Review Article

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Strengthening Dengue Sentinel Surveillance: The Need of the Hour

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Abstract

Dengue is one of the leading arboviral diseases in the world. During the recent years the epidemiology of dengue has undergone significant changes with more frequent epidemics and spread to non endemic areas. Many reports have shown that the reported cases of dengue are a gross underestimate of the actual number of incident cases. Inadequate infrastructure for surveillance is one of the main causes of this underestimation. This also leads to inadequate and delayed response during the time of epidemics. This review looks at the status of sentinel surveillance in India. It is found that the average number of sentinel sites is only 1 per 5 lakh persons in least populous states and 1 per 25 lakhs in most populous states. This review advocates for strengthening the sentinel surveillance system by increasing the number of sites of surveillance, building capacity of personnel and close monitoring and evaluation of the surveillance sites.

Keywords: Dengue; NVBDCP; Sentinel Surveillance.

Introduction

Dengue is an arboviral disease which has the potential for becoming a pandemic with nearly half of the world population at risk of the disease. Over the last fifty years, the global incidence has shown a thirty fold increase [1]. An estimate done recently shows that nearly 390 million cases of dengue occur every year with 96 million of those cases manifesting clinically [2]. In India, dengue cases have been reported for over 200 years [3]. Based on previous reviews it is found that the epidemiology of dengue has undergone significant change and the disease has spread to rural areas and North Eastern parts of

India [4]. Epidemics have become more frequent and cases have been imported to non-endemic areas as well. Lakshadweep remains the only Union Territory (UT) which has not reported any case from 2007. The reported number of cases in the year 2014 is 40,579 and the incidence was nearly 3/lakh population. The case fatality rate has come down to a range of 0.2-0.4. A review has shown that though the incidence based on reported cases is 3/100,000 population, the estimated incidence would be 53/100,000 to 58.83/100,000 and the case load in hospitals would be as high as 7 lakh cases [4]. This shows that there is gross under reporting of dengue cases.

Key Messages

1. Sentinel surveillance is the key to improve reporting of cases and preparedness for response in case of epidemics.

2. Only 1 sentinel surveillance site per 5 lakh population in least populous states of India.

3. Only 1 sentinel surveillance site per 25 lakh population in most populous states of India.

4. Urgent need to increase sentinel surveillance sites.

Sentinel Surveillance

The present problem with dengue epidemics in the country is delayed identification of the epidemic, which leads to a response from the health system that is inadequate and often late. A sentinel surveillance system is the answer to this problem. Surveillance is not mere collection of data, but collection of actionable data i.e. data which on analysis would provide details that would help in prevention and control. The objectives of sentinel surveillance systems are usually (1) early detection

of an epidemic (2) monitor trends of disease (3) provide actionable data that initiates preventive and control measures and (4) evaluation of national programs [5-7].

After the 1996 dengue epidemic, the sentinel surveillance of dengue was started in India in 110 hospitals located in various states and UTs [8]. The present number of sentinel surveillance sites is 499, but even today we are facing problems of under reporting and inability to identify epidemics in a timely manner. Some of the reasons for under reporting are the differential availability of infrastructure for sentinel surveillance, ambiguity about the case definition of dengue, incomplete reporting and inadequate monitoring.

Status of Sentinel Surveillance in India

The long term action plan for Dengue and Chikungunya released by the National Vector Borne Disease Control Programme (NVBDCP) has clarified the definition of dengue to be used for surveillance[8]. By triangulating data from NVBDCP and Census data (2011), the reported incidence of dengue per lakh population and case fatality rate (CFR) were calculated [9,10]. Using the data on number of sentinel sites and the number of sentinel sites/ lakh population, the reported incidence of dengue for India as on September 2015 is 2.29 per lakh population and the CFR is 0.22. The number of sentinel sites throughout the country is 499 (September 2015), but the distribution is not equitable [11].

Figure 1 and 2 describe the number of sentinel sites per lakh population in a state/UT. Figure 1 shows those states/UTs with a population of less than or equal to one crore and Figure 2 shows states/UTs with a population of more than 1 crore. For the purpose of this article let us call those states with a population of <=1 crore as least populous states/ UTs and those with a population of more than 1 crore as most populous states/UTs.
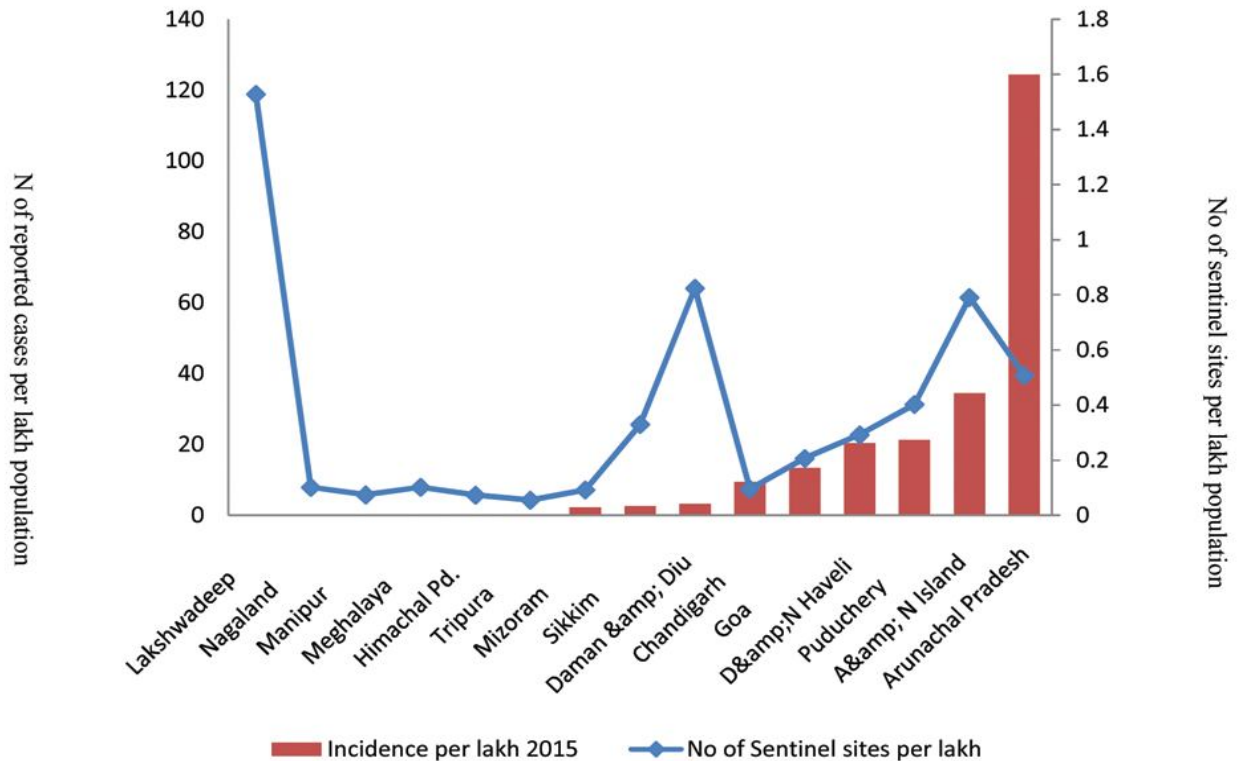

Fig. 1: Sentinel sites per lakh population among group 1 states/UTs (with a population <= 1 crore)

Figure 1 shows that there are 15 states/UTs which have a population of less than 1 crore and 7 of them (50%) have at least 1 sentinel site for a population of 5 lakhs. Among the 21 states with a population of more than 1 crore we find that with the exception of Delhi, all the other states have less than one sentinel surveillance site for every 10 lakh persons. (Figure 2).

It is found that the median reported incidence among least populous states is 2.6/ lakh population (IQR: 0.1-20.4 /lakh population) and that of the most populous states/UTs is 1.5/lakh population (0.3-.9/lakh population).
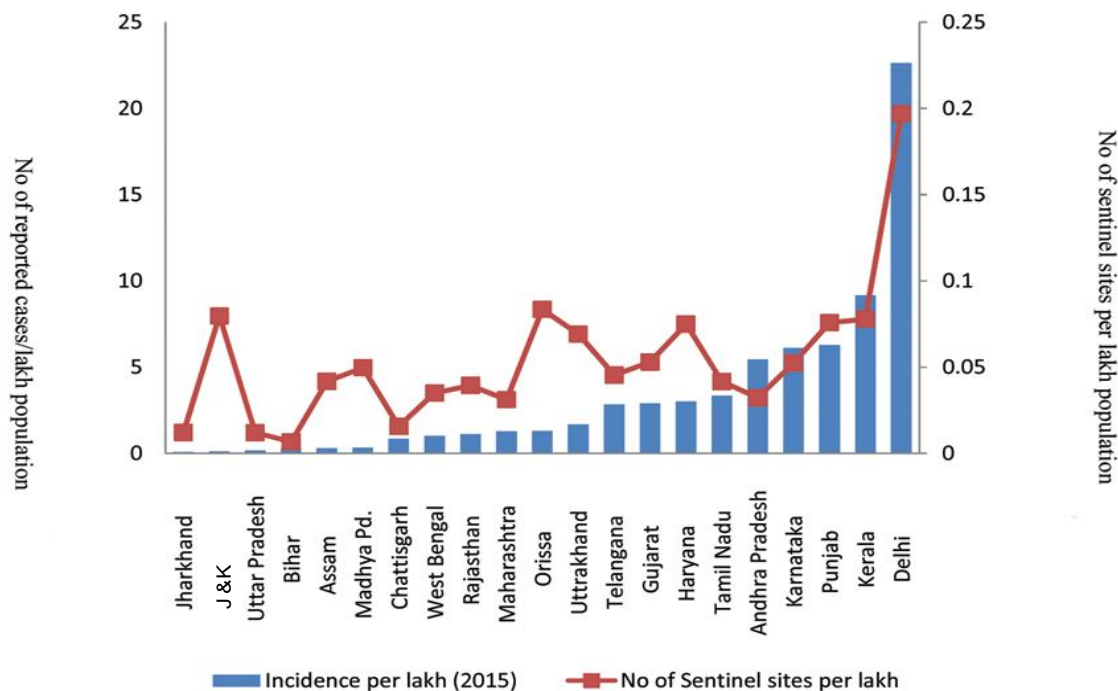
Fig. 2: Sentinel sites per lakh population among group 2 states/UTs (with a population > 1 crore)

Discussion and Conclusion

Dengue is a mosquito borne illness that has been reported in India for the last 200 years. Over the years the epidemiology has undergone significant changes. Bhat et al reported an estimate of nearly 38.5 million overt dengue cases in India [2]. Amarasinghe et al calculated the crude incidence to be nearly 58 per lakh population [4], but the reported number of cases are very less when compared to the estimated cases. In the year 2014 nearly 40,000 cases were reported and in 2015 nearly 22,000 cases were reported as of September 2015.

A three-pronged long term strategy for control and prevention of dengue in India is being implemented by the National Vector Borne diseases Control Program (NVBDCP), under which there is: (i) early case detection and management including epidemic preparedness and rapid response, (ii) integrated vector management and (iii) supporting interventions such as human resource development, behavior change communication, operational research, supervising and monitoring and inter-sectoral convergence. However the sentinel surveillance system can be further strengthened so that adequate response is mounted for dengue epidemics [5].

In India, on an average, there is 1 sentinel surveillance site per 5 lakh population in the least populous states/UTs and only 1 sentinel surveillance site per 25 lakh population in the most populous states/UTs. There is an urgent need to address this lack of infrastructure. Apart from the lack of infrastructure, literature also reports the existence of inadequate reporting, lack of trained manpower and shortage of testing kits in the sites [4,8]. Addressing these issues in the sentinel surveillance system would go a long way in improving our preparedness to tackle dengue epidemics and would also reduce mortality and morbidity due to this disease.

References

1. Health Topic: Dengue [Internet]. WHO; [cited 2015 Sep 28]. Available from: http://www.who.int/topics/dengue/en/.

2. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue.Nature. 2013 Apr 7; 496(7446): 504–7.

3. Jatanasen S, Thongcharoen P. Dengue haemorrhagic fever in South East-- Asian countries. Monograph on dengue/dengue haemorrhagic fever. In WHO; 1993; 23-30.

4. Amarasinghe A, Bhola A., Halstead SB. Uncovering dengue in India: morbidity estimates. [Internet].Global journal of Medicine and Public Health.2014; 3(3).[Cited 2015 Sep 28] Available from: http://www.gjmedph.org/uploads/R1-Vo3No3.pdf.

5.   Runge-Ranzinger S, McCall PJ, Kroeger A, Horstick O. Dengue disease surveillance: An updated systematic literature review. Trop Med Int Health. 2014 Sep; 19(9): 1116–60.

6.   Badurdeen S, Valladares DB, Farrar J, Gozzer E, Kroeger A, Kuswara N, et al. Sharing experiences: towards an evidence based model of dengue surveillance and outbreak response in Latin America and Asia. BMC Public Health. June 24, 2013; 13: 607.

7.   Runge-Ranzinger S, Horstick O, Marx M, Kroeger A. What does dengue disease surveillance contribute to predicting and detecting outbreaks and describing trends? Trop Med Int Health. aug, 2008; 13(8): 1022–41.

8.   Long Term Action Plan for Prevention and Control of Dengue and Chikungunya [Internet]. Directorate of National Vector Borne Diseases Control Program, GOI.; [cited 2015 Sep 28]. Available from: http://nvbdcp.gov.in/Doc/Final_long_term_Action_Plan%20.pdf.

9.   Dengue cases and deaths in India [Internet]. NVBDCP; 2015 [cited 2015 Sep 29]. Available from: http://nvbdcp.gov.in/den-cd.html

10.   Provisional Population totals [Internet]. Office of the Registrar General and Census Commissioner, GOI; 2015 [cited 2015 Sep 29]. Available from: http://censusindia.gov.in

11.   List of Sentinel Surveillance sites for Dengue and Chikungunya, 2015 [Internet]. NVBDCP; [cited 2015 Sep 29]. Available from: http://nvbdcp.gov.in/Doc/SSH-list-den-chik-2015.pdf