



Research Article

A Study to Assess Knowledge, Attitude and Practices on Prevention and Control of Malaria in Two Endemic Blocks of District Nuh (Mewat Region) in Haryana

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A B S T R A C T

Malaria, a life-threatening protozoal infection and continues to be a global public health concern. India is also a malaria endemic country, which constitutes the highest malaria burden in the South East Asia Region. Since the major outbreak of malaria occurred in Mewat region in 1996, few studies have been carried out enumerating various factors associated with malaria prevalence and persistence in the traditionally known epidemic belt of the north-western plains of India. The purpose of the present KAP study was to determine the community perceptions in terms of malaria cause, prevention and control.

A community based cross-sectional survey was carried out in four malaria endemic villages in two PHCs of district Nuh of Haryana with 190 respondents to know respondents knowledge about the disease, its prevention and control in terms of acceptance of Indoor Residual Spray. Data collected were analysed statistically using STATA version 10. Chi-Square test was used for comparison of characteristics between data collected from four villages.

There was significant difference in the disease awareness between male and female, illiterate and literate and low and high income group population. 92% respondents were aware of malaria disease, 44.4% of the respondents reported as rainy season and 31.4% post rainy season and others did not know. On asking about the causative agent of malaria, 82% of the respondents associated malaria with mosquitoes which was significantly associated with the awareness and prevalence of diseases in the region. Mosquito nets, coils 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. The study indicates about little knowledge, less awareness and inadequate practices of respondents on various aspects of malaria



are important factors responsible for the persistence of malaria in the district Nuh.

Keywords: Malaria, Mewat, IRS, KAP, Vector Control

Introduction

Malaria remains one of the most serious global health problems and is not only a major cause of morbidity and mortality, but also the cause of many socioeconomic problems.¹ As per WHO World Malaria report 2018, there were 219 million cases of the disease in 2017 and the estimated global tally of malaria deaths reached 435,000. Approximately 70% of the world's malaria burden is concentrated in just 11 countries-10 in sub-Saharan Africa and India.² These high-burden nations are home to an estimated 151 million cases of malaria and 275,000 deaths. The Global Technical Strategy for Malaria 2016-2030 (GTS) calls for reducing malaria cases and deaths by at least 40% by 2020, at least 75% by 2025 and at least 90% by 2030. In 2017, of all the 11 highest burden countries globally, African countries reported increases in malaria cases over the previous year, but only India marked progress in reducing its disease burden, registering a 24% decrease compared to 2016.

The confirmed cases of malaria in India have decreased from 75 million in 1950's to nearly 1 million in year 2017. The case loads in the country, though steady around 2 million cases annually in the late nineties, has shown a declining trend since 2002. The Slide Positivity Rate (SPR) has also shown gradual decline from 3.50 in 1995 to 0.87 in 2016. The reported Pf cases declined from 1.14 million in 1995 to 0.71 million cases in 2016. However, the Pf% has gradually increased from 39% in 1995 to 65.53% in 2016.³

Malaria is a unique disease and has roots deep within human communities. Beliefs and practices of malaria are often related to culture which can influence the effectiveness of control strategies. Thus, local knowledge and practices related to the disease are key to implementation of culturally appropriate, sustainable and effective interventions.⁴ Community perception, beliefs and attitude about malaria control, symptom identification, treatment, and prevention influence efforts to address malaria and are often overlooked in control efforts⁵ and vary from one region to other region and among individual households. Failure to consider community's knowledge, attitude and practice (KAP) about malaria may contribute to the inability of the program to achieve sustainable control.⁶ Hence, KAP can be an important step in developing strategies aimed at controlling malaria.

In India, Malaria is transmitted by six *Anopheles* species of

mosquitoes which are primary vectors of malaria.⁷ There are some other mosquito species playing a limited role in malaria transmission and recognized as secondary vectors of malaria. The control of malaria and other vectors borne diseases mainly depends on application of insecticides, Indoor Residual Spray (IRS) and use of Insecticide-Treated bed Nets (ITN)/ Long Lasting Insecticidal Nets (LLIN).

As very scanty information is available from the study area, the present study was carried out in four villages of malaria endemic blocks of district Nuh of the State of Haryana where malaria has been a serious public health problem. The region in the past has reported 1300 deaths due to malaria in 1996.⁸ Therefore, this study was planned to find out the knowledge, attitude, awareness and prevention of malaria in the selected area.

Materials and Methods

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.⁹ The district 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 (Figure 1). Other factors like socio-economic status, poor living conditions, lack of awareness, sanitation and level of education play an important role in spreading of the disease. Seasonal variation in the prevalence of vector mosquito species and its biological attributes are very important in shaping malaria transmission pattern, especially in epidemic prone areas like Mewat region. An upsurge in malaria cases was reported in this area¹⁰ during 2011 and 2012.

Study Design

Based on the Primary Health Centre (PHC) and village-wise epidemiological data of District Malaria Office, District Nuh, a community based cross-sectional survey was conducted in two malaria endemic Primary Health Centres (PHCs) namely Ujina and Punhana of the District Nuh. The study was conducted between April to June 2017 in four high risk villages (selected based on the epidemiological data for the year 2016) two each from the endemic PHCs i.e. two villages namely Ranika and Jaisinghpur in PHC Ujina and two

villages namely Naheda and Hathangaon in PHC Punhana. The vector control interventions being implemented in the district are Indoor Residual Spraying (IRS) with synthetic pyrethroid insecticide and use of Long Lasting Insecticidal Nets (LLINs).

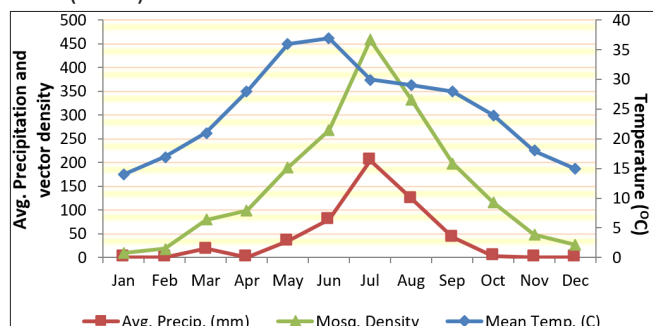


Figure 1. Mean temperature (°C), Rainfall (mm) and Vector Density (PMHD) in the study area from January to December 2017

Data Collection and Analysis

Data were collected from a convenient sample of 190 respondents from different age group with different literacy representing all types of the communities from the study areas by using a well-designed standardized pre-structured questionnaire. All participants gave verbal consent. The first part of the questionnaire included demographic characteristic, whereas the second part had questions on knowledge, attitude and practices of residents about malaria, symptoms of malaria, transmission, protection methods of malaria, malaria vectors, and mosquito breeding, resting places, refusal of DDT spray etc. Data collected were analysed statistically using STATA version 10. Chi-Square test was used for comparison of characteristics. The P-value less than 0.05 was considered significant.

Results

Out of the 190 respondents, nearly 29% of the respondents were in the age group of 15-34 years and 71% were in the

age group of 35 and above. The detailed demographic characteristic of the study population has been depicted in Table 1. Overall 124 participants (65.26%) were illiterate or obtained primary education only in both of the PHC villages while only 5 respondents (2.63%) had acquired higher education. If the students (27.37%) and unemployed/housewife's (31%) are excluded then the majority of people in study area were daily wages workers or farmers (18.42%). Table 2 represents the knowledge, attitudes and practices of respondents about malaria.

Table 1. Socio-demographic characteristics of the study population

S. No.	Variable	Respondent Characteristics	n	Percent
1.	Age (in Years)	15-24	24	12.63
		25-34	31	16.32
		35-44	63	33.16
		45+	72	37.89
2.	Sex	Male	135	71.05
		Female	55	28.95
3.	Educational Status	illiterate	71	37.37
		Primary Level	53	27.89
		Secondary Level	38	20.00
		High School Level	23	12.11
4.	Employment	College Level	5	2.63
		Service	23	12.11
		Business/ Self employed	21	11.05
		Farmer	35	18.42
		Student	52	27.37
		Unemployed	59	31.05

Table 2. Community knowledge, behaviour and practices on malaria vector and its control

S. No.	Detail	Parameter	n	Percent
1.	Awareness of malaria	Yes	176	92.50
		No	13	6.84
		Do not Know	1	0.53
2.	Causative agent of malaria	Mosquito	156	82
		Other insects	34	18
3.	Transmission season of malaria	Rainy	84	44.4
		Post Rainy	60	31.4
		Do not Know	46	24.2
4.	Aware symptoms of malaria	Yes	165	87
		No	21	11

		Do not Know	4	2
5.	If yes, what are the symptoms of malaria	Fever, Cold, Headache, Shivering	148	78
		Enlargement of liver and stomach	21	11
		Do not Know	21	11
6.	Perception on malaria prevention	Can be prevented	151	79.6
		Cannot be prevented	30	15.7
		Not known	9	4.7
7.	Where do malaria mosquitoes breed	In clean water	65	34
		In polluted water	87	46
		Garbage	25	13
		Not known	13	7
8.	What preventive measures taken to avoid mosquito bite at night	Mosquito coils	57	29.8
		Repellent	56	29.3
		Mosquito net	40	21.3
		Do not anything	37	19.6
9.	Where do mosquitoes rest	Indoor (human dwelling)	93	49
		Near Waterbodies	23	12
		Outdoor (cattle sheds)	68	36
		Not known	6	3
10.	Whether spray has been made in all rooms of your house	Yes	121	64
		No	65	34
		Not known	4	2
11.	Whether the IRS is beneficial	Yes	158	83
		No	11	6
		Not known	21	11
12.	Whether Acceptance on IRS	Yes	148	78
		No	32	17
		Not known	10	5
13.	If not, what are reasons for refusal of IRS	Due to bed smell	61	32
		Inconvenient	82	43
		Spraying do not reduce mosquito	44	23
		Not Known	4	2

Most of the respondents (92.5%) were aware of malaria disease, 44.4% of the respondents reported transmission season as rainy season and 31.4% post rainy season and others did not responded. On asking about the causative agent of malaria, 82% of the respondents associated malaria with mosquitoes which was significantly associated with the awareness and prevalence of diseases in the region ($P < 0.05$). Symptoms such as Fever, Cold, Headache and Shivering were mostly (78%) mentioned as signs and symptoms of malaria by the respondents. However, other symptoms like headache, loss of appetite and dizziness were

not found convincing. Nearly 11.4% of respondents had no knowledge about any signs and symptoms of malaria. About prevention of malaria 79.6% respondents reported malaria can be prevented and 15.7% reported that it cannot be prevented.

The awareness of respondents about the resting places of mosquitoes was very high (85%) i.e. human dwelling (49%) and cattle shed (36%). Majority of individuals from both study areas preferred to use mosquito coil (30%) followed by repellent (29%) and mosquito net to combat malaria as shown in Figure 3 but the difference was not

found significant except for mosquito net ($P < 0.05$) in both the study areas. The use of bed nets (21.3%) was not very popular due to financial reasons as the cost of bed nets was quite high. Moreover, inconvenience for use during summer season was another reason for its low usage. Burning of cow dung with dry leaves of "Neem" is also another measure in use by the respondents as indigenous method for the personal protection.

Majority of the respondents (83%) were aware about the benefits of the Indoor Residual Spraying (IRS). IRS due to its patches on walls, disfigurement of rooms, bad odour and fear psychosis of Insecticide spray was not acceptable by some respondents but most of respondents (78%) has shown acceptance of IRS and indicated as an important vector control intervention.

Discussion

This study was conducted to provide baseline information on knowledge and practices regarding malaria and acceptance of IRS which can be used in decision-making processes, the design of sustainable interventions with active community participation and the implementation of educational programmes towards the prevention and control of malaria. The study showed a high level of knowledge about malaria transmission and its symptoms in population which may be due to high rate of prevalence in the area which has led to awareness amongst the residents. Awareness of symptoms of malaria, which is a key factor to seeking early treatment, has been reported in populations in endemic areas where people frequently suffer from malaria infection.^{11,12}

Results of this study showed that Community Health Workers like Accredited Social Health Worker (ASHA) were the main source of household's information about malaria and IRS. This finding is consistent with findings in other studies from different malaria endemic regions around the world which indicates that Community Health Workers are frequently in contact with people.^{12,13} This is in contrast to findings from a recent study conducted in Saudi Arabia and India that reported the social media as the primary source of malaria information.^{14,15} Access to Community Health Workers and communication facilities had previously been reported to play an important role in prevention and control of malaria. The results of some studies indicate that improving the community's knowledge of malaria transmission can greatly contribute to prevention and success of control measures.¹⁶

Results of this study revealed that majority of the participants knew stagnated polluted water as a breeding place of malaria vectors. Awareness of mosquitoes breeding site could influence decision making for appropriate tool for larval source management. This study also indicated that despite having positive perceptions towards IRS, a

large number of respondents in the study population did not apply it. In this regard, 83% of the studied population mentioned IRS as an effective preventive measure against malaria vector, but only 64% of the houses where all the rooms had been sprayed as reported by the participants. This rate of IRS coverage is lower than 80% which is the targeted coverage by WHO.¹⁷

IRS being the main strategy of the programme since the launch of National Malaria Control Programm, a drastic reduction in malaria prevalence was observed in many malaria endemic parts of the country.¹⁸ IRS with organochlorine insecticide DDT 50% wdp was very effective and its acceptance among the community was very good.¹⁸ But, refusal for IRS was reported in these areas due to the resurgence of malaria and development of resistance in the vector mosquitoes Singh et al.¹⁹ To achieve the desired IRS coverage, community participation is also very important. The housing patterns mostly mud plastered with thatched roof adjoining to cattle sheds in study area and other factor is poor living conditions and poor health seeking behaviour of tribal population and their environment makes them vulnerable to malaria.^{20,21}

It has been found that significant improvement in awareness of people occurs in respect of malaria control after proper health education, as majority of the people were found aware of the causes of malaria and common symptoms, season of malaria, and breeding places of mosquitoes.²² Thus, proper health education should be given to increase community knowledge and awareness about the disease symptoms, causative agents etc. at the individual and community level to promote malaria prevention for successful malaria control. The effectiveness of IRS in malaria control is also the main vector borne disease control strategy. However, it is of concern that IRS coverage was very low in the study population. This is especially so in light of the malaria elimination in phase manner in India is aiming for next couple of years. Therefore, efforts should be made for increasing the IRS coverage through promoting the attitude and practice of households regarding IRS for effective vector control.

Conclusion

Low socio-economic status and illiteracy amongst the community in the study area is the main limitation to sustainable malaria elimination. These factors, along with community attitudes and practices, ultimately influence community participation in malaria elimination despite high knowledge. Insecticide spray may be more acceptable to the community, if appropriate and more effective insecticide is being used. There is an urgent need for special campaign to educate the illiterate and poor rural communities on malaria, vector mosquitoes, disease transmission, symptoms and its prevention to increase awareness about malaria. Moreover,

continuous monitoring and evaluation of IRS and conducting more surveys on knowledge, attitude and practices are recommended to improve malaria control measures and to identify indicators for successful and sustainable malaria elimination programme. Evidence based decision making may be adopted for disease vector control through larval source reduction, environmental management, IRS and use of insecticide treated bed nets to reduce and control prevalence of malaria and other vector borne diseases.

Conflict of Interest: None

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