

Chikungunya Outbreak In Kurnool District, Andhra Pradesh

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Abstract

A sudden upsurge in fever cases with arthralgia /arthritis rising up to magnitude of an epidemic was observed in Kurnool district in Andhra Pradesh in November, 2005, which further escalated with time raising an alarm in other districts of Andhra Pradesh and adjoining states. Based on presented clinical features and symptoms, the disease was diagnosed which is a crippling and self-limiting viral disease. It is transmitted to humans by the bite of infected Aedes mosquitoes. Chikungunya virus (CHIKV) is a member of the genus Alphavirus of family Togaviridae. Epidemiological survey showed no mortality but an explosion in number of cases during February and April 2006 created a wave of panic among the resident population. Till April 2006, a total of 6072 cases were confirmed positive for Chikungunya. An entomological survey in the area revealed the presence of Aedes mosquitoes, which are vectors for the CHIK virus. PMHD (Per man hour density) for Aedes ranged from 2-5. Breteau Index was observed to be in the range of 3.57-18.8. The presence of Aedes in very low density in the study area is not correlating with the speed of viral transmission, thus, indicating a possible involvement of other vectors. To prevent the occurrence of more cases and for timely containment of the disease, vector control measures are suggested.

INTRODUCTION

Since its first description by Marion Robinson and W.H.R. Lumsden in 1955, Chikungunya virus in its recent outbreak across the globe has claimed exponential morbidity. Chikungunya is a self limiting febrile, crippling disease caused by Buggy Creek Virus or Chikungunya virus belonging to genus Alphavirus of family Togaviridae (Khan et al.(2002). CHIK is an important human pathogen that causes a disease syndrome characterized by fever, headache, rash, nausea, vomiting, myalgia and arthralgia (Thaikruea et al. (1997), Diallo et al.(1999) , Powers et al.(2000)). During October2005-May 2006, an outbreak of Chikungunya was reported in the media from many places of Andhra Pradesh. District Kurnool was affected by explosion in number of disease cases during this outbreak. This phenomenon of explosive invasion of Chikungunya in hitherto virgin areas prompted us to investigate the causes of the Chikungunya outbreak in Kurnool district. The results of the investigation are presented in this paper.

STUDY AREA

Kurnool district is located in the West-Central region lying in Rayalaseema area of the State bounded at the North by the Tungabhadra and Krishna rivers. The District covers an area of 17,658 sq.km. and has a population of around 29,74000. The district is surrounded by Guntur and Nellore districts in

the East, Ballary district in the West, Mahaboobnagar district in the North, Cuddapah and Anantapur districts in the South directions.

METHOD

SEROLOGICAL SURVEY

As Chikungunya and Dengue are quite similar in their symptoms, Patients are often misdiagnosed and treated. In order to confirm Chikungunya cases, 386 sera samples were collected from the representative cases from the outpatients treated in medical camps and hospitals from Kurnool district. The samples were transported and tested at NIV laboratories.

ENTOMOLOGICAL SURVEY

Entomological survey was conducted by team from Directorate of Health.. Morning and evening house dwelling and cattle shed collections were taken. The house index (Number of houses with Aedes larvae/number of houses inspected X100), Container Index (No. of Positive containers/No. of Containers checked X 100) and the Breteau index (number of positive containers /number of houses inspected X 100) were calculated.

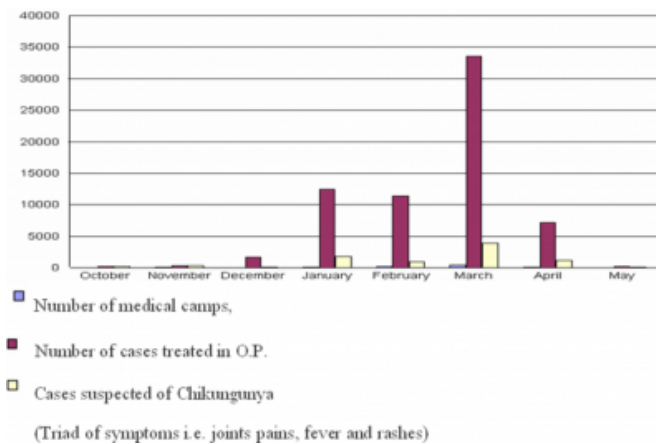
RESULTS

CLINICAL – EPIDEMIOLOGICAL FEATURES

Based on the complaints of outpatients treated in Medical camps and hospitals, the onset of illness was observed to be acute with moderate to high – grade fever, chills and associated joint pains. The joints affected were knee, ankle, elbow, wrist and small joints of the hand. Convalescence was prolonged with joint pains persisting for 1-2 months. In most of cases, the patients found it difficult to stand up on their own and walk because of joint pain. No history of headache, diarrhoea, cough, haemorrhagic manifestation was observed. Lymphadenopathy and rash was not a significant presentation. All age groups were affected with preponderance in 15 years and above. Very few cases have been reported from under 15 years age group. No sex differentiation has been reported. Cases have been reported from both urban and rural areas. Multiple cases in family were observed developing illness within a week, probably acquiring infection at the same time

Figure 1

Figure 1: Incidence of Chikungunya epidemic in Kurnool district (October 2005-May 2006)



In the entomological survey conducted by team headed by district health officer, mosquitoes were trapped from 5 villages viz Pyalaturthi, Gundampad, Jopharapuram, Konidyala and Ramakrishnapuram from the affected district. The mosquitoes catch comprised of Aedes, Anopheles culicifacies, Anopheles hyrcanus, Anopheles barbirostris, Culex vishnui, Culex tritaeniorhynchus, Culex bitaeniorhynchus and other Anohelines and Culicine species. Morning and evening collection were tested for presence of Aedes proportion and Per Man Hour Density was calculated for all the species. PMHD of Aedes ranged from 2-4.5, which was quite low as compared to PMHD of Anopheles, and Culex species. The results are shown in Tables1-5.

Figure 2

Table 1: showing Mosquito Catch in Pyalaturthi village.

Name of the species	Evening collection			Morning collection								
	M	F	MHD	HD		MD		CS		Total		MHD
				M	F	M	F	M	F	M	F	
C. b	-	-	-	-	-	-	-	-	-	-	-	-
C. t	-	-	-	-	-	-	-	-	-	-	-	-
C. v	-	-	-	-	-	-	-	-	-	-	-	-
An. h	-	-	-	-	-	-	-	-	-	-	-	-
An. b	-	-	-	-	-	-	-	-	-	-	-	-
Aedes	-	-	-	1	10	-	1	-	4	1	15	3.75
An. c	-	-	-	-	-	-	-	-	-	-	-	-
Other Culex	-	-	-	3	8	4	11	1	8	8	27	6.75
Other Anopheles	-	-	-	3	8	4	13	2	10	9	31	7.75

Whereas. h=Anopheles hyrcanus, An. c= Anopheles culicifacies, An. b= Anopheles barbirostris, C. t= Culex tritaeniorhynchus, C. b=Culex bitaeniorhynchus and C. v= Culex vishnui [F = female, M = male]

Figure 3

Table 2: showing Mosquito Catch in Gundampad village.

Name of the species	Evening collection			Morning collection								
	M	F	MHD	HD		MD		CS		Total		MHD
				M	F	M	F	M	F	M	F	
C. b	-	-	-	-	-	-	-	-	-	-	-	-
C. t	-	3	1.5	-	-	-	2	-	2	-	7	1.75
C. v	-	-	-	-	-	-	-	-	-	-	-	-
An. h	-	-	-	-	-	-	-	-	-	-	-	-
An. b	-	-	-	-	-	-	-	-	-	-	-	-
Aedes	-	-	-	1	3	-	2	-	3	1	8	2.0
An. c	-	-	-	-	-	-	-	-	-	-	-	-
Other Culex	1	5	2.5	1	2	1	5	-	4	3	16	4.0
Other Anopheles	3	12	6.0	1	4	1	6	-	3	5	25	6.25

Whereas. h=Anopheles hyrcanus, An. c= Anopheles culicifacies, An. b= Anopheles barbirostris, C. t= Culex tritaeniorhynchus, C. b=Culex bitaeniorhynchus and C. v= Culex vishnui [F = female, M = male]

Figure 4

Table 3: showing Mosquito Catch in Ramakrishnapuram village

Name of the species	Evening collection			Morning collection									
	M	F	MHD	HD		MD		CS		Total		MHD	
				M	F	M	F	M	F	M	F		
C. b	-	-	-	-	-	-	-	-	-	-	-	-	-
C. t	-	-	-	-	-	-	-	-	-	-	-	-	-
C. v	-	-	-	-	-	-	-	-	-	-	-	-	-
An. h	-	-	-	-	-	-	-	-	-	-	-	-	-
An. b	-	-	-	-	-	-	-	-	-	-	-	-	-
Aedes	-	-	-	-	1	-	2	1	2	1	5	2.5	
An. c	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Culex	-	-	-	4	12	5	16	2	6	11	34	17.0	
Other Anopheles	-	-	-	2	8	3	10	1	4	6	22	11.0	

Whereas. h=Anopheles hyrcanus, An .c= Anopheles culicifacies, An. b= Anopheles barbirostris, C. t= Culex tritaeniorhynchus, C. bCulex bitaeniorhynchus and C. v= Culex vishnui [F = female, M = male]

Figure 5

Table 4: showing Mosquito Catch in Konidyala village

Name of the species	Evening collection			Morning collection									
	M	F	MHD	HD		MD		CS		Total		MHD	
				M	F	M	F	M	F	M	F		
C. b	-	-	-	-	-	-	-	-	-	-	-	-	
C. t	-	-	-	-	-	-	2	-	1	-	3	1.5	
C. v	-	-	-	-	-	-	-	-	-	-	-	-	
An. h	-	-	-	-	-	-	-	-	-	-	-	-	
An. b	-	-	-	-	-	-	-	-	-	-	-	-	
Aedes	-	-	-	1	4	-	2	-	2	1	8	4.0	
An. c	-	-	-	-	-	-	-	-	-	-	-	-	
Other Culex	-	-	-	-	1	1	3	-	2	1	6	3.0	
Other Anopheles	-	-	-	1	3	-	2	1	3	2	8	4.0	

Whereas. h=Anopheles hyrcanus, An .c= Anopheles culicifacies, An. b= Anopheles barbirostris, C. t= Culex tritaeniorhynchus, C. bCulex bitaeniorhynchus and C. v= Culex vishnui [F = female, M = male]

Figure 6

Table 5: showing Mosquito Catch in Jopharapuram village

Name of the species	Evening collection			Morning collection									
	M	F	MHD	HD		MD		CS		Total		MHD	
				M	F	M	F	M	F	M	F		
C. b	-	-	-	-	-	-	-	-	-	-	-	-	
C. t	-	-	-	-	-	-	-	-	-	-	-	-	
C. v	-	-	-	-	-	-	-	-	-	-	-	-	
An. h	-	-	-	-	-	-	-	-	-	-	-	-	
An. b	-	-	-	-	-	-	-	-	-	-	-	-	
Aedes	-	-	-	1	6	1	2	-	1	2	9	4.5	
An. c	-	-	-	-	-	-	-	-	-	-	-	-	
Other Culex	-	-	-	8	35	4	21	3	10	15	66	33.0	
Other Anopheles	-	-	-	3	14	2	8	1	4	6	26	13.0	

Whereas. h=Anopheles hyrcanus, An .c= Anopheles culicifacies, An. b= Anopheles barbirostris, C. t= Culex tritaeniorhynchus, C. bCulex bitaeniorhynchus and C. v= Culex vishnui [F = female, M = male]

Around 52 houses were found positive for presence of Aedes out of 469 houses inspected across the 5 villages. House index of 3.84-17.3% and Breatau index ranging from 3.84-18.8% and container index in the range of 0.57-6.39 were observed. Konidyala showed the highest House index of 17.3 % while it was only 3.84% in Joharapuram. These results showed active breeding of Aedes inside the houses. The results are shown in Table 6.

Figure 7

Table 6: Showing different indicators on details of Larval samples collected

Village	No. of houses checked	No. of houses positive	No. of Containers checked	No. of containers positive	House Index	Container Index	Breatau Index
Pyalukurthi	104	12	659	12	11.5%	1.82%	11.5%
Gundampadu	100	15	326	15	15%	4.6%	15%
R. Krishnapuram	60	3	345	3	5%	0.86%	5%
Konidyala	101	18	297	19	17.3%	6.39%	18.8%
Joharapuram	104	4	679	4	3.84%	0.58%	3.84%

The probable vector of transmission of the virus was the Aedes aegypti. Aedes has been shown to be capable of transmitting of the Chikungunya virus. Out of 386 representative samples tested at NIV labs, six sera samples were positive for dengue IgM by MAC ELISA and 139 were positive for Chikungunya IgM by MAC ELISA.

DISCUSSION

Chikungunya fever is a self-limiting viral disease characterized by arthritis mostly involving the wrist, ankle, knee and small joints of the extremities associated with rashes and fever. It is transmitted by bite of the mosquito vector *Aedes aegypti*. There is no specific treatment for Chikungunya viral disease. It is only symptomatic relief of fever pains with Paracetamol and other anti-inflammatory drugs like Diclofenac; Ibuprofen etc. This study confirms the occurrence of Chikungunya fever in Kurnool district, Andhra Pradesh, India.

There have been previous reports of Chikungunya disease outbreaks in India. The first outbreak in India was recorded in Kolkatta in 1963(Shah et al. (1964), Chatterjee et al.(1965)) and there have been sporadic outbreaks subsequently in Andhra Pradesh (Jadhav et al.(1965), Maharashtra and Tamil Nadu. The most common signs and symptoms reported in these outbreaks were the triad of fever, rash and joint pains. Physicians should be aware that the Chikungunya virus is present in India. It therefore should be include in the differential diagnosis of diseases with influenza like symptoms, especially when a patient presents with these triad of symptoms. Although Chikungunya is not a fatal disease, it may cause significant morbidity due to severe and prolonged duration of joint pains. This outbreak of Chikungunya fever is another harsh reminder that the only way to fight vector borne diseases is through prevention. Like other mosquitoes borne diseases, e.g. Dengue fever, avoiding contact with vector and maintaining good environmental sanitation can prevent transmission. Only a three-prong strategy focusing on conducting Medical camps, adoption of Vector control measures and Intensive IEC by the concerned departments will help to protect the state from the clutch of the disease. Screening of bedrooms or the use of insect repellents and mechanical barriers such as mosquito nets help minimize exposure to mosquitoes but this is not going to work while dealing with these daytime mosquitoes. So the only way that we are going to win the war against mosquitoes and mosquito borne vector diseases is through concrete efforts to stop their breeding. Vector control measures include the elimination of potential breeding

places of mosquitoes inside and outside homes, schools and offices. Drums, plastic containers and vessels used to store water should be covered. It's not very complicated but these simply practices will go a long way in fighting mosquito borne diseases. The prime challenge faced during this overwhelming outbreak in the country has been the lack of rapid and easily accessible diagnostic facilities. There is an imperative need to create a momentum to combat the disease. Active community participation is needed to emulate the problem.

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References

- r-0. Afjal Hossain Khan, Kouichi Morita, Maria del Carmen Parquet, Futoshi Hasebe, Edward G. M. Mathenge and Akira Igarashi.2002. Complete nucleotide sequence of chikungunya virus and evidence for an internal polyadenylation site. *Journal of General Virology* . 83, 3075-3084.
- r-1. Chatterjee SN, Chakravarti SK, Mitra AC, Sarkar JK. Virological investigation of cases with neurological complications during the outbreak of haemorrhagic fever in Calcutta. *J Indian Med Assoc* 1965;45:314-6
- r-2. Jadhav M, Namboodripad M, Carman RH, Carey DE, Myers RM. Chikungunya disease in infants and children in Vellore: a report of clinical and haematological features of virologically proved cases. *Indian J Med Res* 1965; 53 :764-76
- r-3. Powers, A. M., Brault, A. C., Tesh, R. B. & Weaver, S. C. 2000. Re-emergence of chikungunya and o'nyong-nyong viruses: evidence for distinct geographical lineages and distant evolutionary relationships. *Journal of General Virology* 81, 471-479.
- r-4. Shah KV, Gibbs CJ Jr, Banerjee G. Virological investigation of the epidemic of haemorrhagic fever in Calcutta: isolation of three strains of Chikungunya virus. *Indian J Med Res* 1964; 52 :676-83
- r-5. Thaikruea, L., Charearnsook, O., Reanphumkarnkit, S., Dissomboon, P., Phonjan, R., Ratchbud, S., Kounsang, Y. & Buranapiyawong, D. 1997. Chikungunya in Thailand: a re-emerging disease? *Southeast Asian Journal of Tropical Medicine and Public Health* 28, 359-364.

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