

ASSESSMENT OF AWARENESS OF MALARIA PREVENTION, TRANSMISSION AND TREATMENT AMONG AKHUAKHUARI RURAL COMMUNITY DWELLERS IN EDO STATE, NIGERIA

Ogochukwu N Anaka¹, Valentine U Odili² and Stella F Usifoh²

1. Department of Pharmacology & Toxicology, Igbinedion University Okada.
2. Department of Clinical Pharmacy and Pharmacy Practice, University of Benin, Benin City.

Corresponding Author: Valentine U Odili, vuodili@yahoo.com, +2348023432237.

ABSTRACT

Background: Malaria is more common in rural areas than in cities. Akhuakhuari is a very remote community with their dwelling camps sandwiched between bushes, which encourage malaria transmission. There is no known health or government educational facility in this community.

The objective of the study was to assess the level of awareness of malaria; its transmission, preventive strategies and treatment by rural community dwellers in Edo State, Nigeria.

Methods: A community-based cross-sectional questionnaire survey involving 102 study participants who gave informed consent was conducted during February and October 2013 in Akhuakhuari, village in Iyekogba, Oredo Local Government Area of Edo State. The questionnaire comprised 2 parts which covered the respondents' demographics and the objectives of the study.

Results: Most of the respondents 50 (49.0%) were secondary school certificate holders while 24 (23.5%) were illiterate. The majority of the study participants 32 (31.4%) knew that malaria is a serious disease that can attack all age groups of a population. However, only 24 (23.5%) of the study participants mentioned that mosquito bites could cause malaria. Many of the respondents (80; 78.4%) said they have insecticide-treated net (ITN). Of these, only 69 (86.3%) made use of the ITN. Eight of the 16 respondents that do not use their ITN said it is because it makes them uncomfortable. More than half 57 (55.9%) of the participants reported that the effective treatment for malaria is the use of modern orthodox medicines. However, of the modern drugs reported, chloroquine was most frequently mentioned 18 (17.6%).

Conclusion: The incidence of malaria in the community is quite high, despite this, majority of the respondents had wrong or no knowledge about the cause, mode of

transmission, prevention and treatment of malaria. The relatively high incidence of malaria in the area could be attributable to their low level of education, poverty and the unhygienic state of the environment.

Keywords: Awareness, Malaria, Rural dwellers

INTRODUCTION

In Nigeria, malaria burden is well documented. Available evidence indicates that it is endemic, remains a major public health problem, and is the most common cause of hospital attendance in all age groups¹. Malaria is also a big contributor to the economic burden of disease in communities where it is endemic and is responsible for annual economic loss of 132 billion Naira²⁻⁵.

Malaria exerts a heavy burden on the poorest and most vulnerable communities. It primarily affects low- and lower-middle income countries. Within endemic countries, the poorest and most marginalized communities are the most severely affected, having the highest risks associated with malaria, and the least access to effective services for prevention, diagnosis and treatment. Thus, malaria control and ultimately its elimination is inextricably linked with health system strengthening, infrastructure development and poverty reduction⁶.

Malaria is a major threat to public health, particularly in Africa where over 90% of cases are recorded⁷. It is estimated that 500 million acute illness and at least one million deaths occur worldwide yearly⁸.

It is estimated that 300, 000 deaths each year, 60% of outpatient visits and 30% hospitalizations are all attributable to malaria ^{9,10}. Malaria is also responsible for up to 11% of maternal mortality ⁵. In addition, at least 50% of the population has at least one episode of malaria annually resulting in high productivity losses while children aged less than 5 years have 2 to 4 attacks annually³. The disease is particularly virulent among pregnant women and children under 5 years of age, due to their low levels of immunity.

The National Malaria Control Programme¹¹ reported that a child is sick of malaria between 2 and 4 times in a year and it was estimated that malaria was responsible for nearly 110 million clinical cases.

According to Teklehaimanot and Mejia (2008), a strong correlation exists between malaria and poverty and, not only does malaria thrive in poverty but it also impedes economic growth and keeps households in poverty ¹². Hence, the poor have disproportionate burden of the disease ¹³. Malaria case management therefore remains a vital component of malaria control strategies. This entails early diagnosis and prompt treatment with effective antimalarial medicines.

Malaria is prevalent in tropical and subtropical regions because of rainfall, consistent high temperatures and high humidity, along with stagnant waters in which mosquito larvae readily mature, providing them with the environment they need for continuous breeding. ¹⁴ Abdulgafar (2013) reported that there has been a rise in malaria infection, and a rise in the production of treated mosquito nets from 30 million in 2004 to 95 million in 2007 - but surveys still suggest that half of the children in the region don't sleep under such nets.¹⁵ There have been reports of low utilization of ITNs for malaria prevention despite a high awareness level. This suggests the need for regular educational campaigns to increase bed net use and to promote environmental sanitation measures in communities¹⁶.

In Ethiopia, Mengistu and Wakgari (2009)¹⁷ discovered that communities residing in the highland of Ethiopia were aware that malaria is a serious disease but they lacked clear information about its cause, mode of transmission and preventive methods.

Another author reported that although there was relatively good public awareness of the symptoms and fatality of malaria, improvement in the distribution and uptake of ITNs needed to be addressed by the Malaria Control Programme in Vanuatu¹⁸

In Anambra State, Ukibe et al ¹⁹, showed that though the level of awareness concerning the use of ITNs by pregnant women was high, the actual ownership and use was poor justifying the high prevalence of malaria¹⁹ which has also been reported in the state^{20,21}

This study aimed at assessing the level of awareness of malaria; its transmission, preventive strategies and treatment by rural community dwellers in Edo State, Nigeria.

METHODS

Design

A community-based cross-sectional survey was conducted between February and October 2013 to assess awareness of malaria, its preventive strategies and treatment practices among the community dwellers of Akhuakhuari.

Study Setting

Akhuakhuari is a village at Iyekogba, Oredo Local Government Area of Edo State. Iyekogba comprises 31 villages. Akhuakhuari is a very remote community with the residents dwelling in camps sandwiched between bushes that encourage malaria transmission. The people of Iyekogba have been totally neglected and the area is very underdeveloped. Akhuakhuari is bounded by Uregin, Iboko, Ahkua and Olowojebi.

Akhuakhuari is located in the rainforest region of Nigeria. The resident tribes include Urhobo, Isoko, Bini, Calabar, Yoruba, Delta Igbo and others. There is only one primary school operated by a missionary. However, there is neither a health care facility, nor even a patent medicine store in the community.

The population of Akhuakhuari is in the range of 500 to 600 persons. Their occupation is mostly farming, others include hunting, lumbering and petty trading. They live in mud houses in a kind of clustered and scattered arrangement. Most of the families are clustered in a room. The various spoken languages in Akhuakhuari include Urhobo, Isoko, Bini, Pidgin English, Yoruba, Calabar, Kwale and Hausa.

Study population

Prior to the commencement of the study, all inhabitants were invited to participate in the survey, thereafter all who turned up were instructed on the purpose of the study and that they would be visited in their houses where they will be required to respond to some questions. Thereafter the research team moved from house to house and from one camp to the other.

Informed Consent

The researchers obtained informed verbal consent from the study participants before each interview. Householders resident in the community who were 18 years and above and who gave consent were included in the study.

Questionnaire administration

A structured questionnaire containing 40 questions was administered to the participants to obtain relevant information to the objectives of the study. Questions contained in the questionnaire include; socio-demographic data, awareness of malaria and its preventive strategies amongst others.

A pre-test was done with a few questionnaires; after which some minor changes were made to the study instrument before the main study was done. The 20 respondents used in the pre-test were excluded from the final study.

Prior to the commencement of the study, few teachers from the only school in the community were selected and trained for the administration of the questionnaires. The research team; comprising the researcher and the trained interviewers moved from house to house and consenting householders were interviewed individually out of hearing of the others.

After the administration of the questionnaires, a malaria health education intervention program was organized for the respondents. Here the correct information about malaria, its mode of transmission, methods of prevention and treatment were explained to the study participants both in Pidgin and in Bini language (the local dialect). Insecticide-treated mosquito nets were then distributed first to pregnant women and then to others.

Data analysis

The data obtained were entered into Microsoft excel and crosschecked for accuracy. The questions were analyzed using Statistical Package for Social Sciences (SPSS) version 14, Chicago IL.

RESULTS

One hundred and two individuals participated in the study. Of these, 53 (52.0%) were males and 49 (48.0%) were females. Table 1 shows the socio-demographic characteristics of the study participants. The majority of the participants were Urhobos 46 (45.1%), Christian 89 (87.3%) and farmers 62 (60.8%). Most 50 (49.0%) of the respondents had a secondary school education while 24 (23.5%) were illiterate.

Seventy-eight (76.5%) of the respondents were married and 68 (66.5%) were of a monogamous marriage type.

Most of the respondents have lived in the area for many years, some since birth. The average length of time the respondents have stayed in the area is 2.21 years. On the average, respondents last had malaria 2.64 months prior to the study.

Table 1: **Socio-demographic characteristics of the study participants**

VARIABLES	FREQUENCY	PERCENTAGE
Sex		
Female	49	48.0
Male	53	52.0
Resident Tribes		
Bini	10	9.8
Urhobo	46	45.1
Isoko	26	25.5
Delta Igbo	8	7.8
Ewe	1	1
Ijaw	1	1
Yoruba	1	1
Hausa	1	1
Calabar	2	2
Other Deltans	18	17.6
Religion		
African traditional religion	9	8.8
Christianity	89	87.3
Muslim	1	1.0
None	3	2.9
Marital Status		
Divorced	3	2.9
Married	78	76.5
Single	20	19.6
Widower	1	1.0
Marriage Type		
Monogamy	69	67.7
Polygamy	11	10.8
Educational Status		
Post Secondary	5	4.9
Secondary	50	49.0
Primary	20	19.6
Illiterate	24	23.5
Occupation		
Clergy	2	2
Daily labourer	2	2
Driving	4	2
Electrical/electronic engineer	1	1
Farming	62	60.8
Fashion designing	2	2
Hair dressing	2	2
Hunting	1	1
Mason	1	1
Student	4	3.9
Teaching	1	1
Timber business	1	1
Trading	17	16.7
Welding	1	1

Table 2 shows respondents awareness of cause and mode of transmission of malaria. Among the 102 participants, 99 (97.1%) responded that they have heard about malaria, 77 (75.5%) of whom have been sick of malaria at one time or the other. Of the 99 respondents who have heard about malaria, only 24 (23.5%) and 17 (16.7%) have the right knowledge about the cause and mode of transmission of malaria respectively; a corresponding 14(13.7%) and 42 (41.2%) respondents respectively had no idea.

Some 17(16.7%) of the respondents believed that malaria cannot be transmitted.

The causes adduced for malaria by the respondents were many, only 24 (23.5%) of them mentioned that mosquito bites could cause malaria, other causes of malaria as opined by majority of the respondents include dirty water 14 (13.7%), hard labour 8 (7.8%) and stress 10 (9,8%). 14 (13.7%) had no idea about the cause of malaria. The details are as shown in table 2. Similarly, only 17(16.7%) knew that malaria is transmitted through mosquito bite. Some 17 (16.7%) respondents did not agree that malaria could be transmitted, while 42 (41.2%) respondents had no idea about its transmission. Other ridiculously erroneous modes of malaria transmission such as sleeping together, sex, and walking in the sun were also mentioned. Table 2.

Table 2: **Knowledge of cause and mode of transmission of malaria**

Variables	Frequency	Percentage
Heard about malaria		
Yes	99	97.1
No	3	2.9
Sick from malaria		
Yes	77	75.5
No	24	23.5
Mode of transmission		
Mosquito bite	17	16.7
Sharing object with infected person	7	6.9
Sleeping together	7	6.9
Cannot be transmitted	17	16.7
Cough, sneeze, breath	7	6.9
Pregnancy	1	1
Sex	1	1
Walking in the sun	1	1
No idea	42	41.2
Cause of malaria		
Mosquito bite	24	23.5
Dirty water	4	3.9
Dirty water, mosquito bite	9	8.8
Dirty water, unhygienic food	1	1
Dirty environment	6	5.9
Hard labour	8	7.8
Mosquito bite, poor environment, over labour, sun, rain	9	8.8
Mosquito bite, toilet infection	1	1
Stress	7	6.9
Stress, sun, rain, dirty environment	3	2.9
Unhygienic food, mosquito bite, dirty environment	6	5.9
Weather	1	1
No idea	14	13.7

The respondents had the knowledge of one or more symptoms of malaria. A good number of them believed that malaria can be treated 93 (91.2%) and prevented 80 (78.4%). However, 11 (10.8 %) did not believe that malaria can be prevented while 8 (7.8%) had no idea.

More than half, 76 (74.5%) of the study participants mentioned one symptom of malaria or the other. Also more than half 57 (55.9%) of the participants reported that

the effective treatment for malaria is the use of modern orthodox medicines. 18 (18.6%) stated traditional medicine, 6 (5.9%), stated both, while 1 (1%) had no idea. Among those who believed that orthodox medicine was effective, chloroquine was most frequently mentioned 18 (17.6%), other medicines are as shown in Table 3. Thirty Seven (36.3%) of the respondents stated that the traditional medicine type frequently used are medicinal plants.

Forty- three (42.2%) reported the use of insecticide treated nets (ITN), while others reported other methods of prevention which include use of drugs 5 (4.9%), clearing of bushes and drains 12 (11.8%) and use of native herbs 2 (2%). Others mentioned avoidance of sun, 1 (1%) taking clean water 1 (1%), protection of the body from sun, 1 (1%) use of clean water, avoidance of poor environment and contaminated water 1 (1%) as protective measures taken against malaria. The rest 4 (3.9%) had no idea of any preventive measure.

Table 3: **Knowledge of symptoms, treatment of malaria**

Variables	Frequency	Percentage
Symptoms of malaria		
Shivering	10	9.8
Headache	5	4.9
Bitter taste	6	5.9
Bitter taste, tiredness	1	1
Bitter taste, yellow urine	1	1
Body ache, shivering	8	7.8
Constant spitting	1	1
Dizziness, tiredness	1	1
Fever, headache, yellow urine	2	2
Headache, hotness, weakness	1	1
Headache, body ache, shivering	2	2
Headache, body weakness	1	1
Headache, red urine, bitterness	2	2
Headache, shivering	3	2.9
Headache, vomiting, shivering	1	1
Headache, weakness	4	3.9
Hotness of body, yellow urine	1	1
No appetite, body weakness	1	1
Nausea	2	2
No appetite	2	2
Red eyes	1	1
Shivering, mouth bitterness	1	1
Shivering, no appetite, weakness	1	1
Body tiredness	1	1
Unable to sleep	2	2
Vomiting	2	2
Vomiting, shivering, hotness of body, weakness of body	13	12.7
Treatment		
Traditional medicine type		
Medicinal plants	37	36.3
Formulated Herbal Drugs	5	4.9
No idea	5	4.9
Orthodox drug type		
*NSAID	10	9.8
ACT	3	2.9
CQ	18	17.6
AMX	10	9.8
Amalar	2	2

**NSAID: Non Steroidal Anti-inflammatory Drugs, ACT: Artemisinin Combination Therapy, CQ: chloroquine, AMX: Amoxicillin, AMALAR: Sulphadoxine+ Pyrimethamine.*

Majority of the respondents 80 (78.4%) own an ITN. Of these 21 (26.3%) received it as a gift, 22 (27.5%) from a church, 7 (8.8%) from a hospital and 26 (32.5%) from the government. while 5 (6.3%) bought theirs.

Of the lot that owned an ITN, only 69 (86.3%) use them. Eight of the 16 respondents that do not use their ITN said it is because it is uncomfortable to sleep under, other reasons are as reported in Table 4. Some of the respondents did not have an ITN, because they were not around when it was distributed 5 (25%) or it had spoilt 2 (10%). Majority of the respondents 62 (77.5%) reported that since they started using ITNs, they have not had frequent malaria attacks; while 7(8.75%) said they had never had malaria since they started using ITNs. Table 4.

Table : 4 **Ownership and usage of Insecticide-treated mosquito nets**

Variables	Frequency	Percentage (%)
Do you have ITN?		
No	20	19.6
Yes	80	78.4
If no; why?		
Not around when it was shared	5	25
Makes me hot	2	10
Has spoiled	2	10
Never heard of it	1	5
No money	1	5
Nowhere to buy	5	25
Mosquito not common here	1	5
If yes; how did you get it?		
A gift	21	26.3
Church	22	27.5
Hospital	7	8.75
Government	26	32.5
I bought it	5	6.3
Did you pay for it?		
No	78	97.5
Yes	5	6.3
Do you use it?		
No	16	20
Yes	69	86.3
If no; why?		
Makes me uncomfortable	8	10
Use it for child	1	1.3
No idea	2	2.5
If yes, how do you use it?		
Hang on the bed	70	87.5
Others which are not method of use	2	2.5
How often do you have malaria since you started using the mosquito net?		
After a year I have been using mosquito net	1	1.3
Frequently	6	7.5
Have never had malaria	7	8.75
I do not know	1	1.25
Not frequent	62	77.5

Many 32(31.4%) of the respondents reported that everybody is at risk of malaria

while 27 (26.5%) and 22 (21.6%) respondents said children and pregnant women are at risk respectively, 9 (8.8%) respondents said adults while 4 (3.9%) had no idea. Majority 60 (58.8%) of the respondents did not know right preventive measures of malaria in pregnancy, while 29 (28.4%) had no idea about preventive measures. Only 7 (6.9%) of the respondents mentioned mosquito nets and 1 (1%) ante natal checks. As regards prevention of malaria in children, 9 (8.8%) mentioned the use of mosquito nets while 89 (87.3%) gave wrong responses. For the treatment of malaria in pregnancy, 35 (34.3%) said that they are taken to hospital; 20 (19.6%) mentioned drugs, 8 (7.8%) herbs and 4 (7.8%) both drugs and herbs. Some of the respondents 40 (39.2%); 12 (11.8%); 10 (9.8%); 4 (3.9%); 2 (2%) reported the use of modern drugs, herbs, chloroquine, amoxicillin and Artemisinin Combination Therapy (ACT) respectively for the treatment of malaria in children. Seven (6.9%) had no idea about treatment of malaria in children while 12 (11.8%) said that they are taken to hospital for treatment.

DISCUSSION

In this study, we assessed the awareness of malaria amongst rural community dwellers in Akhuakhuari community in Edo State, Nigeria.

Quite a number of the respondents had poor knowledge of the cause and mode of transmission of malaria. Consequently, it becomes very difficult for them to have the right attitude towards protecting themselves against mosquito bites and therefore malaria. This may be related to the poor educational status and lack of health facilities of any kind in the community. On the average, respondents last had malaria 2.64 months prior to the study; this is indicative of the frequency of malaria attacks in the community and suggests ignorance of preventive measures against mosquito bites and hence malaria. Dike et al., (2006)²² reported that higher level of education was associated with improved knowledge and practice about the appropriate strategies for the prevention and treatment of malaria, thus indicating that education can have a positive impact on the malaria burden. According to the results, almost a quarter of the respondents were illiterate. This may account for the gap in knowledge regarding malaria transmission modes such as drinking dirty water and contaminated food, hard labour, exposure to the sun and others. Such misconception could adversely affect preventive behaviour. This fact emphasizes the need for effective educational intervention to improve the level of knowledge in the study population, which is critical for the malaria prevention and control using ITN.

Although the level of the actual use of ITN was relatively good, more work needs to be done to increase the level of usage of ITN through enlightenment programs targeting the rest of the respondents who had ITN but never used them. This would

help to control malaria transmission. Low level of actual use of ITNs by the respondents who had it could be attributed to socioeconomic and cultural factors such as poor or inconvenient accommodation to hang the net, poor knowledge, attitude and practices concerning the use of ITNs ^{19,23} and low level of education as has been reported by some studies ^{24,25}.

In the study, about a tenth of the respondents did not believe that malaria could be prevented. This is similar to the study by Olorunfemi ²⁶ who reported that about 9.3% and 11.6% in experimental and control groups, respectively, did not believe that malaria was preventable but lower than 77% observed in another study ². Other investigators have also reported these same findings.^{27,28}.

The burden of malaria in the community is high and this can be attributed to the occupation of the people in the community, which is majorly farming. The study area is a settlement of people of different tribes who have settled themselves in camps, in order to farm and sell their produce to fend for themselves. Breeding of mosquitoes is enhanced by uncultivated farmland and bushes.. Dumping of cassava tuber peelings which allows for collection of pools of water in the farms, storage of peeled cassava tubers soaked in water in uncovered containers, digging of trenches, irrigation of farms and the presence of fish ponds are major agricultural practices that favour mosquito breeding on the farms ²⁹. Poverty may also be a contributory factor. According to WHO malaria is inextricably linked with poverty³⁰. The study participants are poor; they all live in mud houses and their main source of income is from the sale of their farm produce. They live in overcrowded houses; on the average a man, his wife and children (as many as they are) live in one room. This form of lifestyle helps in transmission of malaria from one person to the other.

Limitations.

In the course of this study, we were faced with a lot of limitations. The first is the fact that the study participants live in camps and so moving from one camp to the other was not easy. Again, the research was conducted during farming period, so it was difficult to meet most of them at home since they were always in their farms hence we had to visit some of them more than once. Another challenge was the poor access to the community; the only major road leading to the community was abandoned by the contractor.

Conclusion

The incidence of malaria in the community is quite high, despite this, majority of the respondents had wrong or no knowledge about the cause, mode of transmission, prevention and treatment of malaria.

The relatively high incidence of malaria in the area could be attributable to their low level of education, poverty and the unhygienic state of the environment.

.

Recommendation

We recommended that the local government in charge of this community should make provisions for some of their basic needs like portable water (boreholes), schools, health facilities, electricity, market and others. Health education is also strongly recommended to increase their knowledge about what to do to be healthy.

References

1. Anumudu CI, Adepoju A, Adediran M, Adeoye O, Kassim A, Oyewole I (2006). Malaria prevention and treatment seeking behaviour of young Nigerian adults. *Annals of Afr Med.* 5(2): 82-88.
2. Onwujekwe O, Chima R, Okonkwo P (2000). Economic burden of malaria illness on households versus that of all other illness episodes: a study in five malaria holo-endemic Nigerian communities. *Health Policy.* 54: 143-159.
3. Federal Ministry of Health (FMOH) [2005]. National Antimalarial Treatment Policy. FMOH, National malaria and Vector Control Division, Abuja, Nigeria.
4. Jimoh A., Sofola O., Petu A., Okorosobo T (2007). Quantifying the Economic Burden of Malaria in Nigeria Using the Willingness to Pay Approach, Cost Effectiveness and Resource Allocation. 5:6 . doi: [10.1186/1478-7547-5-6](https://doi.org/10.1186/1478-7547-5-6)
5. Olalekan MS, Nurudeen AS (2013). Malaria burden and the effectiveness of malaria control measures in Nigeria: A case study of Asa Local Government Area of Kwara State. *Journal of Economics and Sustainable Development* 4:3, 295-308.
6. WHO (2014). World Malaria Report. pp 16-17, 38. Available at http://www.who.int/malaria/publications/world_malaria_report_2014/report/en/
7. WHO (2009). World Malaria Report. Available at www.who.int/malaria/world_malaria_report_2009/en
8. Amoran OE (2013). Impact of health education intervention on malaria prevention practices among nursing mothers in rural communities in Nigeria. *Niger Med J.* 54(2): 115-122.
9. Federal Ministry of Health (2009). Strategic Plan 2009-2013. "A Road Map for Malaria Control in Nigeria. Nigeria and National Malaria Control Programme (NMCP). Abuja, Nigeria. Available at

http://www.nationalplanningcycles.org/sites/default/files/country_docs/Nigeria/nigeria_draft_malaria_strategic_plan_2009-2013.pdf.

10. National Population Commission (2008). Nigeria demographic and health survey. Federal Republic of Nigeria Abuja, Nigeria.

http://www.unicef.org/nigeria/ng_publications_Nigeria_DHS_2008_Final_Report.pdf

11. National Malaria Control Programme (NMCP), [2007]. Federal Ministry of Health. Annual report. Abuja. Nigeria

12. Teklehaimanot A., Mejia P (2008). Malaria and Poverty. Ann. N.Y. Acad. Sci., 1136: 32-37

13. Onwujekwe O, Ojukwu J, Uzochukwu B, Dike N, Shu E (2005). Where do people from different socio-economic groups receive diagnosis and treatment for malaria in southeast Nigeria. Annals of Tropical Medicine and Parasitology. 99(5): 473-481.

14. Jamieson A, Toovey S, Maurel M (2006). Malaria: A Traveller's Guide. Struik. p. 30

15. Abdulgafar, DS (2013). The extent of achieving the millenium development goals: evidence from Nigeria. Kuwait Chapter of Arabian Journal of Business and Management Review 2(9): 59.

16. Ndo C, Menze-DjantioB, Antonio-Nkondjio C (2011). Awareness, attitudes and prevention of malaria in the cities of Douala and Yaoundé (Cameroon).Parasites & Vectors.4:181

17. Mengistu L, Wakgari D (2009). Community awareness about malaria, its treatment and mosquito vector in rural highlands of central Ethiopia. *Ethiop.J.Health Dev.* 23(1): 40- 47.

18. Elsabagh S, Bennett VA, Wylie A (2010). Public awareness and prevention of malaria in Vanuatu. Public health. 124: 295 – 297

19. Ukibe SN, Mbanugo JI, Ukibe NR Ikeakor LC (2013). Journal of Public Health and Epidemiology. 5(9): 391-396.

20. Mbanugo JI, Okorudo O (2005). Prevalence of Plasmodium infections in Pregnant women in Aguata, Anambra state, South Eastern Nigeria. J. Environ. Health. 2(2):64-68.

21. Aribodor DN, Nwaorgu OC, Eneanya CI, Aribodor OB (2007). Malaria among Primigravid attending antenatal clinics in AwkaAnambra State, South Eastern Nigeria. Niger. J. Parasitol. 28(1):25-27.

22. Dike N, Onwujekwe O, Ojukwu J, Ikeme A, Uzochukwu B, Shu E (2006). Influence of education and knowledge on perceptions and practices to control malaria in Southeast Nigeria. SocSci Med. 63(1):103-106.

23. Chukwuocha UM, Dozie IN, Onwuliri CO, Ukaga CN, Nwoke BE, Nwankwo BO, Nwokeb EA, Nwaokoro JC, Nwoga KS, Uduji OG, Iwuala CC, Ohaji ET, Morankinyo OM, Adindu BC (2010). Perceptions on the use of Insecticide treated nets in parts of Imo River basin, Nigeria: implications for preventing malaria in pregnancy. *Afr. J. Reprod. Health.* 14(1):117-128.
24. Wagbasoma VA, Aigbe EE (2010). ITNs Utilization among pregnant women attending ANC in Etsako West LGA, Edo state. *Niger J. Clin. Pract.* 13(2):144-148.
25. Baley M, Deressa W (2008). Use of insecticide treated nets by pregnant women and associated factors in a predominantly rural population in Northern Ethiopia. *Trop. Med. Int. Health.* 13(1):1303-1313.
26. Olorunfemi EA (2013). Impact of health education intervention on malaria prevention practices among nursing mothers in rural communities in Nigeria. *Niger Med J.* 54(2): 115-122.
27. Adepoju EG, Onajole AT, Oreagba LO, Odeyemi KA, Ogunnowo BO, Olayemi SO (2005). Health education and caregivers' management of malaria among under fives in Ede North L.G.A, Osun State of Nigeria. *Niger Med Pract.* 48:72-81.
28. Kidane G, Morrow RH (2000). Teaching mothers to provide home treatment of malaria in Tigray, Ethiopia: A randomized trial. *Lancet.* 356:550-555.
29. Oladepo O, Tona GO, Oshiname FO, and Titiloye MA (2010). Malaria knowledge and agricultural practices that promote mosquito breeding in two rural farming communities in Oyo State, Nigeria. *Malar J.* 9: 91.
30. WHO (2012) Malaria Factsheet on the World Malaria Report 2012. Available at http://www.who.int/malaria/media/world_malaria_report_2012_facts/en/