

Assessment of knowledge and their practices regarding malaria among members of Village Health Sanitation Committee in rural Uttar Pradesh: A cross-sectional study

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ABSTRACT

Background: In 2019, the global number of malaria cases was estimated at 229 million. An estimated 409,000 deaths were attributed to malaria in 2019. Under-five children are the most susceptible to malaria, accounting for 67% (274,000) of all malaria deaths worldwide in 2019. This study aimed to assess knowledge and practices regarding malaria among Village Health Sanitation Committee (VHSC) members in rural Uttar Pradesh. **Methodology:** This cross-sectional study was conducted in the villages of four districts of Uttar Pradesh with high malaria burden. In the present study, 484 participants were interviewed from four districts of Uttar Pradesh. **Results:** Nearly all the participants (97.1%) have heard about malaria. Majority of the participants (97.1%) were aware that mosquito bites spread malaria. However, many participants were also having a false awareness that malaria is spread by other modes like drinking contaminated water, touching each other, eating contaminated food, and so on. More than half of the participants told that mosquitoes are responsible for malaria breeds in stagnant clean water (25.6%) and stagnant dirty water (28.5%). Nearly half of them were aware that mosquitoes' biting time was sunset (42.1%) and sunrise (7.8%). **Conclusion:** In the present study, many participants were having a false awareness that malaria is spread by other modes like drinking contaminated water, touching each other, eating contaminated food, and so on. Even the knowledge regarding any government program for the prevention and control of malaria of the mosquitoes was very weak. There is an urgent requirement of increasing knowledge among the VHSC members to reduce the malaria burden in the country.

Keywords: Knowledge, malaria, practices, rural, transmission

Introduction

Malaria is a lethal disease caused by parasites transmitted to humans through the bites of infected female anopheline

mosquitoes. In 2019, the global number of malaria cases was estimated at 229 million. An estimated 409,000 deaths were attributed to malaria in 2019. Under-five children are the most susceptible to malaria, accounting for 67% (274,000) of all malaria deaths worldwide in 2019.^[1] The majority of malaria cases and fatalities occur in sub-Saharan Africa. However, South-East Asia, Eastern Mediterranean, Western Pacific, and the Americas of the WHO regions are also in danger.^[1] According to the World

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Table 1: Awareness of malaria among study participants (n=484)

Question	n	Percentage
Do you know about malaria		
Yes	470	97.11
No	14	2.89
From where you have heard about malaria*		
Newspaper	206	42.56
Radio	184	38.02
Television	344	71.07
Friends	106	21.90
Family members	166	34.30
Others	108	22.31
Malaria is spread by*		
Mosquito bite	470	97.11
Drinking contaminated water	82	16.94
Touching each other	12	2.48
Eating contaminated food	42	8.68
Do not know	14	2.89
What are the symptoms of malaria*		
High-grade fever with rigors	456	94.21
Headache	264	54.55
Vomiting	152	31.40
Burning sensation in abdomen	48	9.92
Swelling in limbs	30	6.20
Do not know	6	1.24
How is malaria diagnosed?		
Blood film examination	406	83.88
By ultrasonography	14	2.89
By X-ray	4	0.83
Do not know	60	12.40
What are the various danger symptoms of malaria*		
Seizures	98	20.25
Unconsciousness	126	26.03
Stiffness in neck	66	13.64
High-grade fever	442	91.32
Do not know	2	0.41
Which persons are more prone to malaria*		
Children	150	30.99
Adults	116	23.97
Pregnant women	114	23.55
Elderly	122	25.21
All	362	74.79
Do not know	18	3.72

Malaria Report (WMR) 2019, 3% of the total world malaria cases occur in India. India recorded a 49% decrease in reported malaria cases and 50.5% in deaths compared to 2017.^[2] The WMR 2020 indicates that India has made impressive strides in recent years to reduce malaria incidence. India is the only high endemic country that experienced a 17.6% drop in 2019 compared to 2018.^[3] A study carried out by Tyagi *et al.*^[4] in East Delhi has shown that there is a widespread misconception about the malaria vector and its breeding sites. A review of the available literature shows a marked variation in malaria prevalence between urban and rural sectors, with the data being skewed more toward the rural side. This differential distribution of malaria cases within a low malaria incidence state paves the way for the development

Table 2: Cases of malaria among family members of study participants in last 1 year (n=484)

Question	n	Percentage
Did any of your family member/members suffered from malaria in last one year		
Yes	106	21.90
No	372	76.86
Do not know	06	1.24
If yes how did you come to know that it is malaria* (n=106)		
By doctor	16	15.09
By blood examination	88	83.02
By previous experience	02	1.89
Did any investigation was done		
Yes	88	86.27
No	14	13.73
If yes, what was that (n=88)*		
Blood examination	88	100
Others	40	45.45

*Some participants gave more than one response

of preventative strategies in various regions of India. Early detection and treatment of cases, vector control measures are part of the major malaria control strategies of the National Vector Borne Disease Control Programme.^[5] However, some of the beliefs, customs, and practices associated with malaria are often culturally based, affecting the efficacy of malaria control strategies.^[6] Community beliefs, perceptions, and attitudes about identifying, treating, preventing, and controlling malaria symptoms can influence malaria control efforts and are often overlooked in malaria control efforts.^[4,7] Despite the delay in global progress, there are countries with decreasing malaria cases during 2017. Thus, in 2017, compared with 2016, India recorded a 24% decline in malaria cases.^[8] The disease is not yet under control, as chances increase each year during and after the rainy season, especially in India's rural areas. So, there is a need for a thorough knowledge of "perceptions regarding malaria among the community" in primary care from health-care professionals at the basic level. A successful outreach campaign to members of the Village Health Sanitation and Nutrition Committee on malaria prevention will help improve the malaria situation in India. A recent study showed that about 95% candidates improved knowledge after the training, with 4% showing no effect and 1% faced deterioration.^[9] This study aimed to assess knowledge and practices regarding malaria among Village Health Sanitation Committee (VHSC) members in rural Uttar Pradesh.

Material and Methods

Study design and study area

This cross-sectional study was conducted in the villages of four districts of Uttar Pradesh with high malaria burden.

Study duration

The study duration was 1 year which was conducted from March 2015 till February 2016.

Table 3: Distribution of study participants as per the received educational material on malaria (n=484)

Question	n	Percentage
Did you heard/read any message regarding malaria		
Yes	428	88.43
No	56	11.57
If yes, how long back		
<1 month	30	7.01
1-6 months	178	41.59
>6 months	220	51.40
If yes, from where* (n=428)		
Government hospital	372	86.92
Television	246	57.48
Radio	134	31.31
News papers	128	29.91
Others	22	5.14
What was the content of message related to malaria* (n=428)		
Malaria is dangerous	224	52.34
Malaria is fatal	216	50.47
Malaria is spread by mosquito bite	376	87.85
Use mosquito net to protect from malaria	366	85.51
Others	72	16.82

*Some participants gave more than one response

Table 4: Distribution of study participants as per health education regarding malaria, given at home

Question	n	Percentage
Did anyone give health education regarding malaria at home?		
Yes	288	59.50
No	196	40.50
If yes, how long back		
<1 month	24	8.33
1-6 months	68	23.61
>6 months	196	68.06
If yes, by whom (n=288)*		
Health worker	192	66.67
Social worker	26	9.03
Friend	18	6.25
ASHA	132	45.83
Other	32	11.11
What were the content of message related to malaria given at home (n=288)*		
Malaria is dangerous	118	40.97
Malaria is fatal	164	56.94
Malaria is spread by mosquito bite	218	75.69
Use mosquito net to protect from malaria	210	72.92
Spraying of insecticidal drugs	114	39.58
Others	72	25.00

*Some participants gave more than one response

Sampling universe

The samples were collected from VHSC members of all Panchayat in the selected districts.

Study frame

The study frame consisted of members of VHSC of selected villages of four districts.

Sample size

The sample size calculated by the following formula:

$$N = (Z\alpha/2)^2 PQ/L^2$$

where $Z\alpha/2 = 2.575$ (at confidence level or 1% level of significance)

P = prevalence (of individuals were aware that mosquitoes bite-timing was 82.1%)^[10]

L is an allowable error, which was taken 5% as absolute

$$Q = (100 - P) = 17.9$$

Hence, the minimum required sample size calculated is

$$= (2.575)^2 \times 82.1 \times (100 - 82.1)/5 \times 5 = 389.77$$

So a total of 390 was the minimum sample size calculated for the study. We have taken a total of 500 participants, among which 16 were excluded after incomplete missing data in forms (due to not meeting the inclusion criteria). As a result, 484 study subjects were included in the present study.

Sampling method

Stratified random sampling technique was used to reach the study participants. The districts were selected by dividing Uttar Pradesh into four parts, and from each area, one district was randomly selected using a random number table. The districts selected were from Central Uttar Pradesh, Eastern Uttar Pradesh, Western Uttar Pradesh, and Bundelkhand Region. In the first stage, districts were chosen from the four areas of Uttar Pradesh, and in the second stage, blocks were identified in the selected district. In the third stage, villages were identified in the selected blocks.

Exclusion criteria

Those members of VHSC who are not willing to participate in the study and those members of VHSC who were not available in the village during the survey.

Methodology

The study was carried out by two teams, each comprising one research assistant and two field staff. The duties of each member were as follows: **Field staff:** to carry out an in-depth interview using a pretested structured questionnaire to assess the knowledge of preventive measures on malaria. **Research assistant:** supervise the work of field staff; report the progress of work to PI/CoPI on a day-to-day basis; help the field staff in interviewing study participants. **PI/Co PI:** responsible for the overall supervision

Table 5: Distribution of study participants as per knowledge regarding mosquito responsible for malaria (n=484)

Question	n	Percentage
Places where mosquito responsible for malaria breed*		
Running dirty water	118	24.38
Stagnant clean water	124	25.62
Stagnant dirty water	138	28.51
Running clean water	26	5.37
Garbage	168	34.71
Do not know	18	3.72
Biting time of mosquitoes responsible for malaria		
Sunset	204	42.15
Sunrise	38	7.85
Morning	26	5.37
Night	350	72.31
Noon	40	8.26
Do not know	00	0.00
Knowledge regarding prevention of malaria*		
Prevention by smoke	208	42.98
Use of mosquito net	398	82.23
Use of coil/liquid vaporizer	186	38.43
Spread of anti-mosquito drug	284	58.68
Use of fan	148	30.58
Covering whole body with clothing	186	38.43
Others	32	6.61
How can we control breeding places of mosquito responsible for malaria*		
Stopping collection of water	356	73.55
Covering water storing vessels	250	51.65
Changing water of coolers, etc., regularly	272	56.20
Do not know	66	13.64
Other	10	2.07
Measures taken to prevent malaria*		
Prevention by smoke	242	50.00
Use of coil/liquid vaporizer	210	43.39
Spread of anti-mosquito drug	286	59.09
Use of fan	194	40.08
Use of mosquito net	362	74.79
Covering whole body by cloths during sleep	174	35.95
Keep the house neat and clean	254	52.48
Stopping collection of water	262	54.13
Covering water storing vessels	172	35.54
Changing water of coolers, etc., regularly	204	42.15
Do not know	46	9.50
Others	144	29.75
Drugs for malaria*		
Chloroquine	298	61.57
Quinine	64	13.22
Do not know	24	4.96
Others	150	30.99
Malaria is a		
Common illness	54	11.16
Dangerous illness	406	83.88
Do not know	24	4.96

*Some participants gave more than one response

Table 6: Distribution of study participants as per measures taken to prevent and control malaria (n=484)

Question	n	Percentage
Whether any measures were taken by you to prevent and control malaria		
Yes	280	57.85
No	204	42.15
If yes, then what*		
Spread of Dichlorodiphenyltrichloroethane	218	45.04
Health education	240	49.59
Spread of bleaching powder	118	24.38
Others	156	32.23

*Some participants gave more than one response

collection. **Quality assurance:** A prior workshop and hands-on training was organized for the Research Assistant and Field Staff. The study protocol was finalized and standardized during the above workshop. All the results were double-checked to minimize any human error. Prior to the start of the study, a one-day training program was organized for the orientation of the field staff and the standardization of the study protocol. The present study was carried in two phases. **Phase one:** In the first phase, four districts were selected randomly from the four regions of Uttar Pradesh, that is, East, West, Central, and Bundelkhand to get an overall representation of the state. In each selected district, two blocks were selected randomly. **Phase second:** On reaching the selected districts, both the teams contracted the district officials to get the list of all the villages in the selected block. Each team was given separate blocks. From each block, five villages were selected randomly for an in-depth interview. On reaching the selected village, the team members contacted the Gram Pradhan of the village to get the list of members of VHSCs. The team also explained the purpose of the study in detail to the Gram Pradhan and other study participants. After explaining the purpose of the study, each participant was interviewed separately by the team members. The same protocol was followed in all the selected districts. **Ethical clearance:** All necessary ethical clearance was taken before the start of the study (letter no. 5134/RIMS&R/2013-14). Informed consent was taken from all the participants after explaining the aims and objective of the study.

Results

In the present study, 484 participants were interviewed from four districts of Uttar Pradesh. Data gathered were entered into Microsoft Office Excel software and analyzed. In the present study, majority of the study participants were in the age group of 31–40 years (46.28%) followed by 41–50 years (23.55%) and 21–30 years (15.70%). It was noted in the present study that most of the study participants were female (75.62%), followed by male participants (24.38%). Majority of the study participants were literate with qualifications between 8th and 12th standard (24.79%, 24.38%, and 21.48%), followed by graduate and above (18.18%). Majority of the study participants belonged to other backward class (47.10%), followed by general

of the project; responsible for the quality of the data collected; acquire permission from the district authorities for smooth data

Table 7: Distribution of study participants as per the knowledge of government schemes to prevent and control malaria (n=484)

Question	n	Percentage
Is government is running any program for prevention and control of malaria		
Yes	290	59.92
No	92	19.01
Don not know	102	21.07
Whether any agency other than government is running any program for prevention and control of malaria		
Yes	48	9.92
No	180	37.19
Do not know	256	52.89
If yes, than mention the agency (n=48)*		
NGOs	45	93.75
Private school/Colleges	12	25.00
Others	05	1.03
Is government is running any health program for prevention and control other diseases beside malaria		
Yes	428	88.43
No	15	3.10
Do not know	41	8.47
If yes, which program (n=428)*		
Immunization program	417	97.43
Pulse polio immunization	409	95.56
HIV program	395	92.29
TB program	367	85.75
Filaria program	119	27.80
Leprosy program	102	23.83
Nutritional program	195	45.56
Janni Suraskya Programme	410	95.79
Others	106	24.77

Table 8: Distribution of study participants as per the awareness of action taken by government agencies (n=484)

Question	n	Percentage
Whether anti-mosquito drugs are spread in your village during monsoon season		
Yes	136	28.10
No	278	57.44
Do not know	70	14.46
Whether blood films of persons suffering from fever are prepared by health workers during monsoon season		
Yes	300	61.98
No	100	20.66
Do not know	84	17.36

class (27.27%) and scheduled caste class (21.07%). It was noted that nearly all the participants (97.11%) have heard about malaria. The most common modality for creating awareness was television (71.07%), followed by newspapers (42.56%) and radio (38.02%). It was found that majority of the participants were aware that malaria is spread by mosquito bites (97.11%). However, many participants were also having a false awareness that malaria is spread by other modes like drinking contaminated water, touching each other, eating contaminated food, and so on (30.99%) [Table 1]. Similarly, nearly all the study participants were aware that the most common symptom was high-grade fever with rigors (94.21%), followed by headache (54.55%),

vomiting (31.40%), and so on. About 21.90% of study participants reported that one or more than one family member suffered from malaria in the last 1 year and that majority of them came to know about malaria through blood examination (83.02%) [Table 2]. In the present study, 88.43% of the participants reported that they had received any form of education message regarding malaria and 51% reported that they had received a message more than 6 months back. The most common source of the message was government hospital (86.92%), followed by television (57.48%) and radio (31.31%). The most common content was that "Malaria is spread by mosquito bite" (87.85%) and "Use mosquito net to protect from malaria" (85.51%) [Table 3]. It was found that only 59.5% of the participants reported that they had received health education at home, and the majority (68.06%) received it more than 6 months ago. The most common source of health education was health worker (66.67%), followed by Accredited Social Health Activist (ASHA) workers (45.83%). The most common content of the message was "Malaria is spread by mosquito bite" (75.69%), followed by "Use mosquito net to protect from malaria" (72.92%) [Table 4]. On analysis of questions related to knowledge regarding mosquitoes responsible for malaria, it was noted that only 25.62% of the participants were aware that mosquito responsible for malaria breeds in Stagnant clean water and that 50.0% believed that the biting time of mosquitoes was sunset and sunrise. The majority of participants were aware of various measures for the prevention of malaria. About 82.23% of participants were aware that malaria could

Table 9: Suggestions given by the study participants for prevention and control of malaria (n=484)*

Question	n	Percentage
Suggestion for prevention and control of malaria		
Pour kerosene in open drains	221	45.66
Use of mosquito net	421	86.98
Control of water collection	410	84.71
Keep the surrounding neat and clean	409	84.50
Spread of dichlorodiphenyltrichloroethane	382	78.93
Cover body with cloths	250	51.65
Others	209	43.18
Which medium is most suitable for villagers to raise awareness for the prevention and control of malaria		
Television	450	92.98
Radio	422	87.19
Group discussion	120	24.79
Training	58	11.98
What are the expectations from health department for the prevention and control of malaria?		
Timely spread of anti-mosquito drugs	471	97.31
Preparation of blood film by health workers	410	84.71
Training	281	58.06
What measures will be taken by you for prevention and control of malaria after this training		
Stop stagnation of water	118	24.38
Clean the drain	256	52.89
Use of mosquito net	410	84.71
Cover whole body with clothes	388	80.17
Use coil/mosquito repellent	276	57.02

be prevented by using a mosquito net followed by a spread of anti-mosquito drugs (58.68%). Majority of participants (73.55%) were aware that stopping water collection can control breeding places for mosquitoes responsible for malaria. Majority of the participants used various methods for the prevention of malaria. The most common method quoted by majority of the participants was the use of mosquito net (74.79%), followed by spread of anti-mosquito drugs (59.09%). It was noted that 61.57% of the participants were aware that Chloroquine is the most preferred drug for the prevention of malaria. It was observed in the study that 83.88% of the participants were of the opinion that malaria is a dangerous illness [Table 5]. On the question of whether they took any action to prevent malaria in their community, 57.85% reported that some measures were taken by them [Table 6]. In the present study, only 59.92% of subjects were aware that the government is running program for the prevention and control of malaria. Only 9.92% of the participants were aware that other than the government, other agencies are also involved in prevention and control of malaria, and among them, majority quoted NGOs as the agencies other than government. About 93.75% of participants were having knowledge that the government is running other health programs besides prevention and control of malaria [Table 7]. On the question of awareness about the action taken by the government, 28.10% said that anti-mosquito drugs were spread in his/her village during monsoon season, and 61.98% said health workers prepared that blood films of persons

suffering from fever during monsoon season [Table 8]. Study participants gave various suggestions for prevention and control of malaria. Majority (86.98%) suggested the use of mosquito net followed by control of water collection (84.71%) as the most effective measure for prevention and control of malaria. According to them, television (92.98%) and radio (87.19%) are the most suitable medium for villagers to raise awareness for the prevention and control of malaria. The majority of the participants (97.31%) expected that the health department should timely spread anti-mosquito drugs and prepare blood film by health workers to prevent and control malaria. On the question of the effectiveness of this training on malaria, most participants said that they would use mosquito net (84.71%) and cover their whole body (80.17%) for prevention and control of malaria [Table 9].

Discussion

Assessment of KAP is an excellent initial step for planning public health intervention. This is of greater value in malaria cases, wherein awareness about the cause and spread is a significant 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 potential contribution of disease awareness in lower local disease burden. The findings of this study could shape the future discourse of research on regional approaches to the prevention of endemic diseases in India. In the present study, 484 participants were interviewed. It was noted in the present study that majority of the study participants were female (75.62%), followed by male participants (24.38%). A study by Gupta *et al.*^[11] interviewed 296 study participants, out of which 194 (65.5%) were males, while 102 (34.5%) females. In the present study, majority of the study participant were in the age group of 31–40 years (46.28%) followed by 41–50 years (23.55%) and 21–30 years (15.70%). Gupta *et al.*^[11] did a study in which maximum participants (33.7%) belonged to the 41–50 years age group. Borkar *et al.*^[12] conducted a study in which 400 respondents were interviewed from eight villages. Most of the respondents were males 246 (61.5%). In the present research, most of the study participants were literate with qualifications between the 8th to 12th standard (24.79%, 24.38%, and 21.48%), followed by graduates and above (18.18%). A study conducted by Borkar *et al.* (2017) showed that education-wise, one-third (29.7%) of the participants were illiterate, and an almost equal proportion (29.1%) had studied up to middle standard (8th grade).^[12] In a study by Borkar *et al.*,^[12] 53 (13.20%) participants were illiterate. It was noted in the present study that nearly all the participants (97.11%) have heard about malaria. Similar results were shown by various studies conducted by Madne *et al.*,^[10] Gupta,^[11] Borkar *et al.*,^[12] Gupta *et al.*,^[13] and Singh *et al.*,^[14] where all or most of the study participants heard about malaria, whereas a study conducted by Mahesh *et al.*^[15] in the Rural Endemic area of Kolar, India, showed that only 78% of study participants knew about malaria. In the present

study, most of the participants were aware that malaria is spread by mosquito bites (97.11%). However, many participants were also having a false awareness that malaria is also spread by other modes like drinking contaminated water, touching each other, eating contaminated food, and so on (30.99%). Studies by Tyagi *et al.*,^[4] Gupta *et al.*,^[11] Borkar *et al.*,^[12] Gupta *et al.*,^[13] and Mahesh *et al.*^[15] showed almost similar results to the present study among which most of the participants knew that malaria is transmitted by mosquito bites, whereas a study conducted by Singh *et al.*^[14] showed that only about 66.7% of study participants were aware that malaria is transmitted by mosquitoes. In the present study, the most common modality for creating awareness was television (71.07%), followed by newspapers (42.56%) and radio (38.02%). Television was the main source of knowledge about malaria in the studies conducted by Gupta *et al.*,^[11] De *et al.*,^[16] and Sharma *et al.*^[17] whereas a study by Gupta *et al.*^[13] showed that 45.6%, 10.4%, and 6.8% of participants had knowledge about malaria from TV, friends, and newspapers, respectively. In the present study, nearly all the study participants were aware that the most common symptom was high-grade fever with rigors (94.21%), followed by headache (54.55%), vomiting (31.40%), and so on. Similar results were shown by a study conducted by Borkar *et al.*^[12] in which most respondents (92.2%) told correct symptoms of malaria. Studies by Gupta *et al.*,^[11] Gupta *et al.*,^[13] and Singh *et al.*^[14] showed that about 66.2%, 52.4%, and 74.4% know that fever is a symptom, respectively. It was noted in the present study that 21.90% of study participants reported that one or more than one family member suffered from malaria in the last 1 year. Similar results were shown by Tyagi *et al.*^[4] and Gupta *et al.*^[13] It was noted in the present study that only 25.62% of the participants were aware that mosquitoes are responsible for malaria breeds in stagnant clean water. A study by Gupta *et al.*^[11] showed that about 81.0% know that malaria mosquito breeds in stagnant water. Researches by Tyagi *et al.*^[4] and Borkar *et al.*^[12] in rural areas of New Delhi showed that almost all study respondents had a perception that malaria mosquito breeds in dirty stagnant water. In a study by Singh *et al.*,^[14] 26.5% of study participants said that malaria mosquito breeds in clean water while 55.4% said it breeds in polluted water. It was noted in the present study that 50.0% believed that the biting time of mosquitoes was sunset and sunrise. A study by Gupta *et al.*^[11] showed that 52.7% said that mosquitoes bite at any time, and 43.2% said that it bites at night. In the present study, 82.23% of participants were aware that malaria could be prevented by using a mosquito net, followed by the spread of anti-mosquito drugs (58.68%), whereas a study by Gupta *et al.*^[11] showed that about 51.3% said/had knowledge that it can be prevented by insecticide-treated bed nets. It was observed in the present study that 83.88% of the participants believed that malaria is a dangerous illness, and only 11.16% believed that malaria is a common illness. Similar results were shown by a study conducted by Gupta *et al.*^[11] and Gupta *et al.*^[13] However, studies conducted by Tyagi *et al.*^[4] and Borkar^[12] showed that about two-third and half of the study participants believed that malaria is a serious disease.

Conclusion

In the present study, it was noted that knowledge regarding malaria, its spread, and its vector was very good. However, many participants were also having a false awareness that malaria is spread by other modes like drinking contaminated water, touching each other, eating contaminated food, and so on. The knowledge regarding breeding places of the mosquitoes and biting time was not fair. Almost half of the subjects were unaware that the government is running program for the prevention and control of malaria. There is an urgent requirement of increase in knowledge among the VHSC members to reduce the malaria burden in the country.

Limitations

A large study sample with distribution in rural and urban areas will probably provide us with a better understanding of the role of knowledge and awareness on the differential distribution of malaria.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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