

# A household survey to assess community knowledge, attitude and practices on malaria in a rural population of Northern India

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## ABSTRACT

**Introduction:** An extensive search on PubMed reveals very little in terms of evidence regarding the current knowledge, attitude, and practices (KAP) of the population in general and rural population, in particular, in this part of the country. Therefore, a study was conducted with the aim to assess the communities' knowledge of malaria transmission, recognition of signs and symptoms, treatment seeking. **Materials and Methods:** A stratified two-stage design was used to conduct a house-to-house survey using a semi-structured questionnaire in RS Pura block of Jammu District of Jammu and Kashmir State in North India. **Results:** A total of 300 households were included in the study. However, data on 4 households was found to be incomplete at the time of analysis and, therefore, were excluded. Out of 296 study participants interviewed 65.5% were males, while 34.5% females. All of the study participants (100%) had heard of malaria, and the main source of their information was television/newspaper. 92.5% of the study population considered malaria to be a serious health problem, thus reflecting their attitude to the disease. Regarding practices, 71.6% of the study participants preferred going to doctors at government hospitals for malaria treatment, and 56% were willing to seek medical help in <24 h in case of a child has a febrile episode. **Conclusions:** Results revealed that KAP among respondents were reasonably good and key sociocultural, and related indicators need to be identified as a part of malaria elimination strategy.

**Keywords:** Household, knowledge attitude and practices, malaria, Northern India, rural

## Introduction

Malaria continues to be a serious public health problem in South-East Asia including India. About 36% of the world's population (2020 million) is exposed to malaria in 90 countries.<sup>[1-3]</sup> The South-East Asian Region contributes 2.5 million cases to the global burden of malaria, of which India's contribution is 76%.

According to the World Malaria Report 2014, 22% (275.5 m) of India's population live in high transmission (>1 case/1000 population)

areas, 67% (838.9 m) live in low transmission (0–1 cases/1000 population) areas, and 11% (137.7 m) live in malaria-free (0 cases) areas.<sup>[4]</sup> In 2013, 0.88 million cases have been recorded, with 128 million tests being conducted on the suspected cases, with *Plasmodium falciparum* causing 53% and *Plasmodium vivax* causing 47% of the infections. The incidence of malaria in India accounted for 58% of cases in the South-East Asia Region of WHO.<sup>[4]</sup> At present, official figures for malaria in India, available at National Vector Borne Disease Control Programme,<sup>[5]</sup> indicate 0.7–1.6 million confirmed cases and 400–1,000 deaths annually.<sup>[5]</sup> However, a study conducted by teams from the office of the registrar general of India, Centre for Global Health Research

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at St. Michael's Hospital and University of Toronto, Canada, published in *The Lancet* on November 20, 2010 has reported that malaria causes 205,000 malaria deaths per year in India before age 70 years (55,000 in early childhood, 30,000 at ages 5–14 years, and 120,000 at ages 15–69 years) with a 1.8% cumulative probability of death from malaria before age 70 years.<sup>[6]</sup> The report says that 90% of the deaths were recorded in rural areas, of which 86% occurred at home without any medical attention.

Malaria is a unique disease and has roots deep within human communities.<sup>[7]</sup> Beliefs and practices of malaria are often related to culture which can influence the effectiveness of control strategies.<sup>[8]</sup> Thus, local knowledge and practices related to the disease are key to implementation of culturally appropriate, sustainable, and effective interventions.<sup>[9]</sup> Community perception, beliefs, and attitude about malaria control, symptom identification, treatment, and prevention influence efforts to address malaria and are often overlooked in control efforts;<sup>[10]</sup> and vary from country to country and among individual households.<sup>[11]</sup> Failure to consider community's knowledge, attitude, and practice (KAP) about malaria may contribute to the inability of the program to achieve sustainable control.<sup>[12]</sup> Hence, KAP can be an important step in developing strategies aimed at controlling malaria. Extensive PubMed search reveals very little in terms of evidence regarding the current KAPs of the population in general and rural population, in particular, in this part of the country.

Keeping this in view, a study was planned to evaluate the KAP among rural residents of North India. The KAP prevalent in a community are important drivers of medical attention. Further, the State of Jammu and Kashmir falls in the low endemic zone with annual parasite incidence (API) of 0.1–1 only. However, the major concentration of malaria cases in Jammu and Kashmir is restricted to Jammu Division of the state only with Kashmir Division recording an API of <0.1. In this, the Jammu Division of the state resembles the rest of North India more than the Kashmir Division in the same state.

This differential distribution of malaria cases within a state with a low incidence of malaria is of great public health importance. The importance will lie in our ability to identify the potential contributors to this differential distribution. It also opens up the potential for developing preventive strategies across different parts of India.

## Materials and Methods

A community-based descriptive cross-sectional study was carried out in RS Pura Health Block of Jammu District in Jammu and Kashmir State in North India. The study was carried out from February through March 2015. The main outcome of interest was assessment of KAP regarding malaria among inhabitants RS Pura Health Block. RS Pura Block is located in the South-West of Jammu City adjacent to the Indo-Pak border with a total area of 273 km<sup>2</sup> and average density of 658/km<sup>2</sup>. There are 176 villages

and 1 town (11 wards) in the block with an estimated population of 179,636. The majority of population comprises Hindus.

The methodology used for the purpose of this study has been developed by Institute for Research in Medical Statistics as an alternative to probability proportionate to size (PPS) methodology. The PPS methodology although self-weighting in nature has a somewhat centrist bias which distorts this property. To obviate this bias, alternative methodology (IRMS) was developed and tested with beneficial results across different parts of India by Scientists from Indian Council of Medical Research. A sample size of 300 distributed as described below is in agreement with this methodology. Hence, no separate sampling strategy was adopted to identify the required number of households to be included in the study.<sup>[13]</sup>

The same methodology has been used in the current study.

For the purpose of this study, only the rural area of the block was considered. The entire RS Pura Block was stratified into four strata. The stratification was done in accordance with population size of villages located in RS Pura Block. The villages were identified as the primary sampling units while households located within the villages were identified as the secondary sampling units.

The stratification was conducted as detailed below:

### Stratification

- Stratum 1 small villages - villages with population of <500
- Stratum 2 moderately small villages - villages with population of 500–999
- Stratum 3 medium size villages - villages with population of 1000–1999
- Stratum 4 large size - villages with population  $\geq 2000$ .

Five villages were selected from each stratum by a simple random technique. Thus, the total number of villages taken was 20. From each village, 15 households with at least one member above age of 18 years at the time of the study were selected. The village selected was mapped, and a house-to-house survey was conducted until 15 households were completed. Only one adult per household was interviewed. Thus, the overall sample consisted of 300 households [Flow Chart 1].

From these 300 households, 300 adult respondents were identified for administration of the study questionnaire. The questionnaire was administered either to the head of the household or in his absence to a responsible adult above 18 years of age.

A semi-structured questionnaire was used as the instrument for the study purposes. The questionnaire included questions on: Demographic details, on knowledge and understanding of malaria transmission, on recognition of sign and symptoms, on perception of cause, treatment seeking patterns, preventive measures, and protective patterns.

The ethical clearance was duly sought from Institutional Ethical Committee. Informed verbal consent was obtained before inclusion as the study participant. Those who were not willing to participate were excluded.

### Statistical analysis

The data thus collected were tabulated and analyzed using MS Office Excel software. The analyzed data were expressed as proportions.

### Results

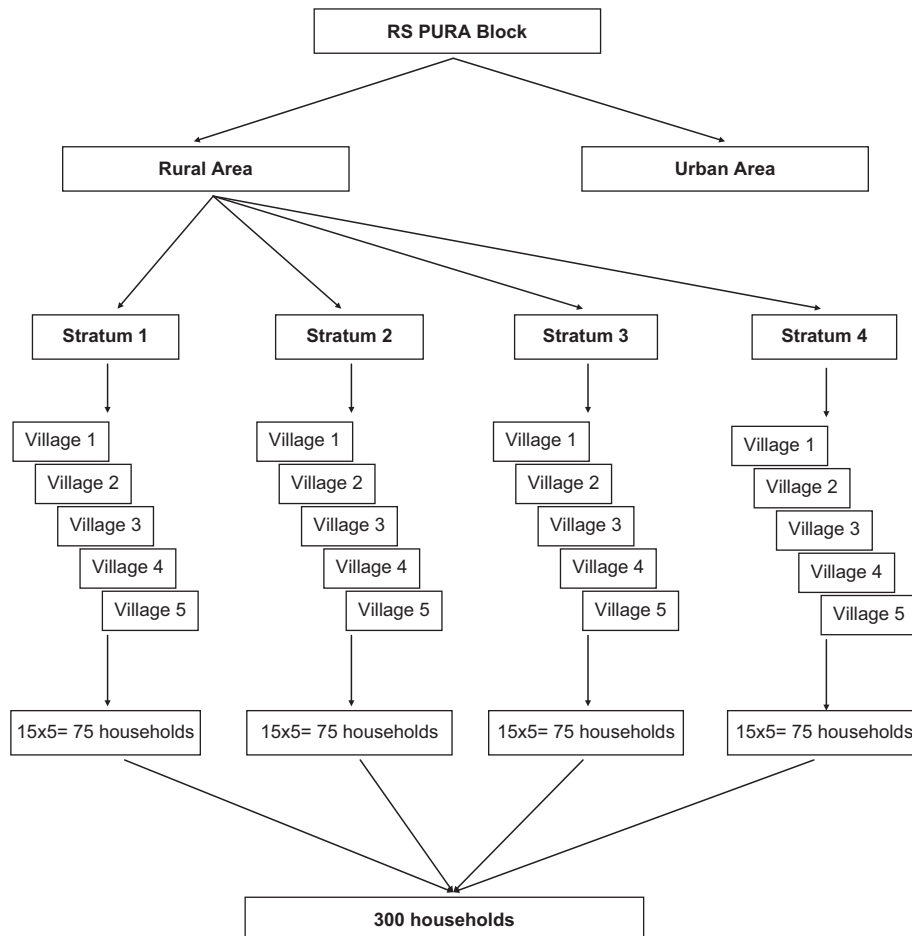
A total of 300 households were included in the study. However, data on 4 households was found to be incomplete at the time of analysis and, therefore, were excluded. Out of 296 study participants interviewed 194 (65.5%) were males, while 102 (34.5%) females [Table 1]. The demographics revealed that the maximum participants (33.7%) belonged to the 41–50 years age group. Maximum number (69.9%) of study participants were Hindu's. Education wise, one-third (29.7%) of the participants were illiterate, and an almost equal proportion (29.1%) had studied up to middle standard (8<sup>th</sup> Grade). Maximum (31%) number of study participants was agriculturists followed by

homemakers (29.7%). More (56%) number of study participants belonged to nuclear families.

All of the study participants had heard of malaria [Table 2]. Importantly, 97% of the study participants correctly associated malaria with mosquito bite [Table 2]. The majority (76.35%) of the study participants had knowledge of malaria symptoms, and a majority of them had knowledge that malaria could be both prevented (90.5%) as well as cured (93.2%). Further, a majority (77.7%) of the study participants knew that malaria could be fatal if not treated. An overwhelming (95%) number of the study participants had knowledge regarding various modes of disease prevention.

The response to questions on knowledge with multiple options drew multiple responses. However, the most common response (68.2%) to questions on the source of information regarding malaria was television (TV)/newspaper. Adequate knowledge was also found among them regarding resting habits of mosquitoes with only 2.8% of responses registering “don't know.” The responses to other questions are detailed in Table 2.

A majority (92.5%) of the study participants considered malaria to be a serious health problem, thus reflecting their attitude to the



**Flow Chart 1:** Study villages from RS Pura Block

**Table 1: The demographic details of the study participants**

Characteristics	<i>n</i>	Percentage
Gender		
Male	194	65.5
Female	102	34.5
Age		
18-30	56	18.9
31-40	64	21.7
41-50	100	33.8
>50	76	25.6
Religion		
Hindu	192	64.9
Muslim	18	6.1
Sikh	86	29.0
Literacy		
Illiterate	88	29.7
Up to primary (5 <sup>th</sup> grade)	16	5.4
Up to middle (8 <sup>th</sup> grade)	86	29.1
Up to matric (10 <sup>th</sup> grade)	64	21.6
Graduate and above	42	14.2
Occupation		
Agriculture	92	31
Business	24	8.1
Service (government/private)	84	28.3
Housewife	88	29.7
Student	08	2.7
Type of family		
Nuclear	166	56.08
Joint	130	43.91

disease [Table 3]. More than two-third of them would consult a doctor in case of child's illness though the majority of them had no knowledge regarding malaria treatment. The overall attitude of the study population toward the use of bed nets was positive and similar was the case with vector control program.

Regarding practices, a majority (71.6%) of the study participants preferred going to doctors at government hospitals for malaria treatment, and 56% of study participants were willing to seek medical help in <24 h in case of a child having a febrile episode [Table 4]. With regard to personal protective measures, 37% preferred using mosquito repellents while bed net usage was at 30%. Regarding preventive practices, more than half of the respondents would avoid collections of stagnant water while a quarter of them would prefer indoor spraying.

## Discussion

Assessment of KAP is a good initial step for planning public health intervention. This is of greater value in diseases such as malaria, wherein awareness about the cause and spread is a major stakeholder for prevention. It assumes significance in a state like Jammu and Kashmir, wherein the distribution of malaria cases within this state is not geographically uniform. Further, the state falls in a low incidence zone for malaria. Therefore, the strength of this study lies in its ability to capture the probable contribution of disease awareness in lower local disease burden. The findings

**Table 2: Knowledge about malaria among respondents**

Questions	Answers			
	Yes		No	
	<i>n</i>	Percentage	<i>n</i>	Percentage
Have you heard of malaria	296			
If malaria is caused by mosquito bite?	288	97.2	08	2.7
Can malaria be prevented?	268	90.5	28	9.45
Can malaria be cured?	276	93.2	20	6.75
Can malaria cause death?	230	77.7	66	22.2
Source of information regarding malaria				
TV/newspaper	202	68.2		
Government hospital/health facility	36	12.1		
Health worker	06	2.0		
Friends/neighbor	106	35.8		
Knowledge about malaria symptoms				
Fever with shivering	196	66.2		
Body pains	70	23.6		
Fever with sweats	96	32.4		
Loss of appetite	48	16.2		
Do not know	70	23.6		
Do you know when mosquito bites?				
Day time	06	2.02		
At night	128	43.2		
Any time	156	52.7		
Do not know	06	2.02		
Do you know resting places of mosquitoes?				
Dark places inside rooms	160	54.0		
Dirty areas	124	41.8		
On edges of ponds/stagnant water	162	54.7		
Cattle sheds	64	21.6		
Do not know	08	2.7		
Do you know mosquito breeding sites?				
Stagnant water	240	81.0		
Bushes/grass	56	18.9		
Do not know	20	6.7		
Do you know ways to prevent mosquito breeding?				
Cleaning household surroundings	190	64.1		
Cleaning bushes/tall grass	78	39.7		
Drainage of stagnant water	196	66.2		
Do not know	08	2.7		
How malaria can be prevented?				
Environmental management	164	55.4		
Insecticide-treated bed nets	152	51.3		
Indoor residual spray	82	27.7		
Prophylaxis	22	7.4		
Do not know	22	7.4		

of this study could shape the future discourse of research on local approaches to prevention of endemic diseases in India.

The results have shown reasonably good KAP of malaria among the study population. This is in agreement with findings of some studies<sup>[14-16]</sup> but is in contrast to other studies.<sup>[17-19]</sup> All the study population had heard of malaria. The findings are similar to that as reported by Abate *et al.*<sup>[16]</sup> This finding assumes importance in view of the fact that the study participants belong to a low

**Table 3: Attitude of respondents towards malaria**

Questions on attitude of participants	Responses			
	Yes		No	
	<i>n</i>	Percentage	<i>n</i>	Percentage
Is malaria one of the serious health problems?	274	92.5	22	7.4
Would you use bed nets?	204	68.9	92	31.08
Is your attitude towards vector control program positive?	240	81.08	56	18.9
Your first action if your child has a fever?				
Consult a doctor	210	70.9		
Home treatment	54	18.2		
Traditional healer	08	2.7		
Do nothing	24	8.1		
Deciding factor in seeking care when child is febrile				
Condition of the child	272	91.8		
Cost involved	12	4.05		
Time availability	12	4.05		
Best treatment for malaria				
Chloroquine	46	15.5		
Paracetamol	08	2.7		
Do not know	242	81.7		

**Table 4: Practices regarding malaria prevalent among respondents**

Questions	Answers	<i>n</i>	Percentage
Whom do you contact for malaria treatment?	At home with anti-malarials	04	1.3
	Doctor at government hospital	212	71.6
	Private doctors	80	27.0
Which protective measures do you use against malaria	Use of mosquito nets	144	29.6
	Mosquito repellents	176	36.2
	Close windows and doors	68	13.9
	Burn cow dung/leaves	66	13.5
	Wear long sleeve shirts	32	6.5
Which preventive measures do take against malaria	Avoid stagnant water collection	244	54.4
	Insecticide spraying	118	26.3
	Proper disposal of tins, work materials, etc.	66	14.7
	Proper hygiene and continuous education	20	4.46
What is the time you take in seeking medical help if child has fever	<24 h	166	56.08
	>24 h	130	43.92

incidence state and, therefore, have a lower exposure to cases of malaria. This may be because the main source of information in the current study population was mass media (TV/newspaper) followed by friends/neighbors. This finding is in contrast to the findings reported by Singh *et al.*<sup>[20]</sup> where an individual's experience with malaria was the main source. Herein, lies the strength of from this study. Creation of awareness through mass media is an excellent model of intervention in the prevention of malaria.

Hlongwan *et al.*<sup>[21]</sup> reported health facility (29%) as the main source of information among the respondents. Knowledge regarding causation of disease, its cure and prevention were very high in this study, though knowledge that it can be fatal was a bit on the lower side. This again may be because of less number of personal interactions with patients of malaria.

The results from our study regarding the transmission of malaria are in contrast to a Nigerian study where only a small proportion of respondents correctly answered questions about malaria transmission and its cause.<sup>[20]</sup> The study results have demonstrated that respondents had good knowledge about malaria signs and symptoms, and the results are consistent with some other studies.<sup>[22-24]</sup> This high level of awareness can best be explained by increased access to mass media and health education by government agencies. 97.2% respondents made correct association between malaria and mosquito bite which is in agreement with those reported by Hlongwana *et al.*, in Swaziland.<sup>[25]</sup>

Knowledge regarding breeding and resting places of mosquitoes were high among the study population in line with the results reported by some other studies like the one by Chirebuv *et al.*<sup>[26]</sup> Similarly, knowledge regarding prevention of mosquito breeding and prevention of malaria was very high, and the results concur with those reported by other authors.<sup>[15,16,20]</sup> It must be mentioned that excellent knowledge does not guarantee better preventive measures as observed by the authors. This could be explained by the low literacy levels and poor socioeconomic status of the study population and is reflective of the trend followed by health seekers in other health initiatives. Therefore, probably the key lies in creating awareness across all socioeconomic domains and identifying the possible bottlenecks.

The respondents' attitude toward malaria was reflected when more than 90% labeled it as a serious health problem. The majority (70.9%) consulted a doctor in case the child was found to be febrile, and only 18.2% reported using a home remedy. The results are in contrast to those reported by Eversole *et al.* where treatment involved traditional medicines more frequently.<sup>[27]</sup> The reasons for better access to registered medical practitioner in our study could be attributed to the better availability of health care in RS Pura Block as the block is a part of medical college field practice area. That may be the probable reasons for only 2.7% reporting to a traditional healer. Our findings are consistent with those reported by Singh *et al.*<sup>[20]</sup> Another positive finding was that the motivation to seek care for a febrile child was the condition of the child in an overwhelming 91.8% of the study population. However, only 15.5% knew chloroquine to be the best treatment for malaria, and the most obvious reason could be low literacy in this rural population. In contrast, Khan *et al.* reported 90% respondents could name drugs used in malaria treatment.<sup>[28]</sup> Despite this attitude toward vector control program was very positive.

The practice of going to government hospital/doctor for malaria treatment was found at a healthy rate of 72% among

the respondents and 56% would seeking help in <24 h of the febrile episode. The results are in agreement with those reported by Hlongwana *et al.* though a higher rate (88%) sought treatment within 24 h of onset of malaria symptoms.<sup>[18]</sup> The majority of the respondents in the current study had adequate knowledge about protective as well as preventive measures against malaria which concur with those reported by Hlongwana *et al.* in the study conducted in South Africa.

### Limitations of the study

Probably, a large study sample with distribution in rural, urban, and tribal areas of Jammu and Kashmir will provide us with a better understanding on the role knowledge and awareness on differential distribution malaria.

### Conclusions

Results revealed that KAP among respondents were reasonably good and key sociocultural, and related indicators need to be identified as a part of malaria elimination strategy.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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