Original Research Article

# Epidemiological investigation of a suspected outbreak of Chikungunya fever in Tasgaon, Maharashtra

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## Abstract

**Background:** Chikungunya fever re- emerged in India after nearly 32 years in October 2005. During the period of 2006 increase in the number of fever with joint pain cases was reported from the Tasgaon area of Western Maharashtra. Apart from the increase in the number of outpatient department (OPD) cases, there were reports of similar morbid conditions in the other household members and neighbourhood areas of the patients. **Materials and Methods:** Descriptive cross sectional study covering entire Tasgaon population was conducted in the RHTC Tasgaon OPD and in the community. Necessary epidemiological data were collected by using pre-tested, structured epidemiological case sheets by interviewing the patients. **Results:** A total of 549 individuals as obtained from the active and passive survey together were found to have the illness clinically suspicious of Chikungunya fever. Thus the attack rate was noted to be 1.6%. Males accounted for 186 (33.9%) cases and females constituted the remaining 363 (66.1%) cases. Joint pain and fever were the chief complaints. **Conclusions:** Women and young adult age group were commonly involved. The duration of illness ranged from 3 to 7 days. Prompt reporting treatment of the cases in addition to spraying and cleanliness operations along with health education about the mode of transmission and control of the illness resulted in control of the outbreak. Personal protection also played major role in control of the outbreak.
**Keywords:** Fever, Outbreak, Epidemiological, Chikungunya.

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Received Date: 15/10/2015 Accepted Date: 15/10/2015

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| Quick Response Code: | Website: www.statperson.com |
| | DOI: --- |

## INTRODUCTION

Chikungunya is a mosquito-borne viral disease caused due to chikungunya virus (CHIKV) belonging to the genus Alphavirus of family Togaviridae. and transmitted by the mosquito, Aedes aegypti.[1] The virus, first reported in 1952 in Tanzania, has been attributed to many outbreaks.[2,3] Chikungunya is an emerging vector-borne disease of high public health significance in the South-East Asia and Africa regions. In Asia, outbreaks have been reported in India, Indonesia, Maldives, Myanmar, Sri Lanka and Thailand.[4] In India, Chikungunya outbreak was first reported in Calcutta in 1963.[5,6] Since then several outbreaks of Chikungunya fever have been documented from different parts of the country including Vellore,[7] Chennai, Puducherry[8], Visakhapatnam, Rajahmundry, Kakinada.[9] Outbreaks have also been reported from Nagpur and Barsi[10] in Maharashtra. Occasional cases were recorded in Maharashtra State between 1983 and 2000.[11,12] Keeping with the character of the disease, Chikungunya fever re- emerged in India after nearly 32 years in October 2005.[11] From February 2006 to October 2006, the World Health Organization (WHO) Regional Office for South-East Asia and the National Vector Borne Disease Control Programme of Government of India reported that 151 districts located in ten states of India had been hit by chikungunya fever. Nearly 136 million suspected cases were reported from the central and southern states of this country.[13]

How to site this article: S S Rajderkar, J D Naik, U U Ukey. Epidemiological investigation of a suspected outbreak of Chikungunya fever in Tasgaon, Maharashtra. *International Journal of Recent Trends in Science and Technology.* September 2015; 16(3): 551-554 http://www.statperson.com (accessed 14 October 2015).

Maharashtra was also amongst the affected states. During the same period increase in the number of fever with joint pain cases was reported from the Tasgaon area of Western Maharashtra. Apart from the increase in the number of outpatient department (OPD) cases, there were reports of similar morbid conditions in the other household members and neighbourhood areas of the patients. The aedes aegyptii mosquito is known to transmit several species of arboviruses including dengue and chikungunya viruses at the same time leading to a mixed clinical picture. With this viewpoint the current study was planned. The main objectives were to study magnitude of the problem of suspected Chikungunya fever, to study the clinical profile of the illness and further to study average duration of illness in the study population.

## MATERIALS AND METHODS

Tasgaon is a Municipal council city in the district of Sangli located in the suthern part of Maharashtra. Its jurisdicton extends over an area of 43.41 $km^2$ (16.76 sq. miles). According to census India 2001, Tasgaon had a total population of about 60,000 (both urban and suburban) of which 33,435 people residing in the town formed the study group. Male population was 52% and females accounted for 48%. Wells and a stream form the only source of water-supply. As a result, water is stored mainly in big mud, cement and plastic tanks at house hold level. The waste water is disposed off by pucca stone-lined gutters. The village is surrounded by many fields. The municipality runs a civil dispensary and a maternity home.[14] The health facilities to this place are also provided by the Rural Health training centre (RHTC) attached to the department of Community Medicine of government medical college Miraj. Since it was observed that many cases of fever with clinical presentation suggesting chikungunya fever were reporting to the OPD as well as reported by medicosocial workers in their routine survey along with the increased mosquito density, a need was felt to investigate into the probable cause of it. The type of study was descriptive cross sectional where in the whole population of Tasgaon was surveyed from1st September 2006 to 30th September 2006. All the patients with complaints of joint pains with or without fever, headache, bodyache etc visiting the OPD (which formed the passive survey) were included in the study. In addition a team consisting of an epidemiologist, post graduate resident doctor, intern and medicosocial worker conducted a house to house active survey to come across the milder missed cases. Necessary epidemiological data were collected by using pre-tested, structured epidemiological case sheets by interviewing the patients at OPD and at households. Chikungunya was suspected when epidemic disease occurs with characteristic triad of 1) Fever, 2) Rash and 3)Rheumatic manifestations. Analysis was done to calculate percentages. Due care was taken specially to rule out duplication of registration in active and passive surveillance and the cases were visited again for cross checking where ever necessary.

## RESULTS AND DISCUSSION

A total of 549 individuals as obtained from the active and passive survey together were found to have the illness clinically suspicious of Chikungunya fever. Thus the attack rate was noted to be 1.6%. Males accounted for 186 (33.9%) cases and females constituted the remaining 363 (66.1%) cases. The details about the number of cases according to gender is shown in table 1 ahead.

**Table 1:** Gender wise Distribution of suspected cases of Chikungunya

| | Active survey | Passive survey |
|---|---|---|
| Males | 127(36.5%) | 59(30.9%) |
| Female | 221(63.5%) | 132(69.1%) |
| **Total** | **348(100%)** | **191(100%)** |

This females were involved more than the males. This observation is similar to that in other studies from Delhi[15] and Nalgonda[16] also. The collection of data to know the magnitude of the problem included identifying certain demographic variables such as age, gender etc. The details of the patients according to their age as a part of passive survey from OPD is shown in table 2.

**Table 2:** Distribution as per age in OPD cases

| Age group (yrs) | Male | Female | Total |
|---|---|---|---|
| 0-5 | 1 | 2 | 3 (1.5%) |
| 5-15 | 12 | 5 | 17 (8.9%) |
| 15-25 | 11 | 17 | 28 (14.7%) |
| 25-40 | 18 | 53 | 71 (37.2%) |
| 40-60 | 8 | 29 | 37 (19.4%) |
| >60 | 9 | 26 | 35 (18.3%) |
| **Total** | **59** | **132** | **191 (100%)** |

Active survey conducted as house to house vists revealed similar results. Details are represented in table 3.

**Table 3:** Distribution as per age in house to house survey

| Age group (yrs) | Male | Female | Total |
|---|---|---|---|
| 0-5 | 4 | 2 | 6 (1.7%) |
| 5-15 | 21 | 13 | 34 (9.8%) |
| 15-25 | 26 | 31 | 57 (16.4%) |
| 25-40 | 38 | 87 | 125 (36.0%) |
| 40-60 | 18 | 47 | 65 (18.6%) |
| >60 | 20 | 41 | 61 (17.5%) |
| **Total** | **127** | **241** | **348 (100%)** |

All ages were affected and similar results were described in an earlier study from Nalgonda district[16]. The most common age to be involved was 25- 40 years. Thusmaximum cases were from the young adult age group. This finding is also in accordance to other studies[15,16]. According to the inclusion criteria all patients with joint pains were considered as a suspect case. The associated clinical features in the form of fever, joint stiffness, difficulty in movement due to pain, joint swelling etc were also noted. The details about the clinical features is displayed in figure 1. The clinical presentation of the patients in the present study are similar to that in other studies.[11,15,16]

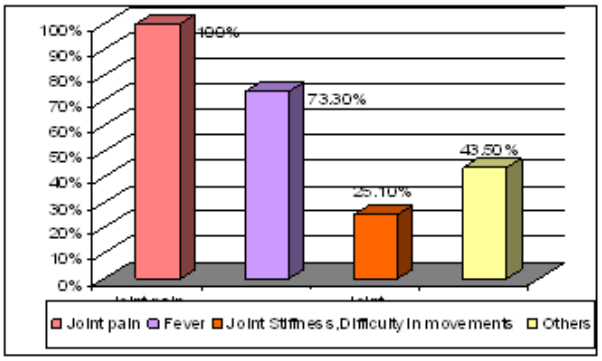


**Figure 1:** Diagram showing distribution of Clinical features

There were reports of joint pain and fever cases from July 2006 till October 2006. The survey was limited to the peak period of September during which most of the cases were reported. The number of cases in each week of the study period was noted. It was o served that during first week of September 70 (12.8 % of 549) cases occurred, 169 (30.8% of 549) cases occurred during second week, 230 (41.9% of 549) in third week and decreasing to 80 (14.6% of 549) during the last week of September. Thus maximum cases occurred during the third week. In this suspected outbreak of Chikungunya, maximum cases occurred during the later half of September which corresponds typically with the previous outbreak in India during the months of August to December[15]. The day wise number of cases as an outbreak curve is represented in figure 2. The outbreak curve revealed that outbreak started slowly in the initial period with a peak in the third week and slowly tailed off which is typical of vector borne diseases.

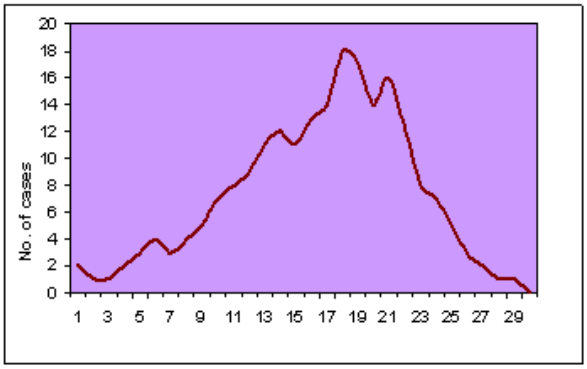


**Figure 2:** Outbreak Curve of the reported case

In the present study, duration of clinical symptoms was observed to be showing a wide variation. Few patients had complaints only for a short span. While in the other few the illness led to a morbid condition for an extended more than 10 days period with a maximum of 25 days. Majority had the duration of symptoms for 3 to 7 days. The details regarding the duration of symptoms is shown in figure 3.

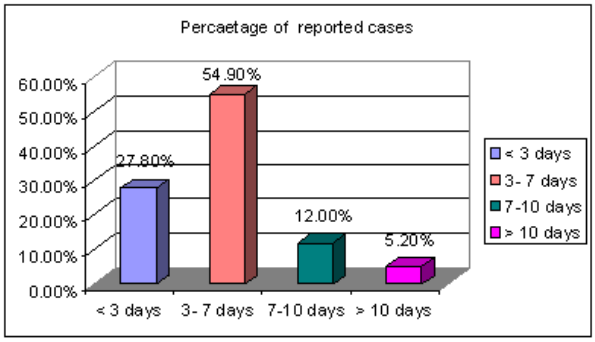


**Figure 3:** Distribution as per number of days symptoms present.

Although the illness caused morbidity, there was no mortality. No hospitalization was reported. The patients were investigated to rule out dengue and malaria. Serum samples from total three patients were sent to National Institute of virology Pune for confirmation of Chikungunya fever. The epidemiological factors in the form of increased mosquito density, artificial water storage and clinical picture suggested the occurrence of Chikungunya fever. There were reports of confirmed cases of Chikungunya fever in the surrounding areas as well as across the country. However laboratory confirmation could not be obtained in the present outbreak investigation. This was one of the limitations of the study. The cases showed decrease in number after various mosquito control activities in the form of indoor and outdoor spraying including personal protection such as wearing of full clothes, avoiding artificial collection of water for more than 7 days etc. at household level were

applied. Health education at OPD as well as during house to house survey also seemed to play a role in control of mosquito population and further the number of cases.

## SUMMARY AND CONCLUSIONS

Females were affected more as compared to males. Main age group affected was 25-40 years. The clinical picture was a minor illness with joint pain as the major cause to seek treatment. Joint pain and fever were the common clinical features. Rash was not observed in any of the reported cases. The duration of illness ranged from 3 to 7 days. The mean duration of treatment sought by patients in OPD: around 5 days. The increased number of cases coincided with the vectorial density. The location of the place and its association with the tertiary health care facility as a medical college had an important part in early reporting, treatment and health education of the patients. Spraying and cleanliness operations along with health education about the mode of transmission and control of the illness resulted in control of the outbreak. Personal protection also played major role in control of the outbreak.

## ACKNOWLEDGEMENTS

The authors acknowledge the co operation by the RHTC staff, local health authorities and the patients in conducting the study.

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Source of Support: None Declared
Conflict of Interest: None Declared