Annals of West University of Timişoara, ser. Biology, 2018, vol. 21 (2), pp.175-184

KNOWLEDGE AND PRACTICES TOWARDS MALARIA CONTROL AND PREVENTION IN AN IRRIGATED COMMUNITY, NORTH CENTRAL NIGERIA

Ebube Charles AMAECHI[1,2*], Onyinye Mkpola UKPAI[1], Carmelita Chima OHAERI[1]., Ozioma Prisca IROLE-EZE[1], Blessing Uzoamaka EJIKE[1,4],Chioma Ada IHEMANMA[4], Amaoge Nnennaya OKOROCHA[5], Onyekachi EGWU[1],Chidiogo Comfort NWADIKE[3]

[1]Department of Zoology and Environmental Biology, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria.

[2]Department of Zoology, University of Ilorin, Ilorin, Kwara State, Nigeria.

[3]Department of Zoology, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

[4]Department of Biology/Microbiology, Abia State Polytechnic, Aba, Abia State, Nigeria.

[5] Department of Public Health, Abia State University, Uturu, Abia State, Nigeria.

**Corresponding author e-mail: ebubeamechi@yahoo.com*

Received 29 June 2018; accepted 11 December 2018

ABSTRACT

Malaria is highly prevalent in irrigated communities in Nigeria. The present study assessed the knowledge, attitude and practice (KAP) towards malaria prevention and control among inhabitants of an irrigated community, north central Nigeria. It was a cross-sectional study involving 285 participants ≥ 18 years living in Omi and surrounding communities, Kogi State, north central Nigeria. Data was collected using structured questionnaire by administering it to selected head of the household to assess their knowledge, attitude and practice about malaria .All the participants were aware of malaria as a deadly disease especially through the mass media (76.8%). A good number of the participants (68.4%) were able to attribute malaria to mosquito bites. Signs and symptoms associated to malaria included fever (98.9%), head ache (95.8%), body weakness (86.7%), convulsion (83.9%) and others. The use of physical methods such as the use of brooms (95.8%) and the use of mosquito coil (88.4%) were the main preventive strategies used in the area. A good number of the respondents (89.8%) used herbs as a means of treatment against malaria while 20.0% visited patent medicine store to purchase antimalarial drugs. Despite the high knowledge of the disease in the study area, significant gap in knowledge exist in the best preventive strategies. Health education that will focus on the use of insecticide treated nets is necessary to control the disease.

KEY WORDS: *Malaria, Knowledge, Practices, Attitude, Omi, Kogi, Nigeria*

INTRODUCTION

Malaria is a major disease of people residing in tropical and subtropical regions of the world. Africa the world's second largest continent is plagued by this disease, bearing 80% of the global malaria burden where Nigeria accounts for about 29% of this burden (WHO, 2016). The burden caused by malaria in a country like Nigeria is enormous. Malaria is responsible for approximately 60% of outpatient visits and 30% of admissions. Moreover, about 11% of maternal mortality, 25% of infant mortality and 30% of under-five mortality are all attributed to

malaria (WHO, 2017). Every year, an estimated 110 million clinically diagnosed cases of malaria and nearly 300,000 malaria-related childhood deaths occur in Nigeria (Nigeria Malaria Fact Sheet, 2011).

A lot of efforts have been put in place at the Federal, State and Local government levels for the control of malaria in Nigeria. Despite these control and preventive strategies, there are still a lot of factors militating against the realization of a malaria free country. Understanding the people's knowledge about a particular disease and their possible attitudes towards its prevention are key elements which must be considered in the implementation of preventive measures (Amaechi & Ukpai, 2013; Ejike *et al*., 2016; Ukpai *et al*., 2017). At the community level, programs which are designed to monitor control efforts of a disease, must factor knowledge, attitude and practices of that disease for any realizable outcome (Amaechi & Ukpai, 2013; Shimaponda-Mataa *et al*., 2017). Water development projects, particularly manmade lakes and irrigation schemes are a factor that has a direct effect on the intensification of malaria through increase in the number of mosquito breeding sites. It could also lead to an extended breeding season and longevity of mosquitoes, relocation of local populations to high risk reservoir areas, and the arrival of migrant populations that seek a source of livelihood around the irrigated area (Ghebreyesus *et al*., 1998, 1999; Yewhalaw *et al.,* 2009). Currently, in Nigeria the national strategy to control malaria consists of three main strategies; early diagnosis and prompt treatment, selective vector control and epidemic prevention and control. The knowledge of the working of these strategies together with the identification of main determinants influencing protective behaviors by individuals in communities are required to monitor and evaluate the progress of the malaria control efforts. The understanding of the possible causes, modes of transmission and individuals preference and decision about the adoption of preventive and control measures vary from community to community and among individual households. This study intends to provide information necessary to support and guide malaria control approaches and policies both regionally and locally. The objective of the study was to assess people's level of knowledge, attitude and practices towards malaria infection, its prevention and control in a community where irrigation is practiced.

MATERIALS AND METHODS

Study area and population

The study was carried out in five communities of Omi dam irrigation project and surrounding communities namely Omi, Ogga, Iddo, Ogbo and Ejiba located in Yagba West Local Government Area (L.G.A) of Kogi State, Nigeria. The L.G.A covers an area of 1276 square kilometers with a population of 149,023.It is about 146 km from Ilorin the capital of Kwara State. It lies between longitudes $6^{0}37^{1}$ and $6^{0}42^{1}$ E of Greenwich and latitudes $8^{0}34^{1}$ and $8^{0}38^{1}$N of the equator (Areoye *et al.,* 2004). The project is located in Omi village, a farming community of about 10,000 people (Amaechi *et al*., 2016).The primary aim of establishing this dam is to promote agriculture through irrigation activities involving more than 5,000 farming households both within and outside Yagba West Local Government Area. There are many settlers particularly fishermen along the lake and this indicates the enormous fisheries potential of the lake. Detailed information about the study area has previously been described by (Amaechi *et al*., 2016).

The most recent prevalence study on malaria recorded a 61.6% infection rate in the area (Amaechi, 2016). This makes the area endemic for malaria. The communities have schools, hospitals and dispensaries where the inhabitants seek treatment. Many of the houses have unscreened windows, holes in the walls, and large open eaves that provide easy entry for mosquitoes. The houses are separated from one another either by agricultural land or small patches of natural vegetation.

Ethical consideration

Permission to conduct the study was obtained from authorities of Lower Niger River Basin Authority, Ilorin. Approval was granted by the Kogi State Ministry of Health and the local government health authority. The traditional Ruler of Omi (Olomi of Omi) and other community leaders also approved the study. Meetings were held in the villages to explain the purpose of the study to the inhabitants. It was made clear that participation in the study was voluntary and that it was possible to withdraw from the study at will. The post-graduate committee board of the Department of Zoology and Environmental Biology, Michael Okpara University of Agriculture, Umudike, gave approval to the study.

Study questionnaire

A semi-structured questionnaire developed by the researchers was validated and pre-tested to ensure consistency, reliability and appropriateness of language before commencement of the field work. During the field work, questionnaires were administered to selected head of households to assess their knowledge, attitude and practice about malaria. For those who could neither read nor write, they were interviewed using 'Okun' the local language of the people of the study area. The questionnaire used in the survey was written in English language.

Statistical analysis

The data obtained from this research was analyzed using Statistical Package for Social Sciences, version 16.0, Chicago, IL, USA (SPSS).The results were double checked to be sure of correctness of the imputed figures before the analysis. The demographic characteristics of the respondents were presented in percentages and frequencies. Chi-square(X^2) test was used to compare proportions.

RESULTS AND DISCUSSIONS

Socio-demographic characteristics of respondents

A total of 285 respondents were sampled using structured questionnaires to ascertain their levels of knowledge, attitudes and practices towards malaria .The respondents fell within the ages 20 years and above 70 years. The males were 140(49.1%) while 145 (50.9%) were females. Marital status showed that 151(53.0%) were married (Table 1a).

The occupations of the respondents included: traders 37(13.0%), civil servants 25(8.8%), Fishermen 64(22.5%) (Table 1b).

On educational status, some of the respondents attained primary school status 98 (34.4%), (Table 1b).

TABLE 1a: Some socio-demographic characteristics of study participants in Omi (n=285)

Variables	No (%)
Sex	
Male	140(49.1)
Female	145(50.9)
Total	**285(100)**
Age group (yrs)	
20-29	65(22.8)
30-39	56(19.6)
40-49	49(17.2)
50-59	53(18.6)
60-69	42(14.7)
70 and above	20(7.0)
Total	**285**
Marital status	
Married	151(53.0)
Single	18(6.3)
Divorced	34(11.9)
Widow/Widower	45(15.8)
Cohabiting	37(13.0)
Total	**285**

TABLE 1b: Some socio-demographic characteristics of study participants in Omi (n=285)

Variables	No (%)
Educational level	
No formal education	24(8.4)
Primary	98(34.4)
Secondary	125(43.9)
Tertiary	38(13.3)
Total	**285**
Occupation	
Trader	37(13.0)
Civil servant	25(8.8)
Fisher men	64(22.5)
Farmer	72(25.3)
Student	29(10.2)
Artisan	19(6.7)
Housewife	34(11.9)
Others	5(1.8)
Total	**285**

Respondents' Knowledge about the causes of malaria

Knowledge about malaria was high (100%) among the respondents. Source of information about malaria was through mass media 219 (76.8%). On the possible causes of malaria, some attributed malaria to staying too long in the sun 143 (50.2%), consumption of contaminated food/water 103(36.1%),bite of any mosquito 195 (68.4%), taking too much oil 201(70.5%), stress 99 (34.7%), weather 29 (10.2%), 48 (16.8%) attributed it to the bites of

Anopheles mosquito, while 4(1.4%) had no knowledge of the possible cause of malaria (Table 2).

TABLE 2: Respondents' Knowledge of the cause of malaria and its transmission

Causes of malaria	No (%)
Heard of malaria	Frequency (%)
Yes	285 (100)
No	0
Source of information about malaria	
Home/ neighbors /friends	134(47.0)
Mass media	219(76.8)
Hospital/dispensaries	113(39.6)
Community health workers	45(15.8)
From experience of previous malaria attack	178(62.5)
Cause of malaria	
Consumption of contaminated food/water	103(36.1)
Staying long in the sun	143(50.2)
Dirty environment	15(5.3)
Stress	99(34.7)
Eating too much oil	201(70.5)
Bites of any mosquito	195(68.4)
Bites of *Anopheles* mosquito	48(16.8)
Weather (cold /Hot)	29(10.2)
Do not know	4(1.4)
Total	**N=285**

Signs and symptoms of malaria reported

Signs and symptoms of malaria reported were loss of appetite 240 (84.2%), fever 282 (98.9%), body weakness 247 (86.7%) (Table 4).

Respondents' mode of prevention of mosquito bites

A good number of the respondents reported using brooms to kill mosquitoes 273 (95.8%), 252 (88.4%) reported using mosquito coil/repellents, 73 (25.6%) insecticide spray, 38 (13.3%) window nets/ door screens, 205 (71.9%) use of insecticide treated nets, 59 (20.7%) (Table 5).

Attitudes against malaria and its control

Majority of the respondents 189 (45.7%) reported using herbs (traditional) while 83 (20.0%) visited patent medicine store each time they had malaria. Quite a number of the respondents 78 (18.8%) resulted to self -medication at home, 57(13.8%) visited hospitals while 7(1.7%) reported visiting a traditional healer.

Assessment of treatment seeking behavior of respondent in relation to malaria

Majority of the respondents 256 (89.8%) reported using herbs (traditional) while 138 (48.4%) used anti-malarials. The reasons given for the use of herbs were as follows: Effective and suitable 256(89.8%), financial constraint 217(76.1%), affordable and accessible 256 (89.8%) and Lack of access to modern medical care 163 (57.2%) (Table 6).

TABLE 3: Respondents' Knowledge of the signs and symptoms of malaria

Signs and symptoms	No (%)
Stomach pains	45(15.8)
Yellowish eyes	21(7.4)
Vomiting	114(40.0)
Convulsion	239(83.9)
Change of skin color	172(60.4)
Diarrhea	20(7.0)
Body weakness	247(86.7)
Headache	273 (95.8)
Yellow urine	251 (88.1)
Feeling feverish	282 (98.9)
Cough	7(2.5)
Sleeplessness	177(62.1)
Loss of appetite	240(84.2)
Do not know	8(2.8)
Others	17(6.0)
Total	**N=285**

TABLE 4: Methods respondents' used for prevention of mosquito bites in their homes

Preventive strategies	No (%)
Mosquito coil	252(88.4)
Insecticide spray	73(25.6)
Window/door netting	38(13.3)
Insecticide treated bed net	205(71.9)
Untreated bed nets	59(20.7)
Protective clothing	221(77.5)
Insect repellent cream	3(1.1)
Use of herbs	189(66.3)
Cleanliness	175(61.4)
Total	**N=285**

(X^2=332.001, P=0.002)

TABLE 5: Attitudes against malaria and its control

Variables		Frequency(%)
Attitudes		
Whenever a child had fever, immediate action taken would be		
a.	Go to hospital	57(13.8)
b.	Self-treatment at home	78(18.8)
c.	Go to a patent medicine store	83(20.0)
d.	Use of herbs	189(45.7)
e.	Visit a traditional healer	7(1.7)

TABLE 6: Assessment of preference mode of treatment practices towards malaria among the study participants

Variables	No (%)
Mode of treatment	
Use of herbs	256(89.8)
Use of anti-malarials	138(48.4)
Reasons for use of herbs	
Effective and suitable	256(89.8)
Financial constraints	217(76.1)
Religious belief	4(1.4)
Accessible	256(89.8)
No side effects	228(80.0)
No special reason	123(43.2)
Approved method	164(57.4)
Lack of access to orthodox medicine	163(57.2)
Total	**N=285**

(X^2=711.324, P=0.000)

Respondents' knowledge about mosquito behavior

Respondents knowledge about mosquito behavior showed that majority 214(75.1%) of the respondents reported that stagnant water was the main breeding site for mosquito,112 (39.3%) reported that it breeds in moving water, 94(33.0%) reported that the presence of grass around homes was responsible for mosquito breeding, while 79(27.7%) reported the presence of thick bushes as responsible. Regarding the biting time of mosquito, 202 (70.9%) reported that mosquitoes bite at night only, 54 (18.9%) said during day time while 29 (10.2%) reported that mosquito bite any time of the day. For transmission season, 84 (29.5%) reported that mosquito transmits malaria during dry season while 201(70.5%) reported transmission takes place in wet season (Table 7).

TABLE 7: Respondents' knowledge about mosquito behaviour

Variables	**No (%)**
Mosquito breeding areas	
Stagnant water	214(75.1)
Moving water	112(39.3)
Grasses around homes	94(33.0)
Thick bushes	79(27.7)
Others (Latrines/ animal shed)	21(7.4)
Biting time	
During night time	202(70.9)
During day time	54(18.9)
Any time	29(10.2)
Do not know	0
Main transmission season	
Dry season	84(29.5)
Rainy season	201(70.5)
Total	**N=285**

For any malaria control program to be effective in a community, findings from survey on the peoples' knowledge, attitudes and practices must be factored into the program design

(Mazigo *et al*., 2010; Ukpai *et al*., 2017). The results of this study can be incorporated into the present intervention programs to assist in the ongoing malaria elimination program. With respect to respondents KAP, findings of the current study indicated that general awareness of malaria was high among the inhabitants of Omi irrigation community where all (100%) of them were found to have heard about malaria. This is a usual phenomenon as malaria is endemic in the community (Amaechi *et al*., 2016, 2017). Our data showed that the respondent demonstrated a good understanding of malaria causes, signs, symptoms, prevention, mode of treatment and knowledge about mosquito behavior. This may be connected to the fact that the respondents had one form of education where the information may probably have been gotten. The study area being endemic for malaria the causative agent of malaria may have been a reason for such knowledge.

Knowledge about malaria was obtained primarily through the mass media (76.8%) and from previous malaria attack (62.5%). This might be due to the fact that most of the respondents possess a radio where information about malaria is being communicated especially in the local language of the people. Previous attack of a particular disease may have been shared with others thereby creating awareness of a particular disease. This observation is consistent with Mazigo *et al*. (2010) in Tanzania.

The majority of the respondents were able to associate the cause of malaria to the bite of mosquito. The presence of conducive breeding grounds makes mosquito to be abundant in the area. This is however contrary to the results obtained by in Idowu *et al.* (2008) Abeokuta where only 11.7% of the respondents were able to associate malaria to mosquito. Although in our study, the respondents were not able to correctly identify the exact specie of mosquito involved in the transmission of malaria. This might be connected to the fact that a good number of the respondents did not go beyond secondary level of education and so the awareness was lacking. Like in other parts of sub Saharan Africa where malaria is endemic, the study community identified malaria on the basis of the symptoms which is usually attributed to the disease. Symptoms such as headache, general body weakness, fever, loss of appetite, yellowish urine and convulsion were mentioned. These observations are similar to reports of Hlongwana *et al*. (2009) in Swaziland and Dawaki *et al*. (2016) in Nigeria. However in a similar study in Tanzania, symptom of convulsion was poorly associated with malaria (Mazigo *et al*., 2010) contrary to our findings where convulsion was correctly linked to malaria.

Observations regarding prevention of mosquito bites in homes showed that most respondents were used to the local methods of mosquito prevention. These include the use of mosquito coil. The use of mosquito coil is only a method that has the ability to repel the mosquitoes rather than killing (Oladepo *et al*., 2010) The fumes from the coils usually possess respiratory health hazards which may in the event of scaring the mosquitoes, lead to other health challenges, and as such may not be recommended for use especially at a time when occupants of the house are sleeping (Amaechi & Ukpai, 2013). A greater number of the respondents (89.8%) were observed to using herbs which they call 'Agbo' in the treatment and management of malaria. Reasons for the use included effectiveness, accessibility and a presumed no side effect. The use of herbs in the treatment of malaria has previously been established in most developing countries as a fast growing method (UNESCO, 1996).

With respect to mosquito breeding area, it was observed by the respondents that stagnant water was the main breeding site. This is consistent with the findings of Deressa *et al.*

(2003) who reported same in Ethiopia. Mosquitoes are thought to bite at night by a greater number of respondents. This is attributed to the dark hours of the day when mosquito are found to be looking for blood meal from humans.

A greater portion of the respondents observed that the rainy season was the peak of malaria transmission. This could be attributed to the presence of stagnant water found in gutters, along the roads, used cans, farm lands etc.

CONCLUSIONS

Based on the current study, Knowledge on malaria cause, transmission, early symptoms and preventive methods was high; however there were misconceptions about the cause and transmission of the disease and control measures of the vector.

We therefore recommend that proper health education to increase community awareness and practice about the transmission and prevention methods of malaria in the area.

ACKNOWLEDGEMENTS

We appreciate the efforts of all we gave technical assistance during the survey. We also thank the authorities of University of Ilorin, Ilorin, Nigeria for financial support.

REFERENCES

- Amaechi E.C., Ukpai O.M. 2013. Knowledge, attitude and practices about malaria among mothers and caregivers in Aba South Local Government Area, Abia State,Nigeria. *Animal Research International,* **10(**3):1786-1791.
- Amaechi E.C. 2016. *Studies on transmission and prevalence of Plasmodium falciparum and Wuchereria bancrofti infections among inhabitants of the Omi dam irrigation area, Kogi State*, Nigeria. Ph.D thesis Michael Okpara University of Agriculture, Umudike, 138pp.
- Amaechi E.C., Ohaeri C.C., Ukpai O.M., Nwachukwu P.C., Ukoha U.K. 2016. Lymphatic filariasis: Knowledge, attitude and practices among inhabitants of an irrigation project community, north central Nigeria. *Asian Pacific Journal of Tropical Disease***, 6(**9):709-713.
- Amaechi E.C., Ohaeri C.C., Ukpai O.M., Ukoha U.K., Nwachukwu P.C, Ejike B.U. 2017. Prevalence and clinical aspects of *Wuchereria bancrofti* among inhabitants of a resource limited irrigation project community, north central Nigeria. *Asian Pacific Journal of Tropical Disease*,**7(**1):32-35.
- Areoye P.A., Owolabi O, Eniola K.I.T. 2014. Aspect of physic-chemical and bacteriological analysis of Kampe (Omi) dam and irrigation Project in Kogi State, Nigeria. *Journal of Aquatic Sci*ence,**19**(1):17-22.
- Dawaki S., Al-Mekhlafi H.M., Ithoi I., Ibrahim J., Atroosh W.M., Abdulsalam A.M., Sady H., Elyana F.N., Adamu A.U.,Yelwa S.I., Ahmed A., Al-Areeqi M.A., Subramaniam L.R., Nasr N.A., Lau Y.L. 2016. Is Nigeria winning the battle against malaria? Prevalence, risk factors and KAP assessment among Hausa communities in Kano State. *Malaria Journal*,**15**: 351.
- Deressa W., Ali A., Enquoselassie F. 2003. Knowledge, attitudes and practices about malaria, the mosquito and antimalarial drugs in a rural community. *Ethioipian Journal of Health Development,* **17**(2):99-104.
- Ejike B.U., Ohaeri C.C., Amaechi E.C., Ejike E.N., Oleka G., Irole-Eze O.P., Belonwu A.C. 2016 .Knowledge, attitudes and practices of malaria amongst pregnant women in Aba South Local Government Area, Abia State, Nigeria. *Animal Research International,* **13**(2):2463-2469.
- Ghebreyesus T.A., Halle M., Getachew A., Alemayehu T., Witten K.H, Teklehaimanot A. 1998.Pilot studies on the possible effects on malaria of small irrigation dams in Tigray Regional State*. Ethiopia. Journal of Public Health Medicine,* **20**:238-240.
- Ghebreyesus T.A., Halle M., Witten K.H., Getachew A., Yohannes M., Teklehaimanot H.D., Lindsay S.W., Byass P. 1999. Incidence of malaria among children living near dams in northern Ethiopia: Community based incidence survey. *British Medical Journal*, **319**:663-666.
- Hlongwana K.W., Mabaso M.L., Kunene S., Govender D., Maharaj R. 2009. Community knowledge, attitudes and practices (KAP) on malaria in Swaziland: A country earmarked for malaria elimination. *Malaria Journal***, 8**: 29-36.

- Idowu O.A., Mafiana, C.F., Lawoye U., Adebanloye O. 2008. Perceptions and home management practices of malaria in some rural communities in Abeokuta, Nigeria. *Travel Medicine and Infectious Disease,* **6**(4):210-214.
- Mazigo H.D., Obasy E., Mauka W., Manyiri P., Zinga M., Kweka E.J., Mnyone L.L., Heukelbach J. 2010. Knowledge, attitudes and practices about malaria and its control in rural north west Tanzania*. Malaria Research and Treatment,* 1-9.
- Nigeria Malaria Fact Sheet. 2011. Retrieved from http://www.who.int/malaria/publications/country-profiles/profilengoen.pdf.
- Oladepo O., Tona G.O., Oshiname F.O., Titiloye M.A. 2010. Malaria knowledge and agricultural practices that promote mosquito breeding in two rural farming communities in Oyo State, Nigeria. *Malaria Journal*, **9**:91
- Shimaponda-Mataa N.M., Tembo-Mwase E., Gebreslasie M., Mukaratirwa S.2017. Knowledge, attitudes and practices in the control and prevention of malaria in four endemic provinces of Zambia. *Southern African Journal of Infectious Diseases*, **32**(1):29-39.
- Ukpai O.M., Irole-Eze O.P., Amaechi E.C., Ejike B.U., Ejike E.N., Okorocha N.A. 2017. A study of knowledge, attitude and practices regarding malaria among inhabitants of Ezinihite Local Government Area, Imo State, eastern Nigeria. *Manila Journal of Science*, **10**:65-74.
- UNESCO.1996.Culture and Health, Orientation texts-World Decade for Cultural Development Documents CLT/DCEC.PRO-1996, Paris, France.
- WHO. 2015. *World Malaria Report* 2015. Geneva: World Health Organization.
- WHO.2017. *World Malaria Report 2017*. Geneva: World Health Organization.
- Yewhalaw D., Legesse W., Bortel W.V., Gebre-Selassie S., Kloos H., Duchateau L., Speybroeck N. 2009. Malaria and water resource development: the case of Gilgel-Gibe hydroelectric dam in Ethiopia. *Malaria Journal,* **8:**21.