Knowledge of Malaria among Adult Residents in Abi Local Government Area, Cross River State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author SAI designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors ZU and JAI managed the analyses of the study. Author JEE managed the literature searches. All authors read and approved the final manuscript.

Article Information

| Original Research Article |

ABSTRACT

Malaria is still responsible for most disease morbidity and mortality especially in poor resource settings where there is stable and high transmission. This study was aimed at assessing the knowledge of malaria among adult residents in Abi Local Government Area, Cross River State, Nigeria. A cross-sectional descriptive study design was adopted for the study. A pre-tested structured questionnaire developed by the researcher was used to collect data from 450 respondents who were selected using the multi-stage sampling technique. Data generated was entered into excel spread sheet and exported to Statistical Package for Social Sciences (SPSS version 20.0) software for analysis. Results were presented in frequencies, tables and charts. The results obtained showed that most respondents 424 (94.2%) acknowledged that they have heard

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of malaria before and their major sources of information were television/radio 208 (42.3%), health worker 138 (28.0%) and awareness programme/campaigns 87 (17.7%). On the average, most respondents 356 (79.1%) had good knowledge of malaria with regards to malaria signs and symptoms 363 (80.7%), methods of malaria treatment 377 (83.8%), malaria preventive measures 358 (79.6%) and consequence of delay in treatment of malaria 391 (86.9%), while the remaining 94 (20.9%) had poor knowledge. It was observed that age (p = 0.003), occupation (p = 0.002), education (p = 0.000) and house type (p = 0.000) were statistically significantly associated with knowledge of malaria among respondents. Hence, to bridge the knowledge gap, correct and debunk any widely held erroneous beliefs about malaria and simultaneously heighten awareness level, malaria information and messages should also be propagated through the traditional media system and other community-oriented outreach strategies.

1. INTRODUCTION

Malaria is still a major public health problem in low and middle income countries where its endemicity has continually threaten the life of the urban and rural populace. It is responsible for high disease morbidity and mortality in the Sub-Saharan African region where over 80% of malaria incidence occurs [1]. More than 50% of the world's population are at increased risk of malaria attack. Pregnant women, children and the elderly are the most-at-risk-population for malaria parasite [2-3]. This is linked to their weak immune system which as a result makes them susceptible to malaria infection.

In Nigeria, malaria contributes to 60% outpatient consultation, 30% hospital admission and 11% of maternal mortality [1,4,5,6]. Several government-oriented malaria control programmes have emerged to help combat malaria especially in areas of high transmission which includes Cross River State. The focus of most malaria control programmes and interventions is the prompt identification and management of malaria cases, regular use of Insecticide Treated Net (ITN) and use of chemoprophylaxis for treatment and prevention of malaria [1]. All of these strategies are geared towards mitigating the spread of malaria especially in poor resource settings where malaria transmission is high. Currently, the Sustainable Development Goals (SDGs) is targeted at combating malaria and other diseases by three-quarters by the year 2030.

Having good knowledge and clear understanding about malaria is one most effective strategy of combating malaria. This is linked to the fact that when individuals are adequately aware of what causes malaria and how it is transmitted, people will know how to prevent it. In cases where individuals are aware of the signs and symptoms of malaria, there is a high tendency of commencing early treatment to arrest the situation without delay. Adequate knowledge of malaria minimizes the thought of misconceptions. Ample evidence showed that individuals still exhibit misconception about causes and transmission of malaria [7-9]. Notwithstanding, evidence-based studies have reported a high knowledge level of malaria [7-11]. Considering the significance of having adequate awareness and knowledge of malaria which plays an essential role in curbing malaria, this study therefore seeks to assess the knowledge of malaria among adult residents in Abi Local Government Area, Cross River State, Nigeria.

2. METHODOLOGY

The study was carried out in Abi Local Government Area of Cross River State, Nigeria. It is situated in the Central Senatorial District of Cross River State and has boundary with Yakurr Local Government Area to the South, Biase Local Government Area to the West, Obubra Local Government Area to the East, and Ikwo and Onitcha Local Government Areas of Ebonyi State in the North. The area has 10 political wards with a population of 218, 734 persons covering a landmass of approximately 334.43 square kilometer [12]. Most inhabitants of the area are mainly commercial farmers, petty traders and civil servants. A cross-sectional descriptive study design was adopted for the study. Multi-stage sampling technique was used to select 450 respondents who were available and expressed enthusiasm to participate in the study. Firstly, simple random sampling technique (take-a-pick lottery method) was used to select five wards out of the 10 council wards in Abi Local Government Area (LGA). Numbers were assigned to each ward, folded in pieces of papers, put in a container and mixed thoroughly.

Thereafter, a research assistant was asked to pick a piece of the folded paper each. Secondly, out of the selected five wards, simple random sampling technique (take-a-pick lottery method) was also used to select five villages from each ward (i.e. 5 x 5 = 25 villages).

Thirdly, the primary health center (PHC) house-enumeration list for Abi L.G.A. was used as the sampling frame and systematic random sampling technique was utilized to select 18 households in each village. The sampling interval was obtained by dividing the total number of households in each village by the sample size (households to be sampled) depending on the total number of households in each village. Lastly, in each of the randomly selected households, an adult, either male or female was selected by simple random sampling to participate in the study. The total number of respondents recruited for the study was 450. A total of 450 copies of the questionnaire were administered to 450 households in 25 villages in the selected 5 wards of the study area.

A pre-tested structured questionnaire developed by the researcher was used to collect data from eligible respondents (18 years and above). The rationale for considering individuals who were 18 years and above was based on the fact that data needed to draw inference and generalize should constitute reliable data which these category of individuals can provide. Also, the target population for this study were adults which are usually from 18 years and above by Nigerian standard. Data generated was entered into excel spread sheet and exported to Statistical Package for Social Sciences (SPSS version 20.0) software for analysis. Results were presented in frequencies, tables and charts. Ethical approval was obtained from the Cross River State Health Research Ethics Committee (CRS-HREC) to carry out the study. Respondents gave their informed consent before participating in the study. No names were required during the process of data collection to maintain anonymity and information obtained were kept confidential throughout the period of research.

3. RESULTS

3.1 Socio-demographic Characteristics of the Respondents

All the 450 questionnaires that were distributed were completely filled and retrieved for analysis. This represents a response rate of 100%. The results obtained in this study shows 120 (26.7%) respondents were between the age bracket of 28-37 years, 110 (24.4%) were between 38-47 years of age while 101 (22.4%) were between 18-27 years of age. Male respondents were 243 (54.0%) while 207 (46.0%) were female respondents. Most respondents 237 (52.7%) were married, 159 (35.3%) were farmers, 415 (92.2%) were Christians, 167 (37.1%) had attained secondary level of education, 353 (78.4%) earned a monthly income of less than N20, 000, 182 (40.4%) live in mud houses with zinc roof and 181 (40.2%) have a household size of between 4-6 persons (Table 1).

3.2 Knowledge of Malaria among Respondents

A greater proportion of the respondents 424 (94.2%) acknowledged that they have heard of malaria before and their major sources of information were television/radio 208 (42.3%), health worker 138 (28.0%) and awareness programme/campaigns 87 (17.7%) (Table 2).

Majority of the respondents 421 (93.5%) stated that malaria was a disease whereas half of the respondents 226 (50.2%) highlighted that malaria was transmitted via mosquito bites. Other methods of malaria transmission as indicated by the respondents were long exposure to sunlight/heat 84 (18.7%), sexual intercourse 39 (8.7%) and 63 (14.0%) had no knowledge at all (Fig. 1).

On knowledge of the signs and symptoms of malaria, 291 (61.9%) highlighted high fever, 54 (11.5%) headache, 36 (7.7%) prolonged abdominal pains, 28 (5.9%) loss of appetite while 51 (10.0%) had no knowledge at all (Fig. 2).

The results on methods of malaria treatment indicated that majority of the respondents; 266 (54.8%) used anti-malarial drugs, 146 (30.1%) used herbs/herbal medicine and 49 (10.1%) had no knowledge of malaria treatment. Methods of malaria preventives measures as highlighted by the respondents were; clearing the surrounding bushes 220 (40.3%), using insecticide spray 90 (16.5%), using insecticide treated nets 81 (14.8%) and 77 (14.1%) had no knowledge at all (Table 3).

On the average, a greater proportion of the respondents; 356 (79.1) had good knowledge of malaria while the remaining 94 (20.9) had poor knowledge (Table 4).

Table 1. Socio-demographic characteristics of the respondents (n=450)

Variables	Number of respondents	Percentage
Age (in years)		
18-27	101	22.4
28-37	120	26.7
38-47	110	24.4
48-57	86	19.1
58 and above	33	7.3
Sex		
Male	243	54.0
Female	207	46.0
Marital status		
Married	237	52.7
Single	73	16.2
Divorced	33	7.3
Widowed/widower	67	14.9
Co-habiting	40	8.9
Household size		
1-3	180	40.0
4-6	181	40.2
7-9	76	16.9
10 and above	13	2.9
Occupation		
Farmer	159	35.3
Trader	90	20.0
Civil servant	103	22.9
Fulltime housewife	17	3.8
Artisan	10	2.2
Student	51	11.3
Unemployed	20	4.4
Religion		
Christianity	415	92.2
Islam	0	0.0
Traditional religion	35	7.8
Educational status		
No formal education	103	22.9
Primary	111	24.7
Secondary	167	37.1
Tertiary	69	15.3
Monthly income		
Less than N20,000	353	78.4
N20,000-N50,000	61	13.6
Above N50,000	36	8.0
House type		
Mud house with bamboo roof	85	18.9
Mud house with Zinc roof	182	40.4
Block house with Zinc roof/asbestos roofing sheets	177	39.3
Uncompleted building	6	1.3
Wooden made house	0	0.0

It was observed that age (p = 0.003), occupation (p = 0.002), education (p = 0.000) and house type (p = 0.000) were statistically significantly associated with knowledge of malaria among respondents (Table 5).

4. DISCUSSION OF FINDINGS

Majority of the respondents 424 (94.2%) indicated that they have heard about malaria before through the following sources: television/Radio 208 (42.3%), health worker 138 (28.0%) and awareness programmes/campaigns 87 (17.7%). This finding agrees with Singh, Musa, Singh, and Ebere (2014), where 93.5% respondents reported that they had knowledge of malaria. The high awareness level reported in the current study could be attributed to the awareness campaign programmes on malaria control and prevention. These malaria messages are disseminated via various communication channels as highlighted above. The electronic media (television and radio) are the most reliable means of communication because of the wide coverage, speedy delivery of malaria messages and accuracy. The electronic media also show uniqueness in terms of reaching a large target audience within a short period of time. The health workers were also a major channel of disseminating correct and factual health messages to clients who visit the health care facility on regular basis. This method is also unique because it provides the opportunity for patient-healthcare provider synergy where misconceptions can be corrected and the patient given professional advice on how to prevent malaria. The mass awareness campaigns and intervention programmes have also been recognized as a major source of information about malaria in this study. This result clearly validates the effectiveness of previous malaria campaigns or intervention programmes. During malaria intervention programmes, malaria testing is carried out with Rapid Diagnostic Test (RDT) kits and ITNs are distributed which often occur at least once every year in Nigeria especially in high malaria endemic zones. This approach may substantially increase the awareness of malaria among the beneficiaries as well as the entire community.

Half of the respondents 226 (50.1%) knew that malaria is transmitted via mosquito bites. This finding corroborates the findings of Olayemi et al. [13], in which 89.8% correctly indicated mosquito bites as the cause of malaria, although the percentage recorded was higher than that reported in the present study. Singh et al. [8], in their study also reported that only 11.8% knew that mosquito bites play a major role in malaria transmission. In this study, 224 (49.8%) respondents believed that malaria can be transmitted via long exposure to sunlight/heat,

sexual intercourse, work stress, eating certain foods with high oil content and witchcraft activities. This level of misconception could hamper the effectiveness of malaria control programmes and consequently encourage the continuous transmission of malaria infection. It is pertinent to emphasize that malaria intervention programmes should be re-designed or properly reviewed to fortify the populace with adequate knowledge of malaria transmission and correct any widely held erroneous beliefs about malaria.

A greater proportion of the respondents 363 (80.7%) knew at least one sign and symptom of malaria where 291 (61.9%) high fever was the most highlighted. This high knowledge exhibition could be as a result of their personal experience of repeated exposure to malaria. Accessibility to correct information on malaria may also account for their high knowledge. This finding corroborates the study carried out by Astatkie [14] where high knowledge level of malaria was reported.

Table 2. Awareness of malaria among respondents

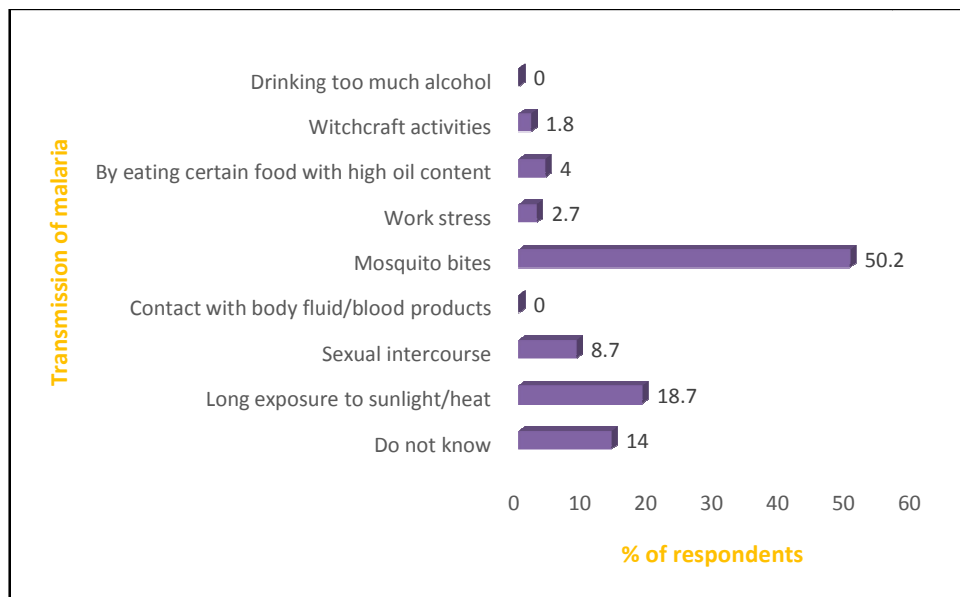| Variables	Number of respondents	Percentage
Ever heard of malaria before (n =450)		
Have heard	424	94.2
Have not heard	26	5.8
Sources of information about malaria (n=492)		
Television/Radio	208	42.3
Awareness programme	87	17.7
Health workers	138	28.0
School	29	5.9
Friends	24	4.9
Poster/bill boards/newspapers/magazines	6	1.2
Knowledge of what malaria is all about (n=450)		
Name of a river	7	1.6
Name of a place	10	2.2
Name of a disease	421	93.5
Name of an animal	12	2.7
Total	**450**	**100**

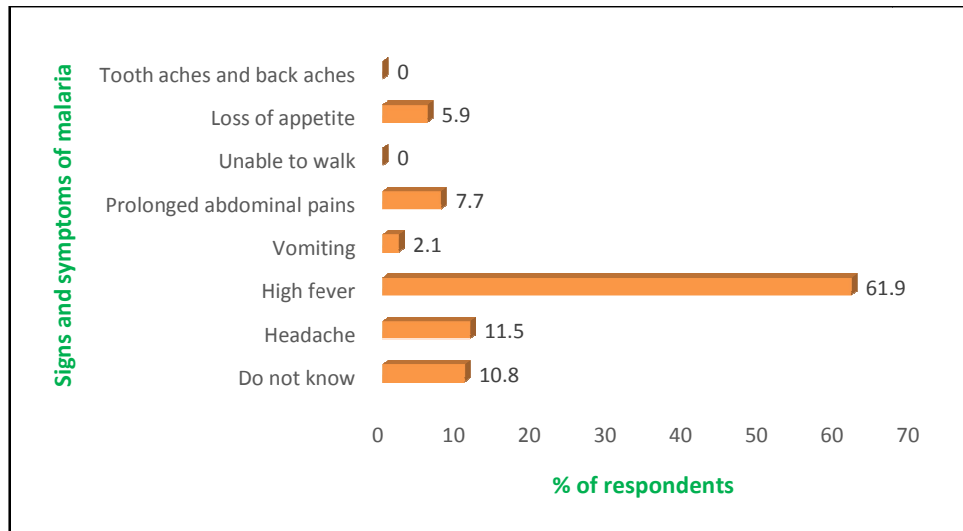**Fig. 1. Knowledge of malaria transmission among respondents (n = 450)**

Fig. 2. Signs and symptoms of malaria among respondents

Table 3. Knowledge of malaria treatment and prevention among respondents

Variables	Number of respondents	Percentage
Methods of malaria treatment (n=485)		
Do not know	49	10.1
Malaria cannot be treated	4	0.8
Use of herbs/herbal medicine	146	30.1
Use of traditional oil	12	2.5
Use of anti-malarial drugs	266	54.8
Eating good food	8	1.6
Methods of malaria prevention (n=546)		
Do not know	77	14.1
Malaria cannot be prevented	15	2.7
Clearing the surrounding bushes	220	40.3
Use of insecticide spray	90	16.5
Regular cleaning drains/gutters	32	5.9
Putting nets on doors/windows	17	3.1
Disposing empty cans/tins/receptacles in waste bin with cover	14	2.6
Use of insecticide treated nets	81	14.8
Use of mosquito coil	0	0.0

Signs and symptoms was equally reported and fever was the most identified symptom of malaria. Despite the high knowledge reported in the current study, 87 (19.3%) respondents still lack adequate knowledge on malaria signs and symptoms. This may lead to delay in treatment, increase mortality rates as well as the poor health status of rural populace especially among the susceptible population. A greater proportion of respondents 377 (83.8%) knew the appropriate methods of treating malaria which were majorly through the use of anti-malarial drugs 266 (54.8%) and herbal medication 146 (30.1%). The high knowledge level may be linked to the type of treatment methods most respondents adopts when they usually suffer from malaria. It may also be due to the fact that these malaria treatment methods are widely advertised, readily available and easily accessible. Usually, when low income earners cannot afford anti-malarial drugs, they subscribe to herbal medications. In some cases, individuals combine both the orthodox and traditional methods to treat very severe malaria cases. This result agrees with a study carried out in Anambra, Southeast Nigeria, in which the use of orthodox medication and local herbs such as *Dogoyaro* were identified as the most popular methods of malaria treatment [15]. Despite the high knowledge level of malaria treatment reported in this study, eating good food and using traditional oil were other methods of treating malaria. Malaria interventions should be re-designed to raise awareness and correct these widely-held misconceptions.

Table 4. Average score for knowledge of malaria among respondents (n=450)

Variables	Number of respondents (%)	
	Good knowledge	**Poor knowledge**
Definition of malaria	421 (93.5)	29 (6.5)
Methods of malaria transmission	226 (50.2)	224 (49.8)
Signs and symptoms of malaria	363 (80.7)	87 (19.3)
Methods of malaria treatment	377 (83.8)	73 (16.2)
Method of malaria prevention	358 (79.6)	92 (20.4)
Consequence of delay in treatment of malaria	391 (86.9)	59 (13.1)
Average	356 (79.1)	94 (20.9)

Table 5. Test of association between socio-demographic characteristics of respondents and knowledge of malaria using Chi-square

Variables	Number of respondents (percentage)			Chi-square (p-value)
Age (in years)				15.88 (0.003)*
≤37	181 (81.9)	40 (18.1)	221 (100)	
>37	175 (76.4)	54 (23.6)	229 (100)	
Sex				
Male	196 (80.6)	47 (19.4)`	243 (100)	0.76 (0.382)
Female	160 (77.3)	47 (22.7)	207 (100)	
Occupation				11.82 (0.002)*
Govt./private employment	91 (88.3)	12 (11.7)	103 (100)	
Self-employed	204 (73.9)	72 (26.1)	276 (100)	
Unemployed	61 (85.9)	10 (14.1)	71 (100)	
Educational status				52.30 (0.000)*
No formal education	60 (58.3)	43 (41.7)	103 (100)	
Primary	81 (73.0)	30 (27.0)	111 (100)	
Secondary	148 (88.6)	19 (11.4)	167 (100)	
Tertiary	67 (97.1)	2 (2.9)	69 (100)	
House type				59.64 (0.000)*
Mud house with bamboo roof	45 (53.0)	40 (47.0)	85 (100)	
Mud house with Zinc roof	147 (80.8)	35 (19.2)	182 (100)	
Block house with Zinc roof/asbestos roofing sheets	162 (91.5)	15 (8.5)	177 (100)	
Uncompleted building	2 (33.3)	4 (66.7)	177 (100)	
Wooden made house	0 (0.0)	0 (0.0)	6 (100)	

*P<0.05

Majority of the respondents 358 (79.6%) could at least highlight one correct method of malaria prevention of which 220 (47.3%) clearing the surrounding of bushes, 90 (19.4%) using insecticide spray and 81 (14.8%) using insecticide treated nets were the most reported. This finding is comparable to that of Singh et al [8], Olayemi et al [13], Astatkie [14] and Arinze-Onyia et al. [15] where high knowledge level of malaria preventive measures were reported. The recognition of malaria prevention methods among the respondents in the current study could be attributed to the efficacy of malaria intervention programmes and propagation of malaria prevention messages. Clearing the surrounding bushes as the most common method of malaria prevention clearly indicates that respondents were aware that bushes and overgrown grasses around residential areas are suitable habitats for the female *Anopheles* mosquito to breed, proliferate and infect the susceptible hosts.

A greater proportion of the respondents 391 (86.9%) recognized that delay in malaria treatment can cause disability and death. This result is a clear indication that the respondents are duly aware of the fact that malaria poses a great danger to human health and prompt diagnosis and treatment are the key prevention strategies. However, it is worrisome that 36 (8.0%) of the respondents in this study indicated that nothing will happen if they delay in the treatment of malaria. This observation may be linked to the fact that respondents may have suffered from the uncomplicated, mild or moderate type of malaria cases. However, it should be emphasized that in severe malaria

cases, prompt treatment should be given to the patient without delay. Therefore, individuals must be encouraged to seek medical attention and care when they notice any sign or symptoms of malaria.

From the analytical perspective, it was observed that age is a strong determinant of knowledge of malaria (P<0.05) (Table 5). Malaria knowledge was found to be higher among younger ages (81.9%) compared to their older counterparts (76.4%). This clearly suggest that younger ages tend to be more exposed to malaria information, more acquainted with recent updates about malaria and may largely constituted the literacy class, whereas the older study participants may largely comprise the illiterate subjects. It was also observed that males were more knowledgeable about malaria than their female counterparts, though the difference was not statistically significant (p>0.05) (Table 5). In the African culture especially in rural settings, while women are saddled with the responsibility of carrying out household chores, child rearing or children care as well as small-scale marketing of local products, the men on the other hand, engage in divergent occupations to primarily raise income so as to cater for their families. In some cases, women are fulltime housewives while the men shoulder the responsible of catering for their families intoto. This may likely suggest that the outdoor life men leads increases their chance of becoming more aware about malaria which is to the detriment of women who are mostly relegated to the household responsibilities.

Government and private employees were found to be more knowledgeable about malaria compared to their self-employed and unemployed counterparts (p<0.05) (Table 5). This could be attributed to the fact that most government oriented malaria programmes and interventions commences in government offices among government workers before it is disseminated in the community. In this case, the government or private employees exert the opportunity of benefitting from the project or programme first before other non-government workers which simultaneously increase their knowledge level and updates about malaria. Educational status was also reported to be a strong determinant of knowledge of malaria among respondents (P<0.05) (Table 5). Respondents with higher educational status (at least secondary education) were found to be more knowledgeable about malaria than those

with lower educational status. Increasing level of exposure to malaria updates and constant access to curative and preventive health information may largely account for high knowledge level among higher educated respondents. Respondents who domicile in houses made with blocks and zinc roof recorded higher knowledge about malaria than those who reside in houses made of mud or wood or in uncompleted buildings (p<0.05). This is a clear indication that respondents are quite aware of the benefits of good housing condition as a measure of malaria control and prevention compared to those who live in mud houses who may not be aware that good housing condition could mitigate malaria transmission to the barest minimum.

5. CONCLUSION AND RECOMMENDA-TIONS

High malaria transmission is still a major public health problem in Nigeria especially in rural and semi-urban settings. It is largely responsible for disease morbidity and mortality and the vulnerable population such as pregnant women, children and the elderly are most affected. Findings in the current study recorded a high knowledge level of malaria among respondents. However, 50% and 14.1% of the respondents lack adequate knowledge of malaria transmission and prevention respectively. Hence, adopting other community-based approaches to dissemination malaria messages such as traditional media, role play, drama and community symposia are essential in improving awareness which is pivotal in mitigating malaria transmission.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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