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Correspondence

Chikungunya outbreak in Atmakur village, Medak district, Telangana State, India

Sir,

Chikungunya is an acute febrile illness caused by chikungunya virus (CHIKV), transmitted by *Aedes aegypti* and *Ae. albopictus* mosquitoes which predominantly breed in fresh water^{1,2}. After an incubation period of 3-7 days (range: 1-12 days), the infected person develops high grade fever (typically >39°C) and poly-arthralgia. Joint involvement is usually bilateral and symmetric, and can be severe and debilitating. Other symptoms may include headache, myalgia, arthritis, conjunctivitis, nausea/vomiting, or maculo-papular rash³⁻⁵. The articular symptoms usually resolve within days to a few weeks, but in some cases, these may last for months or even years⁶. Even though, the disease is rarely life-threatening, the widespread occurrence of disease causes substantial morbidity and economic loss⁷.

In 2006, chikungunya re-emerged in India with widespread outbreaks in Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra⁸⁻¹⁰. According to the National Vector Borne Disease Control Programme, more than 2.7 lakh cases were reported from almost all the States of the country¹¹. Although the disease incidence has shown a decline in India¹², outbreaks continue to occur in areas that were not previously affected. On November 12, 2013, the District Medical and Health Officer of Medak district in Andhra Pradesh (this district is now in Telangana State) informed the State Disease Surveillance Unit about unusually high number of cases of febrile illness from Atmakur village (n=1045). On further enquiry, it was found that all the cases presented with joint pain. The State Disease Surveillance Unit, SHARE India and trainee of the field Epidemiology Training Programme of National Institute of Epidemiology, Chennai began investigations during November 15 to December 16, 2013 with the objectives of (i) confirming the aetiology,

(ii) estimating the magnitude, (iii) identifying the risk factors, and (iv) proposing recommendations to control.

A suspected case of chikungunya was defined as an acute occurrence of fever with joint pain in a resident of Atmakur since November 1, 2013¹³. Trained community health workers searched for suspected cases of chikungunya by house-to-house visits and collected information about age, sex, location, symptoms, date of onset, information about hospitalization, and duration of illness. A total of 20 serum samples were collected from suspected patients admitted in the district hospital, Medak; and were transported to Institute of Preventive Medicine, Hyderabad, for testing IgM antibodies against CHIKV using IgM-capture ELISA developed by the National Institute of Virology (NIV), Pune, India. The age and sex specific attack rates were calculated by dividing the number of cases by using projected, 2012 population estimates¹⁴. The epidemic curve was plotted to describe the distribution of cases by time. Spot map was prepared to understand the distribution of cases.

For the mosquito larval survey, Atmakur village was stratified into two areas (area-1 and area-2) by geographic location of houses and 85 households from each of the areas were systematically sampled and surveyed. The household surroundings were searched for the presence of mosquito breeding places like water storage containers, water containers for animals, flower pots, earthen pots, coconut shells, stagnant pits and tyres, *etc.* House index (HI) was calculated as the proportion of houses having containers with larvae and the Breteau index (BI) as the number of containers positive for mosquito larvae per 100 houses.

A total of 114 suspected chikungunya case-patients were identified from a population of 954 (attack rate: 11.9%; no deaths). All age groups were

Table I. Distribution of suspected chikungunya patients by age-group, gender and locality, Atmakur village, Medak, Andhra Pradesh (now Telangana), India (December 2013)

Population groups		Number of cases	Population	Attack rate (per 100)
Age group (yr)	0-14	13	196	6.6
	15-45	47	340	13.8
	>45	54	418	12.9
Sex	Male	61	497	12.3
	Female	53	457	11.6
Locality	Area-1	87	573	15
	Area-2	27	381	7
Total		114	954	11.9

affected; with higher attack rates among individuals aged 15-45 yr (13.78%) and males (12.3%, Table I). The patients started coming from November 12, 2013, peaked during 15 to 20 November, and subsequently continued to occur for about four weeks. Besides fever (100%) and arthralgia (100%), common symptoms included headache (76%), myalgia (72%), back pain (23%), oedema (20%), nausea (20%), vomiting (18%), and rash (10%). The median number of joints affected was three. The most common joints involved were ankle, knee, wrist, and small joints of hands. Forty three (37.7%) of the 114 suspected patients were hospitalized in the district hospital (n=29) or primary health centre (n=14) for a median duration of eight days. Most of these patients on admission had high-grade fever, severe joint pain, dehydration and headache. At the district hospital, patients were investigated for malaria (peripheral smear), typhoid (Widal test, Span Diagnostics Ltd, Surat, India), and dengue infection (NS1 card test, J. Mitra & Co. Pvt. Ltd, New Delhi, India). All these tests were negative. Ten of the 20 serum samples from the admitted patients were positive for IgM antibodies against CHIKV. Although the sensitivity and specificity for the laboratory assay is high (95 and 97.2%, respectively), the sensitivity of the test in the first week of illness is low. This could be a possible reason for only 50 per cent positivity among the samples tested^{13,15}.

The cases were clustered in area-1 compared to area-2 of the village. Area-2, where houses were made of clay or dried bamboos with no water storage facility had lower attack rate (attack rate: 7%, 27/381). In contrast, the attack rate in area-1 where majority of the houses were *pucca* houses made with brick and mortar and had plenty of water storage containers was

15 per cent (87/573) (Table I). The mean numbers of containers per household in area-1 and area-2 were six and 11, respectively. The entomological indices were higher in area-1 as compared to area-2 (Table II).

Although only 50 per cent of the samples tested were positive for IgM antibodies against CHIKV, but negative test results for other likely aetiologies (dengue, typhoid, malaria), clinical presentation of cases and entomological findings supported chikungunya as the aetiology of outbreak in Atmakur village.

In conclusion, an outbreak of chikungunya occurred in Atmakur village, Medak district in November-December 2013 affecting about 12 per cent of the village population. High entomological indices and the water storage practices in the village were favourable for the transmission of the infection. As per the guidelines of the National Vector borne Disease Control Programme, the health authorities applied temephos in domestic water storage containers and sprayed indoors with pyrethrum extract spray¹⁶. The number of cases declined following these control measures. However, the transmission continued for about one month, as the anti-larval and anti-adult measures were conducted

Table II. Entomological indices in areas 1 and 2, Atmakur, Medak, Andhra Pradesh (now Telangana), December 2013

	Area-1	Area-2
Attack rate (%)	15	7
Mean number of containers per household	60	36
House index	18	12
Container index	5	3
Breteau index	45	32

only for one week on alternate days. This finding underscores the need for continuation of vector control activities till the outbreak subsides.

The State of Andhra Pradesh (now Andhra Pradesh and Telangana) experienced large-scale outbreaks during 2005-2006^{8,9,12}. The occurrence of this outbreak also indicates that chikungunya remains a risk in previously unaffected areas. Health authorities, therefore, need to institute surveillance for chikungunya outbreaks for detecting and responding early so as to interrupt the transmission to other unaffected areas.

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**Chengappa K. Uthappa¹, Ramesh R. Allam¹,
Deepak Gunti², Chava Nalini¹,
Prasada R. Udaragudi²,
Geetha P. Tadi² & Manoj V. Murhekar^{3,*}**

¹SHARE India, Hyderabad, ²Directorate of Health,
Hyderabad, Telangana,

& ³National Institute of Epidemiology,
Chennai 600 077, Tamil Nadu, India

*For correspondences:
mmurhekar@gmail.com

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