

# Dengue awareness and its determinants among urban adults of Rohtak, Haryana

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## ABSTRACT

**Context:** Despite so many efforts to control dengue, the disease has a huge impact on the health, well-being, and economy of the population. The key success to control dengue depends not only on services provided by health authorities but also on the awareness of the community about preventing practices and their health-seeking behavior. Hence, the present study was conducted to assess the awareness regarding dengue and its determinants among urban adult population of Rohtak. **Aims:** To assess the awareness regarding dengue and its determinants among urban adult population of Rohtak. **Settings and Design:** A cross-sectional study. **Methods and Materials:** Data were collected using a pretested, semi-structured interview schedule from 210 participants which included information on the demographic profile of the subject, awareness about the symptoms, transmission, vector behavior in terms of biting time and breeding places, preventive measures and treatment of dengue fever, and responsibility of vector control. Cumulative awareness was calculated on the basis of correct answers provided. **Statistical Analysis Used:** Categorical data were presented as a percentage. Pearson's Chi-square test was used to evaluate differences between groups for categorical variables. **Results:** The level of awareness was better among males (statistically significant). The difference in the level of awareness with respect to education, occupation, and the socioeconomic class was found highly statistically significant. **Conclusions:** Awareness regarding dengue and its preventive measures were specifically low in women; mostly housewives, in participants of the lower socioeconomic group, and those who were illiterate.

**Keywords:** Awareness, dengue, mosquito-borne disease

## Introduction

Dengue is an acute viral disease transmitted by female *Aedes* mosquito that manifests systemically. It has established itself globally in both endemic and epidemic transmission cycles. Since the global incidence of dengue has grown dramatically in recent decades, about half of the world's population is now at risk. There are an estimated 390 million infections each year. In the last three decades, dengue cases have dramatically increased; however, only in the last 6 years, the number of dengue cases

reported to WHO has increased ~6 fold i.e., from <0.5 million in 2010 to over 3.34 million in 2016.<sup>[1]</sup>

In India, dengue is a major public health problem, leading cause of hospitalization and death, hyperendemic with all four serotypes circulating in urban areas and spreading to rural areas.<sup>[2]</sup> Dengue is endemic in 35 states/union territories. The highest number of cases were reported from Karnataka followed by Maharashtra, Uttarakhand, Telangana, and Gujarat. Reasons behind this explosive growth of dengue cases include explosive population growth, unplanned urbanization, inadequate public health systems, climate change, poor control of standing water and vectors, viral evolution and increased international recreational, business, and military travel to endemic areas.<sup>[3]</sup>

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Dengue in human is often inapparent and leads to a wide range of clinical manifestations, from mild fever to potentially fatal dengue shock syndrome.<sup>[4]</sup> Dengue should be suspected when a high fever (40°C/104°F) is accompanied by two of the following symptoms: severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands, or rash. Symptoms usually last for 2–7 days, after an incubation period of 4–10 days after the bite from an infected mosquito.<sup>[1]</sup> CDC recommends that within the first week of illness, diagnostic testing should include a test for dengue virus (RT-PCR or NS1) and IgM anti-DENV. For patients seen more than 1 week after fever onset, IgM anti-DENV antibody detection is preferred.<sup>[5]</sup>

Symptomatic management is the key for dengue treatment which includes adequate hydration, paracetamol for fever or myalgia, and evaluation for impending complications such as early evidence of dengue hemorrhagic fever or dengue shock syndrome. There are no specific medications to treat a dengue infection. This makes prevention the most important step, and prevention means avoiding mosquito bites. Vector control is one of the effective methods of controlling and preventing dengue fever.<sup>[6,7]</sup>

While there are many methods of mosquito control, an integrated approach is recommended to avoid excessive use of any one method and to combine one or more methods. The most important step in reducing the number of mosquitoes is to eliminate their breeding places. It comprises minor engineering methods such as filling, levelling, and drainage of breeding places. The environment should be cleaned up and got rid of water-holding containers such as discarded tins, empty pots, broken bottles, coconut shells, and other artificial collections of water.<sup>[8]</sup>

The application of oil to water is one of the oldest known mosquito control measure. The oils most widely used are diesel oil, fuel oil, and kerosene oil.<sup>[9]</sup> Adult mosquitoes are most commonly controlled by spraying houses with residual insecticides. DDT (1–2 g/m<sup>2</sup>) is the insecticide of choice. Insecticide-treated bed nets have long been used to prevent dengue. Environmental Protection Agency (EPA)-registered insect repellents should be used with one of the active ingredients below. When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breastfeeding women.<sup>[10]</sup>

Although various studies have been conducted in different parts of India as knowledge, attitude and practices (KAP) surveys regarding dengue, very-few community-based studies have been conducted regarding dengue awareness and related sociodemographic factors in India and none in Haryana (endemic for dengue). With the same intention to know the prevalence of awareness regarding dengue fever and its associated factors, the present study was conducted.

## Subjects and Methods

The present study was carried out in the urban field practice area of the Department of Community Medicine, PGIMS, Rohtak

Haryana from April 2018 to March 2019. The urban area is being served by 3 urban health posts (UHPs) and 14 Anganwadi centers. Multistage simple random sampling was employed for the selection of participants. Six Anganwadi centers were randomly selected and 35 houses (one participant from each house) from each selected Anganwadi center were visited. Adult population residing in the study area for more than 12 months were included in the study. Subjects having a gross hearing impairment, diagnosed organic brain pathology, articulation disorder, or not willing to participate were excluded from the study.

The prevalence of awareness regarding dengue fever varies from 34.5% to 90%.<sup>[11-16]</sup> Thus, considering the prevalence of 34.5% and allowable error 20% of prevalence, the sample size was fixed to 189. The final study was carried out among 210 participants (35 houses in each of AWC area). The permission of the institutional ethics committee was obtained before the commencement of study (Date of ethical approval is 20-03-2018).

Data were collected using a predesigned, pretested, semi-structured interview schedule including information on the demographic profile of the subject and his/her awareness about the symptoms, transmission, vector behavior, preventive measures, treatment of dengue fever, and responsibility of vector control [Table 1]. Socioeconomic status of the study population was measured using modified Kuppaswami Scale.<sup>[17]</sup>

The binomial questions (15 in number) from the questionnaire were taken into account for calculating cumulative awareness which was further categorized into poor (score  $\leq 7.5$  i.e.  $\leq 50\%$ ), satisfactory (score 7.5–10.75 i.e. 50%–75%), and good knowledge ( $> 10.75$  i.e.  $> 75\%$ ) on the basis of calculated scores. Cutoff values for scoring were taken in accordance with the study done by Kumar *et al.*<sup>[18]</sup> Mean score was calculated. Categorical data were presented as a percentage (%). Pearson's Chi-square test was used to evaluate differences between groups for categorical variables.

## Results

Mean age of participants was  $36.3 \pm 12.4$  years with 82.4% females. Majority of participants (83.33%) were married. Almost all (98.1%) respondents were Hindu. One-fourth (27.6%) belonged to the general category, 41.4% to OBC, and 31% belonged to SC/ST category. Majority of participants, (46.7%) belonged to a joint family. Moreover, the majority of participants (71.9%) were residing in pukka houses. Almost two-thirds of the participants i.e. 63.8% were unemployed and 38.6% of participants belonged to the upper lower class.

Awareness regarding dengue was categorized into poor, satisfactory, and good knowledge on the basis of calculated scores. The number of candidates having poor, satisfactory, and good knowledge scores were 170 (81.0%), 38 (18.0%) and 2 (1.0%), respectively. The mean score was  $5.58 \pm 2.19$ . When

**Table 1: Responses of participants**

Question	Response	No of participants (%)
1 Ever heard about dengue?	Yes	96.2
2 Knowledge of transmission of dengue from one person to another?	Yes	41
3 Can differentiate between mosquito causing malaria and dengue?	Yes	2.9
4 Knowledge about the cause of dengue?	Mosquito bites	71.9
5 Can name of mosquito causing dengue?	Aedes	11.4
6 At what time does dengue mosquito bite?	Day	60.5
7 Can differentiate between symptoms of malaria and dengue?	Yes	18.1
8 The season during which dengue occurs mostly?	Rainy/Post rainy	64.3
9 Knowledge about drying day?	Yes	1.4
10 Name the test to diagnose dengue?	ELISA/Platelet	4.7
11 Which medicines should be given?	PCM	34.3
12 Which medicines should be avoided?	Brufen Aspirin	4.8
13 Are you at risk of dengue?	Yes	34.8
14 Awareness about self-role in controlling dengue?	Yes	51
15 Awareness about penalty in case dengue larva is found at home?	Yes	46.7

the awareness was correlated with sociodemographic factors, the observations were as follows:

The level of awareness was better among males in comparison to females and this difference was statistically significant. Although participants belonging to the nuclear family were having more satisfactory awareness in comparison to joint and three generations of family, no statistically significant difference was found between the level of awareness and type of family. Besides, the level of awareness was not found significantly associated with marital status. When the awareness was compared among different caste, more participants belonging to general category were having satisfactory knowledge in comparison to OBC and SC/ST. This difference was found statistically significant. Majority of illiterates (96.8%) were having poor awareness and none had good knowledge. The difference in the level of awareness with respect to education was found highly statistically significant ( $P = 0.02$ ). When the occupation of respondents was compared with the level of awareness, most of the unemployed (85.8%) were having poor knowledge and only 14.2% were having satisfactory awareness. While among professionals, 27.3% were having satisfactory awareness and 9.1% were having good awareness. The difference in the level of awareness with respect to occupation was found

statistically significant ( $P = 0.03$ ). All the participants belonging to lower socioeconomic status had poor awareness and 25% of participants belonging to upper socioeconomic status had good knowledge. The difference in the level of awareness with respect to socioeconomic class was found highly statistically significant ( $P < 0.001$ ) [Table 2].

## Discussion

Awareness regarding dengue was categorized into poor, satisfactory, and good knowledge on the basis of calculated scores. The number of candidates having poor, satisfactory, and good knowledge was 170 (81%), 38 (18%) and 2 (1%), respectively. The mean score was  $5.58 \pm 2.19$ . Similar findings were observed in a study conducted by Churi *et al.* in Mysore where low knowledge, moderate knowledge, and high knowledge was 87%, 13%, and 0%, respectively.<sup>[19]</sup> Tram *et al.* also observed similar findings.<sup>[20]</sup>

In the study conducted by Kumar *et al.* high score, medium score, and low score were seen in 50.9%, 42.5%, and 6.6%, respectively. The baseline good knowledge score was higher as the study was done among school teachers.<sup>[18]</sup> In a study done by George *et al.* in rural Kerala good awareness and poor awareness were seen in 49.5% and 50.5% participants, respectively.<sup>[21]</sup>

In the present study, the level of awareness was better among males in comparison to females and this difference was statistically significant. The reason might be that most of the females were housewives and had less exposure to the outer environment and ongoing information, education and communication (IEC) activities. Krishnamoorthy *et al.* found that females were having higher knowledge, adequacy, although it was not statistically significant.<sup>[22]</sup> Churi *et al.* and Rozita *et al.* reported that awareness was better in females which is in contrast with our study results.<sup>[19,23]</sup> This may be due to studies in different geographical settings and difference in literacy level.

In our study, the level of awareness was not found significantly associated with age and marital status. Contrarily, Krishnamoorthy *et al.* reported that unmarried individuals were having higher knowledge adequacy.<sup>[22]</sup> Although it was not statistically significant. The reasons for unmarried having higher knowledge may be that they are free from family responsibilities are more involved in the outer environment. Consequently, their exposure to different ongoing awareness activities may be better.

More participants belonging to general category were having satisfactory knowledge in comparison to OBC and SC/ST. This difference was found statistically significant. No statistically significant association was found between the level of awareness and type of family and type of houses. These aspects could not be compared due to the paucity of data.

The difference in the level of awareness with respect to education and occupation was found highly statistically

Table 2: Level of awareness with a sociodemographic profile (n=210)

		Awareness			Total	X <sup>2</sup> , df, P
		Poor	Satisfactory	Good		
Gender	Males	24 (64.9%)	11 (29.7%)	2 (5.4%)	37 (100.0%)	14.14, 2, <0.001
	Females	146 (84.4%)	27 (15.6%)	0 (0%)	173 (100.0%)	
Type of family	Nuclear	62 (74.7%)	20 (24.1%)	1 (1.2%)	83 (100.0%)	3.74, 4, 0.44
	Joint	83 (84.7%)	14 (14.3%)	1 (1.0%)	98 (100.0%)	
	3 Generation	25 (86.2%)	4 (13.8%)	0 (0.0%)	29 (100.0%)	
Marital status	Unmarried	17 (85.0%)	3 (15.0%)	0 (0.0%)	20 (100.0%)	2.20, 8, 0.97
	Married	139 (79.4%)	34 (19.4%)	2 (1.1%)	175 (100.0%)	
	Divorcee	1 (100.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
	Widow	12 (92.3%)	1 (7.7%)	0 (0.0%)	13 (100.0%)	
	Separated	1 (100.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
Caste	General	40 (69.0%)	18 (31.0%)	0 (0.0%)	58 (100.0%)	11.77, 4, 0.01
	OBC	73 (83.9%)	12 (13.8%)	2 (2.3%)	87 (100.0%)	
	SC/ST	57 (87.7%)	8 (12.3%)	0 (0.0%)	65 (100.0%)	
Education	Professional degree/Honors	14 (82.4%)	2 (11.8%)	1 (5.9%)	17 (100.0%)	22.87, 12, 0.03
	Graduate/Postgraduate	47 (78.3%)	13 (21.7%)	0 (0.0%)	60 (100.0%)	
	Intermediate/post high school	15 (75.0%)	5 (25.0%)	0 (0.0%)	20 (100.0%)	
	High school	21 (61.8%)	12 (35.3%)	1 (2.9%)	34 (100.0%)	
	Middle school	28 (87.5%)	4 (12.5%)	0 (0.0%)	32 (100.0%)	
	Primary school	15 (93.8%)	1 (6.2%)	0 (0.0%)	16 (100.0%)	
	Illiterate	30 (96.8%)	1 (3.2%)	0 (0.0%)	31 (100.0%)	
Occupation	Professional	7 (63.6%)	3 (27.3%)	1 (9.1%)	11 (100.0%)	22.04, 12, 0.03
	Semi-professional	7 (100.0%)	0 (0.0%)	0 (0.0%)	7 (100.0%)	
	Clerical/shop owner/farmer	6 (66.7%)	3 (33.3%)	0 (0.0%)	9 (100.0%)	
	Skilled worker	11 (68.8%)	4 (25.0%)	1 (6.2%)	16 (100.0%)	
	Semi-skilled worker	16 (72.7%)	6 (27.3%)	0 (0.0%)	22 (100.0%)	
	Unskilled worker	8 (72.7%)	3 (27.3%)	0 (0.0%)	11 (100.0%)	
	Unemployed	115 (85.8%)	19 (14.2%)	0 (0.0%)	134 (100.0%)	
SEC	Upper Class	3 (75.0%)	0 (0.0%)	1 (25.0%)	4 (100.0%)	32.45, 8, <0.001
	Upper middle Class	44 (81.5%)	10 (18.5%)	0 (0.0%)	54 (100.0%)	
	Lower middle Class	49 (72.0%)	18 (26.5%)	1 (1.5%)	68 (100.0%)	
	Upper lower Class	71 (87.7%)	10 (12.3%)	0 (0.0%)	81 (100.0%)	
	Lower Class	3 (100.0%)	0 (0.0%)	0 (0.0%)	3 (100.0%)	

significant ( $P < 0.05$ ). Acharya *et al.* reported a highly significant association between knowledge and literacy.<sup>[16]</sup> Itrat *et al.* also reported that literate people were relatively well-informed in comparison to illiterate ( $P < 0.001$ ).<sup>[24]</sup>

Contrarily, Joseph *et al.* and Alobuia *et al.* reported no association between knowledge and sociodemographic profile.<sup>[25,26]</sup>

In a study by Kumar *et al.*, knowledge score was not associated with sociodemographic factors.<sup>[18]</sup> The reasons may be that all participants were school teachers belonging to almost similar education, income, and socioeconomic class and the sample was not representative of the general community. In our study, most of the unemployed had poor knowledge (85.8%) while Krishnamoorthy *et al.* found that unemployed individuals were having higher knowledge adequacy.<sup>[22]</sup> Rozita *et al.* and Syed *et al.* also revealed that there was no significant association between knowledge and economic status.<sup>[23,27]</sup> In the present study, all the participants of the lower socioeconomic class had poor awareness while in a study conducted by Krishnamoorthy *et al.*

participants belonging to lower socioeconomic status were having higher knowledge adequacy. This finding might be due to better healthcare services and IEC activities provided by the healthcare worker of that specific geographical area.

## Conclusion and Recommendation

Awareness regarding dengue and its preventive measures was specifically low in women; mostly housewives, in participants of the lower socioeconomic group, and those who were illiterate. Therefore, efforts should be made on the under-served group to control these endemic diseases. Healthcare personnel, being a primary healthcare provider at the ground root level, should disseminate the knowledge regarding dengue and its preventive measures to the community, especially housewives and lower socioeconomic strata. Anganwadis centers and healthcare centers can be utilized as platforms for dissemination of knowledge.

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## Conflicts of interest

There are no conflicts of interest.

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