

Egg Laying Sites of *Aedes Aegypti* and Their Elimination as the Crucial Etiological Intervention to Prevent Dengue Transmission in Western Rajasthan, India



Medical Science

KEYWORDS : Dengue, Transmission, Earthen pots, egg laying sites, *Aedes aegypti*

Dr. Vinod Joshi	Desert Medicine Research Centre, New Pali Road, Jodhpur, Rajasthan
Dr. Annette Angel	Desert Medicine Research Centre, New Pali Road, Jodhpur, Rajasthan
Dr. Bennet Angel	Desert Medicine Research Centre, New Pali Road, Jodhpur, Rajasthan
Dr. Kiran Kucheria	Desert Medicine Research Centre, New Pali Road, Jodhpur, Rajasthan

ABSTRACT

Development of effective intervention points to check dengue transmission in a disease endemic area forms the key components of a successful disease control programme. Many outbreaks of dengue and dengue hemorrhagic fever have been reported from desert parts of Rajasthan. Present paper reports the results of an investigation of a recent outbreak in Jasole town of Barmer district, Rajasthan. The investigations revealed that while no domestic breeding of the Aedes vectors was observed, some base cum stand over which the earthen vessels (matka) are kept were observed to have eggs of Aedes adhered to it. Since these bases or stands remain unobserved during the treatment programme, they may serve as crucial micro niches for occurrence of the subsequent continuation of disease. Present paper aims to highlight such 'microhabitats' as key sites which need to be examined and included during the control operations for an effective intervention into an ongoing outbreak.

INTRODUCTION

Dengue Fever (DF) associated with Dengue Hemorrhagic Fever (DHF) is becoming an alarming public health problem in many parts of India. In the year 2012, a total number of 50222 cases of dengue with 241 deaths have been reported from the country. In Rajasthan, India 1295 cases of dengue with 10 deaths have been reported in 2012. Unlike other disease endemic areas in the country, in north-western desert Rajasthan, number of outbreaks of DF and DHF have been reported during the pre-rain period of May–June. Due to water scarcity the inhabitants in the desert region possess habit of over storing domestic water collections and hence cluster of vector population of domestic breeding mosquitoes, *Aedes aegypti* get protected in the region. With the availability of intrinsic virus stock in the form of infected human patients, a sub population of such protected larval foci could maintain transovarial or vertical passage of virus could serve to act as the maintenance mechanism of prospective viral dissemination into larger vector population to ultimately cause the pre-rain disease outbreaks.

An outbreak of dengue fever has been reported recently from the Jasole town, Barmer district of Rajasthan during the months of April to May, 2013. About 68 laboratory confirmed cases of dengue were reported by the local Primary Health Centre, Jasole, Barmer (Unpublished data, department of Health & FW, Govt. of Rajasthan). We have investigated the outbreak situation to study possible causes of outbreak and suggest interventions to prevent further transmission. The paper reports the details.

The study area Jasole, Barmer district, Rajasthan, India represents a typical desert setting with a total human population of about 12,414 people according to census 2001. An outbreak of dengue fever was reported during the period of April-May, 2013 by the state health authorities. Retrospective study of the cases of Dengue Fever reported to the local hospital was made with the help of data available at Primary Health Centre (PHC), Jasole. Investigations were carried out in selected households to study causes of outbreaks and suggest intervention measures to interrupt ongoing outbreak.

Entomological investigations were undertaken in 11 representative houses. Different domestic containers such as cement tanks, plastic containers and underground water collections were examined for the presence of *Aedes* larvae. Of the 48 containers examined no container was observed positive for breeding. It was observed that during last one month all the containers were treated with the larvicide hence none showed the active breeding of *Aedes aegypti*.

An important observation was made during the course of field

investigations. In one of the houses, beneath the base cum stand of domestic water utensil (Figure 1 and 2), eggs of *Aedes aegypti* were observed laid. The base cum small water collection pit (Kundi) of domestic water utensil, earthen pots are the preferred sites of egg laying of *Aedes aegypti*. These eggs could not only become root for re-establishing vector fauna but could also serve as the containers of dengue virus to spread the pathogen on availability of favourable conditions. The egg laying sites of vector *Aedes aegypti* bears crucial aetiological significance and need to be demonstrated to public health managers. Wiping or discarding the eggs from such micro habitats could play a crucial role in elimination of the disease outbreaks in an endemic area.



Figure 1: Base cum stand on which the earthen pot (matka) is kept.



Figure 2: The interior of the base/stand showing eggs laid (dark oval shaped) by *Aedes* mosquitoes.

CONCLUSIONS

There have been number of studies on breeding habitats of *Aedes aegypti* in different settings of Rajasthan. Based on these reports the preferred key containers of *Aedes* breeding could be treated with larvicide under National Vector Borne Disease Control Programme. However, no study has been published on the crucial egg laying sites of *Aedes aegypti*. Without the knowledge of preferred egg laying sites and practice of elimination of

eggs collections, the efforts of vector and virus control of dengue may not yield satisfactory results. The observations reported in present paper could be useful and incorporated into ongoing strategy of control of dengue transmission in the endemic areas.

ACKNOWLEDGEMENTS

We are thankful to the Director, DMRC, Jodhpur for providing facilities and encouragements to conduct the study.

REFERENCE

- [1] <http://nvbdcp.gov.in/dengue1.html> | [2] Joshi, V, Mathur, M.L, Dixit, A.K and Singhi, M. (1996), "Entomological studies in a dengue endemic area, Jalore, Rajasthan." Indian Journal of Medical Research, 104, 161-165. | [3] Chauhan, G.S, Rodrigues, F.M., Shaikh, B.H., Ilkal, M.A., Khangaro, S.S., Mathur, K.N., Joshi, K.R, and Vaidhye, N.K. (1990), "Clinical and virological study of dengue fever outbreak in Jalore city, Rajasthan 1985." Indian Journal of Medical Research, 91, 414-418. | [4] Joshi, V, Sharma, R.C., Sharma, Y, Adha, S, Sharma, K, Singh, H, Puorhit, A, and Singhi, M. (2006), "Importance of Socio-economic status and tree holes in distribution of *Aedes* mosquitoes (Diptera: Culicidae) in Jodhpur, Rajasthan, India." Journal of Medical Entomology, 43(2), 330-336. | [5] Reuben, R., and Panicker, K.N. (2008), "Aedes survey in five districts of Rajasthan, India." Journal of Communicable Disease, 7, 1-9. | [6] Sharma, K, Angel, B, Singh, H, Purohit, A, and Joshi, V. (2008), "Entomological studies for surveillance and prevention of dengue in arid and semi-arid districts of Rajasthan, India." Journal of Vector Borne Disease, 45, 140-149. |