



SEROPREVALENCE OF DENGUE IN RURAL AREAS OF CENTRAL INDIA

Clinical Microbiology

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ABSTRACT

Background: Dengue is one of the under reported public health concern. It is most prevalent in tropical and subtropical countries with Asian countries contribute to 70 % of global burden of dengue. Recently, its endemicity moving towards rural area due to urbanisation. Seroprevalence study provide a more accurate estimate of dengue virus infections in a population. **Aim and Objective:** To determine the seroprevalence of dengue infection in rural areas near Nagpur. **Material and Methods:** This study was conducted from May 2021 to December 2021 under the National Vector Borne Disease Control Programme (NVBDCP) in the Department of Microbiology, Govt Medical College, Nagpur. This is study period was from May 2021 to December 2021. Serum samples of patients presenting with dengue-like symptoms from rural areas of Nagpur were subjected to IgM antibody detection by dengue MAC ELISA. **Result:** Seroprevalence of dengue in rural areas of Nagpur was found to be 10.32%. The most common age group affected was 26-50 years age group and female preponderance found with sex ratio of 1: 1.36. Peak of dengue cases found in September. **Conclusion:** Although dengue infection is more common in urban environment but urbanization of rural areas modifying the dengue virus endemicity.

KEYWORDS

Seroprevalence, NVBDCP, IgM antibody ELISA, Dengue virus

INTRODUCTION:

Dengue is one of the most serious vector-borne viral infection affecting mainly tropical and subtropical countries.¹ The unprecedented global population growth in the past decades, WHO classified dengue as a major international public health concern.² Around 50 million dengue infections are recorded annually around the globe, of which Asian countries contribute to 70% of the global burden of dengue.³ Among a total number of 1,93,245 cases and 346 deaths due to dengue have been reported during 2021 in the India, Maharashtra hold at 3rd position accounting 12,720 cases and 42 deaths of dengue.⁴

Like other developing countries, in India, urbanisation of neighbouring rural areas (which are largely unplanned and lacking in civic amenities) has occurred as a result of the cities' faster growth. Such unplanned urbanisation and highly populated foci might be the strong risk factors for the spread of dengue.⁵⁻⁷ Rural areas in India have become endemic for dengue, escalating the severity of the disease there.

In recent years, there has been a shift in the age distribution of dengue cases, affecting people in the productive age group, toward older age groups.^{8,10} Another significant change is the increasing prevalence of dengue in rural areas, which is progressively rising to the high levels seen in urban areas.^{9,10} To better understand the dynamics of the disease, it is necessary to conduct disease burden studies, long-term "disease and risk factor surveillance," and vector-related research.¹¹

This study therefore aims at determining the seroprevalence of dengue infection in rural areas near Nagpur.

MATERIAL AND METHODS:

This study was conducted under the NVBDC program at the Department of Microbiology, Government Medical College, Nagpur, which is the sentinel centre for Dengue. The study was carried out from May 2021 to December 2021. A total of 252 blood samples of patients presenting with fever and at least three symptoms of the following: myalgia, arthralgia, rash, headache, fever abdominal pain, retro-orbital or ocular pain and haemorrhagic manifestation (i.e. petechiae, purpura, epistaxis, gum bleeding, etc.) were collected from different

rural areas near Nagpur. Serum was separated as per the standard guidelines.^{12,13} Samples were subjected to IgM antibody detection by dengue MAC ELISA and processed as per the manufacturer's instructions.

RESULT:

During this study period of 6 month, a total of 252 serum samples tested for dengue IgM by ELISA of which 26 were identified as positive for dengue IgM antibody. Seroprevalence of dengue in rural areas of Nagpur was found to be 10.32%. There has been found gradual increase in cases from July with peak in September.

Among the 26 dengue seropositive patients, 15 were male and 11 were female with male to female ratio 1: 1.36 as shown in table 1. Age-group wise distribution showed maximum (42.30%) patients were from 26-50 years age group followed by 16-25 years age group (27%).

Table 1. Gender distribution of dengue seropositive patients

Gender	Dengue seropositive patients (%)
Male	11 (42.31%)
Female	15 (57.69%)
Male to female ratio	1:1.36

Table 2. Age-group wise distribution of dengue seropositive patients

Age Group	Dengue seropositive cases (%)
0-5 years	0 (0)
6-10 years	3 (11.53)
11-15 years	4 (15.38)
16-25 years	7 (27)
26-50 years	11 (42.30)
> 50 years	1 (3.85)
Total	26 (100)

DISCUSSION:

In recent decades, dengue is emerged as a notifiable public health problem in terms of the mortality, morbidity and economic burden associated with it.^{14,15} It is caused by an arbovirus of family flaviviridae which is spread by the vector mosquito *Aedes aegypti*, which is a day-

time feeder. Previously thought to be an urban and semi-urban disease, but it has now become endemic in rural India as a result of water storage practises and large-scale development activities in rural areas. Seroprevalence studies could provide a more accurate estimate of DENV infections in a population which is essential to assist policymakers and public health managers to prepare for and control outbreaks with limited resources for both diagnosis and treatment in peripheral rural areas.^{14,16}

In the present study, seropositivity of dengue infection found to be 10.32%. Similarly, in study by Madkey et al¹⁴ from Gondia, Rao et al¹⁷ from Andhra Pradesh and Sood et al¹⁸ from Rajasthan found seroprevalence of dengue of 12.37%, 17.7% and 18.99% respectively. In contrast, high seroprevalence of dengue observed in study by Deshkar et al¹⁹ and Ukey et al²⁰ i.e. 24.49% and 31.3% respectively.

The present study showed gradual rise in cases from July to peak in September. Similar finding also reported in study by Madkey et al,¹⁴ whereas Deshkar et al¹⁹ reported peak in August, September, October and November.

Gender distribution of seropositive patients in the present study showed female preponderance with male to female ratio of 1:1.36. This finding is in concordance with the study by Moses et al,²¹ Vimal et al²² and Das et al²³ who also found female preponderance in their study. In contrast, many other Indian studies like Madkey et al,¹⁴ Deshkar et al,¹⁹ Agrawal et al,²⁴ Ray et al²⁵ and Wali et al²⁶ found a higher number of male patients infected with dengue compared to females.

In general, children have a higher prevalence of dengue infection than adults, but people of all ages are susceptible to dengue infections. In the present study, maximum (42.30%) seropositive patients were from 26-50 years age group followed by 16-25 years age group (27%). In the study by Madkey et al,¹⁴ Gupta et al²⁷ and Kumar et al²⁸ revealed maximum cases in adult age group of 21-30 Years. In our study, no cases found in the age group of 0-5 years, whereas, Rao et al,¹⁷ Deshkar et al¹⁹ and Ukey et al,²⁰ observed maximum cases in the age group of 0-10 years which was 35.84%, 40.50% and 43.90% respectively. High seropositivity in 26-50 years and 16-25 years age group in this area due to might be due to more exposure in outdoor activities like agricultural work, construction work, etc. where body is less covered.

CONCLUSION:

The study draws attention toward a shift in the age and gender distribution of dengue cases which is moving towards older age group with female preponderance. Although dengue infection is more common in urban environment but urbanization of rural areas modifying the dengue virus endemicity.

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