Profile of dengue infection in Jamnagar city and district, west India

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ABSTRACT

Background
India is one of the countries in the World Health Organization South-East Asia Region that regularly reports outbreaks of dengue fever (DF)/dengue hemorrhagic fever (DHF). As effective control and preventive programmes depend upon improved surveillance data, this study was carried out to report the seroprevalence of dengue virus infection in an area around Jamnagar city, Western India.

Methods
The laboratory records of clinically suspected dengue patients from July 2008 to June 2011 were analysed retrospectively for the results of immunoglobulin M (IgM) anti-dengue antibodies, tested by dengue monoclonal antibody (IgM) capture enzyme-linked immunosorbent assay (MAC ELISA). Variations in disease incidence by sex, age group and season were assessed.

Results
A total of 903 serum samples were tested, of which 253 were positive. The majority were males (72%) and in the age group of 16–30 years. The incidence of dengue peaked in October and slowly tapered by December.

Conclusion
Dengue cases were higher during September to December, in the post-monsoon season. This observation is useful for planning special preventive strategies. The study draws attention to the susceptibility of the male, young adult age group.

Key words: Dengue, India, seasonal variation, vector

INTRODUCTION
In recent years, dengue has become a major global public health concern. Approximately 2.5 billion people, living mainly in urban areas of tropical and subtropical regions, are estimated to be at risk of acquiring dengue infection.1 In India, unplanned urbanization and migration of the population from rural to urban areas with lack of proper sanitation facilities are important factors that have resulted in an increased burden of dengue in recent times.2 In the last decade, outbreaks and deaths have been reported from northern states of Haryana, Punjab and Uttar Pradesh; southern states of Andhra Pradesh, Tamil Nadu and Karnataka; western states of Gujarat and Rajasthan; and the eastern state of West Bengal. The case-fatality rate has been less than 1% in recent years,3 but a major outbreak associated with haemorrhagic manifestations occurred in Calcutta in 2004.4 Since there is no specific treatment or vaccine for dengue, prevention and control of the disease mainly depend upon epidemiological surveillance that provides reliable estimates of the disease, thereby helping implementation of effective vector-control measures. This retrospective study was carried out to assess the seasonal variation in dengue cases in a tertiary care hospital, and health centres in the surrounding district, to inform control measures and preventive programmes.

MATERIALS AND METHODS
This was a retrospective analysis of routine laboratory diagnostic work; thus, ethical approval was not necessary.
Age and sex data on all patients who presented with signs and symptoms of fever, headache and joint pain that were suggestive of dengue virus infection, dengue haemorrhagic fever (DHF) or dengue shock syndrome (DSS), at the Government Hospital, Jamnagar, Gujarat, India, or at the primary and community health centres in Jamnagar district between July 2008 and June 2011 were recorded. World Health Organization (WHO) criteria were followed for inclusion or exclusion of a case of dengue infection. Serum samples were tested for the presence of anti-dengue immunoglobulin M (IgM), using dengue monoclonal antibody (IgM) capture enzyme-linked immunosorbent assay (MAC ELISA) kit of the National Institute of Virology, Pune, India.

Data on the beginning and end of the annual monsoon season in Jamnagar district were taken from the sample-collection register for dengue, available from the Department of Microbiology, GG Hospital, Jamnagar, Gujarat, India.

**RESULTS**

A total of 903 acute-phase blood samples were collected from clinically suspected cases of dengue virus infection. Out of these, 253 samples (28%) were positive for dengue virus infection. Fig. 1 shows that there were few dengue cases from January to July each year; the incidence started to increase in August to September, peaked in October and slowly tapered by December. This shows a seasonal trend of dengue, which correlates with the monsoon season in west India, and is from the end of July to the start of November each year. The most affected age group was 16–30 years (125/253, 49%), followed by 0–15 years (81/253, 32%), 31–45 years (36/253, 14%), 46–60 years (10/253, 4%), and ≥60 years (1/253, 0.4%). Out of the total 253 laboratory-confirmed dengue cases, 182 were in males (72%) and 71 were in females (28%).

**DISCUSSION**

In the past decade, dengue has been occurring regularly in India, with periodic surges in the number of cases. Analysis of the year-wise distribution of dengue cases revealed an unsteady increase in the number of dengue patients over the past few years. This may be partially attributed to the rapid unplanned urbanization, with unchecked construction activities and poor sanitation facilities contributing fertile breeding grounds for mosquitoes; it is also true that an increased alertness to the disease among the medical fraternity, following the initial epidemic and the availability of diagnostic tools in the hospital, has contributed to the increased detection of cases. To identify the seasonal variation of the disease, analysis of the data on a monthly basis was carried out. A gradual increase in cases was noted from August, with a peak in September and October, over each of the 4 years studied. The correlation between occurrence of dengue and the monsoon season is clearly evident in this study, and is further supported by similar findings from Kerala, Ludhiana, and Karachi. This may be because this season is very favourable for breeding of the vector, i.e. *Aedes aegypti* and *Aedes albopictus*. The presence of some dengue IgM-positive cases even during dry months, as seen in this study, probably reflects the year-round activity of the mosquito vector. The year-round occurrence of dengue infection, with a peak in the rainy season, is consistent with reported patterns of dengue transmission. This seasonal outbreak of disease transmission is very important at a local level, for effective control measures, and emphasizes that preventive measures against dengue infection should come into full swing during water stagnation periods after the initial bouts of rainfall and at the end of the monsoon period.

In this study, 28% of symptomatic patients were serologically positive for dengue infection. The proportion of dengue cases...
for the age group 16–30 years was highest, similar to the results noted in a study by Kumar et al.;7 the order of prevalence was followed by the age group 0–15 years. However, in several international studies, dengue has been reported to be mainly a paediatric public health problem.12,13 Dengue infection occurred in most active age groups, i.e. children and adults, who were out of the house most of the time, either playing or at work. This observation is noteworthy, because true endemicity of dengue is reached when adult infection declines and only the new entrants into the population, i.e. children, are affected more by the disease.8 In the present study, males were found to be more affected than females.

From the high incidence of dengue IgM seropositivity, it appears that dengue is fast emerging as a major health concern in this part of India. In the absence of specific treatment for dengue, management is mainly supportive; further, there are no vaccines currently available in market, thus early diagnosis and vector control is the only method by which dengue can be controlled.

**CONCLUSION**

The number of dengue cases was higher during September to December in the post-monsoon season; this information is useful for planning special preventive strategies. The study draws attention to the male, young adult age group. The results of this study indicate that dengue infection is unlikely to wane, but is going to stay and will play havoc if immediate control measures are not taken. There is an urgent need for a long-term vector-control strategy, to prevent outbreaks. At the same time, this will solve the problem of other mosquito-borne diseases like chikungunya, Japanese encephalitis, malaria and filaria.

**REFERENCES**


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