

Original Research Article

Community awareness on dengue and practices of mosquito bite prevention in urban residents of a central Indian city, Sagar, Madhya Pradesh

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ABSTRACT

Background: Dengue is an arboviral, mosquito borne illness caused by bite of infected aedes mosquitoes which breed commonly on household water containers like cooler tank, fridge trays and flower pots. Though dengue is non fatal illness but it may lead to deaths from dengue hemorrhagic fever and dengue shock syndrome. The objective of the study was to assess the community awareness regarding dengue and practices primarily being used as personal protection measures against mosquito bites and abolition of household breeding sites of mosquitoes.

Methods: A cross sectional observational study done in 5 randomly selected wards of the municipal corporation Sagar. 400 households were studied, selecting 80 houses from each ward randomly. Pretested structured questionnaire was used for interview with the head of family/adult member of the family. The data collected was analysed using SPSS software and chi square test was applied as test of significance.

Results: The households studied were mostly (28.2%) of lower middle class (modified B G Prasad scale). the dengue awareness in the community was fair (44.25%) and satisfactory (46.25) in Likert scale. Awareness regarding household breeding sites of mosquitoes was absolute (100%) but the use of personal protective measures was partial (50%).

Conclusions: The knowledge and awareness to stop the mosquito breeding, biting should be enhanced and should be turned into action.

Keywords: Dengue, Hemorrhagic fever, Knowledge, Awareness, Personal protection

INTRODUCTION

Dengue is an acute, infectious, commonest arboviral disease, caused by dengue viruses, transmitted from person to person, by the bite of infective, female, *Aedes* mosquito. Clinically it is characterized by high fever, headache, and body ache, severe joint and muscular pains. Usually it is not fatal, but can cause severe haemorrhage and profound shock, which may become fatal.¹ The viral infections may be asymptomatic or may

lead to (a) "classical" dengue fever, or (b) dengue haemorrhagic fever (DHF) without shock, or (c) dengue haemorrhagic fever with shock, dengue shock syndrome (DSS).²

Dengue shock syndrome (DSS) - have become major international public health concerns. Over the past three decades, there has been dramatic global increase in the frequency of dengue fever, DHF and DSS and their epidemics.

In India, the risk of dengue has shown an increase in recent years due to rapid urbanization, lifestyle changes and deficient water management including improper water storage practices in urban, peri-urban and rural areas, leading to proliferation of mosquito breeding sites.² DHF epidemics have been described in Kolkata (1963), Vishakhapatnam and Chennai (1964), Jabalpur (1966), Pondicherry (1968) and various places in North India (1988) and Delhi (1996). Dengue occurs in India immediately after monsoon season.³

Aedes aegypti is the main vector of Dengue transmission in India. Another important vector is the *Aedes albopictus*. The mosquito is a peri - domestic and domestic breeder. Mosquito breeding can occur in any water – storage containers, such as desert coolers, flower vases, coconut shells, construction sites, overhead uncovered or partially covered water tanks, discarded buckets, tyres, utensils and large containers used for collecting rain water which are not emptied and cleaned periodically.⁴ The failure of urban authorities to provide civil amenities and poor public health infrastructure raises the potential for the vector to breed at high level and makes the environment transmission conducive.²

According to government resources the cases of dengue in India increased rapidly from 2015 to 2017 i.e. from 99913 cases to 188401 cases. In 2018 the case load reduced to below 1 lac due to various efforts under NVBDCP programme. But in Madhya Pradesh the situation is different with surge of dengue cases to almost double in 2018 from 2015 level.⁵ Sagar located in bundelkhand region of Madhya Pradesh has Sporadic outbreaks of dengue, as reported by regional malaria centre, Sagar.

This study was done in the municipal corporation area of Sagar with the objectives

- To assess the awareness about dengue in urban community.
- To know about the current preventive practices against mosquito bites.
- To make the community aware of increasing incidences of dengue and their orientation regarding need for early diagnosis and treatment.

METHODS

A cross sectional observational study conducted in Sagar municipal corporation during post rainy season from October 2018 to February 2019. Survey was conducted in 400 houses of five randomly selected wards in October, November 2018. 80 households from each ward were also selected using simple random sampling. There are 52833 households as registered in district census handbook of Sagar 2011 out of which desired sample size was calculated to be 382.⁶

Sample size

400 (required sample size is 382 i. e. where the prevalence (p) was taken 50% (50% when proportion/prevalence is unknown) using openepi software. The required precision of the estimate (d) set as 5% confidence level 95%.

Formula for sample size calculator:⁷

$$ss = Z^2 (p)(1-p) / c^2$$

$$\text{Sample size} = ss / (1 + ss / \text{POP})$$

Correction for finite population

Here Z=Z value (e.g. 1.96 for 95% confidence level) p=percentage picking a choice, expressed as decimal (0.5 used for sample size needed); c=confidence interval(error), expressed as decimal= 0.05.

Sampling method

Simple random sampling, 05 (10%) wards were selected from the list of 49 wards of Sagar municipal corporation and Outgroth. The selected wards were Ambedkar ward (48), Tili ward (46), Shiwaji ward (05), Bhojraj ward (47) and Kakaganj ward (44). The separate ward wise population and number of households were assessed through the website.⁸ From each ward 80 households were selected for study from different streets of the wards.

Data collection and analysis

Two teams of a faculty member and an intern visited the selected wards. Reaching the centre place/ square (cross road) of the ward each team went to survey in different directions/streets. The head of the family (if not present wife/ adult son or daughter) was interviewed with a pretested structured questionnaire and the responses were recorded. At the end of interview, the family members were detailed about dengue and other mosquito borne illnesses, the diagnostic and treatment facilities available for dengue and chikungunya, major domestic and peri-domestic breeding sites of mosquitoes and protective measures against mosquito bites.

The collected data was entered into excel spread sheets and analysed using SPSS software version 20, and appropriate test of significance (chi square test) was applied as per requirements.

RESULTS

400 households from five different wards of municipal area of Sagar were surveyed. Among the interviewed persons 366 (91.5%) were males and 34 (9.5%) were females. The average age of respondents was 50 years (50.20±12.7 years) with range of 63 years (21-84 years).

The socioeconomic status of households was calculated using modified B G Prasad scale, taking AI consumer price index November 2018 as 302.⁹⁻¹¹ Most of the households were in lower middle class (28.2%) (Table 1).

Table 1: Socioeconomic status of the households.

Socioeconomic status	Per capita monthly income	Number of house holds	%
Upper class	Rs. \geq Rs. 6893	68	17.0
Upper middle class	Rs. 3447 -6892	72	18.0
Middle class	Rs. 2068-3446	66	16.5
Lower middle Class	Rs. 1034-2067	113	28.2
Lower class	Rs. \leq 1034	81	20.3
Total		400	100

Table 2: Knowledge score of the respondents.

Knowledge /awareness	Score obtained out of 50	Number of respondents	%
Good	\geq 40	15	3.75
Fair	35-39	177	44.25
Satisfactory	31-34	185	46.25
Poor	\leq 30	23	5.75
Total		400	100

The awareness regarding dengue illness was estimated based on correct responses of respondents to the closed ended and multiple types questions (MCQ) asked by interviewers. The maximum score allotted for 100 percent correct Responses was 50 marks. The awareness of respondents was classified on likert scale as poor, satisfactory, fair and good. Most of the respondent has fair (44.25%) and satisfactory (46.25%) awareness regarding dengue illness, its spread, sign symptoms and facilities for treatment (Table 2).

Though the total knowledge score/awareness was satisfactory but on individual questions upon dengue cause, spread, sign symptom, vector breeding and control the results were variable. As observed in table 3 and 4, the 90.8% respondents were aware that dengue is caused by mosquito bites but only few 10.5% were aware of the species *Aedes* and its biting behaviour (13.3%). The 97% respondents were aware that malaria is also caused by mosquito bites but only few (less than 5%) know about other diseases caused by mosquito bites. Only 15% of the respondents were aware of bleeding, haemorrhage and shock like incidents as complication of dengue fever but 85% were aware that dengue is a serious disease where death can occur. All the respondents were aware that mosquito breeds on open water containers, open tanks, roof gutters and abandoned tyres but only 31-32% know that it can breed in fridge and flower pot trays also.

Table 3: Awareness of respondents about dengue illness.

		Aware (no.)	Aware (%)
A	Knowledge about dengue illness		
1	Dengue is a fever like illness with joint pains	376	94.0
2	Dengue is caused by mosquito bites	363	90.8
3	Knowledge about other mosquito borne illnesses		
a	Malaria	388	97.0
b	Filarial	1	0.3
c	Chikungunya	12	3.0
d	Kala azar	00	00
e	Japanese encephalitis	5	1.25
B	Dengue sign and symptoms		
1	High grade fever	392	98.0
2	headache	146	36.5
3	Orbital pain	39	9.8
4	Muscles and joints pain	342	85.5
5	Nausea and vomiting	225	56.3
6	Hemorrhage	59	14.8
7	Shock /collapse	59	14.8
8	Death /fatality	343	85.8

Table 4: Awareness of respondents regarding mosquito vector.

	Awareness regarding vector	Aware (no.)	Aware (%)
1	Dengue is caused by bites of infected <i>Aedes</i> mosquito	42	10.5
2	The bites are usually during day time	53	13.3
3	The <i>Aedes</i> mosquito breeding sites are artificial collected domestic waters like		
	In the tray under the fridge	126	31.5
	In the water container	400	100.0
	In the flower pot trays	128	32.0

The awareness (knowledge score) about dengue illness, mosquito vector was compared on the basis of highest educational qualification of respondents and their socioeconomic status. The educational qualification didn't have significant association with knowledge score however socioeconomic status had (Table 5 and 6).

Though all the respondents were aware of mosquito born disease malaria and 90% were aware that dengue is also caused by mosquito bites, only few of them using personal protective measures and preventive practices from mosquito bites. Only 232 (57.5%) households had mesh/ nets on doors and windows. Only 210 (52.5%) households used mosquito nets. These nets were not ITNs. Many households used chemical mosquito

repellents, mosquito coils, Mortein, Good Knight, etc. Only 26 (6.5%) used other methods like making Neem smokes during evening for getting rid of mosquitoes. There was also rise of use of electric chargeable mosquito

bat/ rackets (36%) (Table 7). The personal protective measures and preventive practices were more often found among households with higher qualification (Table 8).

Table 5: Knowledge score of respondents, scores obtained out of maximum score of 50 points.

Educational qualification	Score	Knowledge score /awareness				Total
		Good	Fair	Satisfactory	Poor	
Illiterate	1	0	3	14	2	19
Primary school certificate	2	3	25	36	1	65
Middle school certificate	3	2	21	21	1	45
High school certificate	4	2	20	26	3	51
Intermediate or post-high school diploma	5	3	52	32	7	94
Graduate or postgraduate	6	4	44	42	10	100
Professional or honors	7	1	12	12	1	26
Total		15	177	185	23	400

*Association of knowledge score with educational qualification of the respondents was not significant; Chi-Square value calculated was 26.803 and p value 0.177 (df-18).

Table 6: Knowledge score distribution as per socio economic status.

Socio economic status	Knowledge score/awareness				Total
	Good	Fair	Satisfactory	Poor	
Upper class	4	26	32	6	68
Upper middle class	2	38	23	9	72
Middle class	2	34	25	5	66
Lower middle class	5	47	61	0	113
Lower class	2	32	44	3	81
Total	15	177	185	23	400

*Knowledge score association with socio economic status was not significant; Pearson Chi-Square value calculated was 25.797 and p value 0.011 (df-12).

Table 7: Practices of mosquito repellents use.

Use of mosquito repellents/killers	No.	Percentage (%)
Mosquito coils/spray/agarbatti	90	22.5
Electric mosquito repellents	76	19.0
Odomas	20	0.5
Traditional neem smoke	26	6.5
Electric mosquito bat	144	36

Table 8: Personal protective measures against mosquito bites and its association with educational qualification.

Educational qualification	Door and window meshes		Use of mosquito nets	
	Present	Absent	Yes	No
Illiterate	7	12	4	15
Primary school certificate	28	37	33	32
Middle school certificate	16	29	13	32
High school certificate	28	23	28	23
Intermediate or post-high school diploma	58	36	49	45
Graduate or postgraduate	76	24	64	36
Professional or honors	19	7	19	7
Total	232	168	210	190
Chi square value and p value	Pearson Chi-square value 36.44, degree of freedom 6, p value is 0.000 which is highly significant		Pearson Chi-square value 27.911, degree of freedom 6, p value is 0.000 which is highly significant	

DISCUSSION

In the study it was found that all people (100%). In the community were aware of most common mosquito borne illness malaria. 94% people were also aware of the dengue which indicates that dengue incidences are becoming common and outbreaks were covered in news. The cases/outbreaks of dengue are notified by the health system and their news in the print and local media has a wider role in increasing awareness. 90.8% were aware that mosquito bite is the cause of dengue illness. Similar results of dengue awareness of 82.3% in residents of rural and slum areas and 82.4% in a hospital setting in Delhi were found.^{11,12} Another study done in central India shows community awareness of 76.58% regarding mosquito bite as cause of dengue.¹³ But an study done by ICMR in 2010 found only 18.3% people aware of mosquito bite as cause of dengue.¹⁴ Most of the people (85) were aware of fatality and fear of death in cases of dengue but only few (14.8%) were aware of internal haemorrhage and shock conditions in the disease.

The unawareness about other mosquito borne illness covered under umbrella programme national vector born disease control programme indicates need of IEC and promotional activities regarding the programme.

Awareness regarding vector: Though 90.8% households were aware that dengue is caused by mosquito bite, only 10.5% know that it is aedes mosquito and only 13.3% know that aedes mosquito mainly bites during day time. a Malaysian study reported similar misconceptions about biting behaviour of aedes.¹⁵ Almost all the households (100%) were aware that the mosquitoes breed in water containers, open water tanks, roof gutters and abandoned tyres. Contrary to our findings only 20% to 30% people of rural and slum areas were aware of these breeding sites.¹⁶ Only one third households were aware that dengue causing mosquitoes breed in cooler tank, refrigerator tray and flower pot trays.

The overall knowledge and awareness about dengue cause, symptoms, vector breeding was analysed for association with educational qualification and socioeconomic status and found to be insignificant on applying chi square test. Contrary to our findings significant association with educational qualification was found in other studies.^{15,17}

Education has significant association with use of personal protective measures. More than 50% households used mosquito nets in night and have protected the entry of mosquitoes by installing widow and door meshwork.

CONCLUSION

The overall general dengue awareness in the urban community is satisfactory. People are also aware of household mosquito breeding sites, preventive measures for mosquito breeding and bites and personal protective

measures but they are not practicing it. Since there is rise of dengue and other arboviral illnesses (Japanese encephalitis, chikungunya) it is the need of hour to make people aware of comprehensive knowledge of diseases included in national vector born disease control programme. The district level authority running NVBDCP (national vector borne disease control programme) programme should make more emphasis on preventing household breeding of mosquitoes through regular visits, survey and inspection. The activity of emptying water tanks, containers, cooler tank, fridge tray etc. should be enhanced during pre and post rainy season. Though it is hard and impossible to clear out mosquitoes from the environment but it is quite possible to limit the man mosquito contact by inhibiting mosquito breeding near human habitations and regular use of personal protective measures. The knowledge and awareness of the community needs to be turned into action through motivation and behaviour change.

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