

**"COMMUNITY BASED SEROPREVALENCE SURVEY OF DENGUE FROM SELECTED URBAN AND RURAL AREAS OF AMRAVATI DISTRICT"**

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ABSTRACT **Background:-**Dengue seroprevalence in India reflects the proportion of the population with detectable antibodies against DENV, indicating past exposure to the virus. It serves as a crucial indicator of cumulative dengue transmission within the country. Dengue disease burden is grossly under-estimated in India. High dengue disease burden and frequent outbreaks result in a serious drain on country's economy and stress on the health systems Understanding seroprevalence hence is critical **Objectives:-** To find out seroprevalence of dengue and to assess and compare age and gender wise distribution of seroprevalence of dengue in study population from selected urban and rural areas of Amravati district. **Methodology:-** Community based comparative study in randomly selected urban and rural areas of Amravati district was carried out. Nearly 90 households from randomly selected areas, both from urban and rural regions of Amravati were surveyed. **Results:-** Total of 703 participants were surveyed from selected urban and rural areas of Amravati district. Majority of the study participants i.e. 260(37%) were from 41-60 years of age group. There were 383(54%) female participants and 320(46%) males. Seroprevalence of dengue was 12.37%. Seroprevalence from urban area was 15.14% and that from rural area was 9.63 %. Our study showed higher seroprevalence amongst participants from urban area which was statistically significant. **Conclusion:-** People continue to be at high risk for DENV infections because of the abundance of vector and conducive environment. India urgently needs to strengthen the existing arboviral disease surveillance programme to assess DENV prevalence, vector distribution, and virus serotypes and genotypes.

KEYWORDS : Dengue, Seroprevalence, Urban, Rural

INTRODUCTION

Dengue fever transmitted by mosquitoes is a global health crisis and (DENV, serotypes 1-4) is a highly significant arbovirus found in the tropics and subtropics. Climate changes favor the survival of vector mosquitoes and contribute to increased DENV transmission.¹ Infection with DENV leads to a spectrum of manifestations ranging from mild dengue without and with warning signs and severe dengue characterized by severe bleeding, severe plasma leakage and shock. Most of the infections are asymptomatic, which is the major contributor in driving the virus transmission.^{2,3} Dengue fever is a significant public health challenge in India, leading to varying disease severity upon secondary infection. India experiences seasonal dengue outbreaks, typically coinciding with the monsoon season, posing a substantial burden on the healthcare system and the economy. Dengue seroprevalence in India reflects the proportion of the population with detectable antibodies against DENV, indicating past exposure to the virus. It serves as a crucial indicator of cumulative dengue transmission within the country. Dengue disease burden is grossly under-estimated in India. Dengue has become one of the most important vectorborne diseases over the last few decades, with a steady rise in the global incidence. It is estimated that over two-fifths (2.5 billion) of the world population live in dengue endemic areas, of which 50 million (2%) are infected annually.^{4,5} High dengue disease burden and frequent outbreaks result in a serious drain on country's economy and stress on the health systems Understanding seroprevalence is critical for: Estimating the true burden of dengue, as many infections are asymptomatic or mild and go unreported, Identifying high-risk populations and geographic areas for targeted interventions, informing dengue vaccine introduction strategies in the future.^{6,7}

Rationale Of Study

India reports more than one-fifth of dengue cases in the world. However, the number of dengue cases is severely under-reported. Despite the endemicity of dengue in India, a significant gap exists in our understanding of the dengue seroprevalence in urban and rural area. Current study was planned to find seroprevalence of Dengue from selected urban and rural area of Amravati district.

OBJECTIVES:

1) To find out seroprevalence of dengue from selected urban and rural

areas of Amravati district.

2) To assess and compare age, gender and area wise distribution of seroprevalence of dengue in study population.

MATERIALS AND METHOD

Study setting	Community based comparative study in randomly selected urban and rural areas of Amravati district
Study Design	Simple Random sampling.
Sample population	All selected household occupants were enrolled in study depending on inclusion criteria.
Sample size	Seroprevalence survey from Central India showed dengue seroprevalence ¹ to be 24 %, As per Open epi version 3.1 with 95% confidence interval and 5% error sample size was 345. We visited 90 households from randomly selected areas, both from urban and rural regions of Amravati. Selection of households was done based on systematic random sampling from each area and assuming 4 members in each house hold. We planned total sample to be enrolled as 700 from rural and urban area combined considering non-response.
Sampling Method	We visited 90 households from randomly selected areas, both from urban and rural regions of Amravati. Selection of households was done based on systematic random sampling from each area and assuming 4 members in each house hold. We planned total sample to be enrolled as 700 from rural and urban area combined considering non-response.
Study Duration	(3 months) October-December 2024
Inclusion	• Individuals above 5 years age • Both gender • Giving valid informed written consent of participating in study • [Below 18 years- informed consent of parents/guardians (Assent)]

Exclusion criteria	- Below 5 years of age , - Not willing to give consent and participate in study
Data collection tool	Questionnaire consisted of Pre designed, pre tested proforma on socio-demographic details. Data was collected from June- September 2021 by trained field staff and co- investigators under the supervision of principal investigator. Information was collected as per pre tested questionnaire followed by serological testing. Interviewed participants were called for blood sample collection at UHTC & RHTC centre of Dr. PDMC Amravati respectively. Blood was collected by trained lab technicians and co-investigators.
Statistical analysis	Data generated was entered in MS excel and percentages of basic demographic variables were calculated. Microsoft Excel will be used to generate graphs.
Consent and ethics approval	Institutional ethics committee clearance was obtained before commencing the study. Participant's data was kept confidential and written valid informed consent taken from all participants.

RESULTS

Table 1 –Age And Area Wise Distribution Of Study Participants

Age in Years	Area		
	Urban	Rural	Total
< 20 Years	54 (15.4)	30 (8.5)	84 (12)
20-40 Years	125 (35.7)	117 (33.1)	242 (34.4)
41-60 Years	120 (34.3)	140 (39.7)	260 (37)
above 60 Years	51 (14.6)	66 (18.7)	117 (16.6)
Total	350(100)	353 (100)	703 (100)

(Figures in parenthesis indicates percentages)

Table 1 shows age and area wise distribution of study participants. Majority of the participants i.e. 260(37) were from 41-60 years of age group. There were 120(34.3%) and 140(39.7%) participants from urban and rural area respectively.

Table 2–Gender And Area Wise Distribution Of Study Participants

Gender	Areas		
	Urban	Rural	Total
Male	120 (34.3)	200 (56.7)	320 (46)
Female	230 (65.7)	153 (43.3)	383 (54)
Total	350 (100)	353 (100)	703 (100)

(Figures in parenthesis indicates percentages)

Table 2 shows gender and area wise distribution of study participants. Majority of the participants i.e. 383(54%) were females and there were 320(46%) males. There were 120(34.3%)males and 230(65.7%) females from Urban areas and 200(56.7%) males and 153(43.3%) females from Rural areas respectively.

Table 3–Distribution Of Study Participants As Per Socio-demographic Variables

Variables	Frequency	Percentage
Religion		
Hindu	673	95.8
Muslim	13	1.8
Buddhist	13	1.8
Others	4	0.6
Education		
Illiterate	100	14.2
Primary	87	12.3
Secondary	262	37.3
Higher Secondary	122	17.4
Graduate	132	18.8
Occupation		
Profession	29	4.1
Semi- profession	25	3.6
Clerical	16	2.3
Shop owner	23	3.3

Farmers	61	8.7
Skilled workers	32	4.6
Semi-Skilled workers	117	16.6
Unskilled workers	78	11.1
Unemployed	128	18.1
Housewife	194	27.6
Family Type		
Nuclear	481	68.4
Joint	187	26.6
Three Generation	35	5.0
Total	703	100

(Figures in parenthesis indicates percentages)

Table 3 shows distribution of study participants as per socio-demographic variables. Out of 703 participants, 96% participants belonged to Hindu religion, 37% of participants were educated up to secondary level of education, 28% of participants were housewives followed by unemployed (18%) and semi-skilled (17%). Nearly 68.4% participants belonged to nuclear family.

Table 4– Seroprevalence Of Dengue Among Study Participants

Seroprevalence	Frequency	Percentage
Reactive	87	12.37
Non-Reactive	616	87.63
Total	703	100

(Figures in parenthesis indicates percentages)

Table 4 shows distribution of study population based on seroprevalence. **Seroprevalence of Dengue was 12.37%.**

Table 5– Area Wise Dengue Seroprevalence Among Study Participants

Seroprevalence	Areas		
	Urban	Rural	Total
Reactive	53 (15.14)	34(9.63)	87(12.37)
Non-Reactive	297(84.86)	319(90.37)	616 (87.63)
Total	350 (100)	353(100)	703 (100)

(Figures in parenthesis indicates percentages, Chi-square value=4.92,df=1, p<0.02)

Table 5 shows distribution of study population based on seroprevalence as per place of residence. **Seroprevalence from urban area was 15.14% and that from rural area was 9.63 %.** Our study showed higher seroprevalence of Dengue amongst participants from urban area which was found statistically significant (p<0.02).

Table 6– Gender Wise Seroprevalence Of Dengue Among Study Participants

Seroprevalence	Gender		
	Males	Females	Total
Reactive	34(10.62)	53(13.83)	87(12.38)
Non-Reactive	286(89.38)	330(86.17)	616(87.62)
Total	320(100)	383(100)	703(100)

(Figures in parenthesis indicates percentages, Chi-square value=1.66,df=1, p=0.19)

Table 6 shows Gender wise distribution of study population based on Seroprevalence of Dengue.

Seroprevalence of dengue in males was 39% and in females was 61%. This was not statistically significant (p=0.19).

DISCUSSION

Despite the endemicity of dengue in India, a significant gap exists in our understanding of the dengue seroprevalence in urban and rural area. So the current study was planned to find seroprevalence of Dengue from selected urban and rural area of Amravati district.

Total of 703 participants were surveyed from selected urban and rural areas of Amravati district. Majority of the study participants i.e. 260(37%) were from 41-60 years of age group. There were 120(34.3%) and 140(39.7%) participants from urban and rural area respectively from the above age group as per table 1.

Table 2 shows that majority of the participants i.e. 383(54%) were

females and there were 320(46%) males. There were 120(34.3%) males and 230(65.7%) females from Urban areas and 200(56.7%) males and 153(43.3%) females from Rural areas respectively.

Out of 703 participants, 96% participants belonged to Hindu religion, 37% of participants were educated up to secondary level of education, 28% of participants were housewives followed by unemployed (18%) and semi-skilled (17%). Nearly 68.4% participants belonged to nuclear family as per table no.3.

Seroprevalence of Dengue was 12.37%. Seroprevalence from urban area was 15.14% and that from rural area was 9.63 %. Our study showed higher seroprevalence amongst participants from urban area, which was statistically significant ($p < 0.02$). Seroprevalence of dengue was 39% in males and was 61% in females.

A systematic review and meta-analysis of dengue seroprevalence¹ from various zones of India showed the seroprevalence rates for East, South, North, and Western regions were 35.38% (95% C.I. 14-31%), 11.57% (95% C.I. 2-69%), 38.10% (95% C.I. 9-61%), and 14.87% (95% C.I. 6-38%) correspondingly. DENV is interestingly spreading across the whole country, and the disease's frequency varies a lot from place to place and from 2010-2023.

CONCLUSIONS

People continue to be at high risk for DENV and other arboviral infections because of the abundance of vector and conducive environment. India urgently needs to strengthen the existing arboviral disease surveillance programme to assess DENV prevalence, vector distribution, and virus serotypes and genotypes. Comprehensive approach and integrated attention is a must to stop the spread over time and geographical locations.

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