence of arthralgia indicates the need for appropriate treatment strategies to reduce the severity and duration of joint pain.

KEYWORDS: Chikungunya, Epidemic, Prevalence, Clinical features.

INTRODUCTION: Chikungunya is a self-limiting viral infection usually characterized by sudden onset of high fever, skin rash and joint pain with or without swelling cause by an Arbo virus and is transmitted by Aedes mosquitoes (*Aedes aegypti*).^[1] The incubation period of Chikungunya is usually between 2-10 days and mostly affects adult population in comparison to young population.^{[2], [3], [4]} Chikungunya virus was first isolated in Calcutta in 1963,^[5] following which there have been several reports of Chikungunya virus infection in different parts of India,^{[6],[7],[8]} The last outbreak of Chikungunya virus infection occurred in India in 1971. Subsequently due to the absence of any systematic surveillance carried out in the country it 'seemed' that the virus had 'disappeared' from the subcontinent^[9] However, recent reports of large scale outbreaks of fever caused by Chikungunya virus infection in several parts of Southern India have confirmed the re-emergence of this virus. It has been estimated that over 1,80,000 cases have occurred in India since December 2005.^[2] Andhra

ORIGINAL ARTICLE

Pradesh (AP) was the first state to report this disease in December 2005, and one of the worst affected (over 80,000 suspected cases). An estimate of the prevalence of infection due to Chikungunya from several surveys conducted during an outbreak gives us an idea of burden of problem in a specific region which seems crucial for initiating any intervention strategy. Hence this study was taken up in the aftermath of this epidemic in Andhra Pradesh to throw light on the epidemiological and clinical features of Chikungunya in this part of South India.

STUDY OBJECTIVES:

1. To study the frequency of various signs and symptoms among the Chikungunya cases.
2. To study the distribution of disease with reference to some epidemiological variables.

METHODOLOGY: It was a descriptive epidemiological study of the Chikungunya epidemic which occurred in Bagepalli Village, Kuppam Mandal, Andhra Pradesh, with a population of 1220. After obtaining necessary clearance from the Institutional Ethical Committee, the entire village was surveyed by house-to-house visits by trained observers to elicit clinical signs and symptoms. Informed consent was obtained from all study participants. The study was carried out in the month of June 2006 following the epidemic of Chikungunya.

STATISTICAL ANALYSIS: The observations were recorded in a pretested proforma. Frequencies and proportions were used to interpret the data and Chi-square test was used to test the statistical significance of associations.

RESULTS: The overall prevalence of Chikungunya was 6.64%, being slightly higher in females as compared to males (7.73% vs. 5.55%) but this gender difference was not found to be statistically significant ($\chi^2=2.38$, $p=0.10$). There was an increasing trend with advancing age with the attack rates being 1.99% in <20 years, 7.60% in 20-40 years age group, 17.64% in 40-60 years and 8.57% in 60 years and above. (Table 1)

The clinical profiling of the cases revealed that 100% of the cases (i.e., 81 of 81) had both fever and joint pains. The other symptoms observed were body ache (28.39%), chills (24.69%), headache (22.22%), conjunctival congestion (19.75%), rash (7.40%) and other non-specific symptoms like chest pain, weakness etc (14.81%) (Table 2). According to the Pareto chart (Fig. 1) it is observed that Fever, Joint Pains and Body ache cause most of the problems in Chikungunya patients. The red line indicates the cumulative relative frequency curve that helps to find the percentage of contributors to the disease load. As per this chart about 80% of disease load is caused by these three symptoms.

The distribution of rash among the cases was found to be 7.40% with 8.82% of the males and 6.38% of females manifesting the rash (Table 3).

Upon analysis of the degree of fever, it was observed that 86.42% had high grade fever and 13.58% had mild grade fever (Table 4). Also, it was observed that 27.16% of the cases had biphasic fever and 72.84% had continuous fever (Table 5).

In 59.25% of the total cases joint pains preceded the onset of fever whereas in 40.75% the fever preceded the joint pains (Table 6). The time interval between the onset of fever and joint pains

ORIGINAL ARTICLE

ranged from 0 to 20 days. But in the majority of the cases (60.49%) the time interval between fever and joint pain was 6-24 hrs (Table 7).

DISCUSSION: This study tried to identify the key clinical and epidemiological features of patients affected with Chikungunya in an epidemic affected village in Andhra Pradesh, South India.

The overall prevalence of Chikungunya was 6.64%, being slightly higher in females as compared to males (7.73% vs 5.55%). In our study it was found that majority of the cases were in the age group of more than 20 years i.e. 86.42% and only about 13.58% were in the age group of below 20 years. Similar findings were reported in a study in Kerala, India by Vijaykumar K P et al^[10] who observed that most of the affected were in the adult age group (73.4%), and only 11% of the cases occurred in persons <15 years of age. This difference in the clinical spectrum with respect to the age group has been documented in other studies also.^[11]

The clinical profile of the Chikungunya epidemic revealed that 100% of the cases (i.e., 81 of 81) had fever and joint pains. Fever and arthralgia have been reported in all patients with Chikungunya in the epidemics reported recently in India.^[2]

The other major symptoms observed in this study were body ache (28.39%), chills (24.69%), headache (22.22%), conjunctival congestion (19.75%), rash (7.40%) and other non-specific symptoms like chest pain, weakness etc (14.81%). These findings are consistent with those reported in similar studies in the past. A study by Bandyopadhyay et al in Kolkata during 2007 showed nearly 41% prevalence of Chikungunya. It was also observed that 66% were male patients and most common symptoms among cases were sudden onset of fever, joint pain and skin rashes.^[12] Vijaykumar K P et al in their study in Kerala too observed a similar clinical pattern with fever and joint pain seen in all the patients included in the study. Swelling of joints was seen in 69.9% of the patients, being closely followed by head ache (64.1%) and itching (50.3%).^[10] Ramachandran et al in a study in Chennai reported that about 11% of patients developed rash, with the proportion being higher among females (12.4%) as compared to males (9.3%) and that nearly 46% of patients reported swelling of the joints with the proportion being significantly higher among females as compared to males (54% vs. 34%)^[13]

It was observed in our study that 86.42% of the cases had high grade fever and 13.58% had mild grade fever. Ramachandran et al in a study in Chennai had similarly observed that majority of the patients had high grade fever (79%).^[13]

CONCLUSION: We found that there is substantial morbidity associated with the present Chikungunya epidemic. It has affected about 7% of the population with a slight preponderance in females. Fever and arthralgia were the most dominant symptoms and there was an increasing trend with advancing age with the majority of cases being in the age group of over 40 years as compared to the younger population. The reasons of this age shift may be attributed to immunological or sociocultural factors. High prevalence of arthralgia indicates the need for appropriate treatment strategies to reduce the severity and duration of joint pain. The manifestation of biphasic fever could be due to dengue fever virus circulation in the community along with chikungunya fever. Until recently Chikungunya was never considered a public health priority in India but of late it has become an important issue in the domain of public health due to its rapid onset, its potential for epidemic and high morbidity. The economic impact of Chikungunya in India is also a matter of concern. During the 2006 epidemic of

ORIGINAL ARTICLE

Chikungunya, it was estimated that national burden in terms of DALYS (Disability Adjusted Life Years) was 25, 588, with 69% of DALYS being contributed by persistent arthralgia. It is evident from prior studies and the present one that Chikungunya has become a major public health problem in India and appropriate strategies should be initiated by public health specialists as well as health care personnel to halt this epidemic and prevent its recurrence. There is also a need to develop standard treatment guidelines that address the treatment needs of the patients in acute and chronic phases of the disease.

Table 1: Population based age and sex wise attack rate of Chikungunya cases (N=1220)

Age	Male			Female			Total		
	No.	Case	%	No	Case	%	No	Case	%
0-10	129	1	0.77	123	3	2.43	252	4	1.58
11-20	157	3	1.91	142	4	2.81	299	7	2.34
21-30	98	4	4.08	115	7	6.08	213	11	5.16
31-40	67	8	11.94	62	7	11.29	129	15	11.62
41-50	63	8	12.69	62	13	20.96	125	21	16.80
51-60	35	5	14.28	27	6	22.22	62	11	17.74
61 & above	63	5	7.93	77	7	9.09	140	12	8.57
Total	612	34	5.55	608	47	7.73	1220	81	6.63

Mean age: 27.64, S.D=19.53

$\chi^2=2.38$ p=0.10

Table 2: Distribution of Chikungunya cases according to various signs and symptoms

Symptoms / sign	No	%
Fever	81	100%
Joint pains	81	100%
Body ache	23	28.39%
Chills	20	24.69%
Conjunctival congestion	16	19.75%
Rash	6	7.40%
Others eg. Chest pain, weakness etc	12	14.81%

Table 3: Distribution of Chikungunya cases according to the presence of rashes

Age	Male		Female		Total	
	No.	Rash (%)	No	Rash %	No	Rash %
0-10	1	0	3	0	4	0
11-20	3	0	4	0	7	0
21-30	4	0	7	0	11	0
31-40	8	2 (5.77)	7	2 (4.25)	15	4 (4.93)
41-50	8	1 (2.94)	13	0	21	1 (1.23)

ORIGINAL ARTICLE

51-60	5	0	6	1 (2.12)	11	1 (1.23)
61 & above	5	0	7	0	12	0
Total	34	3 (8.82)	47	3 (6.38)	81	6 (7.40)

Table 4: Age-wise distribution of cases according to grade of fever

Age	High	Mild
0-10	1	1
11-20	8	0
21-30	7	4
31-40	17	1
41-50	16	1
51-60	12	2
>60	9	2
Total	70 (86.42%)	11 (13.58%)

Table 5: Age-wise distribution of cases according to type of fever

Age	Biphasic (%)	Continuous
0-10	0	4
11-20	0	4
21-30	3	5
31-40	6	10
41-50	7	13
51-60	3	8
>60	3	15
Total	22 (27.16%)	59 (72.84%)

Table 6: Temporal relation between fever and joint pain among the Chikungunya cases

Onset	No.	%
Joint pain preceded fever	48	59.25
Fever preceded joint pain	33	40.75
Total	81	100%

The time interval between joint pain and fever:

Table 7a: Fever followed by joint pain

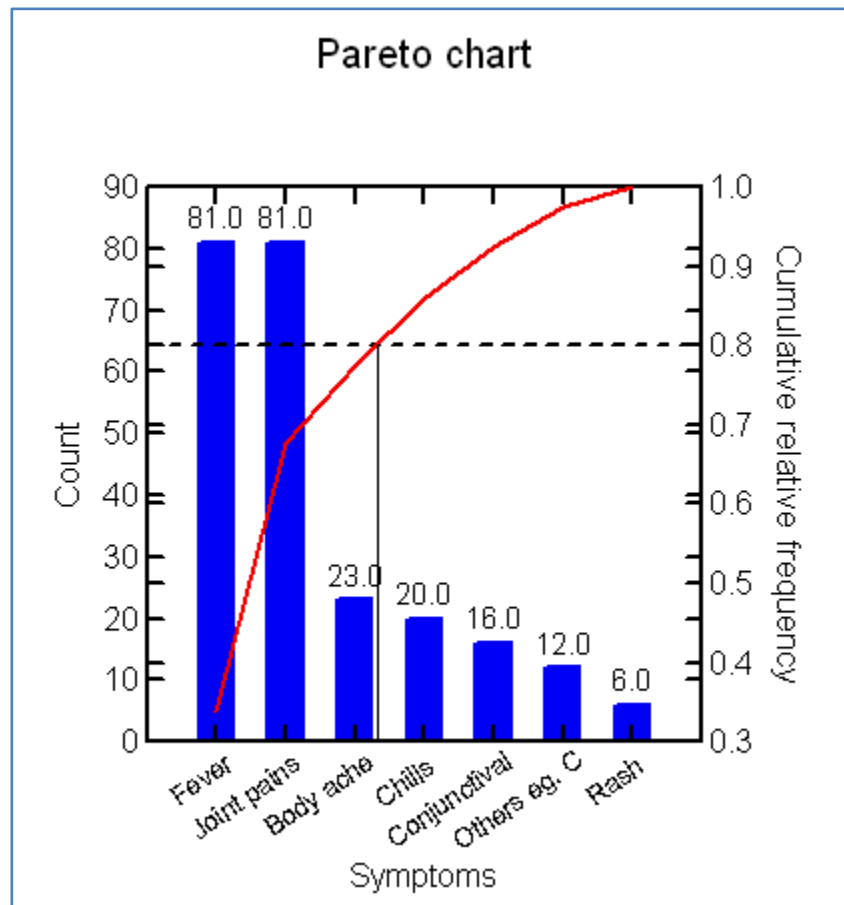
Hrs/day	No of cases	%
0-6 hrs	1	3.03
6-24 hrs	7	21.22%
2-3 days	22	66.66%
4 days and more	3	9.09%
Total	33	100.00

ORIGINAL ARTICLE

Table 7b: Joint pain followed by fever

Onset	No of cases	%
0-6 hrs	11	22.91
6-24 hrs	8	16.66
2-3 days	25	52.08
4 days and more	4	8.34
Total	48	100.00

FIG. 1: SYMPTOMS PRIORITIZED WITH PARETO CHART



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