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Research Article

TRENDS IN SEROPOSITIVITY AMONG SUSPECTED DENGUE FEVER CASES IN WESTERN VIDHARBHA

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ABSTRACT

Dengue has become endemic in India with outbreaks occurring every year. In recent years, the disease has changed its course manifesting in the severe form as DHF, with increasing frequencies. Hence, the seroprevalence data of the last 3 years in samples obtained from suspected dengue patients from a tertiary care hospital were analyzed. Out of 1202 serum samples received in the laboratory from suspected dengue cases during 2010 to 2012, 66 (16.26%) were serologically confirmed. The case fatality rate among children is high. In our study out of 66 cases 31 were children below the age 12. Dengue is observed to be seasonal disease. Dengue specific antibody cases were mainly reported during post-monsoon period with maximum cases 13 (19.69%).

One of the major factor for emergence of dengue as a major public health problem is inadequate surveillance. As a result an epidemic has often reached or passed the peak of transmission before it is detected. The laboratory test such as IgM antibodies is an early warning of an impending dengue epidemic. Also surveillance results can alert the public to take action and physicians to diagnose and properly treat dengue/DHF cases.

Keywords: Dengue fever, Dengue hemorrhagic fever, IgM antibodies, Seasonal Variation, Epidemiology, Surveillance.

INTRODUCTION

Dengue virus (DV) infection is one of the most important mosquito borne human infections of 21st century. The global incidences of the dengue infection have increased enormously and an estimated 50–100 million cases of dengue infections are now reported annually from more than 100 tropical and subtropical countries of the world[1].Dengue is caused by four antigenically distinct viruses designated as DV type 1–4 (DEN 1–4), belonging to genus *Flavivirus* of family *Flaviviridae*[2]. All the four serotypes of dengue viruses are primarily transmitted by bite of *Aedes aegypti*. Infection with any one of these serotypes generally leads to a mild, self-limiting febrile illness (Classical dengue fever, DF).

The epidemiology of DF in the Indian subcontinent is very complex and has changed in terms of prevalent strains, affected geographical locations and severity of the disease [3]. DF is endemic in many parts of India and outbreaks have been reported at regular intervals from almost all parts of India [2].

In the view of high mortality rate and to reduce the disease burden, it is imperative to have a rapid and sensitive laboratory assay for early detection of DF. Diagnosis of DF is routinely done by demonstration of anti DV IgM antibodies in patient's serum using ELISA kits (developed by National Institute of Virology, Pune) and commercial kits[4].

Expansion in the risk area of DF due to rapid urbanisation, increased transportation facilities and changing habitats of the vector is a major concern. Dengue vaccines have been under development since the 1940's, and a tetravalent vaccine which simultaneously provides long-term protection against all DV serotypes is round the corner [5 6]. Since there is no vaccine available against DF at present and the vector control measures are inadequate DF is on a rise [7]. This retrospective study reviews the changing epidemiology of DF in Western Vidharbha (districts of Akola, Washim, Buldhana and Amravati) at the sentinel centre for National Vector Borne Disease Control Programme (NVDCP), Department of Microbiology, Government Medical College, Akola, Maharashtra, India for the years 2010-12.

MATERIALS AND METHODS

A total number of 1202 acute phase blood samples were collected from clinically suspected cases of DF, from various peripheral health centres of Akola, Washim, Buldhana and

Amravati districts, as well as the outpatient departments, emergency services and indoor patients admitted in Government Medical College and Multispeciality Hospital, Akola, Maharashtra, during a three year period (2010, 2011 & 2012).

WHO Criteria were followed for inclusion or exclusion of a case of DF and their categorization as DF/DHF[8]. All the samples were tested for the presence of anti-dengue IgM using MAC ELISA, developed by NIV (National Institute of Virology), Pune [9] and recommended by National Vector Borne Disease Control Programme.

RESULTS

During the study period, a total of 1202 serum samples were tested for dengue IgM antibodies. Year wise results of the tested samples were 302 in 2010, 474 in 2011 and 426 in the year 2012 (Table 1).

Of these, 66 (16.26%) were positive for dengue specific IgM antibodies. A maximum number of sero-positive cases i.e. 36 (7.59%) were detected in the year 2011, followed by 17 (5.62%) cases in the year 2010 and 13 (3.05%) in the year 2012 (Table 2).

Region wise distribution of IgM positive cases show the highest number i.e. 26 (39.30%) in Akola district followed by 19 (28.78%) in Washim, 12 (18.18%) in Amravati and Buldhana with 9 (13.63%) (Table 3).

DF was observed to be a seasonal disease. A maximum of 15 (22.72%) Dengue specific antibody cases were mainly reported during September and 13 (19.69%) cases each were reported during October and November (Table 4 and Fig. 1).

Out of 66 serologically positive cases, 31 (46.96%) cases belonged to paediatric age group (<12 years) and 35 (53.03%) cases to adult (>12 years) age group. (Table 1 and 5).

A total of 36 males showed presence of anti-dengue IgM antibodies as compared to 30 females. (Table 6).

DISCUSSION

Dengue infection is amongst the most important re-emerging viral diseases transmitted by mosquitoes to humans, in terms of both illness and death [10]. The Worldwide large-scale reappearance of dengue for the past few decades has turned this disease into a serious public health problem, especially in the tropical and subtropical countries [11-13]. DF has been known to be endemic in India for over two centuries as a benign and self-limited disease. In recent years, the disease has changed its course by manifesting in the severe form (DHF) with increasing frequencies [14].

A global pandemic of DF began in Southeast Asia after World War II and has intensified during the last 15 years. In 1980s, DHF began a second expansion into Asia when Srilanka, India and the Maldives had their first major DHF epidemics [15]. Outbreaks of DF are reported almost every year in India [16]. Outbreaks of DF caused by various dengue virus types in 1967, 1970, 1982, 1988 and 1996 had been reported from Delhi [17]. Similarly, Nagpur also had epidemic of Dengue and Chikungunya fever in 1967 [18] and 2005-06 [26].

DF is highly endemic in Thailand. Further, the incidence of DF is very less in adults because adults of this country become immune to DV after acquiring multiple infections in their childhood. The trend for the increased incidence of DF among adults was observed by Guha-Sapir D, *et al* [20]. However DF was found equally distributed in adults and children in this study, this finding which correlate well with the study Chakravati A and Kumaria R from Delhi [21].

Gender based predominance was not observed in this study [22]. Unlike the study of Ukey PM, Bondade *et. al.*carried out in central India where male predominanace was noted[26] Male predominanace was also seen by Chakravarti A and Kumaria R carried out in Delhi. The prevalence and distributions of the vector A. *aegypti* larval indices are highest during monsoon and post monsoon period [23-25].DF occurred during post monsoon season in the present study. This seasonal occurrence of DF positive cases is in coordination with the study done by Ukey PM, Bondade SA *et. al.*from Nagpur[26], Chakravarti A and Kumaria R from Delhi [21] , Amin MMM et al. from Bangladesh [27]. This seasonal variation of DF correlates with vector density. This finding of seasonal occurance of DF is very important for specific preventive strategies and effective control measures at local level.

The recent trend of increased epidemic activity and geographic expansion of DF needs to be reversed. These efforts are particularly important as new DV strains and serotypes will continue to be introduced in areas with high vector population density. Disease prevention and control through improved, proactive, laboratory based surveillance systems will help in reversing the recent trend of increased epidemic activity and geographic expansion of DF.

CONCLUSION

In conclusion, our study shows that dengue cases were more during September to November which is useful to plan special preventive strategies. Detailed and continuous epidemiological surveillance is warranted to monitor the incursion and spread of dengue viruses, which will help to undertake effective control and management strategies at the earliest

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Table 1: Demographic and Serologic profile of Dengue cases

Year	**2010**	**2011**	**2012**
Total No. of Cases	302	474	426
IgM positive cases%	17 (5.62%)	36 (7.59%)	13 (3.05%)
Sex Distribution of IgM positive cases			
Male	8	21	7
Female	9	15	6
Age			
< 12 years	5	19	7
>12 years	12	17	6

Table 2: Year wise distribution of IgM Seropositive cases

Year	**2010**	**2011**	**2012**
No. of IgM positive cases%	17 (5.62%)	36 (7.59%)	13 (3.05%)

Table 3: District-wise Distribution of IgM positive cases

District/ Year	2010	2011	2012	Total Cases
Akola	9	12	5	**26 (39.30%)**
Washim	4	15	0	**19 (28.78%)**
Buldhana	3	5	1	**9 (13.63%)**
Amravati	1	4	7	**12 (18.18%)**

Table 4: Month-wise distribution of IgM positive cases

Month/ Year	2010	2011	2012
January	1	1	1
February	0	0	0
March	0	0	0
April	0	1	0
May	2	1	0
June	0	0	0
July	1	0	1
August	3	6	2
September	3	7	5
October	3	10	0
November	2	7	4
December	2	3	0

Table 5: Age wise distribution of IgM Seropositive cases

Age/Year	2010	2011	2012
<12 years	5	19	7
>12 years	12	17	6

Table 6: Sex wise distribution of IgM Seropositive cases

Year/ Sex	Male	Female	Total
2010	8	9	17
2011	21	15	36
2012	7	6	13

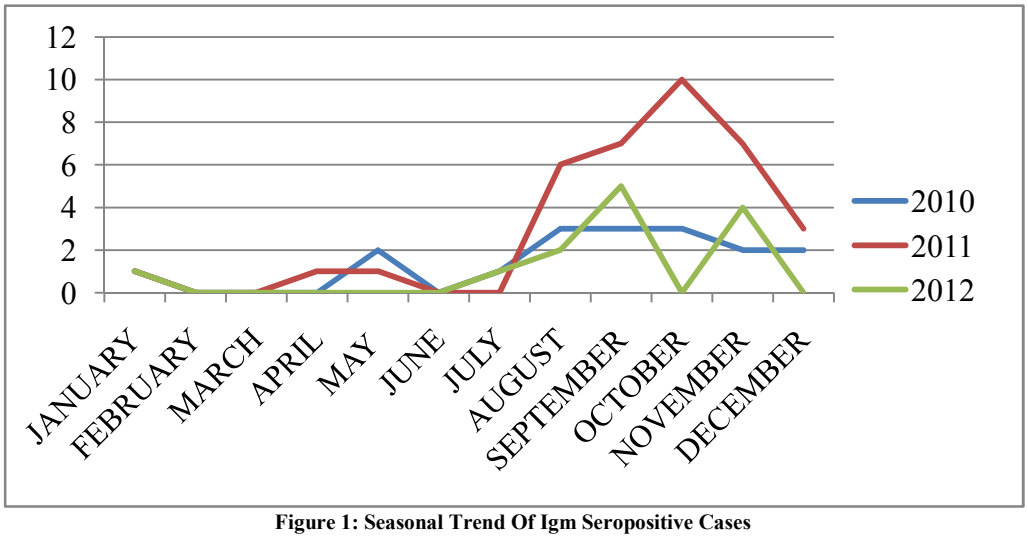

Figure 1: Seasonal Trend Of Igm Seropositive Cases

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