

# Perception regarding mosquito-borne diseases in rural areas of Belagavi – A community-based cross-sectional study

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## ABSTRACT


**Background:** Mosquito-borne diseases such as malaria, dengue, chikungunya and Japanese encephalitis are a major public health concern in developing nations including India. **Objectives:** The aim of the study is to assess the knowledge, attitude, and public participation in preventing such diseases in rural places of Karnataka. **Materials and Methods:** This cross-sectional study included 360 participants from Primary Health Centers in Vantmuri, Kinaye, and Handiganur Villages, under the Department of Community Medicine, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India. Questionnaire included questions regarding mosquito-borne diseases. **Results:** It was observed from the study that 67% of the participants were aware that mosquitoes transmit diseases. Most of them (35.27%) knew this information through hospitals and health personnel. 34.16% were aware of the fact that malaria and dengue are transmitted by mosquitoes whereas 27.32% were not aware. The major symptoms of mosquito-borne diseases such as fever, headache, and body ache were known to 20.27% people but 27.5% did not know any of them. 20.27% knew that stagnant water is a breeding place for mosquitoes, and only 3.6% people used municipal bins for waste disposal. 43.33% used household utensils to store water and 22.5% used open tanks. Only 65% people used coils for preventing mosquito bites. Cleaning of water bodies (28.33%) and stagnant water (20.55%) was done by a small population regularly. **Conclusion:** More awareness among public about the seriousness of various mosquito-borne diseases, symptoms, breeding places, and proper disposal of wastes is necessary. Public participation is required to control mosquito-borne diseases.

**KEY WORDS:** Mosquito-Borne Diseases; Awareness and Practice; Mosquito Bites; Transmissible Diseases; Prevention

## INTRODUCTION

Vector-borne diseases (VBDs) account for 17% of the global burden of infectious diseases, causing more than 700,000 deaths every year.<sup>[1]</sup> Among vectors, mosquitoes are the deadliest which carry and spread various diseases from one human to another. Most of the mosquito-borne diseases are transmitted by those belonging to the genera: *Anopheles*,

*Aedes* and *Culex*. Malaria transmitted by female *Anopheles* mosquitoes caused 4,38,000 deaths in 2015.<sup>[2]</sup> More than half of the world's population live in the area where *Aedes aegypti* mosquitoes are present, which transmit diseases such as dengue, Zika, yellow fever and chikungunya to humans. *Culex* mosquitoes transmit West Nile fever, Japanese encephalitis and St. Louis encephalitis.<sup>[3]</sup> Morbidities and mortalities associated with these mosquito-borne diseases are emerging as serious public health concerns in many South East Asian countries including India. Increased rate of incidences of such infectious diseases is linked with the socioeconomic conditions and ecological issues such as climate change and biological factors in a region.<sup>[4]</sup> In India, National VBD Control Program is conducting various programs to create public awareness to increase community participation and reduce the burden of VBDs.<sup>[5]</sup> In order to increase public

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participation in controlling the spread of infectious diseases, proper knowledge and awareness about the diseases and various practices required to control the spread is required. The objective of the study is to assess the knowledge and awareness about various mosquito-borne diseases and the practices followed to prevent such infections.

## MATERIALS AND METHODS

Study area included Primary Health Centers in Vantmuri, Kinaye and Handiganur Villages, under the Department of Community Medicine, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India. In this cross-sectional study, information was gathered using semi-structured questionnaire, which was filled by 7 internship students of the 2010 year batch posted in Primary Health Centers. Questionnaire included questions related to knowledge about mosquito-borne diseases, symptoms, sources of breeding, disposal of wastes and personal protection used. Data were collected from 360 people who were above 20 years of age, on outpatient department basis by systematic random sampling.

Participants were classified into different age groups, different classes of socioeconomic and educational status and the type of houses they live in, as shown in Table 1, for collecting the demographic details. These participants were asked to answer

**Table 1:** Demographic details of participants  $n=360$

Variable	<i>n</i> (%)
Gender	
Male	181 (50.28)
Female	179 (49.72)
Age	
20–30	34 (9.45)
31–40	62 (17.22)
41–50	105 (29.17)
51–60	108 (30)
>60	51 (14.16)
Socioeconomic status	
Class I	0
Class II	40 (11.11)
Class III	185 (51.38)
Class IV	125 (34.72)
Class V	10 (2.77)
Literacy	
Illiterate	147 (40.83)
Primary	144 (40)
High school	69 (19.17)
Pre University course	0 (0)
Graduate/Post-graduate	0 (0)
Type of house	
Kaccha	227 (63.05)
Pukka	133 (36.94)

questions regarding the knowledge regarding mosquito-borne diseases and the symptoms of such diseases. Practices which are followed by people in their household such as methods of waste disposal, storing water and the awareness about breeding places of mosquitoes were also included in the study [Table 2]. Participants were also asked to answer questions regarding various preventive measures taken to protect themselves from mosquito bites and to prevent breeding of mosquitoes in their surroundings [Table 3].

## RESULTS

Out of 360 adults included in the study, 181 participants were male and 179 were female [Table 1]. Demographic details such as age, gender, educational qualifications, and socioeconomic status (SES) were collected from the participants. Only those participants who were above 20 years of age were considered. Depending on the age, they were classified under different age groups among which highest number of participants belonged to the group, 51–60 years of age (30%) and lowest number from 20 to 30 years of age (9.45%). More than 40% of people were illiterate and among educated participants, none of them were educated after high school. Almost 63.05% participants lived in “kaccha” houses. 67% of the people were aware of the fact that mosquitoes can spread various diseases. The main sources of information for these people were health personnel and hospitals [Table 2].

Participants were asked whether they were aware of the fact that various diseases such as malaria, dengue, chikungunya and filariasis are transmitted by mosquitoes. It was observed that 10.83% knew that mosquitoes transmit malaria and chikungunya (2.22%) and 27.32% were not aware of any of these mosquito-borne diseases [Table 2]. Among the participants, 20.27% people knew that the symptoms of mosquito-borne diseases are fever, headache and body ache. Many participants knew that drainage (3.61%), stagnant water (20.27%), garbage (20.27%), and open tanks (12.77%) were breeding places of mosquitoes and 1.11% was not aware of any of these sources. Only 3.61% used municipal bins for waste disposal whereas 17.5% people choose open disposal and 18.88% use backyard dumping. People used different means of storing water; 22.5% used open tanks, 43.33% used household utensils and another 22.5% used pots to store water.

Among the various preventive measures used to protect themselves from mosquito bites, it was revealed that 65.83% people used mosquito coils, 28.88% used nets, whereas repellants were used by 0.83% [Table 3]. 34.44% people regularly cleaned water bodies and stagnant water in their surroundings.

## DISCUSSION

Out of 360 adults who participated, 181 participants were male and 179 were female, which represents almost

equal participation from both genders. Among different age groups, highest number of participants belonged to the 51–60 years of age group (30%), whereas only 9.45%

**Table 2:** Knowledge about different mosquito-borne diseases (n=360)

Mosquito-borne diseases	Yes (%)
Aware of the fact that mosquitoes can spread diseases	241 (67)
Source of information	
Health personnel	48 (13.33)
Hospitals	49 (13.6)
TV/newspaper	34 (9.44)
Relatives/friends	92 (25.55)
Health personnel+hospital	127 (35.27)
Relatives+TV/newspaper	3 (0.83)
Hospital+TV	7 (1.94)
Malaria	39 (10.83)
Dengue/Filari	21 (5.83)
Chikungunya	8 (2.22)
Malaria+dengue	123 (34.16)
Malaria+chikungunya	8 (2.22)
Dengue+chikungunya	20 (5.55)
Malaria+chikungunya+dengue	43 (11.94)
Not aware	97 (27.32)
Symptoms	
Fever	22 (6.11)
Fever+headache+body ache	73 (20.27)
Nausea+vomiting	14 (3.88)
Do not know	99 (27.5)
Breeding places of mosquito	
Drainage	13 (3.61)
Stagnant water	73 (20.27)
Garbage	73 (20.27)
Open tanks	46 (12.77)
Drainage+garbage	68 (18.88)
Drainage+stagnant water	58 (16.11)
Garbage+stagnant water	18 (5)
Drainage+stagnant water+garbage+pots	07 (1.94)
Do not know	04 (1.11)
Methods of waste disposal	
Open disposal	63 (17.5)
Municipal bins	13 (3.61)
Backyard dumping	68 (18.88)
Open+backyard dumping	194 (53.88)
Open+municipal bins	22 (6.11)
Method of storing water	
Open tank	81 (22.5)
Pots	81 (22.5)
Household utensils	156 (43.33)
Tanks+household utensils	4 (1.2)

participated from the 20 to 30 years of age group. Even though people from all SES were included in the study, it was observed that more than 40% of participants were illiterate. Among those who were literate, all were educated only up to primary (40%) or high school (19.17%). None of the participants belonged to Class I SES, whereas 51.38% belonged to Class III, 34.72% from Class IV and 11.11% from Class II. 63.05% participants lived in “kaccha” houses which may be because of the rural background. When the participants were asked about the mosquito-borne diseases, it was observed that 67% were aware of the fact that mosquitoes can spread various diseases. However, 33% were not aware that mosquitoes could be potential vectors for many deadly diseases which need urgent attention and awareness programs. The major sources of information for these people were health personnel and hospitals (35.27%) followed by relatives/friends (25.55%) and media (9.44%). Media such as television and radio can be used as good sources for giving important information to public, because even illiterate people who cannot read or write will be able to understand. About 10.83% knew that mosquitoes transmit malaria, chikungunya (2.22%) and dengue/filarial (5.83%), whereas 27.32% were not aware of any of these mosquito-borne diseases. 11.94% people were aware that mosquito transmits malaria, chikungunya and dengue.

Malaria is considered to be the most common disease transmitted by mosquitoes in other studies conducted by Taran *et al.* (2015) and Patel *et al.* (2011).<sup>[2,6]</sup> When the participants in this study were asked about the various symptoms of such mosquito-borne diseases, 6.11% knew that fever is a major symptom and 20.27% knew fever, headache and body ache are symptoms of such infections, but 27.5% did not know any of these symptoms for mosquito-borne diseases. In a study conducted by Dhaduk *et al.* (2013), it was demonstrated that 89% of urban population knew about fever as a major symptom for

**Table 3:** Knowledge about preventive measures against mosquito-borne diseases

Preventive measures	Yes (%)
Coils	240 (65.83)
Repellants	3 (0.83)
Nets	104 (28.88)
Mats	12 (3.33)
None	4 (1.11)
Prevention of mosquito breeding around house	
Regular cleaning of water bodies	102 (28.33)
Prevent stagnation of water	74 (20.55)
Closing of open barrels or pots	46 (12.77)
Regular cleaning+prevent stagnation of water	124 (34.44)
Cutting bushes+regular cleaning+prevent stagnation of water	4 (1.11)
None	10 (2.77)

mosquito-borne disease which is quite high figure when compared to the current study.<sup>[7]</sup> These figures signify the importance of awareness about various mosquito-borne diseases and symptoms so that people can take appropriate treatment without any delay.

The study also included questions regarding knowledge about breeding places of mosquitoes, methods of waste disposal and storing water in their houses by these participants which are important factors in such disease transmission. 3.61% of people knew that drainage is a breeding place for mosquitoes wherein 20.27% each believed stagnant water and garbage to be potential sources. Only 1.94% were aware that any of these such as drainage, garbage, pots, or stagnant water can be a breeding place. Open tanks (22.5%), pots (22.5%) and household utensils were used in most of the households for storing water which can also act as breeding places if not closed properly. Pandit *et al.* (2010) reported that more than 19% believed garbage as breeding place and polluted waters (54.2%) as breeding place for mosquitoes.<sup>[8]</sup> Municipal bins were used by a very small percentage, i.e. 3.61% while most of the people chose to dump wastes in backyard (18.88%) and in open areas (17.5%). To protect themselves from mosquito bites, 65.83% of people used mosquito coils, 28.88% used nets, 3.33% mats and 0.83% used repellants. Mosquito nets were commonly used by people (38.9%) and coils by 53.7% in another study by Pandit *et al.* (2010).<sup>[8]</sup> Patel *et al.* (2011) reported that urban population used liquid mosquito repellants (75.46%) as a common protective measure whereas nets were used by only 9.26%.<sup>[6]</sup> 28.33% people regularly cleaned water bodies around their houses, 20.55% did not allow stagnation of water and 12.77% close their water storages properly, whereas 2.77% did not follow any of these methods of cleaning which can be a serious concern for public health. Thakor *et al.* (2015) conducted a study which reported that there was an improvement in the knowledge regarding mosquito-borne diseases and control measures after conducting education sessions. Such interventions should be conducted regularly to improve the knowledge for better control of various mosquito-borne diseases.<sup>[9]</sup>

As the study included participants who attended the service of Primary Health Centers in villages in Karnataka, it mostly represents people from rural background, thus providing important information regarding the need for proper awareness programs in such places. The questionnaire included assessment of knowledge among participants about important mosquito-borne diseases, breeding places of mosquitoes, method of disposing wastes, hygiene and cleanliness of surroundings and protective measures used against mosquito bites. The importance of this study is that the data collected gives information about the knowledge, attitude and practices of people against mosquito-borne diseases. The limitation of the study is that there were no participants who are educated after high school. More studies which include educated people are required to

assess their knowledge and attitude toward mosquito-borne diseases.

## CONCLUSION

From the study, it is evident that most of the rural population is aware of mosquito-borne diseases through hospitals and health care workers. Government can create awareness among more people through the mass media platforms such as television and radio which can be easily followed by illiterate people also, regardless of their age, gender, or SES. Creating awareness regarding the proper disposal of waste, cleaning the water bodies and surroundings regularly and keeping water storage tanks and utensils always closed is a major factor in community participation which can in turn preventing the transmission of mosquito-borne diseases. Proper knowledge, awareness, and public participation in practicing proper cleanliness are the key factors in preventing such infectious diseases transmitted by mosquitoes.

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