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A Retrospective Study of Incidence of Dengue Cases in a Tertiary Care Hospital of West Bengal

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Abstract:*Dengue, a vector-borne viral disease caused by Dengue Virus of genus Flavivirus. It is transmitted from person to person by Aedes mosquitoes. Dengue which is endemic in India, has a seasonal pattern and the cases generally increase after the monsoons. It is a major public health concern to India and there is no specific curative therapy. So, early case detection and vector control are the important preventive aspect. There are very limited researches on seasonal variation of dengue which is important for prevention. So the present study was conducted to find out IgM positivity rate, age and sex distribution and to ascertain seasonal variability. A record based descriptive epidemiological study was conducted from January 2017 to March 2017 in the IDSP unit of Burdwan Medical College and Hospital. Records of five years (January 2012 to December 2016) were reviewed. Altogether 6846 patients were tested among them 790 number of patients were positive for IgM.So, IgM positivity rate was 11.54 %. Males were most commonly affected (57.1%) and 11 to 20 years were most common age group (29.5%). Number of cases increased after the middle of June, reached the peak at September and October and came down at December and January. Number of cases fluctuated every year with a peak rising of the curve unexpectedly at the year 2016. The study showed that there was a seasonal pattern of Dengue but further researches are required regarding vector bionomics.*

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I. Introduction

Dengue, a vector-borne viral disease caused by Dengue Virus of genus Flavivirus. It has four antigenically distinct serotypes (DENV1, DENV2, DENV3, DENV4). It is the one of the most important arboviral diseases in humans, in terms of geographical distribution. The global incidence of dengue has grown tremendously in recent decades; and about half of the world's population is now at risk of Dengue.[1]The infection is transmitted from person to person by Aedes mosquitoes. Dengue virus infections can cause a wide clinical spectrum of disease, from a mild febrile illness known as 'dengue fever' through to dengue hemorrhagic fever (DHF), which is characterized by capillary leakage leading to hypovolemic shock organ impairment and bleeding complications. The clinical features caused by the four serotypes are almost similar. The treatment is mainly symptomatic.[2]There is no specific treatment for dengue, but early detection and access to proper medical care can lower fatality rates below 1%.[1] Dengue prevention and control depends on effective vector control measures.[1-3]

Dengue is endemic throughout the tropical and subtropical zones. Dengue transmission occurs throughout the year in endemic tropical areas; however, in most countries there is a distinct seasonal pattern, with increased transmission usually associated with the rainy season.[2]

Dengue is endemic in India, Bangladesh, Thailand, Maldives and many other countries of South East Asia. In India, Dengue is a major public health concern. The disease has a seasonal pattern and the cases generally increase after the monsoons. However, in the southern states and Gujarat the transmission is perennial.[3]

As there was a seasonal distribution of Dengue, it was necessary to find out this distribution of Dengue to prevent epidemic. There were very few studies on this matter. After thorough literature search, no study in Burdwan district regarding seasonal trend of Dengue was found out. So, the present study aimed to ascertain the age and sex distribution of Dengue and to find out the seasonal trend of Dengue.

II. Material and Methods

This study is a record based descriptive epidemiological study. Data from IDSP unit and Medical Records Department of Burdwan Medical College & Hospital were reviewed. Study period was January 2017 to March 2017. Records of five years (January 2012 to December 2016) were reviewed. Records of IgM positive

Dengue cases were collected from IDSP unit of Burdwan Medical College and Hospital after proper permission of the designated officer of IDSP. Data were entered in the Microsoft Excel software and was analyzed by and Microsoft Excel 2010. Permission from Institutional Ethics Committee was sought prior to the conduction of the study.

III. Result

Altogether 6846 patients were tested for IgM dengue for the period of January 2012 to December 2016 and among them 790 patients were diagnosed as dengue due to their IgM positivity of sample. So, IgM positivity rate was 11.54%.

Table 1: Distribution of Dengue cases according to age groups.

Age group in years	No. of Dengue cases(%)
≤10	98(12.4)
11–20	233(29.5)
21- 30	187(23.7)
31-40	92(11.6)
41-50	66(8.4)
51-60	61(7.7)
≥61	53(6.7)
Total	**790 (100)**

Table 1 reveals that most of Dengue cases (29.5 %) attending Burdwan Medical College & Hospital belonged to11 to 20 years of age group.
Out of 790 cases, 451(57.1%) were male and 339 (42.9%) were female.

Figure 1: Seasonal variation of Dengue cases during reference period (January 2012 to December 2016)

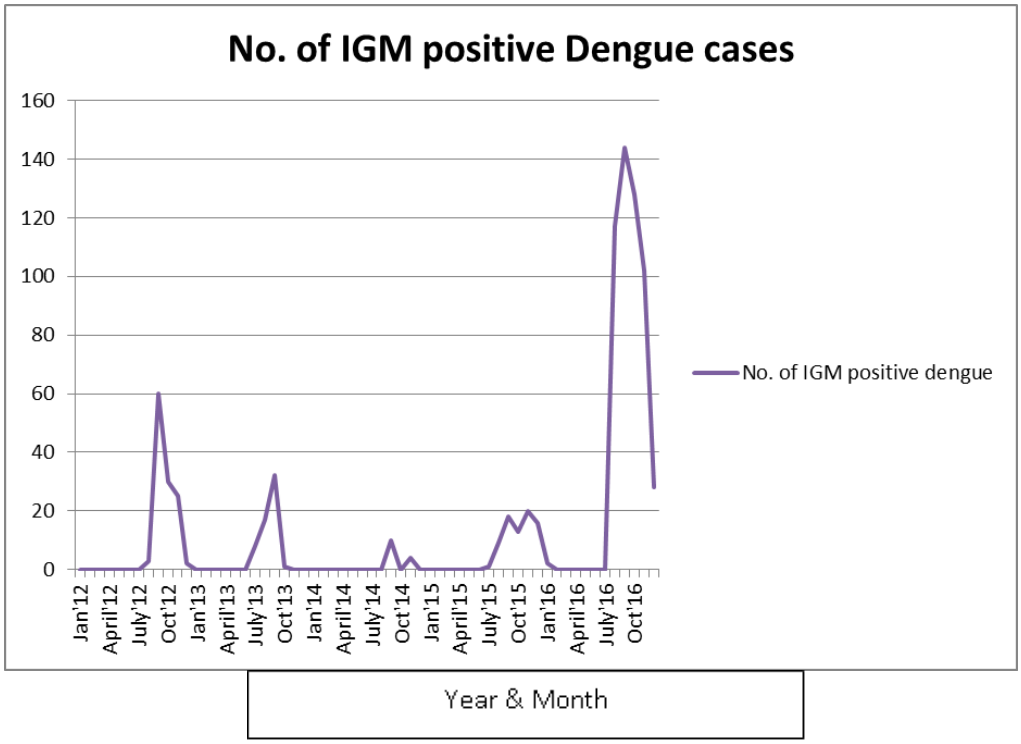

Figure 1 revealed that dengue cases increased after the mid June or end of the month of June and the number of cases reached the peak at September and October and came down at December and January. But only at the year of 2014 it came down early i.e. at the end of month of October. a. But in every year, most of the cases occurred at monsoon and post-monsoon period.

Figure 2: Trend of Dengue cases during reference period(January 2012 to December 2016)

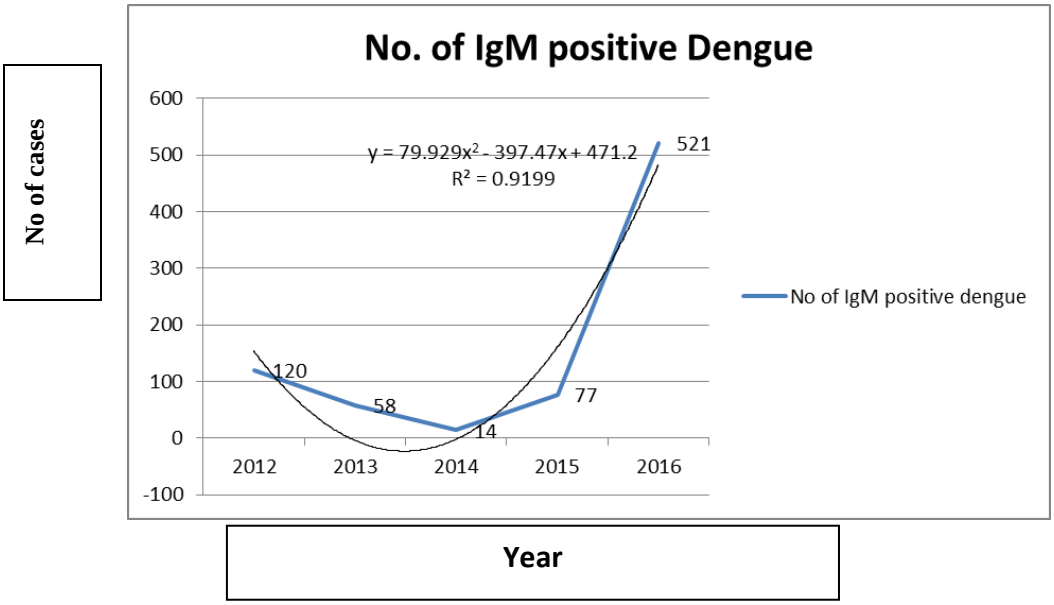

Figure 2 shows that, the number of Dengue cases at 2012 was 120. In next two year i.e. 2013 and 2014 it came down to 58 and 14 respectively. But in successive years (2015 and 2016) there was a increasing trend of Dengue and Number of cases were 77 and 521 respectively. Here, R-squared value is 0.919 and that means there is a good fit of this polynomial trend line for the data.

Figure 3: Seasonal variation of Dengue cases during reference period(January 2012 toDecember 2016) with respect to gender

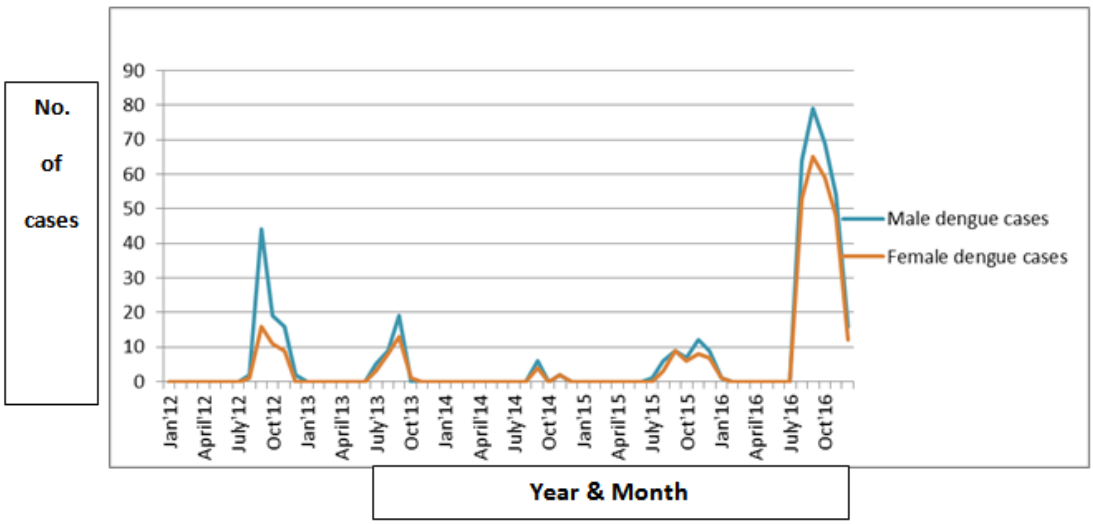

Figure 3 reveals that dengue cases increased after the mid June or end of the month of June and the number of cases reached the peak at September and October and came down at December and January. Seasonal variation of cases for both male and female were similar.

IV. Discussion

6846 patients were tested for IgM dengue for the period of January 2012 to December 2016 and among them 790 number of patients were diagnosed as dengue due to their IgM positivity of sample; IgM positivity rate being 11.54 %. A record based cross-sectional study conducted at a tertiary care centre of Odisha showed that majority(47.86%) of cases were detected at the month of September and number of cases increased after the rainy season. Number of cases rose after the month of August and this increasing of seasonal trend persisted up to December. This study also showed that most common affected age group was 11-20 year and IgM positivity among female and male were 21.2 % and 20.9% respectively.[4]

Another study was conducted(January 2015 to December 2015) in a tertiary care centre of south India showed that IgM positivity rate was 5.8% and most common affected age group was 11 to 20 years age group(25.8%). Most number of sample was received for testing at the month of November (39.5%) and most positive samples were found at the month of October. Percentage of positivity was highest at the month of March (24.1%). This study also revealed that males were more affected than females.[5]

A retrospective study was conducted in a tertiary care center also showed that males(60.7%) were affected more than females (39.3%). The result of the study revealed that high proportion of dengue cases were in 20 to 39 years (42.02%) in males while females showing high proportion of cases in the 40 to 59 years (41.04%).[6]

Another record-based study (2008-2010) conducted at Jakarta showed that number of dengue cases raised from January and reached peak in March and started declining from September. In this study highest number of dengue patients was 15-44 years age group.[7]

But studies conducted in New Delhi and Pune has shown sample positivity was quite high(above 40%).[8]Present study also showed that most of Dengue cases (29.5 %) belonged to 11 to 20 years of age group. Similar results were found in two other record-based study in different parts of India.[4,5]But a longitudinal study conducted at Pune showed that most commonly affected age group was 21 to 30 years of age.[8]

Present study also denoted that 57.1% dengue cases were male and 42.9% were female. A retrospective study was conducted in a tertiary care center also showed that males(60.7%) were affected more than females (39.3%).[6]

This study also showed that there was a seasonal fluctuation of dengue cases with most of the cases occurred at monsoon and post-monsoon period. No of cases started to rise from June or July and reached the peak at September or October and comes down to December.(Fig.3, Fig.5) Association of monsoon and post-monsoon season with increasing number of cases were also showed in others study.[4,5]Trendline showed that there was a polynomial trend line (R2=0.919) which fitted the curve most. This was due to fluctuating number of cases in different years.[9] Contrary to previous report no of cases came down in 2013 and 2014 but again increased from 2015. But overall India common pattern was gradual increasing number of cases in each year.[8]

Results showed that there was a sudden fall in number of cases at September and again increased at October. This may be due to fluctuating rainfall.

But this is a record-based study and data of only five years were analyzed in as single tertiary care center. As it is a tertiary care center, number of cases was obviously high. Further research may be required regarding sudden rise of case number in a year. Research regarding changes in vector bionomics is also required. More well designed epidemiological study should be conducted on this important vector-borne disease.

V. Conclusion

Results of the study showed that IgM positivity of dengue cases were 11.54% and males were most commonly affected. There were an increase number of cases in rainy season and post-monsoon season probably due to high breeding of Aedes mosquito. There was also sharp rise in number of cases in 2016 all over West Bengal which requires further research regarding any changes in environment and certain behavior in mosquitoes. Increased urbanization, inappropriate storage of water and changes in vectors 'behavior may be the cause of such increase.

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