



Knowledge, Attitudes and Practices Regarding Malaria Among Residents of Ganye, Adamawa State, North-eastern Nigeria

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ABSTRACT

Background: A study on knowledge, attitudes and practices regarding malaria was conducted among residents of Ganye Local Government Area of Adamawa State, Nigeria to describe the knowledge and practices on malaria among residents.

Methods Four hundred structured questionnaires were administered to participating households. Blood samples were collected for preparation of stained blood smears which were examined microscopically at X100.

Results The results show that, all respondents had heard of malaria. Knowledge of malaria cause and transmission was low, as only 0.5% of respondents identified plasmodium parasite as the cause as ell only 2.0% said malaria is transmitted by infected female Anopheles mosquito. Respondents' knowledge of signs and symptoms was high as majority could identify: fever/hotness of body (90.0), headache (62.0%), vomiting (39.8%), body weakness (28.0%), shivering (23.5%) and loss of appetite (18.5%). Also, respondent's knowledge of mosquito behaviour and

breeding site was high well. Latrine/toilets (76.3%), tall grasses and bushes (75.3%), stagnant water (62.3%) were the most frequently mentioned breeding sites. knowledge of preventive measures against malaria through the use of bed nets as the most effective means of preventing mosquito bites was high among respondents as 69.5% reported ownership of bed nets. These might have been the reason why majority of the respondents indicated that they or their family members sleep under treat bed nets every night.

Conclusion Respondents showed good treatment seeking practices as majority of them report immediately to the available health facility when the notice symptoms of malaria. Educating the public on proper and regular use of treated nets will help in reducing the suffering from malaria which is the major reason for hospital visits.

Keywords: Malaria, insecticide treated nets, KAP, North-eastern Nigeria





INTRODUCTION

Malaria is a life-threatening disease caused by *Plasmodium* parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes¹. In 2015, 91 countries and areas had ongoing malaria transmission. Between 2010 and 2015, malaria incidence among populations at risk fell by 21.0% globally¹. Malaria remains one of the world's greatest public health challenges, most malaria cases and deaths occur in sub-Saharan Africa. According to the latest WHO estimates, released in December 2016, there were 212 million cases of malaria in 2015 and 429 000 deaths^{2,3,1}. Whilst Africa accounts for over 90.0% of the disease burden worldwide.^{4, 5} Sub-Saharan Africa is the worst afflicted malaria region⁶⁻⁹ and malaria is one of the top killers¹⁰.⁷ reported that malaria episodes in Africa are underestimated and many cases never reach health facilities and are therefore not captured by the health management information systems (HMIS). Notably, the flow of malaria cases to health facilities is likely to be affected by the treatment-seeking behaviour as well as the amount and quality of malaria health education provided to the community. Human migration across national borders is another critical factor which is likely to compromise the effectiveness of malaria-control interventions^{11, 12}, especially malaria information, education and communication (IEC) and promptness in treatment-seeking practices. Cross-border movement does not only pose a risk of malaria parasites being imported into the country, but some people may arrive after IEC activities have been conducted, so the monitoring of IEC impact can become very difficult.

In Nigeria, malaria is holoendemic in the rural areas and mesoendemic in the urban areas¹³. In the southern part of the country, the transmission rate is approximately uniform throughout the year¹³. According to¹⁴, malaria transmission is geographically specific; Farming activities which take place mostly during the rainy season provide good breeding conditions for the mosquitoes thereby increasing the effects of malaria in rural areas due to their proximity to farm lands. Adequate knowledge of, and practices relating to malaria is important in ensuring that people apply preventive measures against malaria, and seek prompt and appropriate treatment for themselves and their dependants. Therefore, becomes necessary, to ascertain people's knowledge, attitudes and practices with regard to malaria regularly. Available data on malaria knowledge and practices survey conducted in Ganye town are inadequate, hence, the objective for this study was to investigate and describe the local adult residents' knowledge and understanding of malaria transmission, their recognition of signs and symptoms, their perceptions of cause, treatment and preventive practices, and use of bed nets.

METHODOLOGY

Study Area

The study was conducted in four wards: Gamu Gurumpawo, Jaggu and Yebbi in Ganye Local Government Area of Adamawa State, Northeastern Nigeria between November and December, 2016. Ganye is situated South-western part of the State. It has coordinates 8°26'N, 12°4'E/8°43'N, 12°67'E. Ganye is bounded in the North and East by Jada LGA, Cameroun Republic in the Southeast. In the West, by Taraba State and Toungo LGA on the South. It has a land area of 2277.530km² and a



projected population of 212,234 as per 2006 National Population Census. The topography is mountainous made up of undulating hills and mountain ranges criss-crossed by many rivers. Ganye has a total of 18 health centres including a General Hospital, several basic clinics and dispensaries located at strategic points in the LGA. There are 118 primary, 41 secondary schools and 1 tertiary institution (College of Agriculture) in Ganye LGA. Inhabitants of the LGA are predominantly Chamba, with a mixture of other tribal groups such as Fulani, Mumuye, Igbo, and Lamja. There are two dominant religions Christianity and Islam. Most inhabitants are farmers, traders, civil servants and cattle rearer's.

Research Design

A community based survey was conducted in the months of November and December 2016. Structured questionnaires were administered to four hundred (400) randomly selected households. Only household heads (male or female) or any adult representative were selected, one per household. Household heads or adult representatives were then administered the questionnaire prepared in English language but translated to Hausa or Chamba (the local Tribe) were necessary to individuals who did not understand English.

Ethical Considerations

The study was approved by the Adamawa State Primary Healthcare Development Agency (ASPHDA) Yola, Moddibo Adama University of Technology Yola and the Primacy Healthcare Authority Ganye. Ward and district heads of the various locations were informed of the study and their approval were granted, also consent of all

participants was sought and obtained.

Sample Collection

A total of 400 blood samples (2 miles each) were collected from participating members of each household for the preparation of thick and thin films. Both were allowed to air dry before they were stained with Giemsa and later examined at X100 oil immersion light microscope. Infection is defined as the presence of any asexual forms on the thin and thick films.

Sample Size Determination

The sample size of 400 was determined using the formula¹⁵ for estimating a sample population at 95% confidence level and 5% margin of error.

$$S = \frac{X^2 N p (1 - p)}{d^2 (N - 1) + X^2 P (1 - P)}$$

Where S = required sample size, P = population proportion = 0.50 (50%), 2 = chi-square value for one degree of freedom and D= degree of accuracy (0.05).

All data collected were entered into Microsoft worksheet (excel), tables were constructed to measure frequencies of all variables.

RESULTS

Socio-demographic characteristics of the respondents in Ganye LGA, Adamawa State

Four hundred (400) households' heads or representatives were administered questionnaire, 100 each were from Gamu, and Gurumpawo, 90 from Jaggu and 110 from Sangasummi wards. There were 247(61.9%) females and 152(38.1%) males. Three hundred and sixty-three (90.5%) of the



respondents were married, single 30 (7.5). Islam was the most predominant religion with 272 (73.0%) respondents. majority were of the age group 20-39 years 298 (74.5%) while 80 years and above had the least 3 (0.8%). One hundred and fifty (37.5%) of the male respondents were farmers while 202 (50.5%) of the female respondents were housewives. Twenty-five (25.0%) were uneducated, 29.0 % (116) had primary education, 27.0 % (108) had secondary and 19.0 % (76) had tertiary education. The predominant tribe among the respondents was the Chamba (84.5%) (Table1).

Table 1. Socio-demographic data of Respondents in Ganye LGA Adamawa State.

Variable	Number (%)
Gender	
Males	152 (38.3)
Female	247 (61.7)
Marital status	
Single	30 (7.5)
Married	363 (90.5)
Divorce/widow/widower	7 (1.8)
Occupation	
Farming	150 (37.5)
Business	20 (5.0)
Housewife	202 (50.5)
Student	15 (3.8)
Civil servant	12 (3.3)
Religious affiliation	
Christian	108 (27.0)
Muslim	292 (73.0)
Level of education	
None educated	100 (25.0)
Primary	116 (29.0)
Secondary	108 (27.0)
Tertiary	76 (19.0)
Tribe	
Chamba	338 (84.5)
Mumuye	26 (6.5)
Fulani	24 (6.0)
Others	12 (3.0)
Total	400 (100)

Knowledge of cause, symptoms and transmission of malaria in Ganye LGA, Adamawa State

When asked "Have you heard of malaria?" All respondents said yes. The common and reliable source of information about malaria was the health facility 87.7% followed by radio/Television (TV) (7.5), others includes those who heard it from home (3.8%), school and neighbors (1.5%). Of the total respondents, only 1.0% correctly identified *Plasmodium* as the cause of malaria, two hundred and forty-eight (62.0%) said mosquito is the cause of malaria, 3.8% mentioned other causes such as rain, dirty environment, refuse dump sites as well as lack of personal hygiene. only 2.0% of the respondents correctly identified infected female *Anopheles* mosquito as the carrier of the malaria parasites and that malaria is transmitted when an infected mosquito bites an uninfected person during the process of blood meal. Thirty-seven (37.0%) said, mosquito can transmit malaria, while other sources of transmission also mentioned by the respondents include cold weather, dirty water, dirty areas and lack of personal hygiene.

Table 2. Knowledge of cause and transmission of malaria in Ganye LGA, Adamawa State

Variable	Number (%)
Source of information about malaria	
Radio/TV	30 (7.5)
Health worker	351 (87.8)
Home	13 (3.8)
School/neighbors	6 (1.5)
Cause of malaria	
<i>Plasmodium</i> parasite	2 (0.5)
Mosquito	248 (62)
Other	15 (3.8)
Did not know	135 (33.8)
Transmission of malaria	
Mosquito bite	147 (37.0)
Infected mosquito	8 (2.0)
Other	2 (0.5)
Did not know	242 (60.5)



Knowledge of symptoms and prevention of malaria among residents of Ganye LGA adamawa state

On symptoms, respondents identified hotness/fever as the most common symptom of malaria mentioned by 32.5% of respondents, followed by headache (16.5%), vomiting (16.3%), body weakness (15%), shivering/chill (7.5), loss of appetite (6.5%). Other symptoms mentioned by the respondents includes, convulsion, abdominal pain, joint and back pain (5.7%). Two hundred and twenty (55.0%) of the respondents indicated that malaria can be prevented by treated bed nets, mosquito coils (19.3%), clearing of bushes around houses (12%), treatment (5.7%) and the use (table 3).

Table 3. Knowledge of symptoms and prevention of malaria among residents of Ganye LGA adamawa state.

Variable	Numbers (%)
Symptoms of malaria	
Fever	130 (32.5)
Headache	66 (16.5)
Weakness	60 (15.0)
Vomiting	65 (16.3)
Loss of appetite	26 (6.5)
Cold/shivering	30 (7.5)
Other	23 (5.8)
Prevention of malaria	
Treated bed nets	220 (55.0)
Mosquito coil	77 (19.3)
Clearing of breeding sites	48 (12.0)
Treatment	23 (5.8)
Insecticide/repellent	21 (5.3)
Other	11 (2.8)

Knowledge of breeding sites and behaviours of mosquitoes in Ganye LGA, Adamawa State

Respondents reported latrine/toilets (67.5%), tall grasses and bushes (75.3%), stagnant water (65.3%) and others (6.7%) as the breeding sites for mosquito. Majority reported that mosquito usually bites at night (97.5%) while (1.3%) said mosquito usually bites during the day and anytime. On the resting place of mosquito after biting, 82.5% said dirty places in and around houses, 62.0% said edge of river/ponds, 54.0% said latrine and cattle shed while 37.3% said dark places around the house were the resting places for mosquitoes. On prevention of mosquito bites, 84.5% of the respondents reported clearing of bushes and grasses around houses, 70.3% reported clearing of house surrounding while, draining of gutters and stagnant water sources was reported by 47.3% of the respondents (Table 4).

Table 4. Knowledge of Breeding and Behaviour of Mosquito in Ganye LGA Adamawa State

Variable	Number(%)
Mosquito breeding sites	
Stagnant water	261 (65.3)
Tall grasses/bushes	301(75.3)
Latrine/toilet	305 (67.5)
Other	27 (6.75)
Biting time	
Day	1 (0.3)
Night	390 (97.5)
Anytime	5 (1.3)
Did not know	4 (1.0)
Resting place for mosquitoes	
Dark place	149 (37.3)
Dirty place	330 (82.5)
River/pond	284 (62.0)
Latrine/ cattle shed	216 (54.0)
Prevention of mosquito bites	
Clearing of house surrounding	281 (70.3)
Draining of gutters	189 (47.3)
Clearing of bushes	338 (84.5)
Did not know	8 (2.0)



Attitudes about malaria control and treatment options in Ganye LGA, Adamawa State

When asked "what would be your first action if you or your child has fever?" three hundred and seventy-seven (94.3%) respondents reported that they will go to the hospital immediately after onset of symptoms. The condition of the child (77.0%) was the deciding factor for seeking care for fever. This was followed by the perceived cost of treatment (17.2%), time of sickness (5.3%) and distance to health facility (0.5%). On treatment options for malaria, respondents could identify paracetamol (80.7%), arthemisinin and lumfertrine combination therapy (ACT) (49.3%) and chloroquine (17.0%). Others include Maldox (0.3%), Fansider (1.8%) while (9.8%) could not identify any drug (Table 5).

Table 5. Attitude about Malaria and control in Ganye LGA Adamawa State

Variable	Number (%)
First action after onset of symptoms	
Hospital	359 (89.7)
Home treatment	4 (1.0)
Chemist/drugstore	33 (8.3)
Traditional	4 (1.0)
Total	400 (100)
Important factor for seeking care for symptoms of malaria	
Condition of the body	308 (77.0)
Cost of treatment	69 (17.2)
Time of sickness	21 (5.3)
Distance to health facility	2 (0.5)
Total	400 (100)
Treatment options available	
Chloroquine	68 (17.0)
Paracetamol	323 (80.8)
ACT	199 (49.3)
Fansider	7 (1.8)
Maldox	2 (0.5)
Did not know	39 (9.8)
Total	400 (100)

Ownership and use of treated bed nets in Ganye LGA, Adamawa State

Two hundred and seventy-eight (69.5 %) respondents reported ownership of bed net. The source of the nets was from the clinic (79.2%), market 19.8% and mass distribution (1.0%). Among those who own, 57.75% said they sleep under the net, while 32.3% said though they had the nets; they did not sleep under it. When asked who sleeps under the net" one hundred and thirty-five (53.8%) of the respondents said all members of the family sleep in the net, children alone 18.3% mother and children 4.5% and parent alone 1.0%. (Table 6).

Table 6. Use of Insecticide Treated Nets (ITN) in Ganye LGA Adamawa State

Variable	Number (%)
Own a net?	
Yes	278 (69.5)
No	122 (30.5)
Source of the net	
Clinic	220 (79.2)
Market	55 (19.8)
Others	3 (1.0)
Do you sleep under the net?	
Yes	231 (57.8)
No	129 (32.3)
Who sleep under the net?	
Children	75 (18.3)
Children and mother	18 (4.5)
Parent	4 (1.0)
Every one	135 (33.8)
How often?	
Every night	215 (53.8)
Anytime	16 (4)

Treatment seeking Practices of Residents of Ganye LGA, Adamawa State

Three hundred and fifty-seven (89.3%) of respondents sought treatment for malaria within the first 24 hours after onset of symptoms. This is made up of those who



sought care within the first twelve hours (64.8%) and those who sought care in the second twelve hours (24.5%) of the first 24 hours of onset of symptoms. Forty-three (10.8%) sought treatment between 25 to 48 hours of onset of symptoms. The most preferred place of treatment for malaria as indicated by the respondents was the hospital 89.8% followed by chemist/drugstore (8.3%). Home remedy and traditional healers had (1%) respectively. Two hundred and fifty-three (63.3%) of respondents said that they reside within a Kilometre distance to the health facility, 31.3% within 1to 3 Kilometres, while 5.5% said beyond 5 Kilometres to the health facility. On the methods of diagnosis at the health centre, one hundred and ninety (47.5%) of respondents said microscopy, 40.3% said rapid diagnostic test kit while 12.3% said it was by clinical means (Table 7).

Table 7. Treatment seeking Practices among Residents of Ganye LGA Adamawa State

Variable	Number (%)
Time between onset of symptoms and treatment sought	
1-12 hours	259 (64.8)
13-24 hours	98 (24.5)
25-48 hours	43 (10.8)
Total	400 (100)
Place of treatment of symptoms	
Hospital	359 (89.8)
Chemist/drugstore	33 (8.3)
Home	4 (1.0)
Traditional	4 (1.0)
Total	400 (100)
Distance to health facility	
< 1kppm	253 (63.3)
1-3 km	125 (31.3)
3-5 km	22 (5.5)
Total	400 (100)
Method of diagnosis	
Microscopy	190 (47.5)
RDT	161 (40.3)
Clinical	49 (12.3)
Total	400 (100)

DISCUSSION

The Result of this study revealed that all respondent said they have heard of malaria, is consistent with other studies^{16,17}. The main source of information about malaria was the health facility, consistent with other studies¹⁸⁻²⁰. The fact that 87.8% received information from the health facility means that, they had the right knowledge of malaria. But having the right knowledge did not always mean taking the right step in prevention and control. Knowledge of *Plasmodium* parasite as the causative agent of malaria was showed by only 1.0% of respondents. Other causes of malaria as mentioned by the respondents included rain, dirty water, waste, refuse dumpsites, and lack of Personal hygiene. On means of transmission, only about 2.0% of the total respondents correctly identified infected female *Anopheles* mosquito as the carrier of the malaria parasite during blood meal/feeding by the mosquito. One hundred and forty-seven (37.0%) of the respondents said the bites of mosquito transmit malaria. This is consistent with^{18, 17, 21}, This might be attributed to the low level of education among respondents and the fact that respondents are told that mosquito are the cause of malaria by the health workers in their respective healthcare centres

Knowledge of mosquito breeding and behaviour is important for the development of effective control and prevention of mosquito bites and hence malaria. Respondents of this study clearly identified stagnant water, dirty places around houses, toilet/latrines, tall grasses and bushes as potential mosquito breeding sites. Dirty areas around houses, toilet and latrines, rivers ponds were identified as the resting place for mosquito after they might have



bitten during the day time. The most frequently mentioned measures of preventing mosquito bites were clearing of the grasses and bushes around houses and draining of stagnant water sources close to home. This is consistent with other studies^{22, 23, 16}. Although high knowledge does not necessarily translate to improved preventive practices, this might be due to low level of education or poor socioeconomic status among rural dwellers.

Three hundred and seventy-seven, (94.3%) of the respondent reported that they visit health facility whenever they notice symptoms resembling those of malaria, the deciding factors for seeking treatment among respondents was the condition of the sickness. This agrees with^{17, 24}. On the available treatment options, respondents of this identified Paracetamol as the drug use for the treatment of malaria as against Chloroquine identified by respondents¹⁷.

Two hundred and seventy-eight (69.5%) of respondent reported that they own at least one treated net. Among those who had bed nets, 53.8% sleep under the net every night. Similar knowledge on the use of bed nets to prevent contact with mosquitoes was reported in other studies^{19, 16}, but contradicts²¹. The World Health Organization and Roll back malaria^{25, 26} recommend the timely and regular use of long lasting insecticide treated bed nets as one of the main measures of preventing malaria. As reported, among those who did not own treated bed nets, unavailability and cost of the nets were reasons for not owning the nets. Similar studies agree with unavailability and inconsistency in distribution and cost as barriers to ownership of bed nets^{27, 22}. Since it

is now understood that cost and none availability are reasons for none ownership of nets, it will be appropriate for Government to consider subsidizing the nets while also ensuring regular distribution to enable all families have access to treated bed nets.

Three hundred and fifty-seven (89.3%) of the respondents in this study who sought treatment for malaria within the first 24 hours after the onset of symptoms is encouraging. This however contradicts²⁴. That 89.3% of respondents sought treatment for malaria within the 24hours is a reflection of their knowledge of malaria and also access to the health facility. The most preferred place of treatment of malaria was the hospital/clinic^{19-20, 16-17}, but disagrees with²⁸⁻²⁹ who reported that their respondents preferred home remedy and medical sellers respectively. Although drugstore/chemist were not indicated as a popular option by respondents, but a closer look reveals that more respondents actually take this option for the treatment of malaria the knowledge of whom may be questionable. This might result in worsening of the situation and some cases death of the individual.

CONCLUSION

Knowledge of cause and transmission of malaria was low, while their knowledge of signs and symptoms of malaria was high. Respondent's knowledge of mosquito behaviour and breeding site, as well as knowledge of preventive measures against malaria through the use of bed nets as the most effective means of preventing mosquito bites was high. Good treatment seeking practices was demonstrated as majority of participants report immediately to the available health facility when they notice



symptoms resembling those of malaria. Educating the public on proper and regular use of treated nets will help further in reducing the suffering from malaria which is the major reason for hospital visits among the study population.

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