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Original Research Article

Knowledge and awareness towards dengue infection and its prevention: a cross sectional study from rural area of Tamil Nadu, India

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ABSTRACT

Background: Dengue infection transmitted by *Aedes aegypti* is endemic in India. Environmental changes and lack of awareness result in increase in transmission of dengue infection and rise in dengue outbreaks. The present study was conducted to determine the knowledge of dengue infection and practices towards dengue prevention among a rural population in Kancheepuram district of Tamil Nadu.
Methods: The study was cross sectional study, conducted in Kadambadi village of Kanchipuram district, Tamil Nadu. The study was conducted among 224 study participants from June - August 2016. Systematic random sampling was followed for selecting the houses. A pretested, semi structured questionnaire was used. Significance of difference in proportions (qualitative variables) was calculated using Chi square test. Significance of p value was taken as $p< 0.05$.
Results: Among the study participants, 210 (93.7%) heard about dengue infection. Fifty percent of participants responded correctly the symptoms of dengue infection. 89% responded correctly that dengue is transmitted by *Aedes* mosquito. Around 40% of the participants had correct knowledge about the breeding habitat and biting habit of *Aedes* mosquito. Study participants use various methods - mosquito coils (63.4%), mosquito nets (14.7%) for mosquito bite prevention. 24.1% does not follow any method of mosquito bite prevention.
Conclusions: Though majority of the study participants heard about dengue symptoms and mosquito transmitting dengue infection, less than half were aware about breeding habits of *Aedes* mosquito and 25% did not follow any method of mosquito bite prevention practices. Community awareness is a key role in improvising dengue prevention practices.

Keywords: Awareness, Dengue infection, Knowledge, Practices, Rural area

INTRODUCTION

Dengue a mosquito-borne viral disease has rapidly spread in all regions of WHO in recent years.[1] The number of dengue cases reported annually to WHO 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.[2] In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries and in the present decade, from urban to rural settings.[3] The estimated global annual incidence of symptomatic cases is about 50 million – 100 million who were predominantly from Asia, followed by Latin America and Africa.[4]

In India, 16517 cases and 545 deaths were reported during 1996 dengue outbreak after which there was upsurge of cases from 2010 onwards. In 2015, 99913

cases have been reported which were higher than the cases reported in 2014. Tamil Nadu reported 4.5% of the national burden in the year 2015.[5,6] Overall burden of disease is appearing sleek due to the substantial under-reporting of dengue within health systems. [7]

The disease was mainly restricted to urban and semi-urban areas of the country because of the availability of favorable breeding sites of dengue vector. However, over period of time there was a paradigm shift in the trend of incidence of dengue from urban to rural areas due to urbanization, industrialization, large scale development activities and rapid transportation which made the rural areas favorable for dengue vector breeding. These developments have resulted in frequent outbreaks of dengue in rural areas of the country.[8] Rapid population growth, lack of correct knowledge about dengue infection and preventive measures, environmental changes and increased breeding of *Aedes* in the living premises resulted in higher transmission of disease.[9,10]

Considering the severity of the disease it has become need of the hour to adopt preventive and control measures to halt the transmission of dengue. This in turn depends on the community acceptance and participation which again depends on the community awareness regarding dengue and its prevention. With this background the study was conducted to determine the awareness about dengue and its prevention among a rural population in Kancheepuram district of Tamil Nadu state.

METHODS

Study setting: The study was a cross sectional study conducted in Kadambadi village which is in Kanchipuram district of Tamil Nadu State.

Study duration: The study was conducted from June - August 2016 which is pre-monsoon period of south India.

Sample size determination: Assuming the prevalence of good awareness about dengue fever and its prevention as 50%, along with absolute precision of 7% and a non-response rate of 10%, the sample size arrived was 224.

Sampling and study population: The study population comprised of residents of Kadambadi village of Thirukalukundram block of Kanchipuram district. According to census 2011, there were 13 blocks/ municipalities in Kanchipuram district. Among the 13 blocks, Thirukalukundram block was selected by simple random sampling. Out of 54 villages in Thirukalukundram block, Kadambadi village was selected by simple random sampling with lottery method. Kadambadi village had a total population of 1774 with 915 males and 859 females residing in 440 houses. Houses in the village were enumerated and study participants were enrolled by systematic random sampling method i.e. from alternate houses after choosing the first house randomly by lottery method numbered one to ten. This process was followed until the required sample was reached. One person from one house is included -either Male or female whosoever available at the house at the time of data collection. If in a house both male and female are available at the time of data collection, male and females were alternatively included in such cases.

The inclusion criteria were – 1) Residents of age ≥18 years, 2) Resident of the village for more than 6 months and 3) Willing to participate in the study. Those who cannot be contacted even after three visits were excluded.

Data collection procedure: The study participants were given subject information sheet and explained about the study and written informed consent was obtained. All the enrolled participants were interviewed in their door steps using pre-tested, semi–structured questionnaire by trained investigators in the local language i.e. Tamil.

Study tool: The study tool comprised of three sections. Section I comprised of Socio- demographic details such as age, sex, education, occupation, type of family and socioeconomic status (modified B G Prasad classification). Section II was about Community perception regarding mosquito borne disease and dengue in particular. This includes source of information about Mosquito borne disease, diseases transmitted by mosquito, previous exposure to dengue infection, cause of dengue and its transmission, vector bionomics and its life cycle, knowledge about symptoms of dengue and treatment for dengue fever. Section III was about awareness regarding prevention of Dengue i.e. subjective view on dengue prevention, preventive measures against mosquito breeding, personal protective measures against mosquito bite, Government measures and actions taken by Government to prevent dengue and the effective method to prevent and control dengue. The study instrument was pretested among 20 residents in Chrompet, an urban area of Chennai in June 2016 and necessary changes have been made.

Outcome variables: Outcome variables include those which assess the knowledge of dengue infection-symptoms, mosquito transmitting and its breeding and biting habits and preference to seek care.

Statistical analysis: Data was entered in Microsoft Excel Spread Sheet. The study questionnaire was checked for completeness and correctness before entering into the worksheet. Data validation checks were performed at a regular interval for data entered into the worksheet of MS Excel. Data was analysed with Statistical Package for Social Sciences (SPSS IBM) version 21.0. The qualitative variables are described in the form of proportions and quantitative variables are described in the terms of mean, median, range and standard deviation. Data was checked for normality before applying appropriate tests of significance. Significance of difference in proportions (qualitative variables) was

calculated using chi square test. Significance of *p* value was taken as p<0.05.

Ethical consideration and confidentiality: Institutional Ethical Committee approval was obtained before starting of the study. Confidentiality of study participants was maintained in all the phases of the study.

RESULTS

The study was conducted among 224 participants with a response rate of 100%. The age of the participants ranged from 19 to 64 years with mean (SD) of 35(±12.7). Among them 20.5% were illiterates and majority (67.4%) belong to nuclear family. Among the females, 82 were homemakers (Table 1).

Table 1: Baseline characteristics of study participants. (n=224).

Socio-demographic profile	N (%)
Gender	
Male	102 (45.5)
Female	122 (54.5)
Age group	
18-30	89 (39.7)
31- 45	85 (37.9)
46- 60	38 (17)
>60	12 (5.4)
Education	
Illiterate	46 (20.5)
Primary	13 (5.8)
Middle	20 (8.9)
Higher secondary	99 (44.2)
Graduate and above	46 (20.5)
Occupation	
Professional	8 (3.6)
Clerk/Shop owners	19 (8.5)
Skilled	17 (7.6)
Semiskilled	48 (21.4)
Unskilled	26 (11.6)
Unemployed	24 (10.7)
Home maker	82 (36.6)
Socio economic class*	
Class I	158 (70.5)
Class II	66 (29.5)
Class III	-
Class IV	-
Type of family	
Nuclear	157 (67.4)
Joint	73 (32.6)

*Modified BG Prasad classification

Among the study participants, 210 (93.7%) heard about dengue infection. The source of information was from Television (67.8%), followed by health care providers (38.3%) and newspaper (29%). 80% of the study participants correctly responded the diseases transmitted by mosquito. 89% responded correctly that dengue is transmitted by *Aedes* mosquito. 4(1.2%) had acquired dengue infection previously. 20% of study participants' friends, neighbours and relatives had dengue infection previously. Around 40% of the participants had correct knowledge about the breeding habitat and biting habit of *Aedes* mosquito. Around 56% of the study participants said that *Aedes* mosquito breeds in dirty stagnant water. Fifty percent of participants identified correctly the symptoms of dengue infection. Majority (75.9%) of study participants prefer public health sector for seeking treatment for dengue infection (Table 2).

Table 2: Knowledge regarding mosquito borne diseases and health seeking behavior (n=224).

Knowledge and health seeking behaviour	N (%)
Heard about Dengue	
Yes	210 (93.7)
No	14 (6.3)
Source of information*	
Television	152 (67.8)
Health care providers	86 (38.3)
News paper	65 (29.0)
Public displays	61 (27.2)
Radio	59 (26.3)
Others	5 (2.2)
Name of the dengue transmitting mosquito	
Incorrect response	199 (88.8)
Correct response	25 (11.2)
Dengue mosquito breeding habit*	
Stagnant dirty water	131(55.8)
Stagnant clean water (artificial collection of water)	87 (38.8)
Running clean water	3 (1.3)
Plants & Vegetation	1 (0.4)
Dengue biting habits	
Day	87 (38.8)
Both Day and night	80 (35.7)
Night	39 (17.4)
Symptoms of Dengue	
Correct response	112 (50.0)
Incorrect response	64 (28.6)
Knowledge on preventive measures*	
Keeping surroundings clean	195 (87.0)
Removal of artificial collection of water from premises	85 (37.9)
Proper drainage	105 (46.9)
Spraying chemicals on water	17 (7.6)
Don't know	3 (1.3)
Exposure to dengue infection before	
No	220 (98.2)
Yes	4 (1.8)
Preference to seek treatment for dengue infection*	
Public health sector	170 (75.9)
Private Clinics/ hospitals	75 (33.5)
Home remedy	5 (2.2)
Traditional Healers	3 (1.3)
No treatment is required	5 (2.2)

*Multiple response

Majority of study participants (63.4%) use mosquito coils for prevention of mosquito bites at their home. Only 14.7% use mosquito bed nets and 24.1% does not follow any method of mosquito bite prevention. Only 11.2% use insecticide treated bed nets. According to the participants most effective measure in preventing the mosquito breeding and biting is chemical measures which includes space sprays, mosquito repellants, coils, and repellant liquids (Table 3).

The proportion of participants who had higher education are better aware about the breeding and biting habits of *Aedes* mosquito when compared to those who are illiterates and had primary school education. This was found to be statistically significant. (p=0.000). Those who belong to nuclear family had better knowledge on *Aedes* breeding and biting habits. (p=0.043) Also, participants who are from joint family are aware about at least one method of prevention when compared to participants from nuclear family (p=0.01) (Table 4).

Table 3: Practice of prevention of Dengue (n=224).

Practice of dengue prevention	N (%)
Using personal protective measures*	
Mosquito coils	142 (63.4)
Bed nets	33 (14.7)
Insecticide treated bed nets	25 (11.2)
Repellant cream	23 (10.3)
Repellant Spray	8 (3.6)
Nothing	54 (24.1)
Most effective measure	
Chemical	118 (52.7)
Environmental	65 (29.0)
Biological	18 (8.0)
Integrated	9 (4.0)
Don't know	14 (6.2)

Table 4: Association of knowledge about dengue infection and prevention measures with selected variables (n=224).

Variables	Aware about Aedes mosquito breeding and biting habit			Aware about at least one preventive method		
	Yes (N=87)	No (N=137)	*p* value	Yes (N=148)	No (N=76)	*p* value
Gender						
Male	36 (35.3)	66 (64.7)	0.320	67 (65.7)	35 (34.3)	0.911
Female	51 (41.8)	71 (58.2)		81 (66.4)	41 (33.6)	
Age group						
18-30	41 (46.1)	48 (53.9)		55 (61.8)	34 (38.2)	
31- 45	32 (37.6)	53 (62.4)		63 (74.1)	22 (25.9)	
46- 60	12 (31.6)	26 (68.4)	0.149	25 (65.8)	13 (34.2)	0.095
>60	2 (16.7)	10 (83.3)		5 (41.7)	7 (58.3)	
Education						
Illiterate	6 (13)	40 (87)		29 (63)	17 (37)	
Primary	3 (23.1)	10 (76.9)		7 (53.8)	6 (46.2)	
Middle	5 (25.0)	15 (75.0)	**0.000**	10 (50.0)	10 (50.0)	0.295
Higher secondary	39 (29.4)	60 (60.6)		68 (68.7)	31 (31.3)	
Graduate & above	34 (73.9)	12 (26.1)		34 (73.9)	12 (26.1)	
Occupation						
Professional	7 (87.5)	1 (12.5)		6 (75.0)	2 (25.0)	
Clerk/Shopowners	4 (21.1)	15 (78.9)		15 (78.9)	4 (21.1)	
Skilled	10 (58.8)	7 (41.2)		11 (64.7)	6 (35.3)	
Semiskilled	20 (41.7)	28 (58.3)		38 (79.2)	10 (20.8)	
Unskilled	6 (23.1)	20 (76.9)	0.09	14 (53.8)	12 (46.2)	0.036
Unemployed	11 (45.8)	13 (54.2)		10 (41.7)	14 (58.3)	
Home maker	29 (35.4)	53 (64.6)		54 (65.9)	28 (34.1)	
SE class*						
Class I	36 (35.3)	66 (64.7)	0.320	107 (67.7)	51 (32.3)	0.522
Class II	51 (41.8)	71 (58.2)		40 (60.6)	26 (39.4)	
Type of family						
Nuclear	65 (43.0)	86 (57.0)	**0.043**	89 (58.9)	62 (41.1)	**0.01**
Joint	22 (30.0)	51 (69.9)		59 (80.8)	14 (19.2)	

***SE- socio-economic, Chi square test applied, p value <0.05 is significant.

DISCUSSION

The present study explored the knowledge and preventive practices regarding Dengue infection among the rural community of Tamil Nadu as it is one of the state hit by dengue outbreaks during post monsoon periods. It was found in the present study that knowledge about biting and breeding habits was much higher in those who had

higher education. This finding is consistent with other studies done by Kohli C et al and Sharma AK et al.[11,12] Knowledge about breeding habits and preventive measures did not significantly differ by gender. This is similar to previous studies done by Van Benthem BH et al and Kohli et al where knowledge did not have a significant difference.[11,13]

In the present study, 93.7% had heard about dengue infection. In a study done in a rural community by Malhotra G et al around 60% of the respondents had previously heard about dengue fever.[14] In another study done in urban settlement area of South Delhi, 90% reported of being aware of dengue , 78% in a study done in Brazil whereas in Thailand knowledge about dengue was 67%.[15- 17] Though the present study was done in rural area, the knowledge about dengue was at par with urban area due to better awareness about the disease.

In the present study, 89% said correctly that dengue is transmitted by Aedes mosquito. Malhotra G et al reported that 72.62 % respondents mentioned mosquito bite as cause of dengue similar to study done in Brazil.[14,16] Swaddiwudhipong et al reported that >90% respondents knew the disease is transmitted by Aedes mosquitoes.[17]

In our study, Fifty percent of participants identified correctly the symptoms of dengue infection. The study done by Gupta et al reported 92 % knew about fever followed by headache as a symptom of dengue whereas in Degallier N et al and Benthem et al studies, majority identified the symptoms rash or bleeding specific for dengue infection to distinguish dengue infection from other diseases.[13,16,18] Correct knowledge on symptoms of dengue is very essential and helps in early reporting to health care system.

In the present study, around 40% of the participants had correct knowledge about the breeding habitat and biting habit of Aedes mosquito. However in a study done by Matta et al found that, 79.8% respondents knew about breeding places of mosquitoes. There is a substantial gap in the correct knowledge about the breeding and biting habits of Aedes mosquito in our study.[19]This issue needs to addressed with targeted information dissemination and to educate the community on preventive measures to combat dengue.

Majority of study participants (63.4%) use mosquito coils, bed nets (14.7%) insecticide treated bed nets (11.2%) and other measures for prevention of mosquito mosquito bites at their home. In previous study by Malhotra G et al found that most respondents were aware of measures like window screening, mosquito mat/coil/liquid vaporizer/ repellent cream, use of bed nets, using fans, use of smoke to drive away the mosquitoes especially both rural and slum areas.[14] Itrat A et al and Hairi F et al had reported these methods to be most effective means of preventions.[20,21]

CONCLUSION

From our study findings, it was clear that though majority of the study participants heard about dengue symptoms and mosquito transmitting dengue infection, less than half were aware about breeding habits of Aedes mosquito and 25% did not follow any method of mosquito bite prevention practices. Hence it is recommended that health campaigns and health education should be more aggressive and targeted on preventive practices in future. Health education would be provided via various strategies including mass media and using audio visual aids in health campaigns. Also, these programs should also ensure putting into practice the knowledge acquired.

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