



Community Knowledge, Attitude, Awareness and Protective Practices Regarding Malaria in Mewat and Rohtak Districts of Haryana, India

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Authors' contributions

This work was carried out in collaboration between all authors. Author AK designed the study, wrote the protocol, and wrote the first draft of the manuscript. Authors AK and PKS collected the data. Authors MK and RK analyses and edited the study performed. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2015/17311

Editor(s):

(1) Crispim Cerutti Junior, Department of Social Medicine, Federal University of Espirito Santo, Brazil.

Reviewers:

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(2) Soumya Mishra, Department of Physiology, JIPMER, Puducherry, India.

Complete Peer review History: <http://www.sciencedomain.org/review-history.php?id=1124&id=12&aid=9616>

Original Research Article

Received 7th March 2015
Accepted 7th May 2015
Published 6th June 2015

ABSTRACT

Aim: Mosquito borne diseases especially malaria is a serious public health problem in the tropical and sub-tropical regions of the world especially the developing countries including India. Besides available key interventions to control the spread of vectors and vector borne diseases, there is a felt need for involving a suitable community approach based on knowledge, attitude, awareness, behaviour and protective practices to get the best results. Hence, the present study is an attempt to provide some inputs in this direction.

Methodology: A community based cross-sectional survey was carried out in a highly malaria endemic cluster of six selected villages of Rohtak and Mewat region of Haryana to know the respondent knowledge about malaria and other mosquito-borne diseases, as much as their attitude, awareness and practices regarding the malaria and its control. The results obtained were

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processed and analyzed statistically by using STATA version 10 software.

Results: The study revealed that about 52% of the respondents in Rohtak region and 42.68% in Mewat region committed that malaria is transmitted by mosquito bite which was directly correlated with the level of education. It was observed that high fever, chills and body pain were considered as the major signs/symptoms of malaria. Television followed by friends and relatives and health care provider's acts as the major source of information about malaria and other mosquito borne diseases. Overall (76.2%) individuals from both study areas mentioned that malaria is a serious problem in their area but only 46.3% knew about various Government measures for the protection and treatment of malaria. Mosquito nets, mosquito coil and repellents were commonly used as protective practices by the respondents but the difference was not found significant except for mosquito net ($P < 0.05$) in both the study areas.

Conclusion: Promoting active community participation by improving current intervention strategies through information, education and communication regarding malaria and other mosquito-borne diseases may yield better results.

Keywords: Malaria; India; knowledge; attitude; awareness; practice.

1. INTRODUCTION

Mosquito borne diseases especially malaria continue to remain a major public health problem in tropical and sub-tropical countries of the world despite decades of national and international efforts. According to WHO, globally over 2400 million persons are at risk due to malaria with around 207 million cases and at least 0.6 million deaths per year solely attributable to malaria [1]. In Southeast- Asia region, India alone accounts for 61% of malaria cases and about 70% of them occur in people with low socio-economic status [2]. Apart from this, several other factors are responsible for the occurrence of malaria like poor drainage and sanitation facilities, lack of knowledge about mosquito-borne diseases, poor surveillance and monitoring, champed agricultural practices, new irrigation schemes, developmental activities, increasing population, frequent travel etc. which modify the environment and hence directly influence the risk of disease. For the prevention and control of malaria and other mosquito-borne diseases Government of India makes tremendous efforts through National Vector Borne Disease Control Programme (NVBDCP) [3] which is an umbrella programme to effectively control vector borne diseases and is implemented throughout the country through the primary health care system. The key components of current vector control strategy of NVBDCP are: (1) use of insecticide treated bed-nets (2) use of indoor residual spray (3) use of larvivorous fish like guppy and gambusia (4) case detection and treatment. These targets specified by the NVBDCP for the prevention and control of vectors will be achieved only when people have better knowledge, attitude and awareness towards the disease as these might

help them in recognition of symptoms, utilization of proper protective measures and health services and also developing seriousness towards the disease.

Studies conducted earlier revealed that people's knowledge, attitude, awareness and protective practices used against mosquito bites differ considerably from one region to other region [4-11]. As very scanty information is available from the study area, the present study was carried out in two districts of Haryana viz. Mewat and Rohtak where malaria has been a serious public health problem. Moreover, 1300 deaths were reported due to malaria in Mewat region in 1996 due to an outbreak [12]. Therefore, this study was planned to find out the knowledge, attitude, awareness and protective practices used regarding mosquito borne diseases especially malaria in the selected area to assist the ongoing malaria control program.

2. MATERIALS AND METHODS

2.1 Study Area

Mewat district of Haryana with a total population of 1,089,263 according to Census 2011 is situated between 26° and 30° North latitude and 76° and 78° East longitude adjacent to Gurgaon with an average annual rainfall of 336-440 mm [13] while Rohtak district with a total population of 1,058,683 falls under 28.89° North latitude and 76.57° East longitude with an average rainfall of 458 mm [14]. The total number of literates in Mewat district is 454,222 (41.7%) [15], while in Rohtak district the number of literates is 749,548 (70.8%) [16]. However, only 146,462 females are literate in Mewat district which is a serious

indicator of a poor performance affecting the disease profile. Both districts have rainy season from July to September which coincides with the peak time for malaria transmission, as high temperature and humidity during this period provides favourable conditions for mosquito breeding. Other factors like socio-economic status, poor living conditions, lack of awareness, sanitation and level of education play an important role in transmission of the disease.

2.2 Study Design

This community based cross-sectional survey was conducted between October and December 2013 in six selected villages i.e. three in Mewat and three in Rohtak district. The villages were selected based on the data collected from District Malaria Officer, where more cases were reported during the last five years. The villages selected from Mewat region were Ujina (28.088 N; 77.023 E), Nagina (27.917 N; 76.983 E), Pinangwan (27.9 N; 77.1 E) while from Rohtak district were Kalanaur (28.83 N; 76.4 E), Meham (28.98 N; 76.3 E) and Bhaulat (28.9 E; 76.7 E). Malaria transmission rate as observed was highest in Ujina village followed by Pinangwan and Nagina as compared to villages in Rohtak district. The current malaria control interventions being implemented in the area are prompt treatment, indoor residual spray (IRS), insecticide treated nets (ITNs) and early diagnosis according to National Vector Borne Disease Control Programme under the aegis of Health Department, Haryana.

2.3 Data Collection

Data were collected from a convenient sample of 825 respondents from different professions and age groups, representing all types of the communities from the study areas by using a well designed standardized pre-structured questionnaire. Informed and free consent of all the respondents was obtained prior to the study. Children below age of 10 were assisted by their guardians. The questionnaire investigated the socio-demographic characteristics of the individuals as well as the knowledge, attitude, awareness and protective practices on malaria. The first author with the help of Accredited Social Health Activists (ASHA) workers and others was involved in the survey.

2.4 Statistical Analysis

Data collected were analysed statistically using STATA version 10. Chi-Square test was used for comparison of characteristics between Rohtak

and Mewat villages. The *P*-value less than 0.05 was considered significant.

3. RESULTS

3.1 Socio-demographic Characteristics of Respondents

Overall 560 participants (67.8%) were illiterate or obtained primary education only in both of the study areas while only 24 respondents (2.9%) had acquired higher education. In Mewat region 84 individuals (19.5%) preferred to go to Motharsaas (schools for muslims where only religious aspects are taught) or learnt some technical skills to earn their livelihood but in Rohtak district 72 respondents (18.2%) preferred to learn technical skills. When excluding the students (27.2%) and housewife's (31%), the majority of people in Mewat region were daily wages workers (18.37%) while in Rohtak region majority of respondents were shopkeepers, vendors or hawkers (14.4%) and in public or private service (11.39%) as given in Table 1.

3.2 Knowledge about Breeding Places, Causative Agents and Diseases Transmitted by Mosquitoes

On asking about the causative agent of malaria only 42.6% of the respondents in Mewat region and 52% of the respondents in Rohtak region associated malaria with mosquitoes which was significantly associated with the difference in the educational level of the two regions ($P < 0.05$). Seventy percent of the respondents in Rohtak district and 75.8% in Mewat district mentioned ditches, pond/rivers and stagnant water as breeding sites for mosquitoes but overall in both of the study areas about 6.6% of participants enumerated vehicle tyres as one of the breeding places for vectors while only 15.2% respondents knew about coconut shells/coolers as breeding places of mosquitoes as given in Table 2. On asking about diseases transmitted by mosquitoes, only 51% of respondents in Rohtak district and 33% in Mewat region had knowledge that malaria is transmitted by mosquitoes, followed by dengue while there was a significant difference in the number of respondents from both the regions who stated that chikungunya is transmitted by mosquitoes ($P < 0.05$).

3.3 Knowledge about Malaria Signs and Symptoms

Symptoms such as chills, fever and body pain were mostly mentioned as signs and symptoms

of malaria by the respondents in both the districts as depicted in Fig. 1. However, other symptoms like headache, loss of appetite and dizziness were not found convincing. Nearly 11.4% of respondents in Mewat region had no knowledge about any signs and symptoms of malaria.

3.4 Awareness and Attitude about Malaria

About 69.6% of the respondents in Rohtak district and 83.8% of the respondents in Mewat district perceived that malaria acts as a serious problem in their locality ($P < 0.05$) but on enquiry

about various Government measures used for vector control, only 31.3% of the individuals in Mewat district had knowledge about them as compared to the individuals in Rohtak district (62.5%) as given in Table 3. Television acts as a primary source of information among the respondents in both study areas followed by other sources like Health care providers, radio, newspaper/magazine but in Mewat region the second major preferred source of information observed was communication from friends and relatives ($P < 0.05$).

Table 1. Socio-demographic characteristics of respondents in Rohtak and Mewat districts

	Rohtak	Mewat	Overall
Age (Yrs)			
0-5	13 (3.3)	36 (8.4)	49 (6.0)
6-15	66 (16.7)	85 (19.8)	151 (18.3)
16-25	115 (30.13)	136 (31.6)	251 (30.4)
26-above	201 (52.4)	173 (40.2)	374 (45.3)
Educational status			
Illiterate	125 (31.6)	155 (36.0)	280 (33.9)
Matric	129 (32.7)	151 (35.1)	280 (33.9)
Graduation	49 (12.4)	36 (8.3)	85 (10.3)
Post-graduation	20 (5.06)	04 (0.9)	24 (2.9)
Others	72 (18.2)	84 (19.5)	156 (18.9)
Occupation			
Business	57 (14.4)	51 (11.86)	108 (13.1)
Service	45 (11.39)	30 (6.97)	75 (9.1)
Farmer	31 (7.8)	32 (7.4)	63 (7.6)
Student	110 (27.8)	114 (26.5)	224 (27.2)
Housewife	132 (33.4)	124 (28.8)	256 (31.0)
Any other	20 (5.0)	79 (18.37)	99 (12.0)
Economic status			
<5,000	244 (61.77)	280 (65.1)	524 (63.5)
5,001-10,000	104 (26.32)	119 (27.7)	223 (27.0)
10,001-20,000	33 (8.35)	21 (4.9)	54 (6.5)
20,001-50,000	14 (3.54)	10 (2.3)	24 (3.0)
>50,000	-	--	-
Family type			
Nuclear	247 (62.5)	268 (62.3)	515 (62.4)
Joint	148 (37.4)	162 (37.6)	310 (37.5)
Type of house			
Thatched	109 (27.6)	129 (30.0)	238 (28.8)
Cemented	286 (72.4)	295 (68.6)	581 (70.5)
Other	00 (0.0)	06 (1.4)	06 (0.7)
Water supply			
Piped supply	368 (63.6)	390 (63.6)	758 (69.4)
Well	37 (6.4)	50 (8.1)	87 (7.9)
Handpump	172 (29.7)	170 (27.7)	242 (22.1)
Any other	01 (0.17)	03 (0.4)	04 (0.3)

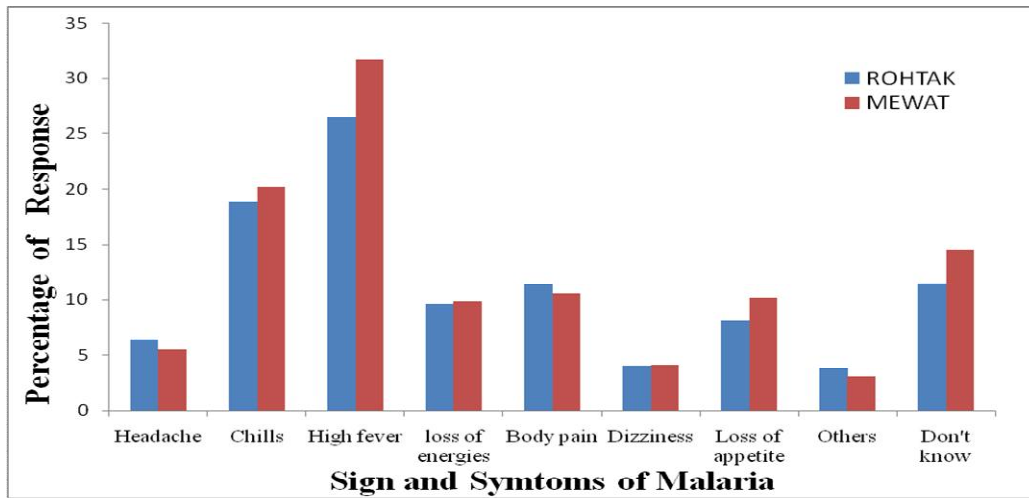


Fig. 1. Knowledge about sign and symptoms of malaria in Rohtak and Mewat region

Table 2. Knowledge regarding malaria and other vector borne diseases

	Rohtak	Mewat	Overall	p- value
Breeding places				
Ditches	313 (33.9)	213 (32.1)	526 (33.23)	0.0002
Ponds/rivers	156 (16.9)	160 (24.1)	316 (19.9)	ns
Vehicle tyres	63 (6.8)	42 (6.4)	105 (6.6)	0.055
Stagnant water	189 (20.5)	130 (19.6)	319 (20.1)	0.0015
Coconut shells/coolers	159 (17.3)	82 (12.4)	241 (15.2)	0.00009
Others	41 (4.5)	35 (5.3)	76 (4.8)	ns
Causative agents				
Mosquito bite	265 (52.0)	182 (42.68)	447 (47.4)	0.0001
Drinking dirty water	41 (8.0)	49 (9.96)	90 (8.9)	ns
Overwork/sun exposure	37 (7.0)	45 (9.15)	82 (8.0)	ns
Food	53 (10.4)	29 (5.89)	82 (8.0)	0.011
Other	15 (2.9)	11 (2.24)	26 (2.6)	ns
Don't know	98 (19.2)	148 (30.0)	246 (24.6)	0.0017
Disease transmitted by mosquito				
Malaria	274 (51.0)	210 (33.0)	484 (41.0)	0.004
Chikungunya	44 (8.0)	14 (2.2)	58 (4.9)	0.00014
Dengue	132 (24.0)	89 (29.7)	221 (27.3)	0.0047
Filariasis	04 (0.7)	02 (0.3)	06 (0.5)	ns
Others	02 (0.3)	01 (0.16)	03 (0.26)	ns
Don't Know	83 (15.0)	220 (35.0)	303 (25.8)	ns
Control measures				
Environmental	44 (11.06)	81 (23.4)	125 (16.8)	0.0013
Chemical	340 (85.4)	247 (71.4)	587 (78.9)	0.00015
Biological	-	-	-	-
Integrated	-	-	-	-
Don't know	14 (3.5)	18 (5.2)	32 (4.3)	ns

A total of 92% of the respondents from both the study areas showed positive response towards cooperation with insecticide spraying operation ($P < 0.05$) but on the other hand, there was no significant difference observed between the respondents of the study areas in terms of hesitation for consuming tablets.

3.5 Protective Practices Used among Respondents

Majority of individuals from both study areas preferred to use mosquito coil followed by repellent and mosquito net to combat malaria as shown in Fig. 2 but the difference was not found

significant except for mosquito net ($P < 0.05$) in both the study areas. Some respondents also mentioned destroying of small mosquito breeding grounds, fumigation by smoke and keeping house and surroundings clean as self protection measures against mosquitoes as shown in Fig. 2.

4. DISCUSSION

So far no comparative study has been conducted in Haryana about malaria regarding knowledge, attitude, awareness and protective practices. The study showed that 274 (51%) respondents in Rohtak region and 210 (33%) in Mewat region knew about the role of mosquitoes in transmission of malaria which was a comparatively lower figure than the observations made in most of the previous studies [4,6-9]. Accordingly, it was clear that respondents with low socio-economic status and with low level of education had less knowledge about the disease as well as the role of mosquitoes in causing malaria and other mosquito borne diseases. However, a significant proportion of participants in Mewat region had no knowledge at all about the causes of malaria ($P < 0.05$).

Regarding the knowledge of breeding places of mosquitoes, ditches (33.23%) followed by stagnant water (20.1%) and ponds/rivers (19.9%) were considered the most common by the respondents with low level of education from both the study areas while only few respondents knew about coolers/coconut shells (15.2%) and

vehicle tyres (6.6%) as the breeding places for mosquitoes. The results were found to be comparable to the study conducted in periurban areas of Puducherry [9]. Hence, the level of education and income plays an important role in people's perception and practices for treating and controlling malaria. Findings of the present study showed that more than 50% of the respondents from both study areas recognized high fever, chills and body pain as the most common signs and symptoms of malaria. These results are in line with the previous studies in some of the endemic regions except for one symptom *i.e.* body pain [17,18].

Promising results were reported about the source of information showing that about 38.6% of the individuals under survey in Rohtak and 27.8% in Mewat region were aware about malaria and other mosquito borne diseases through television followed by friends and relatives *i.e.* 21.2% in Rohtak region and 27.5% in Mewat region. Study from Nepal [19] showed radio (58.1%) and television (25.4%) as the major sources of information among the respondents regarding malaria while 3/4th (75.93%) of the study population from Puducherry considered television as the primary source of information. Further, the present study revealed that 69.6% individuals in Rohtak region and 83.8% in Mewat region considered malaria as a serious problem ($P < 0.05$) whereas this percentage was 54.90% in Puducherry and in Tanzania almost 3/4th of the study population reported the same [20].

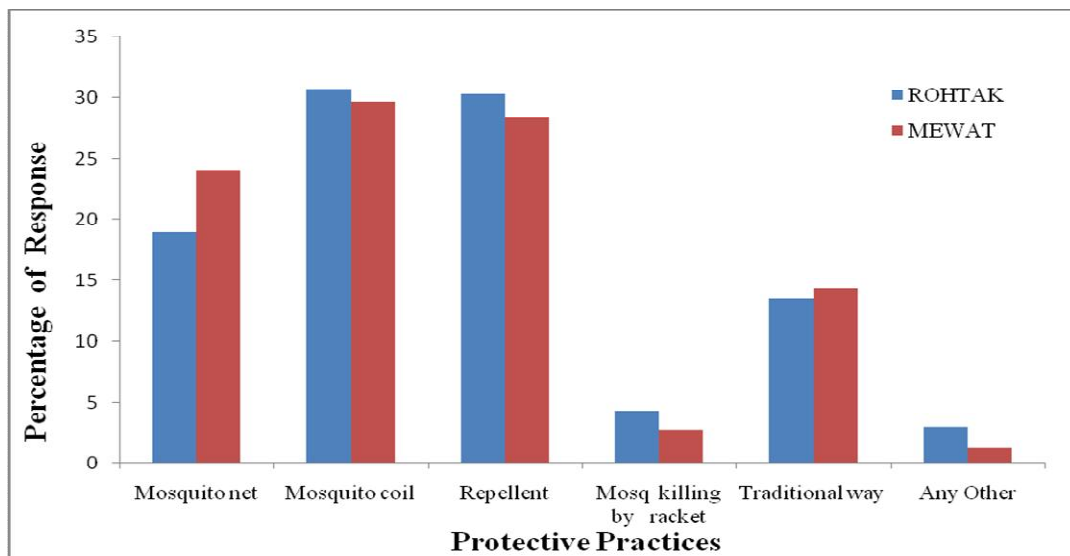


Fig. 2. Protective practices used among respondents of Rohtak and Mewat Region

Table 3. Awareness and attitude of respondents regarding malaria

	Rohtak	Mewat	Overall	p-value
Source of information				
T.V.	237 (38.6)	187 (27.8)	424 (32.9)	0.017
Radio	59 (9.6)	89 (13.2)	148 (11.5)	0.013
Newspaper / Magzine	61 (9.9)	72 (10.7)	133 (10.3)	ns
Health care providers	87 (14.1)	102 (15.1)	189 (14.7)	ns
Hoarding-banners	34 (5.5)	25 (3.7)	59 (4.5)	ns
Friends & Relative	130 (21.2)	185 (27.5)	315 (24.5)	0.004
Others	05 (0.8)	12 (1.7)	17 (1.3)	ns
Serious problem in area				
Yes	275 (62.5)	135 (31.3)	382 (46.3)	0.007
No	120 (30.3)	78 (18.57)	198 (23.7)	
Awarenes about various Govt. measures				
Yes	247 (62.5)	135 (31.3)	382 (46.3)	0.0001
No	148 (37.4)	295 (68.6)	443 (53.6)	
Hesitation for consuming tablets				
Yes	36 (26.08)	42 (25.7)	78 (25.9)	ns
No	102 (73.9)	121 (74.2)	223 (74.08)	
Cooperation with insecticide spraying operations				
Yes	376 (95.1)	384 (89.3)	760 (92.1)	0.002
No	19 (4.8)	46 (10.6)	65 (7.8)	
Drug compliance				
Yes	42 (91.3)	77 (93.9)	119 (94.4)	ns
No	02 (4.3)	05 (6.09)	07 (5.5)	
Sleeping habits				
Indoors	395 (64.7)	430 (65.5)	825 (65.6)	ns
Outdoors	205 (33.6)	226 (34.4)	431 (34.3)	

Moreover, only about 25% of the respondents from both regions were hesitant to consume tablets distributed freely by the Government and 92% of them had expressed willingness for cooperation with insecticide spraying operation. These figures were quite higher than that reported from Coastal Puducherry [7]. Further, 94.4% malaria patients reported under both study areas showed complete drug compliance for the treatment of malaria.

When enquired about the use of personal protection methods, mosquito coils (29.8%) followed by repellent (29.3%) and mosquito net (21.3%) were mostly used by the individuals in both study areas while in Coastal Puducherry the most preferred protection measures were mosquito coil (50.24%) and liquid vaporizers (43.85%) whereas in Rajasthan these figures were comparatively on the lower side [21].

5. CONCLUSION

The present study revealed that basic knowledge about malaria in Mewat region was higher as compared to Rohtak region which was probably associated with the large number of malaria

cases reported in that region and hence people became more familiar with such type of common disease. It is expected that active community participation and health education campaigns will enhance better knowledge and understanding of protective practices used for the prevention of malaria transmission.

It is also suggested to strengthen the ongoing interventions such as indoor residual spray (IRS) and insecticide treated nets (ITNs) along with the biological control methods such as use of larvivorous fish like guppy and gambusia in the temporary or permanent water bodies which could reduce the frequency and prevalence of malaria and other vector borne diseases.

ETHICAL APPROVAL

All authors hereby declare that all participants involved gave informed consent.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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