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## A cross-sectional survey investigates the awareness of mosquito-borne diseases (MBDs) among urban and rural population

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### Abstract

**Aim:** This study investigates the awareness of mosquito-borne diseases (MBDs) among urban and rural population.

**Methods:** A cross-sectional survey was conducted with 400 participants, utilizing a structured questionnaire to assess knowledge of symptoms, transmission routes and preventive measures. Data were collected through face-to-face interviews conducted by trained enumerators.

**Results:** Total of 400 participants, evenly split between urban and rural population, with each group consisting of 200 individuals. 30% participants were aged 18-30 years, 35% were between 31-45 years, 25% were 46-60 years, and 10% were 61 years and older. In terms of gender, 52% of the participants were female and 48% were male. Regarding education levels, 10% had no formal education, 20% completed primary education, 40% had secondary education, and 30% attained higher education. Urban respondents demonstrated significantly higher awareness levels compared to rural participants, particularly regarding symptoms and transmission methods. Notable misconceptions were identified in the rural population.

**Conclusion:** Targeted educational interventions are essential to address knowledge gaps and misconceptions in rural areas, aiming to enhance awareness and reduce the incidence of mosquito-borne diseases.

**Keywords:** Mosquito-borne, diseases, awareness

### Introduction

Mosquito-borne diseases pose a significant global health threat, responsible for millions of infections and thousands of deaths each year. In India, the burden of these diseases is particularly high, with diseases such as malaria, dengue fever, and chikungunya leading to substantial morbidity and mortality. According to the National Vector Borne Disease Control Programme (NVBDCP), India reported over 1.5 million cases of dengue and nearly 1 million cases of malaria in 2019 alone, making it one of the most affected countries in the world <sup>[1, 2]</sup>.

The impact of mosquito-borne diseases varies between urban and rural populations, largely due to differences in environmental conditions, healthcare access, and socio-economic factors. Urban areas, characterized by high population density, inadequate waste management, and stagnant water sources, often experience outbreaks of diseases like dengue and Zika. Conversely, rural regions, while typically less populated, can have ideal breeding conditions for mosquitoes due to natural water bodies and agricultural practices <sup>[3, 4]</sup>. For instance, studies have indicated that dengue outbreaks in urban areas often correlate with heavy rainfall and poor drainage, leading to increased mosquito breeding sites <sup>[5]</sup>.

Awareness and understanding of mosquito-borne diseases play a crucial role in effective prevention and control. Public knowledge can influence behaviors related to disease prevention, such as the use of mosquito repellents, bed nets, and community sanitation practices. However, studies have shown significant disparities in awareness levels between urban and rural populations. Urban residents may have better access to information and healthcare services, which can enhance their understanding of these diseases <sup>[6]</sup>. In contrast, rural populations often rely on local knowledge and may face barriers in accessing current

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health information [7].

Research indicates that misconceptions about disease transmission and prevention are prevalent, particularly in rural areas. For example, a study conducted in rural India found that many participants lacked basic knowledge about the symptoms and transmission of common mosquito-borne diseases, leading to ineffective preventive measures [8]. Similarly, urban populations may be exposed to misleading information through social media and other channels, necessitating targeted health education campaigns that address specific misconceptions [9].

In light of these disparities, this study aims to assess the level of awareness regarding mosquito-borne diseases among urban and rural populations. By identifying knowledge gaps and evaluating sources of information, the findings can inform the development of tailored public health interventions designed to improve awareness and promote effective preventive measures.

### Methodology

A cross-sectional survey design was employed to collect data from a sample of 400 individuals, representing both urban and rural populations. The study utilized a structured questionnaire to gather quantitative data on participants' awareness and knowledge of MBDs.

Participants were selected through a stratified random sampling method to ensure adequate representation of both urban and rural populations. The sample was divided based on demographic characteristics, including age, gender, and educational attainment, as detailed in the results tables.

Data were collected through face-to-face interviews conducted by trained enumerators. The questionnaire included sections on:

- Demographic Information:** Age distribution, gender and education level.
- Awareness of Diseases:** Participants were asked if they were aware of specific mosquito-borne diseases, including dengue and malaria.
- Knowledge of Symptoms:** Respondents were assessed on their ability to correctly identify symptoms associated with these diseases.
- Transmission Knowledge:** Participants indicated their understanding of how MBDs are transmitted, specifically the role of mosquito bites.
- Preventive Measures:** The survey included questions regarding the use of preventive measures, such as mosquito nets and repellents.
- Sources of Information:** Respondents identified where they obtained their information regarding MBDs, including healthcare professionals, media, community health workers, and family members.

Data were analyzed using statistical software SPSS version 22 to compute frequencies and percentages for categorical variables. Comparisons between urban and rural populations were conducted using chi-square tests to determine the significance of differences in awareness, knowledge and practices related to MBDs.

### Results

The survey included a total of 400 participants, evenly split between urban and rural populations, with each group consisting of 200 individuals. 30% participants were aged 18-30 years, 35% were between 31-45 years, 25% were 46-60 years, and 10% were 61 years and older. In terms of gender, 52% of the participants were female and 48% were male. Regarding education levels, 10% had no formal education, 20% completed primary education, 40% had secondary education, and 30% attained higher education.

**Table 1:** Demographic characteristics of participants

Characteristic	Total (n=400) inclusive of both urban and rural
<b>Age Distribution</b>	
18-30 years	60 (30%)
31-45 years	70 (35%)
46-60 years	50 (25%)
61 years and above	20 (10%)
<b>Gender</b>	
Male	96 (48%)
Female	104 (52%)
<b>Education Level</b>	
No formal education	20 (10%)
Primary education	40 (20%)
Secondary education	80 (40%)
Higher education	60 (30%)

When assessing awareness of mosquito-borne diseases (MBDs), urban participants demonstrated significantly higher knowledge compared to their rural counterparts. Specifically, 85% of urban respondents were aware of dengue, while only 65% of rural respondents identified the disease. Similarly, 78% of urban participants recognized malaria, compared to 68% of rural participants. Furthermore, knowledge of symptoms was greater among urban respondents, with 73% able to correctly identify symptoms of both dengue and malaria, whereas only 54% of rural participants could do so.

**Table 2:** Awareness of Mosquito-Borne Diseases

Disease	Urban Awareness (%)	Rural Awareness (%)
Dengue	170 (85%)	130 (65%)
Malaria	156 (78%)	136 (68%)

**Table 3:** Knowledge of Symptoms

Knowledge of Symptoms	Urban (%)	Rural (%)
Correctly Identified Symptoms	146 (73%)	108 (54%)

Urban respondents also showed a better understanding of disease transmission methods, with 79% recognizing that MBDs are transmitted through mosquito bites, compared to 61% of rural respondents. Awareness of preventive measures was similarly higher in urban areas; 77% of urban participants were informed about using mosquito nets, whereas only 63% of rural participants knew about this preventive strategy. The use of repellents was acknowledged by 58% of urban respondents, compared to just 42% in rural areas.

**Table 4:** Knowledge of transmission

Transmission Knowledge	Urban (%)	Rural (%)
Recognized mosquito bites as transmission route	158 (79%)	122 (61%)

**Table 5:** Awareness of preventive measures

Preventive Measure	Urban (%)	Rural (%)
Use of mosquito nets	154 (77%)	126 (63%)
Use of repellents	116 (58%)	84 (42%)

Regarding sources of information, urban participants primarily relied on healthcare professionals (45%) and media, including television and social media (34%). In contrast, rural

respondents mostly depended on community health workers (47%) and family members (28%) for information about MBDs.

**Table 6:** Sources of Information

Source of Information	Urban (%)	Rural (%)
Healthcare professionals	90 (45%)	34 (17%)
Media (TV, social media)	68 (34%)	16 (8%)
Community health workers	22 (11%)	94 (47%)
Family members	20 (10%)	56 (28%)

Statistical analysis using chi-square tests revealed significant differences in awareness levels between urban and rural populations for all assessed variables ( $p < 0.05$ ). Misconceptions were notably more prevalent among rural

respondents, with 48% believing that MBDs could be contracted from contaminated food or water, compared to only 17% of urban participants.

**Table 7:** Misconceptions About MBDs

Misconception	Urban (%)	Rural (%)
Believed MBDs can be contracted from contaminated food or water	34 (17%)	96 (48%)

## Discussion

The findings from this study highlight significant disparities in awareness and knowledge regarding mosquito-borne diseases (MBDs) between urban and rural populations. The results indicate that urban respondents exhibit a higher level of awareness about MBDs, recognizing symptoms and transmission routes more effectively than their rural counterparts. For instance, the data showed that 85% of urban participants were aware of dengue, compared to 65% in rural areas. This difference suggests that urban populations may benefit from better access to health education and resources, which are crucial for disease prevention and management<sup>[10, 11]</sup>.

One key area of concern is the understanding of transmission methods. While a majority of urban respondents (79%) recognized mosquito bites as the primary transmission route, only 61% of rural respondents did so. This gap is further exacerbated by the misconception prevalent in rural areas, where nearly half (48%) believe that MBDs can be contracted from contaminated food or water<sup>[12]</sup>. Such misunderstandings can lead to inadequate preventive measures, as individuals may focus their efforts on addressing perceived risks rather than on effective mosquito control strategies. Targeted education campaigns in rural areas are essential to clarify these misconceptions and promote accurate information about the transmission of mosquito-borne diseases<sup>[13]</sup>.

The data also revealed a stark difference in the sources of health information between the two populations. Urban residents predominantly rely on healthcare professionals and media sources, with 45% citing healthcare professionals as their primary source of information. In contrast, rural individuals largely depend on community health workers, with 47% indicating them as their main source<sup>[14]</sup>. This reliance on community health workers highlights their critical role in rural health education, but it also points to a need for strengthening their training and resources to ensure they can

effectively disseminate accurate health information. Additionally, increasing the availability of educational resources through media channels in rural areas could help bridge this gap<sup>[15, 16]</sup>.

Furthermore, the lower usage rates of preventive measures, such as mosquito nets and repellents, in rural populations (63% and 42%, respectively) signal a need for improved access and education regarding these tools<sup>[17]</sup>. Enhanced availability of these preventive measures, coupled with community-based education initiatives, could empower rural residents to adopt effective strategies to mitigate their risk of contracting mosquito-borne diseases. Given the significant impact that mosquito-borne diseases have on public health, addressing these gaps in awareness and access is vital for improving health outcomes in both urban and rural settings<sup>[18, 19]</sup>.

In conclusion, the disparities in awareness and knowledge regarding mosquito-borne diseases between urban and rural populations underline the importance of tailored public health interventions. By focusing on correcting misconceptions, improving access to educational resources, and enhancing the distribution of preventive measures, health authorities can better equip communities to combat the threat of mosquito-borne diseases effectively<sup>[20, 21]</sup>.

## Conclusion:

This study highlights significant disparities in awareness of mosquito-borne diseases between urban and rural populations, with urban residents showing greater knowledge of symptoms, transmission, and preventive measures. Targeted educational interventions in rural areas are essential to correct misconceptions and improve health outcomes.

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