

## SEROPREVALENCE OF DENGUE IN KOTA, RAJASTHAN: A STUDY AT A TERTIARY CARE HOSPITAL

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### HOW TO CITE THIS ARTICLE:

Deepak Maheshwari, Divya Dadhich, Naveen Saxena. "Seroprevalence of Dengue in Kota, Rajasthan: A Study at a Tertiary Care Hospital". *Journal of Evolution of Medical and Dental Sciences* 2015; Vol. 4, Issue 05, January 15; Page: 821-825, DOI: 10.14260/jemds/2015/118

**ABSTRACT:** Introduction: Dengue is a most significant febrile illness caused by a single stranded enveloped RNA virus belongs to the family Flaviviridae, genus Flavivirus. Dengue infection is caused by any one of four distinctive antigenically related dengue virus serotypes: DENV-1, DENV-2, DENV-3 and DENV-4. In India, a dengue virus infection has been frequently encountered in epidemic proportions in several states. There is no specific treatment for dengue/ severe dengue, but early detection and access to proper medical care lowers fatality rates below 1%. **MATERIALS AND METHODS:** This study was undertaken at a tertiary care teaching hospital at Kota from January 2013 to December 2013. Blood samples were received from patients of all age group suspected of dengue, DHF and Dengue Shock Syndrome. Sera were separated and preserved at 4°C till the time of testing. Sera were tested by dengue IgM antibody capture ELISA (MAC ELISA) (received from NIV, Pune) for IgM antibody detection as per kit insert. **RESULT:** During the study period, a total of 13077 blood samples were tested for dengue. Of all the patients tested, 9066 were males and 4011 were females. Dengue affected males and females in a ratio of 3.7:1. During this study, out of the total positive for dengue, positivity was highest (n=566, 31.65%) in the adult age group of >30 yrs followed by the age group of 15 to 30 yrs (n=408, 22.8%). **DISCUSSION:** Dengue is an important emerging disease of the tropical and subtropical regions today. Epidemics of dengue are increasing in frequency. The prevalence of dengue seropositivity among clinically suspected cases during the study period was 13.67%. Our study results call attention to the need for continuous surveillance and individual and community action for dengue control.

**KEYWORDS:** Dengue, dengue hemorrhagic fever, IgM antibody capture ELISA.

**INTRODUCTION:** Dengue is a most significant febrile illness caused by a single stranded enveloped RNA virus belongs to the family Flaviviridae, genus Flavivirus.<sup>(1)</sup> Dengue infection is caused by any one of four distinctive antigenically related dengue virus serotypes: DENV-1, DENV-2, DENV-3 and DENV-4.<sup>(2)</sup>

Medical manifestations of dengue infection range from asymptomatic, to mild flu-like symptoms, to severe life-threatening dengue complications such as dengue shock syndrome (DSS) and dengue hemorrhagic fever (DHF).<sup>(3)</sup> The dengue virus is transmitted to humans through the bite of an infected mosquito of the genus *Aedes* (Namely *Aedes aegypti* and *Aedes albopictus*) during daylight hours.<sup>(4)</sup> Both viral and host factors are thought to contribute to the manifestations of the disease in each infected person.<sup>(5)</sup>

The incidence of dengue has grown dramatically around the world in recent decades. Over 2.5 billion people – over 40% of the world's population are now at risk from dengue. WHO currently estimates there may be 50–100 million dengue infections worldwide every year.<sup>(6)</sup> In India, a dengue virus infection has been frequently encountered in epidemic proportions in several states.<sup>(7-10)</sup> There

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is no specific treatment for dengue/ severe dengue, but early detection and access to proper medical care lowers fatality rates below 1%.<sup>(6)</sup>

As effective control and preventive programmes for dengue infection are based upon improved surveillance data, this study was done to report the prevalence of dengue virus infection at Kota, Rajasthan.

**MATERIALS AND METHODS:** This study was undertaken at a tertiary care teaching hospital at Kota from January 2013 to December 2013. Blood samples were received from patients of all age group suspected of dengue, DHF and Dengue Shock Syndrome.

Sera were separated and preserved at 4°C till the time of testing. Sera were tested by dengue IgM antibody capture ELISA (MAC ELISA) (received from NIV, Pune) for IgM antibody detection as per kit insert.

### RESULT:

Gender	Frequency	Percentage
Male	9066	69.3
Female	4011	30.7
<b>Total</b>	<b>13077</b>	<b>100</b>

Table 1: Gender distribution of patients

Gender	Dengue IgM		Total (%)
	Positive (%)	Negative (%)	
Male	1407 (10.76)	7659 (58.57)	9066 (69.33)
Female	381 (2.91)	3630 (27.80)	4011 (30.67)
<b>Total</b>	<b>1788 (13.67)</b>	<b>11289 (86.33)</b>	<b>13077 (100)</b>

Table 2: Seroprevalence of Dengue IgM antibodies

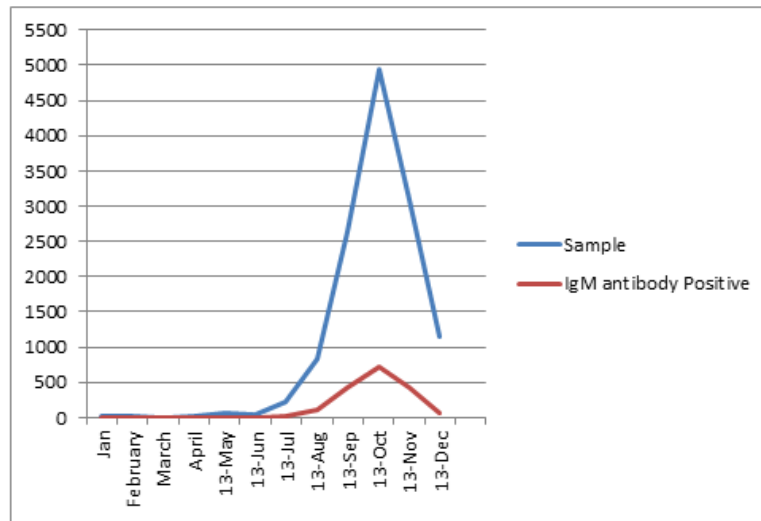
Gender	Dengue IgM Positive	Percentage
Male	1407	78.7
Female	381	21.3
<b>Total</b>	<b>1788</b>	<b>100</b>

Table 3: Gender wise distribution of Dengue positive cases

Age group	Male (%)	Female (%)	Total (%)
0-23 months	40 (2.23)	53 (2.97)	93 (5.20)
2-4 years	109 (6.09)	27 (1.51)	136 (7.60)
5-9 years	178 (9.95)	43 (2.40)	221 (12.35)
10-14 years	106 (5.92)	74 (4.13)	180 (10.05)
15-30 years	408 (22.81)	56 (3.13)	464 (25.25)
>30 years	<b>566 (31.65)</b>	128 (7.15)	694 (38.81)
<b>Total</b>	<b>1407 (78.69)</b>	<b>381 (21.31)</b>	<b>1788 (100)</b>

Table 4: Age and sex wise distribution of Dengue positive cases

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**Graph 1: Month wise distribution of Dengue cases**

During the study period, a total of 13077 blood samples were tested for dengue. Of all the patients tested, 9066 were males and 4011 were females [Table 1]. Of the total samples tested, 13.67% (n=1788) were found to be positive for dengue virus [Table 2]. From the total positives for dengue, 78.7% (n=1407) were males and 21.3% (n=381) females. So, it was observed that dengue affected males and females in a ratio of 3.7:1 [Table 3].

During this study, out of the total positive for dengue, positivity was highest (n=566, 31.65%) in the adult age group of >30 yrs followed by the age group of 15 to 30 yrs (n=408, 22.8%) [Table 4].

In the study population, highest numbers of patients were tested for dengue in the month of October 2013 (n=4952) followed by November 2013 (n=3083) and September 2013 (n=2648). A gradual increase in dengue positive cases was noticed from July 2013 (n=30) with a highest peak in October (n=715) followed by November (n=431) and September (n=426) [Graph 1].

**DISCUSSION:** Dengue is an important emerging disease of the tropical and subtropical regions today. Dengue infection has been known to be endemic in many parts of India for over two centuries as a benign and self-limited disease. Epidemics of dengue are increasing in frequency. Detection of all four dengue serotypes in India has now rendered the India hyperendemic.<sup>(11)</sup>

The present study focused the status of dengue fever cases in Kota (Rajasthan). The prevalence of dengue seropositivity among clinically suspected cases during the study period was 13.67% which is lower than the study done by Saini et al (30.6%).<sup>(12)</sup> The male to female ratio in present study was 3.7:1 showing male predominance as reported by various authors.<sup>(12-14)</sup> The study revealed the most affected age group was (>30 year) followed by (15-30yr) which is comparable to Saini et al<sup>(12)</sup> and Kumar et al.<sup>(15)</sup> Some authors reported the vulnerability of children to dengue infection.<sup>(16,17)</sup> The transmission of dengue infection increases in post monsoon period as was also observed in the study. The presence of stagnant water after rain fall favors the mosquito breeding which leads in an increased occurrence of dengue.<sup>(18-20)</sup>

Our study results call attention to the need for continuous surveillance and individual and community action for dengue control.

**REFERENCES:**

1. Naeem-Ullah U, Akram W. Dengue knowledge, attitudes and practices in Multan, Pakistan: an urban area at the verge of dengue infestation. *Public Health* 2009; 123: 452-3.
2. Chakravarti A, Kumaria R, Berry N, Sharma VK. Serodiagnosis of dengue infection by rapid immunochromatography test in a hospital setting in Delhi, 1999- 2001. *Dengue Bull* 2002; 26: 936-9.
3. Halstead S, Suaya J, Shepard D. The burden of dengue infection. *Lancet* 2007; 369: 1411-2.
4. Gubler DJ, Clark GG. Dengue/dengue hemorrhagic fever: the emergence of a global health problem. *Emerg Infect Dis* 1999; 52: 55-7.
5. Jahan F. Dengue fever (DF) in Pakistan. *Asia Pac Fam Med* 2011; 10: 1.
6. WHO | Dengue and severe dengue. World Health Organization;
7. Garg A, Garg J, Rao YK, Upadhyay GC, Sakhuja S. Prevalence of dengue among clinically suspected febrile episodes at a teaching hospital in North India. *J Infect Dis Immunity*. 2011; 3: 85-9.
8. Kalawat U, Sharma KK, Reddy SG. Prevalence of dengue and chikungunya fever and their co-infection. *Indian J Pathol Microbiol*. 2011; 54: 844-846.
9. Paramasivan R, Thenmozhi V, Hiriyan J, Dhananjeyan KJ, Tyagi BK, Dash AP. Serological & entomological investigations of an outbreak of dengue fever in certain rural areas of Kanyakumari district, Tamil Nadu. *Indian J Med Res*. 2006; 123: 697-701.
10. Gupta E, Dar L, Kapoor G and Broor S. The changing epidemiology of dengue in Delhi, India. *Virology*. 2006; 3: 92.
11. Park K. *Park's Textbook of Preventive and Social Medicine*. 22nd Ed. Jabalpur: Banarasidas Bhanot; 2013: p224-232.
12. Saini S, Kinikar AG, Deorukhkar S, Bhalerao D, Roushani SB. Epidemiology and seropositivity of dengue fever cases in a rural tertiary care hospital of western Maharashtra, India \* *Correspondence Info* : 3809 (2013).
13. Neeraja M, Laxmi V, Teja VD, Umbala P, Subblakshmi MV. Serodiagnosis of dengue virus infection in patients presenting to a tertiary care hospital. *Ind J Med Microbiol* 2006; 24 (4): 280-2.
14. Chakravarti A, Matlani M, Kashyap B, Kumar A. Awareness of changing trends in epidemiology of Dengue fever is essential for epidemiological surveillance. *Indian J Med Microbiology* 2012; 30 (2): 222-226.
15. Kumar A, Rao CR, Pandit V, Shetty S, Bammigatti C, Samarasinghe CM. Clinical manifestations and trend of Dengue cases admitted in a tertiary care hospital, Udupi District, Karnataka. *Indian J Commun Med* 2010; 55: 586-590.
16. Gunasekaran P, Kaveri K, Mohana S, Arunagiri K, Babu BVS, Padma Priya P et al. *Indian J Med Res* 2011; 133: 322- 325.
17. Cherian T, Ponnuraj E, Kuruvilla T, Kirubakaran C, John TJ, Raghupathy P. An epidemic of dengue haemorrhagic fever and dengue shock syndrome in and around Vellore. *Indian J Med Res* 1994; 100: 51-56.

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18. Chandralekha, Gupta P, Trikha A. The north Indian dengue outbreak 2006: A retrospective analysis of intensive care units admissions in a tertiary care hospital. *Trans R Soc Trop Med Hyg* 2008; 102: 43-147.
19. Bharaj P, Chanar HS, Pandey A, Diddi K, Dar L, Guleria R, et al. Infections by all four dengue virus serotypes during an outbreak of dengue in 2008 in Delhi, India. *Viol J* 2008; 5: 1.
20. Dar L, Gupta E, Narang P, Broor S. Co- circulation of dengue serotypes, Delhi, India, 2003; *Emerg Infect Dis*; 12: 352- 353.

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Date of Submission: 22/11/2014.  
Date of Peer Review: 25/11/2014.  
Date of Acceptance: 06/01/2015.  
Date of Publishing: 14/01/2015.