Research Article

Seroepidemological Study of Dengue Fever in Vasantrao Naik Gmc Yavatmal

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ABSTRACT

BACKGROUND: Dengue fever (DF) is a mosquito-borne zoonotic disease that affects humans and non-human primates. The disease is caused by the dengue virus (DENV) which is known to have four distinct serotypes (DENV-1-4) and belongs to the family Flaviviridae, which also includes chikungunya, yellow fever, and Zika viruses. Each of these viruses is known to be transmitted by the female mosquitoes mainly of the species *Aedes aegypti* and, to a lesser extent, *A. albopictus*, which become vectors for viral transmission after taking a blood meal from an infected host.

AIM AND OBJECTIVES: 1. Seroepidemological study of dengue fever in Vasantrao Naik GMC Yavatmal.

2. To find out prevalence of dengue infection patients by serological test

METHODS: **Study Design:** Cross sectional study. **Study Population:** All dengue suspected patients admitted in Vasantrao Naik GMC Yavatmal during study period such cases were included in the study. **Study Duration:** 2024-2025 **Sample size:** 1705

RESULTS: Most of the cases found in 12-25 years age group 498 (29.20%) followed by 26-40 group 393 (23.04%), 41-45 age group 294 (17.24%), 56-65 age group 254 (14.90%) and above 66 years age 266 (15.60%). majority of cases were males 1022 (59.94%) and females were 683 (40.05%). most of the cases place of residence was urban area 1270 (74.48%) and 435 cases from rural area (25.51%). Anti-DENV IgM positivity rate was 2.99%, Anti-DENV IgG positivity rate was 3.81%. The entire weighted seroprevalence of dengue-specific antibodies (IgM and/or IgG) in the population studied was 6.8%.

CONCLUSIONS: Most of the cases found in 12-25 years age group, majority of cases were males, most of cases from urban area, seroprevalence of NS1 was 1.87%. Anti-DENV IgM positivity rate was 2.99%, Anti-DENV IgG positivity rate was 3.81%. The entire weighted seroprevalence of dengue-specific antibodies (IgM and/or IgG) in the population studied was 6.8%.

Keywords: DF, DENV, Anti-DENV Igm, Anti-DENV Igg.

INTRODUCTION

Dengue fever (DF) is a mosquito-borne zoonotic disease that affects humans and non-human primates [1]. The disease is caused by the dengue virus (DENV) which is known to have four distinct serotypes (DENV-1-4) and belongs to the family Flaviviridae, which also includes chikungunya, yellow fever, and Zika viruses. Each of these viruses is known to be transmitted by the female mosquitoes mainly of the species *Aedes aegypti* and, to a lesser extent, *A. albopictus*, which become vectors for viral transmission after taking a blood meal from an infected host [1].

DF has dramatically expanded its endemicity pattern from localized epidemics affecting only nine countries before 1970 to the current pandemic in which the virus is circulating in 129 countries, putting an estimated 3.9 billion people across the globe at risk of infection

[2].Following an incubation period usually ranging from 4 to 10 days [3], dengue infection can vary from a subclinical infection without any detectable symptoms in 20-80% of cases to a more pronounced flu-like disease [4].

While illness can be mild in some individuals, infection results in severe symptoms and pathology in up to half a million people worldwide every year. This is marked by the manifestation of severe bleeding, organ impairment, and/or plasma leakage [5]. Neither specific treatments nor approved vaccines are currently available for dengue infection, leaving the entire global population at risk of infection in any upcoming pandemic. Compounding this problem further is evidence indicating that the generation of antibodies to any of the four serotypes not only fails to protect against the other strains but also

increases the risk of developing severe dengue on subsequent exposure to any of the other DENV serotypes [6-9]. However, the fact that this phenomenon can occur in any individuals who have been exposed to the virus, including individuals who remained asymptomatic [7], represents a vexing challenge which warrants the need for continuous monitoring of the individuals in the endemic areas along with the application of the necessary mosquito control and public health education programs.

Aim and Objectives
Aim: Seroepidemological study of dengue fever in Vasantrao Naik GMC Yavatmal
Objective: 1. To find out prevalence of dengue infection patients by serological test

MATERIAL AND METHODS
Study Design: Cross sectional study
Study Setting: Department of Microbiology, Vasantrao Naik GMC Yavatmal
Study Population: All dengue suspected patients admitted in Vasantrao Naik GMC Yavatmal during study period such cases were included in the study
Duration of Study: 1 year
Sample Size: with reference **Lee, YH et al [10]** He reported that the people aged over 70 years, the seropositive rate reached 19%. Formula for sample size calculation: $4PQ/L^2$
P=19%, Q=100-19=81, L= 10% of prevalence, L^2 =13.03, 4×19×81/ 1705= 1705
Sample size = 1705

Inclusion Criteria
- Age > 12 years
- All dengue suspected cases
- Patient who gives consent.

Exclusion Criteria
- Age < 12 years
- Patient who are not ready for consent.

Type of Sampling: Convenient sampling technique
A cross sectional study was conducted in Microbiology department of Vasantrao Naik GMC Yavatmal after ethics committee permission. Suspected dengue patients who came to our general medicine OPD and IPD and who fulfilled the inclusion criteria were considered for the study. Informed consent is taken from all study participants.

Demographic data, clinical history, examination findings and tests of these patients were noted. Diagnosis of dengue was done with the help of serological test NS1 Antigen & Igm ELISA Antigen. Patients who had no or incomplete data were excluded from the study.

Data entry done using M.S. Excel and it will be statistically analyzed using Statistical package for social sciences (SPSS Version 25) for M.S. Windows. Descriptive statistical analysis carried out to explorer the distribution of several categorical and quantitative variables. Categorical variables summarized with n (%), while quantitative variables will be summarized by mean S.D. All results presented in tabular form and are also shown graphically using bar diagram or pie diagram among genders as appropriate. Inferential Statistics: categorical variables tested by Chi-Square test. P-value less than 0.05 considered to be statistically significant.

OBSERVATION AND RESULT
A cross sectional study was conducted in Microbiology department of Vasantrao Naik GMC Yavatmal after ethics committee permission. Suspected dengue patients who came to our general medicine OPD and IPD and who fulfilled the inclusion criteria were considered for the study. Informed consent is taken from all study participants.

Table No. 1: Distribution of cases according to age (N=1705)

Age in years	Frequency	Percentage
12-25	498	29.20%
26-40	393	23.04%
41- 55	294	17.24%
56-65	254	14.90%
Above 66	266	15.60%
Total	1705	1705 (100%)

The table shows most of the cases found in 12-25 years age group 498 (29.20%) followed by 26-40 group 393 (23.04%), 41-45 age group 294 (17.24%), 56-65 age group 254 (14.90%) and above 66 years age 266 (15.60%)

Table No.2: Distribution of cases as per sex (N=1705)

Gender	Frequency	Percentage
Male	1022	59.94%
Female	683	40.05%
Total	1705	1705 (100%)

The above table shows majority of cases were males 1022 (59.94%) and females were 683 (40.05%).

Table No.3: Distribution of cases as per place of residence (N=1705)

Place of Residence	Frequency	Percentage
Urban area	1270	(74.48%)
Rural area	435	(25.51%)
Total	1705	

The above table shows most of the cases place of residence was urban area 1270 (74.48%) and 435 cases from rural area (25.51%)

Table No.4: Seroprevalence of NS1

NS1	Frequency	Percentage
Positive	32	(1.87%)
Negative	1673	(98.13%)
Total	1705	1705 (100%)

The above table shows seroprevalence of NS1 was 1.87%

Table No.5: Seroprevalence Of Anti-DENV Igm

Anti-DENV IgM	Frequency	Percentage
Positive	51	(2.99%)
Negative	1654	(97.01%)
Total	1705	1705 (100%)

The above table shows seroprevalence of anti-DENV IgM was 2.99%

Table No.6: Seropositivity of anti-DENV IgG

Anti-DENV IgG	Frequency	Percentage
Positive	65	(3.81%)
Negative	1640	(96.19%)
Total	1705	

The above table shows Seropositivity of anti-DENV IgG was 3.81%

DISCUSSION

A cross sectional study was conducted in Microbiology department of Vasantrao Naik GMC Yavatmal after ethics committee permission. Suspected dengue patients who came to our general medicine OPD and IPD and who fulfilled the inclusion criteria were considered for the study. Informed consent is taken from all study participants.

In current study most of the cases found in 12-25 years age group 498 (29.20%) followed by 26-40 group 393 (23.04%), 41-45 age group 294 (17.24%), 56-65 age group 254 (14.90%) and above 66 years age 266 (15.60%). Similar result found in the study conducted by Lee, YH et al [10] He Studied 1308 dengue suspected cases Majority of cases from 0-9 years age group 246 followed by 30-39 years age group 196 cases, 20-29 group 180,40-49 group 178 cases,10-19 years age group 154 cases, 60-69 group 119 cases and ≥ 70 age group 58 cases. Diallo, M et al [11] The ages of the patients were between 0 and 90 years, with a median age of 4 years and a mean of 11 years. According to the age group, 1995 (58.7%) were children under 5 years, 738 (21.7%) were children between 5 - 14 years, 380 (11.2%) were young adults aged 15 to 30 years, and 287 (8.4%) were adults 30 years and over. The difference in the percentage of seropositivity between men

(18.8%) and women (20%) was not significant (p = 0.7).

In current study majority of cases were males 1022 (59.94%) and females were 683 (40.05%). Contrast result found in the study conducted by Lee, YH et al [10] He reported that the most of cases were females 791 and 517 males. Kurane, I. et al [12] A total of 3400 blood samples from clinically suspected dengue cases were recorded from January 2017 to December 2020, of which 1784 (52.5%) were males and 1616 (47.5%) were females.

In current study most of the cases place of residence was urban area 1270 (74.48%) and 435 cases from rural area (25.51%). Similar result found in the study conducted by Lee, YH et al [10] He reported that the majority of cases from urban area 69% and 31% cases from rural area.

In current study seroprevalence of NS1 was 1.87%. Similar result found in the study conducted by Lee, YH et al [10] He reported that the seroprevalence of NS1 was 1.69%.

In current study Anti-DENV IgM positivity rate was 2.99%, Anti-DENV IgG positivity rate was 3.81%. The entire weighted seroprevalence of dengue-specific antibodies (IgM and/or IgG) in the population studied was 6.8%. Among the study subjects, only one sample showed seropositive to both IgM and IgG. Similar result found in the study conducted by Lee, YH et al [10] He reported that the 1308 study subjects, the overall weighted seropositive rate of anti-DENV IgM was 1.76%.

Weighted seropositive rates among females and males were 2.47% (95% CI, 2.42–2.52%) and 1.21% (95% CI, 1.18–1.24%), respectively. The overall weighted seropositive rate of anti-DENV IgG was 3.40% (95% CI, 3.37–3.42%). The weighted seropositive rates among women and men were 3.52% (95% CI, 3.47–3.58%), and 3.27% (95% CI, 3.21–3.32%) respectively. The entire weighted seroprevalence of dengue-specific antibodies (IgM and/or IgG) in the population studied was 6.78%. Among the study subjects, only one sample showed seropositive to both IgM and IgG.

The seroprevalence of dengue antibodies in this study was lower than that reported from the epidemiological study conducted in nearby countries (39.3–59.0%) including Bangladesh and Singapore [13,14], but higher than that reported from Hong Kong (1.6%) [15].

CONCLUSION

Most of the cases found in 12-25 years age group, majority of cases were males, most of cases from urban area, seroprevalence of NS1 was 1.87%. Anti-DENV IgM positivity rate was 2.99%, Anti-DENV IgG positivity rate was 3.81%. The entire weighted seroprevalence of dengue-specific antibodies (IgM and/or IgG) in the population studied was 6.8%.

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