ORIGINAL ARTICLE

PERCEPTIONS OF MALARIA AND THE UTILISATION OF LONG LASTING INSECTICIDE TREATED NETS IN A RURAL NIGER DELTA COMMUNITY IN NIGERIA

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ABSTRACT

Introduction: Malaria represents a heavy disease burden with high death tolls in sub-Saharan countries, particularly among children less than five years of age and pregnant women. Misconceptions about the disease are reported to still exist in malaria endemic countries. Insecticide-treated nets (ITNs) have since been advocated as effective control measures against malaria, but how well are they utilised? **Objectives**: To explore and ascertain the perception of malaria and the utilisation of ITNs in a rural community in the swampy areas of Nigeria's Niger Delta region. **Method:** A cross-sectional, descriptive study was conducted using simple random sampling technique. Data were collected from household heads with the aid of pre-tested, semi-structured, interviewer-administered questionnaires and analysed using SPSS version 17.0 **Results**: A good perception of the cause (86.9%), mode of transmission (92.8) and preventive measures of malaria were demonstrated. Although, the awareness of ITNs was high (75.6%) with health facilities (35.5%) and radios (33.5%) being the major sources of information, the utilisation rate of ITNs was poor (29%). **Conclusion**: Intensified efforts by government agencies and diverse stakeholders are recommended to increase the availability and access to ITNs, in order to improve their utilisation rate in rural communities, with adequate priority given to groups at higher risk. Such interventions when implemented consistently and comprehensively are likely to contribute to moving the nation further from malaria control and elimination, towards the possibilities of malaria vaccines and ultimate eradication.

Keywords: Insecticide-treated Nets, Malaria, Perception, Rural, Utilization

INTRODUCTION

Diverse facets of human development such as health, education, socioeconomic development and productivity are hampered in many low and medium income countries of Africa by a number of infectious diseases of the tropics.[1] They include an almost inexhaustible list of both emerging and re-emerging diseases such as tuberculosis, malaria, HIV/AIDS, cholera, meningitis, schistosomiasis, lymphatic filariasis, onchocerciasis, acute respiratory illnesses, Ebola etc.[1,2]Malaria takes a leading role among these diseases and often results in heavy morbidity and mortality burdens, especially among children under the age of five years and pregnant women. Other population groups at risk of contracting malaria and developing severe complications include non-immune immigrants, mobile populations and travelers as well as HIV/AIDS patients.[1,3-4] Although, majority of malaria morbidities and mortalities occur in sub-Saharan Africa, South-East

Asia, the Americas and Eastern Mediterranean and Western Pacific regions are also at risk.[3] Almost 300 million clinical cases of malaria occur worldwide annually; out of which, over one million people die of the disease.[1]The World Health Organization's African Region (AFRO) is reported to carry about 90% of the global malaria disease burden and 91% of malaria deaths.[3] Of this, Nigeria alone accounted for 27% of malaria cases and 24% of malaria deaths globally in the year 2016.[4]In the same year, an estimated 216 million cases of malaria were reported globally across 91 countries, reflecting an increase of about 5 million cases compared to the preceding year (2015).[3,4] This is not very encouraging, in view of the heavy global funding and intensive efforts channeled into intervention programmes such as the Roll Back Malaria (RBM) Initiative and the Millennium Development Goals (MDGs), which were launched at the turn of the century towards controlling (and possibly eliminating) the disease by the years 2010 and 2015, respectively.[5,6] However, unlike the morbidity statistics, malaria mortality remained fairly stable between the two years; with an estimate of 445,000 deaths in 2016, compared to 446,000 deaths in the year before.[3,4] The sixth Millennium Development Goal (MDG6) was aimed at halting and reversing the incidence of malaria, tuberculosis, HIV/AIDS and other related disease by 2015. Obviously, rather than halting and reversing the scourge, on the contrary, an increase was recorded just around the projected "finish line" of 2015. Ever since the global adoption and support of the ideals of RBM and the MDGs, with the commitment of diverse resources and technical aids channeled therein, many strides have been attained at the global level. These include a fall in the global malaria incidence and mortality rates by an estimated 37% and 58%, respectively. However, the same cannot be said about all malaria-endemic nations, as the United Nations Millennium Development Goals Report for 2015 states that "malaria continues to pose a major public health challenge".[7] The same report says that in 2015, malaria remains endemic in 97 countries and territories around the world, with an estimated 3.3 billion people at risk of infection. Furthermore, it accounts for a large proportion of health spending in low-income countries.

Riding upon the global gains of the MDGs, the United Nations General Assembly adopted the 17 Sustainable Development Goals (SDGs) in 2015.[8]These global goals came into effect in January, 2016, with the timeline of becoming actualized by the year 2030. Among them is "Goal 3" (Good health and well-being for people), which commits to "Ensure healthy lives and promote well-being for all at all ages." It proposes, among many other targets, to end the preventable death of newborns and children under 5 and to end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases as well as combat hepatitis, water-borne diseases and other communicable diseases by 2030 (Targets 3.2 and 3.3).[9] The concept of the SDGs is to build upon and sustain the gains attained by the MDGs.

The disease burdens and death tolls of malaria are reported to be relatively higher in rural areas of Africa.[10,11] Rural communities in Nigeria are often additionally burdened with higher levels of ignorance and illiteracy.[12] Thus, perceptions regarding the disease and awareness of effective preventive measures may either be low or shrouded in diverse misconceptions or superstitious beliefs. Many proven and effective interventions in the fight against malaria have been advocated by the RBM Initiative, MDG6 and the National Malaria Elimination Program (NMEP) in Nigeria.[3,6-7,10] These include the use of insecticide-treated mosquito nets, indoor residual spraying, early diagnostic testing and prompt treatment with anti-malarials such as artemisinin-based combination therapies (although the spread of drug-resistance is being reported in some regions endemic to Plasmodium falciparum[13,14]outside Nigeria). Health education (towards the impartation of appropriate information and knowledge) and the use of insecticide-treated nets (ITNs) are both relevant at the primary level of prevention. The World Health Organisation (WHO) identifies ITNs as one of the cornerstones of malaria prevention efforts[15] and also recognizes that an increased awareness of malaria among individuals, groups and communities empowers and enables them take better control over and improve their health.[16] This study sought to explore both the perception of malaria and the utilisation of

ITNs in a rural community in the swampy areas of Nigeria's Niger Delta.

MATERIALS AND METHOD

Study Area:

The study area is Owa-Alero, a rural community underOwa Kingdom, situated in Ika-land (Boji-Boji Owa constituency) in Ika North-East Local Government Area of Delta State, in the Niger Delta region of Nigeria. It has an estimated population of over 7,000 inhabitants, whose major occupations are farming, trading and artisanship. Crops grown here include tubers such as yams, cassava and coco-yam, as well as vegetables like okro, pepper, tomatoes and melon.[17]Located about252m (830 ft) above sea level, the study area is a terrain of undulating, swampy lowlands with sandy and loamy soils and forest vegetation typical of the rain and mangrove forests vegetation belts. It experiences a long rainy season which starts from around March to October annually. These geographical features constitute ideal ecological settings for the breeding of mosquitoes, the vectors for malaria transmission.

Study Design:

A cross-sectional, descriptive study design was employed.

Study Population:

Heads of selected households constituted the study population.

Sampling Technique:

Using the enumeration area (EA) template (list) for households in the Local Government Area's Primary Health Care (PHC) Department as the sample frame, simple random sampling technique using a table of random numbers was employed for selecting the households participating in the study. The heads of selected households were interviewed.

Sample Size:

The sample size was calculated using the formula:
Where,

$$n = \frac{z^2 p q}{d^2}$$

n = desired sample size
z = standard normal deviate which corresponds to 95% confidence interval (normally set at 1.96)
p = proportion of the target population estimated to have correct/right perceptions of malaria from a similar study[18] = 70% (ie. 0.7)
q= 1 — p = 30% (ie. 0.3)
d = degree of precision (0.05)

$$n = \frac{(1.96)^2 \times 0.7 \times 0.3}{(0.05)^2}$$

n = 323

The response rate was 320 (99.07%)

Data Collection and Management:

Pre-tested, semi-structured, interviewer-administered questionnaires were used to elicit information from the household heads. Data collected were checked for completeness, cleaned, coded and analysed using Statistical Package for Social Sciences (SPSS version 17.0) software. Data were summarised and presented as tables and charts.

Ethical Consideration:

Approvalto conduct the study was obtained from Ika North-East Local Government Area Primary Health Care Authority. Verbal informed consent was also obtained from the study participants before administering the questionnaires.

RESULTS

Majority of the respondents (95%) were males. About 70.3% were in their twenties and thirties (aged 20-39 years), with a mean age of 27.3 years. Only 1.6% of the respondents had post-secondary education; while over 80% were engaged in trading or artisanship.

Table 1: Socio-demographic Profileof Respondents (n= 320)

Variable	Frequency (%)
Age Group (Years)	
20-29	125 (39.1)
30-39	100 (31.2)
40-49	92 (28.8)
50-59	3 (0.9)
Total	**320 (100.0)**
Sex	
Male	304 (95.0)
Female	16 (5.0)
Total	**320 (100.0)**
Religion	
Christianity	305 (95.3)
Atheists/others	15 (4.7)
Total	**320 (100.0)**
Educational Status	
None	23 (7.1)
Primary	190 (59.4)
Secondary	102 (31.9)
Tertiary	5 (1.6)
Total	**320 (100.0)**
Occupation	
Farming	40 (12.5)
Trading	123 (38.4)
Artisans/Others	157 (49.1)
Total	**320 (100.0)**

Table 2: Respondents' Perception of the Definition of Malaria

Definition of Malaria	Frequency (%)
Any fever	16 (5.0)
Fever caused by mosquitoes	278 (86.9)
Fever due to exposure to rain	19 (5.9)
Don't know	3 (0.9)
Others	4 (1.3)
Total	**320 (100.0)**

Most of the respondents (86.9%) knew malaria to be a fever caused by mosquitoes; only less than 1% admitted ignorance of malaria (0.9%).

Table 3: Respondents' Perception of the Mode of Transmission of Malaria

Mode of Malaria Transmission	Frequency (%)
Mosquito bites	297 (92.8)
Contact with malaria patients	10 (3.0)
From mother to child	6 (2.0)
Don't know	7 (2.2)
Total	**320 (100.0)**

A large majority of the respondents (92.8%) knew that malaria is transmitted by mosquito bites and only 2.2% were ignorant of the mode of malaria transmission.

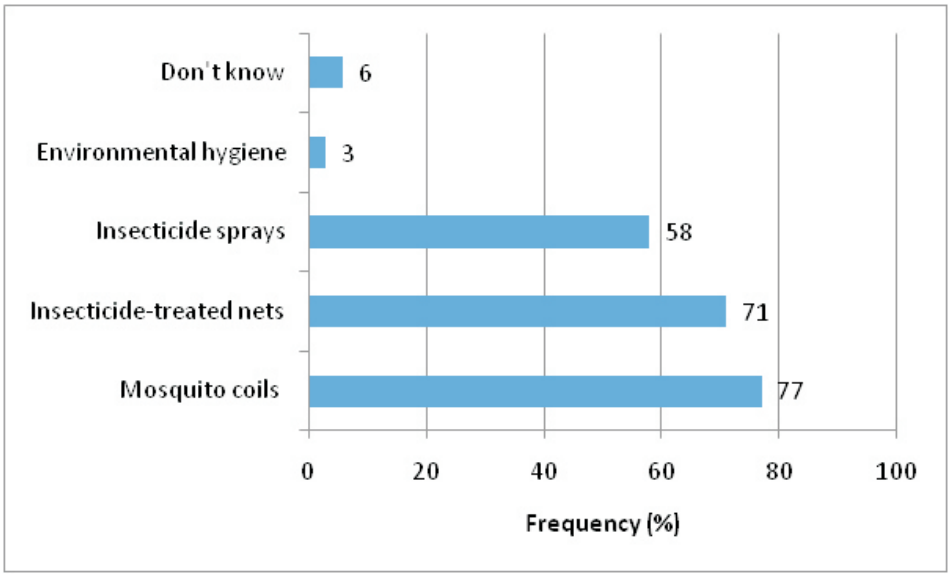

Figure 1: Respondents' Perception of Effective Preventive Measures against Malaria (Multiple responses were allowed)

Preventive measures mentioned by respondents were largely vector-targeted.

Table 4: Respondents' Perception of Groups or Individuals at Higher Risk of Contracting Malaria Infection

Groups or Individuals at Higher Risk of Malaria	Frequency (%)
Everybody	38 (11.9)
Pregnant women and under-fives	234 (73.1)
Under-fives **only**	32 (10.0)
Old people	13 (4.1)
Don't know	3 (0.9)
Total	**320 (100.0)**

Most of the respondents knew that pregnant women and under-five children are at higher risk of contracting malaria (73.1%) and 0.9% of them didn't know.

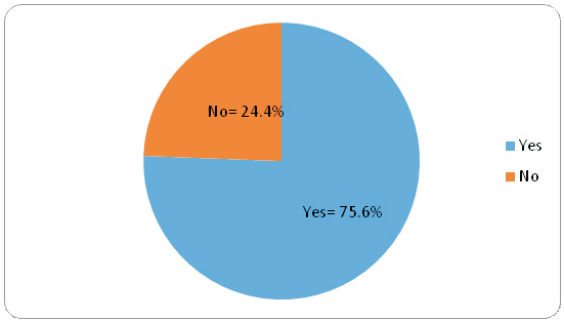

Figure 2: Respondents' Awareness of Insecticide-Treated Nets (ITNs)

About three-quartres (75.6%) of the respondents were aware of insecticide-treated nets (ITNs); while 24.4% had never heard of ITNs before.

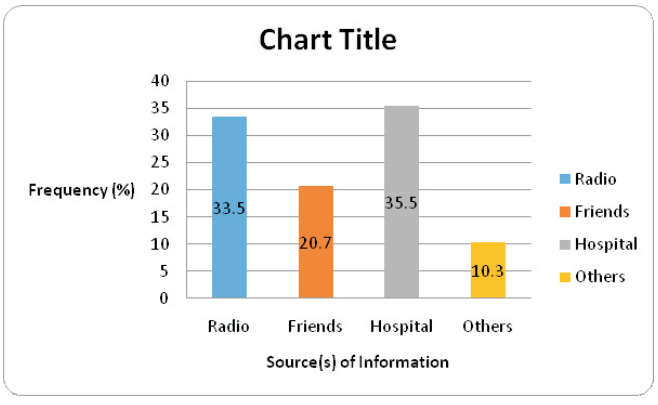

Figure 3: Sources of Information about Insecticide-Treated Nets (ITNs) Among Respondents

Over one-third (35.5%) of the respondents, who were aware of ITNs had heard of ITNs from hospitals and other health facilities. Radios and friends accounted for 33.5% and 20.7%, respectively.

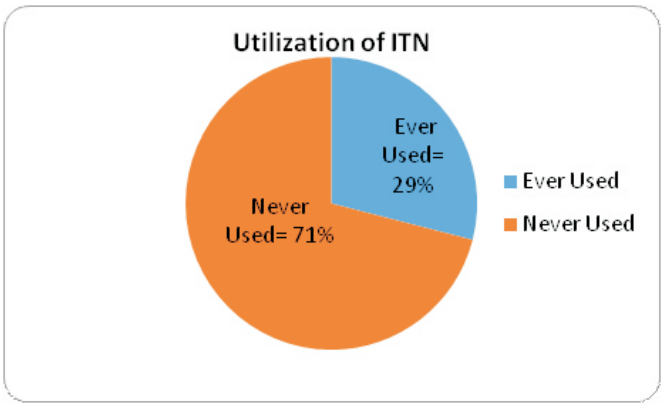

Figure 4: Utilisation of Insecticide-Treated Nets (ITNs) Among Respondents

Both current and previous utilisation of ITNs was only 29% among respondents.

DISCUSSION

The socio-demographic profile of this community (Table 1) depicts that of a typical rural setting in Nigeria as reported in the Nigeria Demographic and Health Surveys (NDHS),[12] with predominantly male-headed households, elementary levels of education and little or no evidence of white collar employments. A large majority of the respondents perceived malaria by definition (86.9%) and mode of transmission (92.8%) as a "fever caused by mosquitoes" (Tables 2 and 3); others attributed it to exposure to rain, direct contact with malaria patients etc. This finding corresponds with national figuresfrom the National Malaria Indicator Survey 2015for knowledge of the cause of malaria in rural areas (86.8%) and south-south zonal figures (85.7%), where the study area is situated.[10] This study's values are relatively higher than findings of similar studies conducted in rural communities in Akwa-Ibom State, south-south Nigeria and Imo State, south-eastern Nigeria, where about 70% and 65% of the respondents, respectively knew that malaria is caused through mosquito bites.[18,19] In south-western Nigeria, proportions of respondents with correct perceptions of the cause or mode of transmission of malaria ranged from 66.7% to 81.2% across six rural communities.[20] However, this understanding was found to be less than 20% in studies conducted in rural communities in Aliero and Kuje, north-western and north-central Nigeria, respectively.[21,22] This contrast as compared to other cited areas of the country may not be unconnected to the consisted disparity in literacy and health

indicators between the northern and southern parts of the country.[10,12] A right perception of the cause of malaria is reported from rural areas of other African countries such as Cameroon (92%), Burkina Faso (85.2%) and Central African Republic (65.5%).[23-25] A correct perception of the cause and mode of transmission of the disease is likely to ensure that appropriate measures are taken by communities to prevent it's occurrence; and thus, contribute immensely to reducing the incidence of malaria.

This is reflected in the high proportion of affirmative responses reported in this study with regards to effective preventive measures against malaria, as only 6% of respondents were ignorant of this (Figure 1). This finding corresponds with the Nigeria Malaria Indicator Survey 2015,[10] which reports that nationally, 93% of respondents affirm that there are ways (measures) of preventing malaria. The preventive measures mentioned in this study include mosquito coils (77%), ITNs (71%), insecticide sprays (58%) and environmental hygiene (3%). This is corroborated by various Nigerian studies from different regions of the country.[18-21] The measures mentioned in this study are largely vector-targeted, which are the main strategies advocated by WHO as being effective in a wide range of circumstances for the prevention and reduction of malaria transmission.[15] Regarding groups or individuals at higher risk of malaria (Table 4), almost three-quartres (73.1%) of the respondents correctly said pregnant women and under-five children (although an additional 10% mentioned under-fives **only**). This agrees with the combined national figure of 70.2% for rural areas, for knowledge of people most likely to be affected by malaria; namely pregnant women (18.9%) and children (51.3%) being at risk.[10] Mention was also made of children under five and pregnant women as being more susceptible to malaria by respondents in the earlier cited study in south-western Nigeria.[20] The finding in this study is higher compared to an Ethiopian study, where less than two-thirds (62.2%) of the respondents had this awareness.[26] Children under the age of five years and pregnant women are known to be at a higher risk of contracting malaria due to factors associated with low immunity.[3-4,10-11,18,22-25] A good knowledge or awareness of groups particularly susceptible to contracting malariawill positively sensitise communities and governments to take greater actions in protecting such groups in particular from exposure to mosquito bites and consequently, malaria as well.[21,27]

Insecticide-treated nets (ITNs) ranked second among measures mentioned unprompted by respondents in this study for malaria prevention (Figure 1); and about three-quartres of them (75.6%) were aware of the existence of ITNs (Figure 2). However, upon further scrutiny, only 53% of these respondents reported ever seeing an ITN. This is a poor reflection of the availability of and accessibility to ITNs. It was intended ab initio by the RBM Initiative, WHO and MDG6 that a wide coverage of ITN use is critical to attaining the successful and sustainable control of malaria.[3,5,7] The National Malaria Elimination Programme (NMEP) in Nigeria states the objective of "the provision of at least 80% of the targeted population with appropriate preventive measures", which includes expanding the universal access to insecticide-treated materials, such as ITNs by 2020.[10] The fact that barely half (53%) of the respondents in this study had seen an ITN implies that greater efforts are still required, in order to achieve this objective. The awareness of ITNs in Nigeria appears to show some degree of regional variation across northern and southern regions with rates of less than 40% and over 90% in some northern and southern states, respectively.[28] Over two-thirds of the respondents (69%), who were aware of ITNs in this study, had obtained information about them from hospitals and other health facilities (35.5%) as well as via electronic media such as radios (33.5%). Others obtained same from interactions with friends (Figure 3). Health facilities and electronic media also topped the list of sources of information in various studies in Nigeria, Cameroon and Ghana.[23,28-30] This underscores the place of such media and the role of health workers as channels and agents, respectively for the dissemination of vital health information relevant for positive changes in health and social indicators.

The relatively low proportion of respondents who had ever seen ITNs may explain or account for the

rather low combined current and previous utilisation of ITNs (29%) among respondents (Figure 4). Out of these, only 27% were currently using ITNs. This corresponds with findings from a study conducted in the neighbouring Edo State, south-south Nigeria[31] which reported that all the respondents (100%) had heard about ITNs, 89.6% had seen them before, but only 23.8% had ever used ITNs before; with only 4.3% currently using them. A study from south-eastern Nigeria[32] reported 80% ITN awareness among respondents, but utilisation was only 26.1%. The national ITN utilisation rate[10]stands at an estimated 37.3%. Another study covering 18 states across the country[33] reported that 93.2% of respondents had heard of ITNs, while the actual use was just 19.2%. These rather low rates of ITN utilization reveal the urgent need for health education interventions to transcend the mere awareness of ITNs towards ensuring and encouraging their actual use. Other studies have identified factors limiting the use of ITNs, which is an acknowledged limitation of the scope of this study. However, the authors envisage that subsequent research on this subject matter in this rural community will address this gap. Reasons for the non-use of ITNs captured in other studies include an endless list of factors such as cost of ITNs, low or poor community perception of ITNs as preventive measures against malaria, perceived absence of mosquitoes (differences in malaria transmission intensity), perceived discomfort (such as itching, insomnia, chemical odour and feeling of suffocation), generation of heat by ITNs, inconvenience of spreading or hanging ITNs etc.[21,25,28-32] The application of such information (including building in skills on how to hang or use ITNs)[33] is likely to be helpful in mounting interventions targeted at reversing these low trends of ITN use towards attaining the 80% universal coverage. Furthermore, there is the need to customize the content of malaria education communications to capture the local socio-cultural and ecological peculiarities of rural communities, rather than the dissemination of generic information, in order to make health education more effective in malaria control.[24]

CONCLUSION

A high awareness of malaria and the dynamics involved in its transmission and prevention as well as a high awareness of insecticide-treated nets (ITNs) were demonstrated in this study. However, there was a low level of utilisation of ITNs in this rural community, where location and ecological factors obviously favour the endemicity of malaria.[18] It is therefore, recommended that government agencies and all stakeholders involved intensify efforts at identifying and addressing issues hindering the utilisation of nets and other strategies in the prevention and control of malaria. This should be implemented with adequate priority given to groups more vulnerable to malaria. The promotion of such interventions when implemented consistently and intensively is likely to contribute immensely to improving malaria control and elimination efforts in the country, towards the possibilities of malaria vaccines and ultimate eradication.

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