Original Research Article

A study on knowledge and practices regarding mosquito borne diseases in Rithala village, New Delhi

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ABSTRACT

Background: Despite various continuous efforts by the government, mosquito borne diseases (MBDs) like dengue and malaria are still a public health problem. Awareness and knowledge about the risk of mosquito bite and source reduction can prevent the transmission of these diseases. The present study was done to assess the awareness of rural population about MBDs and preventive measures against mosquito bite and personal preventive measures (PPMs) taken by them. Objective of the study was to assess the knowledge about Mosquito borne diseases and to identify the utilization pattern of personal preventive measures for mosquito control.
Methods: A community based cross-sectional study was carried out among adult rural population of Rithala village, New Delhi by systematic random sampling and were interviewed by using semi-structured, pretested and predesigned questionnaire. Data analysis was done by using SPSS version 22.
Results: It was observed that 92.21% (188/204) of study participants were aware of mosquito borne diseases and majority were aware of dengue i.e., 87.25% (178/204). The most common source of information about mosquito borne diseases was television 60.78% (124/204). One or the other PPMs were used by 86.76% (177/204) and most commonly used PPMs was liquid vaporizers i.e., 43.13% (88/204).
Conclusions: There is a gap between knowledge of MBDs and use of PPMs so there is a need to educate rural population about all MBDs, their different mosquito breeding site and other less common methods of PPMs.

Keywords: Mosquito borne diseases, Dengue, Malaria, Community

INTRODUCTION

In recent years, vector borne diseases have emerged as a serious health problem in the world as it is about 1/6th of the illnesses and disabilities.[1] Vector borne diseases are the illnesses, that spread pathogens are caused by vectors like mosquitoes, ticks and fleas. Some of the vector borne diseases known to man includes malaria, dengue, chikungunya, Japanese encephalitis, plague and leishmaniasis etc. According to WHO, vector borne diseases account for more than 17% of all infectious diseases and causes more than 700,000 deaths annually.[2]

MBDs are most common among all vector borne diseases, as over 1 million people die worldwide in every year.[3] Most common MBDs are malaria, dengue/DHF, chikungunya and Japanese encephalitis. Globally, malaria contributes 219 million cases and 400,000 deaths every year. Dengue/DHF affects more than 3.9 billion people in 129 countries and causes 40,000 deaths every year.[3] The worldwide incidence of dengue has risen 30-fold in the past 30 years.[4]

Chikungunya mostly occurs in Africa, Asia and the Indian Subcontinent. However, a major outbreak in 2015 affected America.

India contributed 6-9% of total cases in South-East Asian Region (SEAR) countries between 2009 and 2011, which has increased to 19% in 2013.[5] Around 95% of the Indian population lives in areas at risk of malaria.[6] In 2019, India had 334693 total malaria cases with 50 deaths, 136422 dengue/DHF affected people with 132 deaths, 9477 total chikungunya cases and 2294 notified cases of J E with 231 deaths.[7] In India majority cases of JE were belongs to Assam (In 2019, 642 notified cases and 161 deaths) and Uttar Pradesh (In 2017, 693 notified cases and 93 deaths).

Dengue is the most common mosquito borne infection caused by *Aedes aegypti* and *Aedes albopictus* mosquitoes.[8] In 2015, India experienced largest dengue outbreak, 99,913 notified cases and 220 deaths as compared to 2019 data, 136422 notified cases and 132 deaths. At that time Delhi being most severely affected with 15,867 notified cases and 60 deaths compared to 4155 notified cases and 0 death in the year 2019.[9] Because of chikungunya, total of 9793 notified cases and 442 deaths occurs in Delhi in 2016.[10]

Out of urban, rural and slums, the most affected areas are rural and urban slums. According to various studies, it has been observed that there is lack of proper knowledge regarding environmental management strategies and personal preventive measures among rural population and thus results in large number of cases.

Therefore, to control the MBDs it is important to remove the gaps between knowledge and preventive behavior of people in relation to their lifestyles and environmental factors such as housing conditions.

METHODS

Study design

A community based cross-sectional study was conducted from July 2019 to December 2019.

Study population

The study was conducted among adult population catered by Anganwadi center of Rithala village which is a rural field practice area of Dr. Baba Saheb Ambedkar medical college and hospital, New Delhi. The total houses covered under selected Anganwadi center was 440.

Adult population who are residing in that particular area for more than one year were included in the study. The adults who were seriously ill, who couldn't be contacted at the time of study and if migrants were excluded.

Sample size

For sample size calculation, prevalence (p) was taken as 86.2%, knowledge of malaria as a disease and its transmission from a study conducted among rural communities of Peninsular Malaysia. Confidence interval was taken as 95 and 5% of margin of error.

Formula used, $n=Z^2 \times p(1-p)/d^2$
(Here, p is 86.2%, d is 5% and Z is 1.96)

Later, the sample size was adjusted to compensate for non-response rate of 10%. Final calculated sample size was 204 (185+10% x 185=204).

Sampling technique

The selection of houses was done by systematic random sampling. Total number of houses covered under selected Anganwadi center was 440. Sampling interval calculated as 2.1 {(K)=total houses/sample size}. With the reference of the 'list of total houses comes under Anganwadi center' first house was selected by simple random sampling, then next house was selected by using sampling interval and so on till total sample size was achieved.

From each selected house, one adult of the particular family who was present at the time of data collection was enrolled in the study.

Data collection

A semi-structured, pretested and predesigned question-naire was used for collection of data.

The questionnaire was divided into three parts. First part consists of detailed socio-demographic characteristics-age, gender, education, occupation and socio-economic status of study population. Second part consist of detailed questions of knowledge, perception of people regarding various mosquitoes, about mosquito bites, their breeding places, various diseases transmitted by them and symptoms of the mosquito borne diseases.

Third part consists of questions regarding PPMs used by study population or by their family and duration of use.

Ethics

Institutional ethics committee permission was obtained prior to start of the study.

Data analysis

Data was compiled in MS excel sheet analyzed using SPSS version 21. Chi square test was used to test the associations between different variables. P value less than 0.05 was considered as significant.

RESULTS

A total of 204 adults were selected from Rithala village.

Socio-demographic details of the study participants. It was observed that among all respondents, majority 88.2%

(180/204) were married women belonged to 18-30 years of age group i.e., 53.9% (110/204). The socio-demographic classification was based on modified BG prasad scale (proposed updating for January 2017) which shows majority 45% (92/204) of participants belongs to middle class, followed by 27.5% (56/204) in lower middle class, than 17.6% (36/204) in upper middle class and others 4-6% (8/204-12/204) belongs to upper and lower class (Table 1).[11]

Table 1: Socio-demographic characteristics of study population.

Characteristics	Frequency	Percentage (%)
Gender		
Male	24	11.8
Female	180	88.2
Age (year)		
18-30	110	53.9
≥ 31	94	46.1
Type of family		
Nuclear	128	62.7
Joint	76	37.3
Marital status		
Unmarried	10	4.9
Married	194	95.1
Education		
Illiterate/just literate	62	30.4
Primary	12	5.9
Secondary	36	17.6
High school or more	94	46.1
Occupation		
Unemployed	08	3.9
Housewife	144	70.6
Private job	24	11.8
Govt. Job	28	13.7
Socioeconomic status		
Upper	12	5.9
Upper middle	36	17.6
Middle	92	45.1
Lower middle	56	27.5
Lower	08	3.9

*Each row consists of 204 study participants.

Majority of study participants belongs to nuclear family i.e., 62.7% (128/204).

It was observed that 92.2% (188/204) of study participants were aware of mosquito borne diseases and majority were aware of dengue i.e., 87.3% (178/204). Sixty four percent (130/204) and 60% (116/240) of study participants knows that mosquitoes and dirt/stagnant water are responsible for transmission of diseases.

Approximately 53% (108/204) of study participants know that mosquitoes can bite both during night and day time. It was also observed that majority of study participants have the knowledge that water is the only breeding place for mosquitoes, either polluted/clean/stagnant water.

None of the participants had responded, about the spread of mosquito borne diseases due to sins. Seventy one percent of study participant considers that high fever is most common symptom of any mosquito borne disease followed by headache i.e., 34.3% (70/204) and joint pain i.e., 30.4% (62/204). Most of the participants 52.9% (108/204) were aware of biting time of different mosquitoes. Forty eight percent and 45% of the participants were aware of the fact that mosquitoes can breed both on stagnant water and clean water (Table 2).

Table 2: Knowledge regarding mosquito borne diseases.

Characteristics	Frequency	Percentage (%)
Knowledge regarding different MBDs*		
Malaria	130	63.7
Dengue	178	87.3
Chikungunya	92	45.1
Others**	26	12.7
**Include typhoid, jaundice and cholera		
MBDs is spread by*		
Bacteria/virus/parasites	18	8.8
Dirt/stagnant water	116	56.9
Mosquito bites	130	63.7
Drinking dirty water	18	8.8
Others**	20	9.9
**Includes MBDs spread by sexual contact, hand shaking, droplet infection, open waste disposal, eating oily food, eating food in plastic container		
Biting time of mosquitoes		
Day	74	36.2
Night	22	10.7
Both	108	52.9
Breeding places of mosquitoes		
Drains/polluted water	126	61.8
Clean water	98	48.0
Stagnant water	92	45.0
Ponds	18	8.8
Ditches	08	3.9
Old tyres	12	5.9
Flower Pot	34	16.7
Other**	28	13.7
**Includes coolers, open waste disposal and broken or unused containers.		
Signs and symptoms*		
High fever	144	70.6
Chills	28	13.7
Headache	70	34.3
Eye pain/retro-orbital pain	04	2.0
Joint pain	62	30.4
Fatigue	12	5.9
Rashes/red spots	90	44.1
Others**	106	52.1

** Includes vertigo, vomiting, weakness, dec in platelets count, neck pain, stomachache, body ache, red eyes, loss of appetite, cough and cold, itching, *multiple response possible

The most common source of information about mosquito borne diseases was television 60.78% (124/204). It was observed that 23.55 of the study participants were aware of 'Paracetamol' that can be given for fever and many participants had also responded-coconut water, goat's milk and papaya leaf that can be used for the treatment of mosquito borne diseases. Many of the participants had no idea about insecticides and very few were aware of 'temephos' as that was under government supply to the residents of the selected area. Seventy six percent of the study population were aware of 'dengue outbreak' in 2015. Approximately 55 % of the study participants had family history of dengue. According to 58.8% of the study participants like to consult government hospitals, if gets infected with mosquito borne diseases and 26% said that they would like to consult private hospitals depending upon the poor condition of the family member. It has observed that 92.2% of the study participants thinks that dengue is a dangerous disease and 73.5% of the study participants thinks that they are at a risk of getting MBDs (Table 3).

Table 3: Distribution of study population based on their source of information about mosquito borne diseases.

Source of information	Number	Percentage (%)
Newspapers	38	18.6
Radio	40	19.6
Television	124	60.8
Health workers	62	30.4
Friends/neighbors	78	38.2
Others*	26	13.72

* Includes, mobile phones and Past history of mosquito borne diseases in the family.

One or the other PPMs were used by 86.76% (177/204) and most commonly used PPMs was liquid vaporizers i.e., 43.13% (88/204) followed by mosquito coils i.e., 40.2%. It was observed that 19.6% (40/204) participants were using bed nets on daily basis and only 12.7% (26/204) of participants were using bed nets for all family members. The use of personal preventive measures was common during nights only i.e., 76.5% (156/204) (Figure 1 and 2).
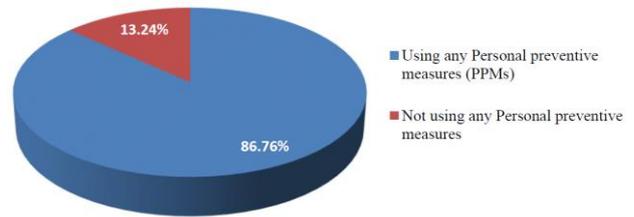

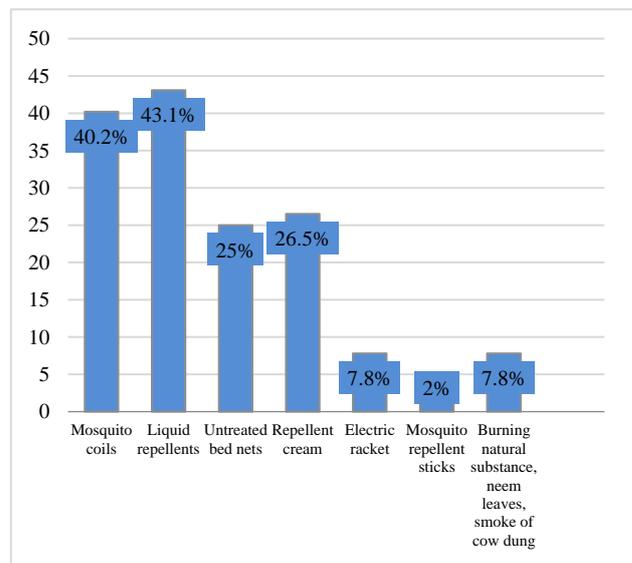**Figure 1: Distribution of study population according to use of PPMs.**

Figure 2: Distribution of study population according to the use of any of the PPMs in their houses.

The use of PPMs was found to be associated with education of study participants (Table 4).

Table 4: Factors influencing the use of personal preventive measures (PPMs).

Variable	Study population using PPMs	Study population not using PPMs	Chi-square value	P value
Gender				
Female	156	24	0.013	0.910
Male	21	03**		
Age (years)				
18-30	92	18	2.034	0.153
≥ 31	85	09		
Type of family				
Nuclear family	113	15	0.587	0.444
Joint family	66	10		
Marital status				
Married	171	23	0.092	0.762
Unmarried	08	02**		

Continued.

Variable	Study population using PPMs	Study population not using PPMs	Chi-square value	P value
Education				
Illiterate/just literate	32	30		
Primary	06	06	9.712	0.021*
Middle or more	22	14		
High School or more	70	24		
Socio-economic status				
Upper	12	01**		
Upper middle	30	06		
Middle	78	13	8.461	0.076
Lower middle	54	02**		
Lower	06	02**		

*Significant, **Yates correction applied to calculate the Chi-square value

DISCUSSION

In the present study it was observed that 92.2% (188/204) of study participants were aware of mosquito borne diseases. Sixty four percent (130/204) respondents know that mosquitoes are responsible for transmission of malaria, dengue and chikungunya. Approx. 71% (144/204) respondents correctly identified fever as a cardinal symptom of mosquito borne diseases. Most common source of information about mosquito borne diseases was television 60.8% (124/204).

Al-Dubai et al conducted a study among 300 participants in 3 different geographical settings- in urban, semi-urban and rural areas within the states of Selangor and Kuala Lumpur, similarly they had found that television was the most common source of information about dengue fever.[12]

Similarly, in a study conducted by Sharma et al in Rajasthan among 966 respondents.[13] Approximately 89% of respondents were aware of MBDs, 97.16% of respondents were aware of fever as a most common symptom. Singh et al conducted a study in tribal areas of Bihar and Jharkhand among 426 study participants had found similar findings that 92.5% of them knows about mosquito borne diseases and 82.4% of study participants considers fever as a most common symptom of MBDs.[14]

Verma et al conducted a study among 400 subjects of rural community in Haryana and they found similar results, 72% or respondents knows that mosquito bites are responsible for transmission of MBDs and 93.8% of respondents knows that fever is the most common symptom of mosquito borne diseases.[15] Similar findings were found in a study done by Chellaiyan et al among 224 rural population in Kadambadi village of Kanchipuram district, Tamil Nadu and they found that 38.8% (87/224) of population knows that mosquito bites during day time also.[16]

Similar results were found in a study conducted by Mohapatra et al among 235 patients attending rural tertiary care hospital in Sasaram, Bihar.[17] They had found that, fever was identified as the most common symptom of dengue and majority of them answered that television/radio is the main source of information about dengue or other mosquito borne diseases.

Similarly, in a study conducted by Koduri et al among 270 participants in the rural field practice area of a tertiary care teaching institute in Medchal-Malkajgiri district of Telangana, found that 67.4% of study participants were aware of malaria as a mosquito borne disease.[18] Mayur et al conducted a study in rural areas of Rajkot district, Gujrat also found the similar findings that majority of study participants identified fever with chills as a common symptom of dengue.[19]

In the present study, one or the other PPMs were used by 86.76% (177/204) and most commonly used PPMs was liquid vaporizers i.e., 43.13% (88/204). Untreated bed nets were used by only 24.5% (50/204) study participants.

Similarly, in a study conducted by Malhotra et al among 800 respondents in two slums and two rural areas.[20] They found, the most commonly used personal preventive measure was-coils and liquid vaporizers.

In a study conducted by Podder et al among 288 households at slums of Chetla in South Kolkata and they found similar results as use of untreated bed nets among study population was only 26.0%.[21]

In contrast to the present study, Oladepo et al conducted a study among 403 farmers of 2 rural farming communities in Oyo state, Nigeria.[22] They had found that only 12.4% of farmers knew about MBDs and its transmission by mosquitoes. According to the 35.4% (231/403) farmers, consumption of contaminated food/water causes malaria and most common preventive measure they were using at their homes was killing of mosquitoes with broom i.e., 25.3% (204/403). In a study conducted by Solimani-Ahmadi et al among 400 households of 4 villages in Iran.[23] Most common source of information about MBDs was health workers 46% and majority of them (60.8%)

were using long-lasting insecticidal bed nets as a PPMs. They used to wash those bed nets once in every 6 months.

Also, in contrast to present study, a study done by Belay et al among 815 pregnant women of rural areas in northern Ethiopia.[24] The most commonly used PPMs was insecticidal treated bed nets i.e., 65.7% (485/738).

Limitations

As it was a cross-sectional study, the different pattern of usage of various PPMs could not be identified. And the study was conducted during working hours, so the knowledge of MBDs and other relevant information was taken by only one family member, present at the time of study and not of the family as a whole.

CONCLUSION

In the present study, study participants are more commonly aware of dengue and malaria. The knowledge regarding biting habits of different mosquitoes was good, but still majority of them use PPMs during night time only. The use of bed nets was less as compared to other modern methods of PPMs like mosquito coils and liquid repellents. And among those who were regularly using bed nets, very few were using for all family members.

Recommendations

Emphasis should be given on control measures and especially during rainy season. Health education and IEC activities regarding MBDs, different mosquitoes and their breeding sites, mosquito biting habits, less common or cheap methods of PPMs should be conducted in community by local authorities or municipalities.

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