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An Insight Investigation of Dengue in a Tertiary Care Teaching Hospital, West Bengal

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Dengue is the most common and widespread arboviral infection in the world today. It is an increasingly prevalent tropical arbovirus infection with significant morbidity and mortality. Dengue fever is a recurrent problem in West Bengal. The purpose of this study is to present a comprehensive report on the diagnosis of Dengue fever cases with age and sex preponderance, data available from January 2013 to December 2016 at Malda Medical College, Malda, West Bengal. This is a cross-sectional investigative study done at Malda Medical College. In suspected Dengue fever cases, serum samples were tested for presence of Dengue NS1 antigen and presence of Dengue specific IgM antibodies by IgM antibody capture enzyme linked immunosorbent assay (MAC ELISA), strictly following the manufacturer's protocol. On the year 2013, 2014, 2015 and 2016 Dengue confirmed cases were 25, 33, 68 and 1102 respectively. The number of Dengue cases in 2016 clearly outnumbered the Dengue cases in 2013, 2014 and 2015. In our study the highest numbers of cases were recorded in the age group 11 to 30 years and males were more affected than females. The majority of the cases were reported during the monsoon and post monsoon seasons. Dengue is increasing its geographical areas mostly everywhere now and this Dengue epidemiology demands efforts and support for controlling the disease effectively.

Keywords: Dengue, 4 years analysis, Malda, West Bengal.

Dengue is the most common and widespread arboviral infection in the world today. It is an increasingly prevalent tropical arbovirus infection with significant morbidity and mortality.[1] In recent times Dengue fever is getting attention in medical and social fields in developing countries especially in South East Asia.[2] Presently, about 40% of the world's population is at risk and there are 50 to 100 million cases every year. An estimated 500000 people with severe dengue require hospitalization each year and about 2.5% of those affected die.[3]According to WHO, nearly 75% of global burden of dengue fever are in south east regions and western pacific region.[4]Dengue infection has been known to be endemic in India for over two centuries.[5] This emerging disease in India extending from urban area to semi urban and rural areas.[4]Dengue fever causes a major health, social and economic trouble on the populations of widespread areas.[6]Symptoms include fever, headache, retro orbital pain, muscle and joint pain and a characteristic skin rash, the disease may develops into the life threatening Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS).[7] Dengue is transmitted mainly

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in India by Aedes aegypti mosquito and also by Aedes albopictus. Dengue fever is a recurrent problem in West Bengal.[8] The purpose of this study is to present a comprehensive report on the diagnosis of Dengue fever cases with age and sex preponderance, data available from January 2013 to December 2016 at Malda Medical College, Malda, West Bengal.

MATERIALS AND METHODS

This is a cross-sectional investigative study included the patients who attend the OPD (out patient department) and admitted in IPD (in patient department) of Malda Medical College, Malda with suspected cases of Dengue fever. Dengue fever patients typically develop sudden onset of high grade fever. Hence, fever cases of all age groups and either sex attending the (all the year round) Malda Medical College, were selected as per WHO criteria (An acute febrile illness with ≤2 of the following manifestations: headache, retro-orbital pain, myalgia, arthralgia, rash and haemorrhagic manifestation) and tested on referral microbiology laboratory, Department of Microbiology, Malda Medical College. Blood samples from suspected acute Dengue fever cases d"4 days duration were tested for Dengue NS1 antigen and blood samples of suspected Dengue fever cases at least 5 days duration were tested for Dengue specific IgM by MAC ELISA test kit prepared by National Institute of Virology, Pune, India.

Table 1. Dengue suspected and Positive cases on the year 2013

Month	Fever cases tested for Dengue NS1 Ag	Dengue NS1 Ag ELISA Positive cases	Fever cases tested for Dengue IgM Ab	Dengue IgM MAC ELISA Positive cases	Total confirmed cases of Dengue
January	3	0	5	0	0
February	1	0	4	0	0
March	0	0	0	0	0
April	0	0	0	0	0
May	0	0	0	0	0
June	8	0	12	1	1
July	16	3	25	9	12
August	15	2	21	3	5
September	22	2	28	5	7
October	7	0	12	0	0
November	0	0	3	0	0
December	0	0	0	0	0
Total	72	7	110	18	25

Table 2. Age and Sex wise distribution of Dengue confirmed cases on the year 2013

Dengue confirmed cases Age (Years)	Male	Female	Total
0-10	1	0	1
11-20	8	3	11
21-30	2	3	5
31-40	2	2	4
41-50	1	0	1
51-60	1	1	2
>60	1	0	1
Total	16	9	25

Serum samples were tested for presence of Dengue NS1 antigen and presence of Dengue specific IgM antibodies by IgM antibody capture enzyme linked immunosorbent assay (MAC ELISA), strictly following the manufacturer's protocol.[8, 9]

RESULTS

Table 1 shows, on the year 2013, 72 fever cases were tested for Dengue NS1 Ag of which 7 cases were positive and 110 fever cases were tested for Dengue IgM Ab of which 18 cases were

Table 3. Dengue suspected and Positive cases on the year 2014

Month	Fever cases tested for Dengue NS1 Ag	Dengue NS1 Ag ELISA Positive cases	Fever cases tested for Dengue IgM Ab	Dengue IgM MAC ELISA Positive cases	Total confirmed cases of Dengue
January	1	0	6	0	0
February	0	0	2	0	0
March	0	0	0	0	0
April	0	0	0	0	0
May	0	0	3	1	1
June	12	0	19	0	0
July	14	1	26	3	4
August	17	1	27	1	2
September	24	2	31	3	5
October	22	3	35	4	7
November	28	4	42	10	14
December	8	0	11	0	0
Total	126	11	202	22	33

Table 4. Age and Sex wise distribution of Dengue confirmed cases on the year 2014

	Dengue confirmed cases		
Age (Years)	Male	Female	Total
0-10	3	2	5
11-20	2	2	4
21-30	4	3	7
31-40	8	1	9
41-50	5	1	6
51-60	1	0	1
>60	0	1	1
Total	23	10	33

positive. Total confirmed cases were 25. Table 2 shows, out of 25 Dengue confirmed cases, 16 were male and 9 were female. Male: female ratio was 1.7: 1.Table 3 shows, on the year 2014, 126 fever cases were tested for Dengue NS1 Ag of which 11 cases were positive and 202 fever cases were tested for Dengue IgM Ab of which 22 cases were positive. Total confirmed cases were 33. Table 4 shows, out of 33 Dengue confirmed cases, 23 were male and 10 were female. Male: female ratio was 2.3: 1. Table 5 shows, on the year 2015, 125 fever

Table 5. Dengue suspected and Positive cases on the year 2015

Month	Fever cases tested for Dengue NS1 Ag	Dengue NS1 Ag ELISA Positive cases	Fever cases tested for Dengue IgM Ab	Dengue IgM MAC ELISA Positive cases	Total confirmed cases of Dengue
January	2	0	5	0	0
February	0	0	2	0	0
March	0	0	0	0	0
April	0	0	0	0	0
May	0	0	0	0	0
June	0	0	3	0	0
July	3	0	11	0	0
August	16	0	27	3	3
September	11	0	62	10	10
October	0	0	242	18	18
November	93	9	98	10	19
December	0	0	137	18	18
Total	125	9	587	59	68

cases were tested for NS1 Ag of which 9 cases were positive and 587 fever cases were tested for IgM Ab of which 59 cases were positive. Total confirmed cases were 68.Table 6 shows, out of 68 Dengue confirmed cases, 44 were male and 24 were female. Male: female ratio was 1.8: 1. Table 7 shows, on the year 2016, 1859 fever cases were tested for NS1 Ag of which 433 cases were positive and 3216 fever cases were tested for IgM Ab of which 669 cases were positive. Total confirmed cases were 1102. Table 8 shows, out of 1102 Dengue confirmed cases, 652 were male and 450 were female. Male: female ratio was 1.4: 1.

Table 6. Age and Sex wise distribution of Dengue confirmed cases on the year 2015

Age (Years)	Dengue confirmed cases		
	Male	Female	Total
0-10	9	5	14
11-20	10	7	17
21-30	11	7	18
31-40	7	1	8
41-50	4	1	5
51-60	2	1	3
>60	1	2	3
Total	44	24	68

The number of Dengue cases in 2016 clearly outnumbered the Dengue cases in 2013, 2014 and 2015. The highest numbers of cases were in the age group11 to 30 years with a male preponderance. The majority of cases during the months of august to December indicating increased vector transmission in the monsoon post monsoon periods.

Table 7. Dengue suspected and Positive cases on the year 2016

Month	Fever cases tested for Dengue NS1 Ag	Dengue NS1 Ag ELISA Positive cases	Fever cases tested for Dengue IgM Ab	Dengue IgM MAC ELISA Positive cases	Total confirmed cases of Dengue
January	0	0	21	3	3
February	0	0	8	0	0
March	0	0	0	0	0
April	0	0	18	2	2
May	0	0	8	0	0
June	0	0	44	1	1
July	0	0	55	6	6
August	319	44	392	76	120
September	284	61	509	102	163
October	273	79	712	203	282
November	445	120	1284	239	359
December	538	129	165	37	166
Total	1859	433	3216	669	1102

Table 8. Age and Sex wise distribution of Dengue confirmed cases on the year 2016

Age (Years)	Dengue confirmed cases		
	Male	Female	Total
0-10	86	76	162
11-20	200	113	313
21-30	171	94	265
31-40	85	86	171
41-50	53	47	100
51-60	41	28	69
>60	16	06	22
Total	652	450	1102

Table 9 shows, analysis the risk factors of Dengue infection in total number of positive cases.

DISCUSSION

Dengue is emerging as a major public health problem in India. It is one of the major public threats in West Bengal. The Dengue is gradually spreading to the rural areas of West Bengal.[8] In our study, on the year 2013, 72 fever cases were tested for NS1 Ag of which 7 cases

were positive and 110 fever cases were tested for IgM Ab of which 18 cases were positive. On the year 2014, 126 fever cases were tested for NS1 Ag of which 11 cases were positive and 202 fever cases were tested for IgM Ab of which 22 cases were positive. On the year 2015, 125 fever cases were tested for NS1 Ag of which 9 cases were positive and 587 fever cases were tested for IgM

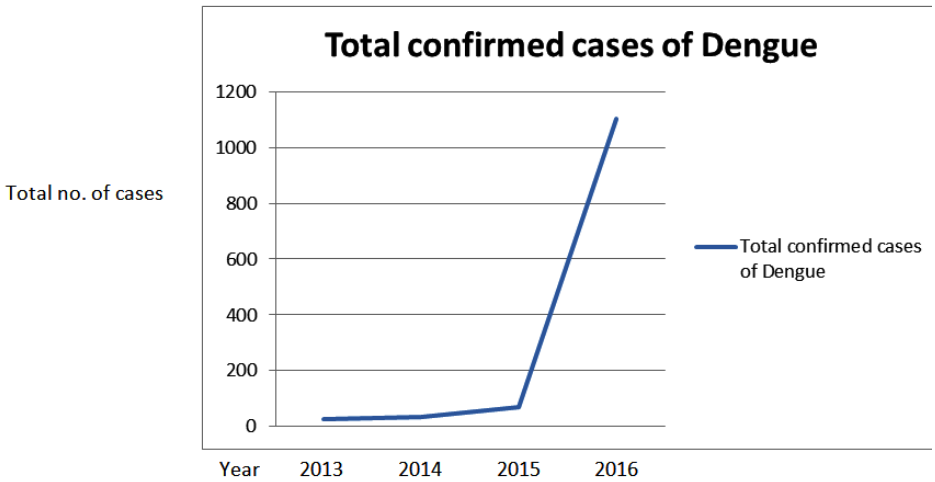

Diagram 1. Total confirmed cases of Dengue on the year 2013, 2014, 2015 and 2016

Table 9. Analysis of Risk Factors in total number of positive cases (n= 1228)

Risk Factors						
Education	Illiterate	Primary	Upper primary	Secondary	Higher Secondary	Graduate
	612	361	102	90	41	22
Occupation	Student	Housewives	Unskilled labour	Skilled labour	Professional	Others
	94	42	656	408	20	08
Unhygienic environment around house	Present	Absent				
	1190	38				
Indoor and Outdoor water containers to store water	Present	Absent				
	1228	0				
Eliminate waters from artificial containers	Daily	Weekly	Monthly			
	64	756	408			
Screened doors and windows	Present	Absent				
	37	1191				
Good air conditioning houses	Yes	No				
	88	1140				
Using mosquito net	Yes	No				
	206	1022				
Using mosquito repellents	Yes	No				
	0	1228				
Wearing long-sleeved garments	Yes	No				
	97	1131				
Activity around house	Yes	No				
	1186	42				
Previous infection with a Dengue fever virus	Yes	No				
	22	1206				

Ab of which 59 cases were positive. On the year 2016, 1859 fever cases were tested for NS1 Ag of which 433 cases were positive and 3216 fever cases were tested for IgM Ab of which 669 cases were positive. On the year 2013, 2014, 2015 and 2016 Dengue confirmed cases were 25, 33, 68 and 1102 respectively. The number of Dengue cases in 2016 clearly outnumbered the Dengue cases in 2013, 2014 and 2015. In our study the highest numbers of cases were recorded in the age group 11 to 30 years and males were more affected than females. This observation correlates with other studies.[5, 8, 10, 11] The majority of the cases were reported during the monsoon and post monsoon seasons, in accordance with the reported patterns of Dengue transmission, that correlates with other studies.[8,12,13,14] Analysis the risk factors of Dengue infection like unhygienic environment around house, indoor and outdoor water containers to store water and time taken for elimination of water, screened doors and windows, good air conditioning houses, using mosquito net and repellents, wearing long-sleeved garments etc. The finding of our study similar to other study.[15, 16]

CONCLUSION

Dengue is a notifiable disease in India since 1996.[7] Dengue is increasing its geographical areas mostly everywhere now and this Dengue epidemiology demands efforts and support for controlling the disease effectively. Dengue fever sometimes leads to death without proper treatment and care. There is no vaccine and specific drug to control infection but it is curable with proper symptomatic treatment and efforts.[6] Attention is therefore required for effective vector control measures. Dengue infections are mostly seen in monsoon and post monsoon season, hence preventive measures should be in full swing at the early onset of monsoons.

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