

## Seroprevalence of Dengue Virus in Civil Hospital, Gandhinagar, Gujarat

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### Abstract

**Background:** Dengue fever (DF) and dengue hemorrhagic fever (DHF) are important arthropod borne viral diseases. Dengue is emerging as major public health concern in India and spreading with increased morbidity. **Objective:** This study was carried out to determine the seroprevalence of Dengue infection among patients attending in Gandhinagar civil hospital attached with medical college during the period of January 2018 to December 2018. **Methods:** A total of 2545 blood samples received in the department of microbiology, were tested for the confirmation of suspected cases of dengue. Dengue NS1 antigen and Dengue IgM antibody ELISA tests were performed for the confirmation of dengue cases. We estimated the incidence by applying age, sex and season adjusted dengue positivity. **Results:** Out of 2545 samples tested, 639 were positive for dengue infection, among the positive cases 503 were NS1 antigen ELISA positive and 136 were IgM ELISA positive. Higher incidence in male patients was noted. Number of positive cases was increased in rainy season. **Conclusion:** Virus activity is high during monsoon and post monsoon period which coincides with increased vector breeding. This study thus emphasizes the need for continuous sero epidemiological surveillance for the timely formulation and implementation of effective dengue control programme.

**Keywords:** Dengue, IgM antibody, NS1 antigen, ELISA, seroprevalence.

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### INTRODUCTION

Dengue fever and Dengue Haemorrhagic fever (DF/DHF) is an acute viral disease caused by Dengue virus. The infection is transmitted by the bite of an infected female mosquito- *Aedes aegypti*. The Dengue virus causes significant morbidity and mortality in many parts of the world, including India

In recent years, transmission has increased predominantly in urban and semi-urban areas and has become a major national & international public health concern. Dengue is believed to infect 50 to 100 million people worldwide a year with half a million life-threatening infections requiring hospitalization, resulting in approximately 2.5% deaths [1].

Dengue viral infection may be asymptomatic or may give rise to undifferentiated fever with or without other associated clinical manifestations, namely, Dengue fever (DF), Dengue hemorrhagic fever (DHF), or Dengue shock syndrome (DSS) [2].

In India, dengue is endemic with history of disease outbreaks in big metropolitan cities and spreading on account of increased urbanization, deforestation, rapid population movement /increased air

connectivity establishing foothold in areas which are free from the disease. As per national records there has been steady increase in cases every passing year.

There is no specific treatment for dengue/severe dengue, but early detection and access to proper medical care lowers fatality rates below 1% [1].

This study was done to report the prevalence of dengue virus infection at district hospital and medical college Gandhinagar, Gujarat, India. It also intended to detect the epidemiological and clinical profile of dengue infection.

### MATERIAL AND METHODS

This study was undertaken at a district hospital attached with medical college at Gandhinagar, Gujarat from January 2018 to December 2018. Blood samples were received from patients of all age groups (1 month to 90 years) suspected of dengue, Dengue Hemorrhagic Fever and Dengue Shock Syndrome. Demographic details and clinical history were obtained from Laboratory Request forms and recorded in specially designed proforma.

Blood sample was taken in plain vacuttte. Serum were separated from each and every blood sample and preserved at 4°C till the time of testing. All the testing was done within 24 hour from the time of blood collection. Sera of patients with illness 5 days or less were tested by Dengue Early ELISA (Enzyme Linked Immunosorbent Assay) (Bio-Rad) for non-structural 1 (NS1) antigen, while sera of patients with illness more than 5 days were tested by dengue IgM antibody capture ELISA (MAC ELISA, received from NIV, Pune) for IgM antibody detection as per kit insert

literature. All the testing was done within 24 hour from the time of blood collection.

**RESULTS**

It can be seen from table no. 1 that Out of 2545 patients sample 1450 (57%) were male while 1094 (43%) were female. age group 21 – 30 years is the most common age group comprise of 924 (36.30%) from where most number of patients tested for dengue test.

**Table-1: Age group and sex wise distribution of patients**

Age group	Male	Female	Total
0-10	106	86	192(7.5%)
11-20	423	204	627 (24.63%)
21-30	486	438	924 (36.30%)
31-40	184	172	356(13.98)
41-50	107	115	222(8.7%)
51-60	77	37	114(4.4)
61-70	47	28	75(2.9%)
71-80	15	11	26(1.02%)
81-90	5	4	9(0.3%)
Total	1450(57%)	1094 (43%)	2545(100%)

Age group and Sex wise distribution of dengue positive cases is shown in table no. 2.it can be seen that out of 639 dengue positive cases male were (n= 440,68.85%) & (n= 199,31.15%) were female. Majority of patients tested positive for dengue were of

11 to 20 yrs age group (n=230, 36%) followed by the age group 21to 30yrs (n=216, 33.80%). In age group 11 - 20 years & 21- 30 year males were (n= 161, 70%) and (n= 159, 73.61%) while female were (n= 69, 30%) and (n= 57, 26.39%) respectively.

**Table-2: Age group and Sex wise distribution of dengue positive cases**

Age group	Male	Female	Total
0-10	33 (56.89%)	25 (43.11%)	58 (9.07%)
11-20	161 (70%)	69 (30%)	230 (36%)
21-30	159 (73.61%)	57 (26.39%)	216 (33.80%)
31-40	54 (70.12%)	23 (29.88%)	77 (12.05%)
41-50	17 (45.94%)	20 (54.06%)	37 (5.7%)
51-60	12 (85.71%)	2 (14.29%)	14 (2.19% )
61-70	3 (50%)	3 (50%)	6 (0.9%)
71-80	1 (100%)	0 (0%)	1(0.1% )
Total	440 (68.85%)	199 (31.15%)	639 (100%)

Out of total 639 positive cases, NS1 antigen test were positive in 503(78.71%) cases while IgM

antibody test were positive in 136(21.28%) which shown in table no. 3

**Table-3: NS1 antigen and IgM antibody test positive dengue cases**

SEX	NS1 positive	IgM positive	Total
Male	354(80.45%)	86(19.5%)	440(68.85%)
Female	149(74.87%)	50(25.12%)	199(31.15%)
Total	503(78.71%)	136(21.28%)	639(100%)

Month wise distribution of dengue positive cases shown in table no.4, shows highest positive cases

in the month of October (n=289, 45.2%) followed by in November (n=146, 22. 84%)

**Table-4: Month wise Distribution of Total Positive Cases**

Months	Total cases	NS 1 Positive cases	IG M Positive cases	Total Positive cases (%)
January	106	3	0	3 (0.4%)
February	48	0	0	0 (0.00%)
March	62	3	0	3 (0.4%)
April	53	2	1	3 (0.4%)
May	44	2	7	9 (1.4%)
June	52	4	3	7 (1%)
July	159	6	7	13 (2%)
August	240	27	6	33 (5.1%)
September	354	85	20	105 (16.4%)
October	893	240	49	289 (45.22%)
November	399	108	38	146 (22.84%)
December	135	23	5	28 (4.38%)
Total	2545	503	136	639 (100%)

Figure – 1 Seasonal trend of dengue positive cases

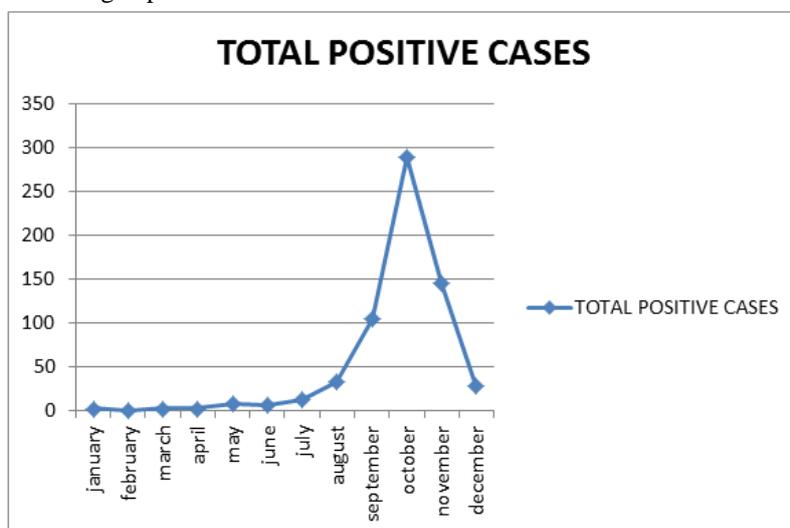


Fig-1

## DISCUSSION

In this study, 25% patients were positive for dengue infection. These findings are in accordance with other studies conducted in India by Manisha Patankar [4] and Garg A [5]. Gandhinagar being a capital city of Gujarat, infrastructure development occur at a rapid pace so as a result rapid unplanned urbanization with unchecked construction activities and poor sanitation facilities contribute to fertile breeding grounds for mosquitoes.

Prevalence of dengue infection was higher in male patients than female patients; the male to female ratio was 2:1, which very well correlates with other studies done by Goswami *et al.* [6] and Usha kalavat *et al.* [7]

The higher prevalence of dengue infection was noted among males than females. High prevalence amongst males is probably due to more outdoor activities by males in comparison to females which results in more exposure to day biting mosquitoes.

The epidemics of dengue have been commonly associated with the rainy season which is in the months of August to November [11]. In a study conducted in Asam, Andhrpradesh and Lacknow, it was observed that dengue transmission occurred round the year with peak incidence in the postmonsoon season [6, 8, 9].

Similarly, these studies found the highest proportion of dengue positive patients during post monsoon season. In the present study also most of the cases were found to report during post monsoon season

## CONCLUSION

From the above study we conclude that there is high prevalence (%) of dengue infection in our region. There is no any specific treatment for dengue fever but only supportive management. Effective vector (*Aedes aegypti* mosquito) control measure and early diagnosis is only measures to control outbreak of dengue fever and reducing morbidity, mortality and diseases burden from the country.

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