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Research Paper

RECENT TREND OF SEROPREVALENCE OF DENGUE IN HARYANA

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Introduction: Dengue is a common arthropod borne viral infection caused by any of the four serotypes of dengue virus. It can lead to life threatening complications such as dengue hemorrhagic fever. An increase in the number of cases of dengue has been noticed in India during recent years. **Aims and Objectives:** The present retrospective study was undertaken to know the trend of seroprevalence of dengue from 2007 to 2012 in a tertiary care hospital. **Materials and Methods:** A total of 2,405 blood samples from clinically suspected dengue patients were received in Microbiology laboratory during the study period of six years. Serum was separated from all blood samples and was further tested for the presence of IgM and IgG anti- dengue antibody by dengue IgM capture ELISA(MAC-ELISA, Pan Bio, Australia) and dengue Duo Cassette rapid strip test (Pan Bio diagnostics, Australia). **Results:** Out of 2405 serum samples, 720 (29.9%) were positive for IgM and IgG antibodies. Out of 720 positive samples, IgG antibodies were detected in 289/720 (40.1%), followed by IgM+ IgG antibodies 238 (33%), 193/720 (26.8%) and IgM antibodies 193/720 (26.8%). **Conclusion:** In this study, we conclude that dengue cases are on an increase in Delhi, Haryana and adjoining region in the last five years (2007-2012). Therefore, health authorities and people of this region should make efforts to prevent further increase in dengue cases.

Keywords: Dengue, Seroprevalence, Dengue hemorrhagic fever, Rapid test, Capture ELISA

INTRODUCTION

Dengue fever is the most common of all the arthropod borne viral illnesses. It is one of the most important emerging diseases of the tropical and sub-tropical regions, affecting urban and periurban areas. Dengue is caused by infection with one of the four serotypes of dengue virus (DEN-1,2,3,4).

These acute viral infections can be asymptomatic or may lead to (a) classical dengue fever; (b) Dengue Hemorrhagic Fever (DHF) without shock or (c) dengue haemorrhagic fever with shock (DSS) (WHO, 1986 and 1983) Dengue fever is a self limiting disease and represents the majority of cases of dengue infection.

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The reservoir of infection is both man and mosquito. *Aedes aegypti* is the main vector. Dengue outbreaks have also been attributed to *Aedes albopictus*, *Aedes polynesiensis* and *Aedes scutellaris* complex. A prevalence of *Aedes aegypti* and *Aedes albopictus* together with the circulation of dengue virus of more than one type in any particular area tends to be associated with outbreaks of DHF/DSS.

The number of cases has increased dramatically in the last 40 years. Some 2.5- 3 billion people live in areas where dengue virus can be transmitted. A pandemic in 1998, in which 1.2 million cases of dengue fever and DHF were reported from 56 countries, was unprecedented. It is estimated that each year 50 million cases occur with 5,00,000 cases of DHF and at least 12,000 deaths (WHO, 2002).

In India a recent increase in the cases of dengue has been noticed, which is attributed to rapid urbanization, life style changes and improper water storage, deficient water management especially in rainy seasons. All these factors lead to increase in the mosquito breeding sites and their proliferation.

Since the first isolation of dengue virus in 1945 (Sabin, 1952), Delhi has experienced many outbreaks of dengue fever in 1967, 1970, 1982 and 1988 (Balya et al., 1969; Diesh et al., 1972; Rao et al., 1985; Kabra et al., 1992). The disease has a seasonal pattern, the cases peak after monsoon. All the four serotypes have been reported to be circulating in India with changes occurring in the leading serotypes. Since 1996, the area of endemicity is increasing with about 450 million population at risk (Govt. of India, 2007-08). In 2008, total of 12,561 cases and 80 deaths were reported. In 2009, 15,509 cases were

reported with 89 deaths. The case fatality rate was 3.3% in 1996 has come down to 0.57 in 2009 because of better water management (Govt. of India, 2010).

The aim of our study is to know the trend of dengue from the year 2007 to 2012 in a tertiary care hospital. This would help to plan control measures more precisely and implement preventive programs for dengue. This study is done to know the trend of dengue in Haryana and adjoining region.

MATERIALS AND METHODS

A total of 2,405 serum samples from clinically suspected dengue patients attending various outdoors, casualty services and indoor patients in our hospital were received at the Department of Microbiology of Pt. B.D.Sharma PGIMS Rohtak from June 2007 to December 2012.

Five milliliter of blood was collected from all suspected cases of dengue fever, i.e., patients with fever of 3-5 days duration and two or more associated features like headache, retro-orbital pain, arthralgia, myalgia, colicky pain, abdominal tenderness, altered taste sensation, rashes, hemorrhagic manifestations and leucopenia.

Serum was separated from all blood samples and was further tested for the presence of IgM and IgG anti- Dengue antibody by dengue IgM capture ELISA (MAC-ELISA, Pan Bio, Australia) and dengue Duo Cassette rapid strip test (Pan Bio diagnostics, Australia). Tests were done and results were read as per the literature provided. Available data was analyzed and the trend of Dengue was observed during the study period.

RESULTS AND DISCUSSION

During the study period (2007-2012), a total of

2,405 serum samples were tested for dengue IgM and IgG antibodies, out of which 720 were positive for IgM and IgG antibodies (Table 1 and Figure 1). Dengue is one of the major re-emerging viral infections. In India, the risk of dengue has shown an increase in recent years due to rapid urbanization, life style changes and improper water management. Improper water storage practices in urban, periurban and rural areas lead to proliferation of mosquito breeding sites (Park, 2011).

In the last decade, dengue has assumed pan-India proportions. Outbreaks and deaths have

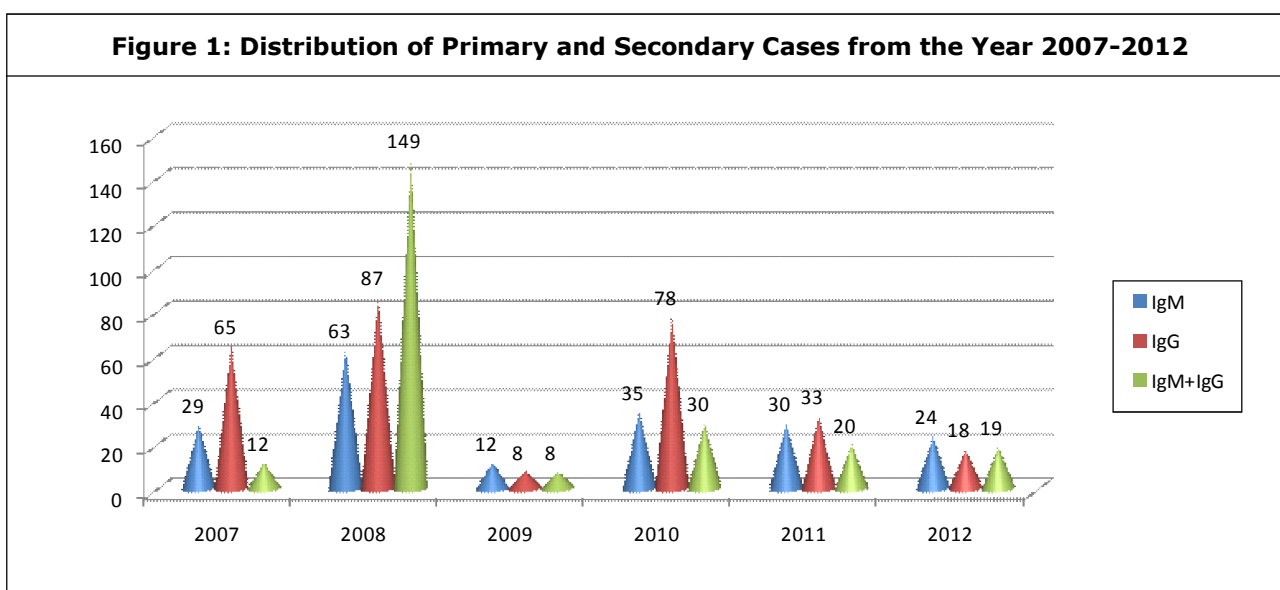
been reported from northern states of Haryana, Punjab and Uttar Pradesh; southern states of Andhra Pradesh, Tamil Nadu and Karnataka; western states of Gujarat and Rajasthan; and eastern state of West Bengal. In fact, the case fatality rate has been above 1% over the last 10 years (WHO, 2009).

The predominant serotype observed in 1996 was DEN-2, whereas all dengue serotypes were detected in 2003 outbreak in North India. However, the outbreak in 2005 in Delhi was mainly due to DEN-3 serotype. The mortality observed in 1996 was far greater than the outbreak in 2003 and

Table 1: Year Wise Distribution Of Dengue Cases

Year	Total no. of suspected dengue cases	Total no. of dengue positive cases
2007	332	106 (31.9%)
2008	1077	299(27.8%)
2009	118	28(23.7%)
2010	484	143 (29.5%)
2011	302	83 (27.5%)
2012	92	61(66.3%)

Figure 1: Distribution of Primary and Secondary Cases from the Year 2007-2012



possibly can be explained by the difference in the serotypes DEN-2 is more virulent than DEN-3 (Gupta et al., 2006; Dar et al., 2003; Gupta et al., 2005; Vajpayee et al., 1999; Dash et al., 2005).

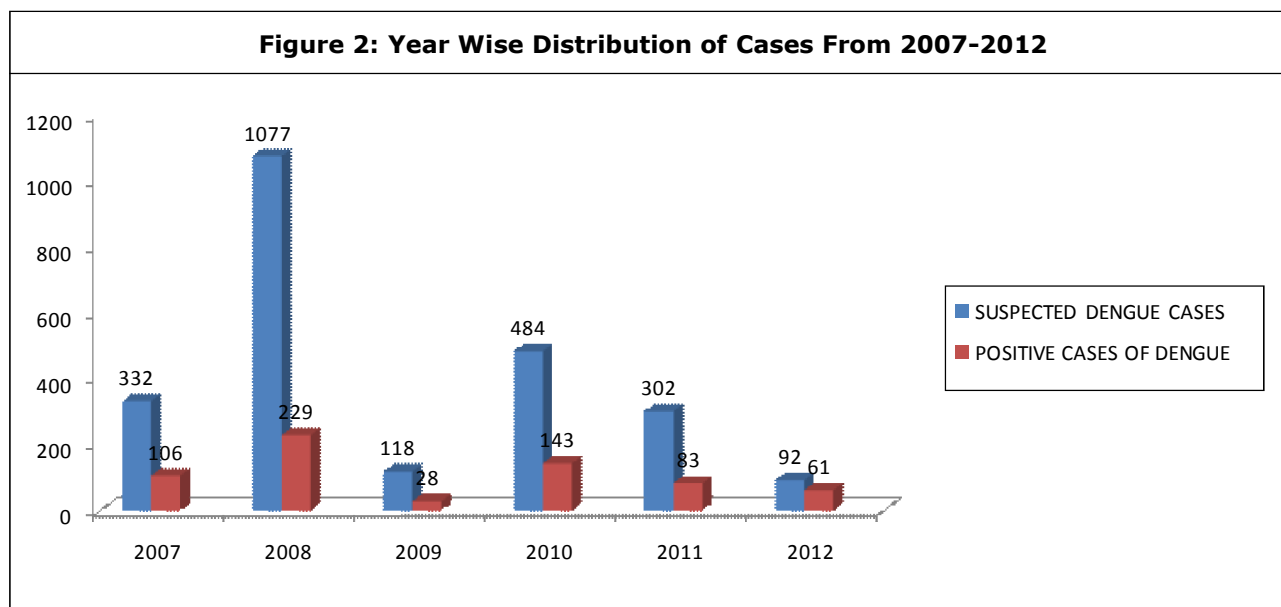
On analyzing the year-wise distribution of dengue cases in the study population, there is steady decrease in the number of dengue patients over the past few years was noticed. This study shows that in the year 2007, 2008, 2009, 2010, 2011 and 2012 dengue positive cases were respectively 31.9%, 27.8%, 23.7%, 29.5%, 27.5% and 66.3% (Table 2; Figures 2 and 3). Males were

found to be more affected than females. The proportion of dengue cases for age group 11-30 years was highest (Tables 3, 4, 5, 6 and 7). Similar results were also noted in the studies conducted by Ashwini Kumar et al. (2010) and Tank Arun et al. (2012). The seasonal variation is also noticed during this period, a gradual increase in cases was noticed from June with a peak in October month, which could be due to the stagnation of water, which in turn facilitate vector breeding. The correlation between occurrence of dengue and monsoon season is clearly evident in this study.

Table 2: Distribution of Primary and Secondary Cases From the Year 2007-2012

Year	IgM	IgG	IgM+IgG
2007	29(27.35%)	65(61.3%)	12(11.32%)
2008	63(21.07%)	87(29.1%)	149(49.8%)
2009	12(42.8%)	8(28.57%)	8(28.57%)
2010	35(24.5%)	78(54.54%)	30(21%)
2011	30(36.14%)	33(39.75%)	20(24.09%)
2012	24(39.4%)	18(29.50%)	19(31.14%)

Figure 2: Year Wise Distribution of Cases From 2007-2012



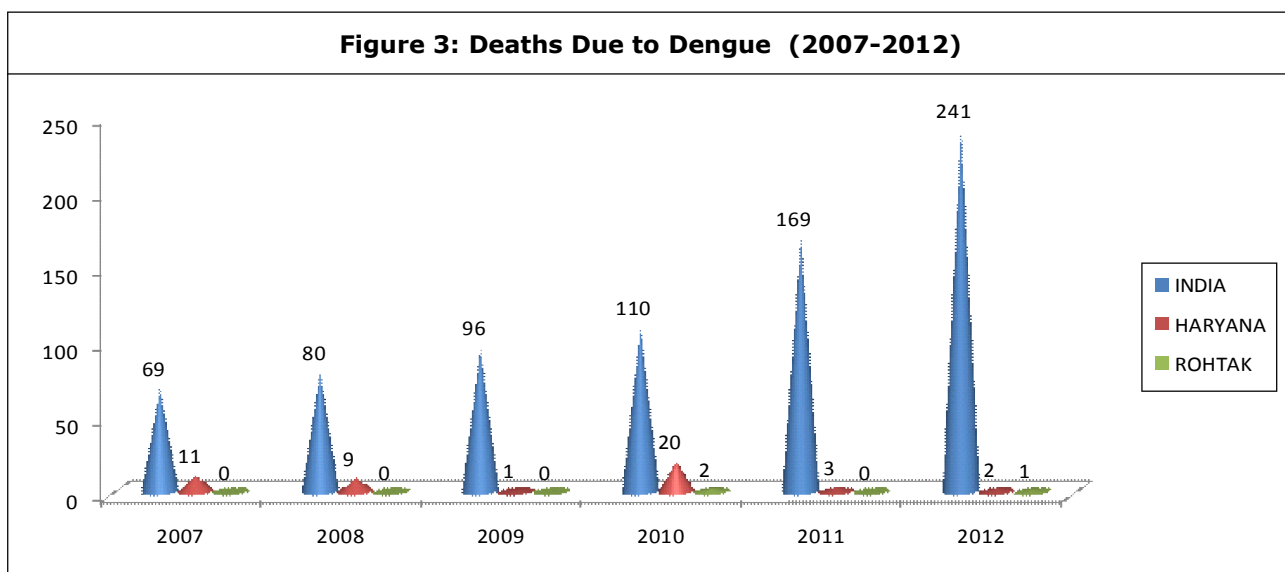


Table 3: Month Wise Distribution of Cases From 2007-2012

Year	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total
2007	-	-	-	-	-	1	1	2	19	68	11	4	106
2008	3	1	1	0	0	1	4	59	130	79	19	2	299
2009	2	0	1	0	0	0	0	0	0	11	13	1	28
2010	2	3	5	0	3	2	2	9	42	49	25	1	143
2011	0	0	0	0	0	0	1	3	35	32	12	0	83
2012	1	0	0	0	0	0	2	0	8	29	20	1	61
Total	3	3	5	0	3	2	5	12	85	110	57	2	720

Table 4: Age Wise Distribution Of Cases

Age (years)	2007	2008	2009	2010	2011	2012	Total	%
0-10	8	34	2	30	16	13	162	18.1%
11-20	33	60	9	64	30	21	332	37.13%
21-30	31	103	12	38	24	18	226	25.27%
31-40	23	56	2	8	7	4	100	11.1%
41-50	3	20	3	2	3	5	36	4.02%
51-60	6	24	-	1	2	0	33	3.69%
61-70	1	1	-	0	1	0	03	0.34%
71-80	-	1	-	-	-	-	01	.1%
81-90	1	-	-	-	-	-	01	.1%

Table 5: Sex Wise Distribution of Cases

Year	Males	Females	Total
2007	65(61.3%)	41(38.67%)	106
2008	221(73.9%)	78(26.08%)	299
2009	19(67.8%)	9(32.14%)	28
2010	100 (51.5%)	43 (46.2%)	143
2011	56 (28.9%)	27 (29.03%)	83
2012	38 (19.6%)	23 (24.7%)	61
Total	499(69.3%)	221(30.7%)	720

Table 6: Total Cases Of Dengue In India And Haryana From The Year 2007-2012

Year	India	Haryana
2007	5534	365
2008	12561	1137
2009	15535	125
2010	28292	866
2011	18860	267
2012	49602	768

Table 7: Year Wise Distribution Of Deaths Due To Dengue (2007-2012)

Year	India	Haryana	Rohtak
2007	69	11	0
2008	80	9	0
2009	96	1	0
2010	110	20	2
2011	169	3	0
2012	241	2	1

CONCLUSION

In this study, we conclude that dengue cases are on increase in Delhi , Haryana and adjoining region in the last five years (2007-2012). Major outbreak of dengue has been reported in the year 2006 (Gill et al., 2008), after this dengue has

become endemic in this region and the cases of dengue are being reported every year, so there is a need for early diagnosis and treatment of dengue cases, to decrease the mortality. These findings indicate that preventive measures against dengue infection should be taken during

water stagnation periods after the end of monsoon. Therefore, health authorities and people of this region should make efforts to prevent further increase in dengue cases.

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