

## Original Research Article

# Awareness of dengue and practice of dengue control measures among urban population in Tamil Nadu, India

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## ABSTRACT

**Background:** The dengue infection has become endemic in India as a result of changing environmental conditions and lack of awareness among the public. So, the present study was conducted with the objectives of studying the awareness of dengue and dengue control practices among urban population in Coimbatore, Tamil Nadu.

**Methods:** The study was of cross sectional design conducted in the fever clinic of Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu. Systemic random sampling was done to select the study participants. A pre-tested, pre-validated semi-structured questionnaire was used to obtain data was obtained from 270 individuals during August to November 2017.

**Results:** Among the study participants, 254 (94.1%) had heard of dengue. Among them, 145 (53.7%) correctly identified the symptoms of dengue, 221 (81.6%) correctly responded that the dengue is transmitted by *Aedes* mosquitoes and 82 (30.4%) had correct knowledge about *Aedes* mosquito breeding places. Younger age group individuals and those with higher education had significantly better awareness about mosquito control measures ( $p < 0.005$ ).

**Conclusions:** Majority of the study population was aware about dengue, only half of them knew about the symptoms of dengue and only one-third correctly knew about breeding habitats of *Aedes* mosquitoes. Therefore, already functioning health campaigns should ensure that the knowledge acquired is put into practice.

**Keywords:** Dengue infection, Awareness, Control practices, Urban area

## INTRODUCTION

Dengue fever is a disease caused by one of the four types of dengue virus. In recent years, dengue infection has spread to all the regions of World Health Organization (WHO).<sup>1</sup> There has been a steady increase in the number of dengue cases reported annually to WHO. It has increased from 0.4 to 1.3 million in the decade 1996–2005, reaching 2.2 million in 2010 and 3.2 million in 2015. Worldwide, in the last decade, the incidence of dengue fever has increased nearly 30 folds by spreading

to new geographical locations and from urban to rural areas.<sup>2</sup>

WHO has recognized dengue virus infection as one of the world's important emerging infectious disease transmitted by arthropod vectors. *Aedes aegypti* mosquito has been implicated as a vector in most of the dengue outbreaks in different parts of the world. More than half of the world's population resides in areas potentially at risk for dengue transmission. This makes dengue one of the most important human viral diseases transmitted by arthropod

vectors in terms of morbidity and mortality caused by the infection. This has made dengue infection as an important international public health concern.<sup>3</sup>

At present, there is no effective antiviral treatment for dengue. The management of the disease is mainly limited to supportive therapy. Further, there are no licensed vaccines for the prevention of dengue infection. So, in the absence of a specific antiviral drug or vaccine, the vector control is one of the most important preventive measures in combating dengue. Recent studies have shown that better knowledge of people regarding causes, signs and symptoms, modes of transmission and preventive measures of dengue leads to better prevention techniques adopted by people to prevent dengue.<sup>4</sup>

Some studies have also highlighted the fact that people having high level of knowledge regarding dengue, use better prevention practices in order to avoid dengue.<sup>5</sup> The knowledge and practice of vector control among the public therefore plays an important role in determining the mortality and morbidity caused by the disease. Therefore, the present study was conducted with the objectives of studying the awareness of dengue and dengue control practices among urban population in Coimbatore, Tamil Nadu.

## METHODS

### *Study setting*

The study was a cross sectional study conducted in the fever clinic of Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu. The study was conducted from August 2017 to November 2017.

### *Sample size*

The sample size was calculated by assuming the prevalence of good awareness among the study population as 50%. The minimum sample size for this study using the formula,  $n = z^2 pq / d^2$ , where  $n$  = minimum sample size;  $z$  = 1.96 at 95% confidence interval obtained from standard statistical table of normal distribution;  $p$  = estimated prevalence of self-medication in a given population (50% or 0.5);  $q$  = precision i.e. (1- $p$ ) or 0.5 and  $d$  = relative error of 5%. Using this formula the minimum sample size calculated was 264. In the present study, data was collected from 270 individuals.

### *Sampling and study population*

The study population was the patients attending the fever clinic of the Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu. Systematic random sampling technique was used in selecting the study participants. Every third patient coming to the fever clinic was included in the study. The process was continued till

the required sample size was reached. Finally, the data was collected from 270 study participants.

The inclusion criteria were – 1) individuals above the age of 18 years and 2) willing to participate in the study. Those individuals with severe symptoms and signs of dengue were excluded from the study to ensure immediate treatment.

### *Data collection*

The study participants were given subject information sheet and explained about the objectives of the study. Written informed consent was obtained from them. Then, the study participants were interviewed using pre-tested, pre-validated, semi-structured questionnaire by trained investigators in their local language i.e. Tamil.

### *Study tool*

The study tool comprised of three sections. The first section contained information regarding socio-demographic details of the participants such as age, sex, education and socio-economic status. The second section contained questions which assessed the awareness of mosquito borne illnesses among the study participants particularly dengue and the third section had questions about vector control practices.

### *Statistical analysis*

The data was entered in Microsoft Excel Spread Sheet. The study questionnaire was checked for completeness and correctness of data before entering into the worksheet. Data validation checks were performed at regular intervals. Data was analyzed with Statistical Package for Social Sciences (SPSS) version 21.0. The qualitative variables are described in the form of proportions and the differences in proportions were tested using Chi-square test. The quantitative variables are described in the terms of mean, median, range and standard deviation. All the data was checked for normality before applying appropriate tests of significance.

### *Ethical issues*

The study was conducted after obtaining the approval of institutional ethical committee (IEC). The confidentiality of the study participants were maintained at all the stages of the study.

## RESULTS

### *Socio-demographic profile*

The study was carried among 270 study participants with a response rate of 100%. Among them, 138 (51.1%) were males and 132 (48.9%) were females. The mean age of

the study participants were 39.16 years with a standard deviation of 15.86 years. The minimum and maximum ages were 18 and 76 respectively. The illiterates among

the study population were found to be 26 (9.63%). Most of them belong to socio-economic class II (40.2%) (Table 1).

**Table 1: Socio-demographic profile of the study participants (n=270).**

S.No	Socio-demographic profile		Number (%)
1	Sex	Male	138 (51.1)
		Female	132 (48.9)
2	Age	18 – 30 years	88 (32.6)
		31 – 45 years	111 (41.1)
		46 – 60 years	35 (13.0)
		> 60 years	36(13.3)
3	Education	Illiterate	26 (9.6)
		Primary	40 (14.8)
		Middle	54 (20.0)
		Higher secondary	67 (24.8)
		Graduate and above	83 (30.8)
		I	112 (41.8)
		II	94 (34.7)
		III	64 (23.5)

\* Modified BG Prasad's classification (2016).

**Table 2: Awareness regarding dengue among the study participants (n=270).**

S.No	Awareness regarding dengue		Number (%)
1	Heard about dengue	Yes	254 (94.1)
		No	16 (5.9)
2	Source of information*	Television	196 (72.8)
		Health care provider	111 (41.2)
		Newspapers	65 (24.1)
		Public displays	51 (18.9)
		Radio	41 (15.2)
		Others	19 (7.1)
3	Symptoms of dengue	Correct response	145 (53.7)
		Incorrect response	125 (46.3)
4	Dengue mosquito breeding habits*	Stagnant dirty water	210 (77.8)
		Stagnant clean water	82 (30.4)
		Plants and vegetation	14 (5.2)
5	Knowledge of preventive measures*	Keeping surroundings clean	248 (91.8)
		Proper drainage	230 (85.2)
		Removal of artificial collection of water	121 (44.8)
6	Preference to seek treatment for dengue	Public health facilities	162 (60.0)
		Private clinics	57 (21.1)
		Self medication	51 (18.9)

\* Multiple responses possible.

### Awareness about dengue

Most of the study participants, 254 (94.1%) were aware about dengue. The main source of information about was television (72.8%), followed by health care providers (41.2%) and newspapers (24.1%). Nearly ninety percent (89.6%) of the study population was aware that the dengue is transmitted by mosquitoes. Among them, 221 (81.6%) of participants correctly responded that the

dengue is transmitted by *Aedes* mosquitoes. Among the study participants, 14 (5.1%) had previous dengue infection. More than half of them, 145 (53.7%) responded correctly about the symptoms of dengue. Regarding the breeding places for mosquitoes, most of them said that *Aedes* mosquitoes breed in stagnant dirty water (77.8%). About 91.8% of the study participants said that the mosquitoes can be controlled by keeping the surroundings clean. About 162 (60%) preferred

government hospitals to get treatment for fever, 57 (21.1%) preferred private clinics and 51 (18.9%) took self treatment. About 47 (17.4%) had used Nilavembu water (Table 2).

### Practice of mosquito control measures

Most of the study participants, 149 (55.2%) were using mosquito repellents in their home to prevent mosquito

bites. Only 43 (15.9%) were using mosquito nets. When the study participants were asked regarding the most effective way of controlling mosquitoes, most of them, 171 (63.3%) were of the view that only chemical measures such as insecticide sprays and fogging are effective in controlling mosquitoes. Only, 93 (34.4%) were of the view that environmental measures are the most effective control measure for preventing the occurrence of dengue infection (Table 3).

**Table 3: Practices of mosquito control measures among the study population (n=270).**

S.No	Practices of mosquito control measures	Number (%)
1	Personal protective measures*	Mosquito repellents
		149 (55.2)
		Mosquito nets
		43 (15.9)
2	Most effective measure	Repellent cream
		21 (7.8)
		Repellent sprays
		14 (5.2)
		Chemical
		171 (63.3)
		Environmental
		93 (34.4)
		Biological
		6 (2.3)

\* Multiple responses possible.

**Table 4: Association of knowledge about *Aedes* mosquito breeding habits and preventive measures with socio-demographic profile (n=270).**

S.No	Socio-demographic profile		Aware about <i>Aedes</i> mosquito breeding habits			Aware about at least one preventive measure		
			Yes (N=82)	No (N=188)	P value	Yes (N=162)	No (N=108)	P value
1	Sex	Male	40 (29.6)	95 (70.4)	0.798	84 (62.2)	51 (37.8)	0.691
		Female	42 (31.8)	90 (68.2)		78 (59.1)	54 (40.9)	
2	Age	<30 years	49 (55.7)	39 (44.3)	0.000	64 (72.7)	24 (27.3)	0.004
		≥30 years	33 (18.1)	149 (81.9)		98 (53.9)	84 (46.1)	
3	Education	Illiterate and school education	14 (7.5)	173 (92.5)	0.000	91 (48.7)	96 (51.3)	0.000
		Graduate and above	68 (81.9)	15 (18.1)		71 (85.5)	12 (14.5)	
4	Socio-economic class*	I and II	61 (29.6)	145 (70.4)	0.741	148 (71.8)	58 (28.2)	0.000
		III	21 (32.8)	43 (67.2)		14 (21.9)	50 (78.1)	

\* Modified BG Prasad's classification (2016).

It was found that younger age group individuals (<30 years) were significantly aware about the *Aedes* mosquito breeding habits ( $p=0.000$ ) and mosquito preventive measures ( $p=0.004$ ). The proportion of participants who had higher education (graduate and above) was better aware about *Aedes* mosquito breeding habits when compared to those who had lesser education ( $p=0.000$ ). It was also found that the awareness about mosquito preventive measures was significantly higher in higher socio-economic class ( $p=0.000$ ) (Table 4).

## DISCUSSION

The present study was done to explore the level of awareness and practice of mosquito control activities in an urban population in the state of Tamil Nadu, which has frequently been affected by dengue outbreaks in the recent past in every post monsoon season. We have found

that the knowledge and awareness about dengue and mosquito control measures were significantly higher in younger age groups and those who had received higher education. These findings were similar to the results obtained by studies conducted in Delhi separately by Kohli et al and Sharma et al.<sup>6,7</sup>

We had found that 94.1% of the study population had heard about dengue. This is higher when compared to the results a study done in North Indian city by Malhotra et al where only 60% of people knew about dengue.<sup>8</sup> But, the results of the study were similar to that obtained by Chellaiyan et al conducted near Chennai where 93.7% of the study participants knew about dengue.<sup>9</sup> This could be due to the fact that because of frequent outbreaks of dengue in South India when compared to North India and also due to awareness campaigns carried out by the government agencies.

In the present study, nearly ninety percent (89.6%) of the study population was aware that the dengue is transmitted by mosquitoes. Among them, 82% of participants correctly responded that the dengue is transmitted by *Aedes* mosquitoes. In the study conducted by Malhotra et al, 72.62% of the study population were aware about mosquitoes transmitting dengue while Chellaiyan et al had reported 89%.<sup>8,9</sup> The result of the present study was also in accordance with a study done in Thailand by Swaddiwudhipong et al.<sup>10</sup>

In our study, more than fifty percent (53.7%) of the study population had correctly responded to the symptoms of dengue infection. This result is significantly less when compared to the results of the study done by Gupta et al.<sup>11</sup> in rural and slum areas of Delhi where 92% of the respondents correctly responded that dengue fever will result in fever followed by headache. In another study conducted by Benthem in Thailand, more than 90% of the respondents identified the symptoms of rash and bleeding specific for dengue infection to distinguish it from other similar illness.<sup>12</sup> This is very important as the correct knowledge about the symptoms of dengue helps in early reporting to the healthcare systems.

The present study has also highlighted the fact that only about one-third of the study participants were aware about the correct breeding habitat of *Aedes* mosquitoes. This result was significantly lower when compared to the results of the study done by Matta et al in which 79.8% knew about the correct breeding places of *Aedes* mosquitoes.<sup>13</sup> Therefore, there is a substantial gap in our study regarding correct knowledge about the breeding places of *Aedes* mosquitoes which needs to be addressed immediately by information, education and communication (IEC) campaigns and targeted interventions.

When asked about the mosquito control practices, the majority of the study participants of our study had reported using mosquito repellents in the form of coils (55.2%) followed by mosquito nets, repellent creams and repellent sprays. In previous studies by Malhotra et al and Itrat et al, the study participants were aware of various mosquito control measures like window screening, mosquito coil, liquid vaporizer and repellent cream.<sup>8,14</sup> In rural areas, people reported using smoke to drive away the mosquitoes.

The study also has some limitations. The study was conducted in a clinical setting which makes it difficult to generalize the results obtained in the study. But, the results of the study can be used in planning targeted interventions in clinical settings. Similar studies can be done in a community on a wider scale to obtain the real picture about the knowledge, awareness and mosquito control practices among the urban population. Qualitative research methods like focused group discussions can be utilized in further studies to have an in-depth knowledge about these objectives among the study population.

## CONCLUSION

The results of our study has clearly highlighted the fact that although majority of the study participants knew about dengue, only half of them were able to correctly identify the symptoms of dengue and only one-third had correct knowledge about the breeding habitats of *Aedes* mosquito. Therefore, it is recommended that the information, education and communication (IEC) campaigns should be more aggressive on preventive strategies. Already functioning health campaigns should ensure that the knowledge acquired is put into practice.

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