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Research Article

Perception about Malaria and Understanding of Malaria Prevention Information in Selected Rural Communities of Nigeria

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Received Date: May 23, 2023 | Accepted Date: Jun 03, 2023 | Published Date: Jun 12, 2023

Citation: Solomon Abiodun Oyeleye, (2023), Perception about Malaria and Understanding of Malaria Prevention Information in Selected Rural Communities of Nigeria, *Clinical Trials and Case Studies*, 2(3); **DOI:**10.31579/2835-835X/027

Abstract

Studies have shown that social and cultural factors affect how people perceive diseases. Thus, the area of perception about malaria has been the focus of several scholarly interventions. However there has been limited investigation of the perception of people and their understanding of malaria prevention information in Nigeria. This study, anchored on the Health Belief Model, investigated the perception of selected rural dwellers in Oyo and Osun states, Nigeria, about malaria and their understanding of available malaria prevention information provided by Roll Back Malaria (RBM) in the two states. The study used Survey, Focus Group Discussion and analysis of secondary data. There were 2120 survey respondents selected through multi-stage sampling across 10 local government areas of Oyo and Osun states and 96 participants in 16 focus groups involving men, women and expectant mothers. The result of this study indicates that although respondents had a good understanding of the symptoms of malaria, a significant percentage still had a wrong perception about its cause, respondents had low level of exposure to the malaria prevention information and therefore a low recall of the messages on malaria prevention. Pearson Chi-Square test indicated significant relations between perception of the rural dwellers and their utilization of malaria prevention information (p.value = 37.947, DF = 16, Asymp.Sig. (2-sided) = .002 while a test of correlation of Knowledge, Attitude and Practice of information about malaria prevention indicated positive and statistically significant relationship between the perception about malaria and knowledge of people of respondents on information on malaria prevention ($r = 0.212$ $p < 0.01$). The study recommends state governments should direct their broadcast stations to air malaria prevention jingles regularly as a part of social service among other efforts at devoting more resources to communication activities on the disease.

Keywords: malaria; perception; prevention; information; Nigeria; roll back malaria

Introduction

Like many other health conditions, social-cultural factors affect the perception about the causes of malaria and subsequently attitude to its control (Oaks, Mitchell, Pearson &Carpenter, 1991, Aberese-Ako, Magnussen, Ampofo, and Tagbor, 2019). It is therefore imperative that people's perception and some of their cultural associations must not only be well understood in tackling the incidence of malaria, the whole context of lives that give shape to these perceptions and behaviours must be clearly identified and accepted for a successful (behaviour) change to take place (Heggenhougen et al. 2003; Kywat-Kywat-Swe & Pearson, 2004; Minja, Schellenberg, Mukasa, Nathan, et al., 2008). In south eastern and south-western Nigeria, excessive heat, over–work, sunlight, excessive sex, too much sun, mosquitoes, fried food, cold weather, dirty environment, weakness, alcohol, noise as well as witchcraft are perceived as possible causes of malaria (Morenikeji, 2009; Brieger, Nwankwo, Ezike, Sexton, Breman, Parkes, 1997; Nebe, Adeoye, Agomo, Mosanya, 2000; Okeke &Okafor, 2008).

While Okeke &Okafor (2008) found a correlation between education and correct knowledge of mosquitoes as cause of malaria, they also report other respondents as claiming that the disease can be transmitted through breast milk, bodily contact, drinking dirty water, inhalation and sharing the same cup. Some of the respondents felt it is inborn. Majority of respondents in the study above mentioned high fever as a symptom suggestive of a severe illness and while convulsion was recognised as a symptom of severe illness that kills children easily, most of the respondents did not connect it with malaria. To them, it is not malaria that causes convulsion but the high fever associated with malaria. Some of the mothers attributed the cause of convulsion to cold weather saying that "if rainy season or cold weather comes, it causes fever which results in convulsion" (Okeke & Okafor, 2008: 218).

And in a study of the perception of causes and treatment of malaria in a Nigerian university, 7.3% of the study population who were Christians expressed confidence that prayer is the best cure for malaria while others, predominantly Muslims from Awori tribe, believed that local remedies

were the best cure (Okwa &Ibidapo, 2010). This indicates how belief is a factor of access and utilisation of malaria prevention information. Such beliefs which contradict scientific explanation for the cause and treatment of malaria may lead to inaction, delay in seeking appropriate treatment or ineffective action, and may even inhibit community participation in intervention programmes (Heggenhougen, 2003: 38). Thus, it is evident that people in different societies hold a variety of beliefs about the cause and transmission of malaria that vary according to cultural, educational, and economic factors, and which have direct consequences for both preventive and treatment-seeking behaviour as well as for activities to control malaria (Aunger & Curtis, 2007, p38). This is why there is need to understand people's perceptions of malaria, and the social, political, cultural factors in which the disease occur as a critical element in mounting successful interventions (communication) programmes (Jones and Williams, 2004).

Statement of the Problem

Available literature point to the reality that people in different societies still hold a variety of beliefs about the cause and transmission of malaria which have negative impacts on activities to control the disease (Aunger & Curtis, 2007). Therefore, perception about various aspects of malaria has been the focus of scholarly investigations (Okwa and Ibidapo, 2010, Omole, Ogboi, Agu, Jarikre, Audu and Nmadu, 2018, Andrada, Herrera, Inyang, Mohammed, Uhomoibhi and Yé, 2019, Muhammad, Oyewole and Dipeolu, 2021, Duodu, Dzomeku, Emerole, Agbadi, Arthur-Holmes and Nutor, 2022), Abiodun and Ilori, 2022). To tackle the challenge the Nigerian government adopted the Global Strategic Plan on Roll Back Malaria (2005–2015) and domesticated its recommendations into her National Malaria Strategic Plan (2014–2020). The Strategic Plan included the creation of awareness, demand and appropriate use of malaria prevention products and the development of country-level advocacy and communication. It is therefore apt to examine the current state of perception about malaria, especially among rural people who have been exposed to the communication materials, vis a vis the goals of the Strategic Framework. In doing this, this study sought to know how the Strategic Framework for Malaria Communication address wrong perception about malaria among the rural population, investigated prevailing perception of rural dwellers in Oyo and Osun states about malaria and examined how the prevailing perception affect their attitude to the available prevention information. None of the available studies on malaria perception examined the preventive information against which they investigated the perception and attitude of their respondents. This study is therefore able to fill that gap in the scholarly investigations about malaria and perception of selected populations. A positive perception about malaria will enhance the acceptance and utilisation of preventive measures and the achievement of the SDG Goal 3 of ensuring healthy lives and promoting well-being for all at all ages, among others.

Literature Review

Many scholars have investigated various aspects of perception abut malaria among diverse populations in Nigeria with varied findings. Okwa and Ibidapo (2010) studied the perception of cause and treatment of malaria among 600 undergraduate students of Lagos State University. In that study, only 53.3% of the respondents understood the cause of malaria while 25% attributed the disease to exposure to sunlight. Only 35.5% understood the use of insecticide treated nets as prevention against malaria, 30% of the students believed local remedies are the best treatment for malaria while 7.33% believed in prayers.

Omole, Ogboi, Agu, Jarikre, Audu and Nmadu (2018) assessed perceptions of malaria and the utilisation of long-lasting insecticide treated nets in a rural Niger Delta community in Nigeria. The study indicated a good perception of the cause of malaria among respondents (86.9%), mode of transmission (92.8%) and preventive measures of malaria but noted that even though the awareness of ITNs was high at 75.6% among respondents, the utilisation rate of ITNs was however poor at 29%. Andrada, Herrera, Inyang, Mohammed, Uhomoibhi and Yé (2019) conducted a subnational profiling analysis of regional differences as the main predictor of ITN ownership and use in Nigeria, using the Chi square automatic interaction detector (CHAID) model. The study identified households in the South West, North Central and South-Central regions with low ITN ownership, and the general population in the South South, South East and North Central regions with low ITN use.

Muhammad, Oyewole and Dipeolu (2021) studied knowledge and perception of malaria among Hausa Married Men in Mokola Community of Ibadan, Oyo State, Nigeria and found very poor perception about the disease among the study population. According to the authors, 84.1% of respondents still believed that prolonged standing in the sun can cause malaria, 85.4% of the perception that tiredness could cause the disease and 66.9% of respondents of the perception that rainfall could cause malaria. As such, only 9.9% had the correct perception that malaria is caused by bites from an infected anopheles' mosquito.

Duodu, Dzomeku, Emerole, Agbadi, Arthur-Holmes and Nutor (2022) reviewed the 2018 Nigeria Demographic and Health Survey with their attention on Rural–urban dimensions of the perception of malaria severity and practice of malaria preventive measures. The study tested to know whether women who agreed that malaria could potentially lead to death would be more likely to adopt malaria preventive measures, including treated bed net use and found that while this hypothesis was right in the urban, rural and combined samples, in the multivariable model, the association between perceived malaria severity and use of a treated bed net was only significant for rural women. The authors noted unexpected results indicating that rural Nigerian women who perceive malaria to be severe have a lower likelihood of using treated bed nets. Abiodun and Ilori (2022) investigated caregivers' perception and determinants of delayed presentation of children with severe malaria in an emergency room in Benin City, Nigeria. According to the authors, there was a negative correlation between caregivers' perception of treatment ($r = -0.113$, $P = 0.21$) of convulsion in severe malaria and timing of presentation.

Outside Nigeria, Portugaliza, Galatas, Nhantumbo, Djive et al (2019) did a qualitative study that examined community perceptions of malaria to inform elimination efforts in Southern Mozambique. The results indicated that respondents understood malaria in two concepts; one involved 'signs of unusual behaviour or confused thinking' while the other was termed "bile" involving the vomiting of greenish fluid accompanied by other malaria symptoms, such as weakness and shivering. Participants in the study had a fragmented perception of malaria etiology but still related mainly to mosquito-mediated transmission. In Ghana, Aberese-Ako, Magnussen, Ampofo, and Tagbor (2019) identified how restocking of LLINs was organized in health facilities, content of health information on LLINs given to ANC, as socio-cultural, environmental, economic and individual factors as some of the 'multiple level factors' that influenced use of LLIN among their respondents. In Brazil, Murta, Marques, Santos et al (2021) investigated the perception of Brazilian gold miners about malaria. The study found that gold miners were subjected to prejudice from the community due to forest diseases that they can transmit, among them malaria. Most of the miners themselves did not know how malaria transmission occurs, and associated its occurrence with contaminated water and food and they believed in the use of medicinal plants for treatment of malaria.

The Health Belief Model

This study is anchored on the Health Belief Model (HBM), developed by Hochbaum, Rosenstock and Kegels along with others in the U.S. Public Health Services in the 1950s. The HBM is based on the understanding that a person will take a health-related action if such a person:

feels that a negative health condition can be avoided,

has a positive expectation that by taking a recommended action, he/she will avoid a negative health condition, and

believes that he/she can successfully take a recommended health action.

Six constructs;

Perceived Threat, Perceived Benefits, Perceived Barriers, Cues to Action, Motivating Factors and Self-Efficacy constitute the main pillars of the theory. The Model assumes that an individual's action towards a preventive health measure will be based on his/her beliefs and attitudes while acknowledging that beliefs and attitudes are not spontaneous but the function of a progressive experience by the individual decision maker. It is for this reason that the model seeks to explain the demographic and socio-psychological variables which could influence the perception of an individual about his/her vulnerability to a health condition, the perceived severity of the health condition as well as the perceived benefits and barriers to the action.

Successful malaria prevention information should thus clearly spell out either the various threats inherent in an attack of malaria such as loss of life, income, etc or the possible benefits of malaria -free living. It should also indicate the possible actions an individual can take to avoid the threats or enjoy the prospective benefits. This can be achieved if the information was designed with an understanding of the various barriers to accessing the information and understanding same. One of the criticisms of the HBM according to Family Health International (2002) is that it "does not incorporate the influence of social norms and peer influences on people's decisions regarding their health behaviors".

Materials and Methods

Available Communication Materials on Malaria in South West Nigeria

This study accessed six radio jingles on malaria prevention, one RBM Malaria IPC Guide, one Interpersonal Communication Flip Chart for Malaria Control in the Community and three generic posters; "Net Safe", "Take Good Care of Your Long-Lasting Nets", and "Disease Prevention". Five of the radio jingles were produced by MAPS/Oyo State Government/RBM, while the sixth was produced by Osun State/RBM. In terms of their themes, the six jingles focused on the use of LLN and general malaria prevention. Four of the jingles were in Yoruba while the remaining two were in Pidgin English.

RBM Malaria IPC Guide

The RBM Malaria IPC Guide was produced by Roll Back Malaria, Federal Government of Nigeria and Society for Family Health. It is a 26-page document printed in fully digital colours. There is a "message page", where the written message is displayed and an additional "illustration page" with a pictorial representation of the message. Each message page has the headline of the message in bold, black letters while additional points are written in smaller letters. The illustrations are hand drawn pictures. Page 1 is on "What is Malaria", page 2 "Myths and Misconceptions" page 3 "Special groups at risk", page 4 "Symptoms of malaria", page 5 "Effects of Malaria", page6 "Malaria in Pregnancy", page 7 "IPT" page 8 "Integrated Vector Management", page 9 "Long Lasting Insecticide Treated Nets", page 10 "Effective malaria treatment", page 11 "Is it malaria?", page 12 "Malaria prevention" page 13 "ACTs most effective compared to older medicines like SP and CQ". There is an additional page on "Management of severe malaria" but while the message page has no page number, the illustration page has the page number "1" as different from the original Page "1" that focuses on "What is Malaria".

Interpersonal Communication Flip Chart for Malaria Control in the Community

Interpersonal Communication Flip Chart for Malaria Control in the Community was another communication materials accessed for the study. It was produced by Centre for Disease Control (CDC), United States Agency for International Development (USAID), President's Malaria Initiative, Federal Government of Nigeria and fhi360 (THE SCIENCE OF IMPROVING LIVES) and was used by MAPS in Oyo state. It is a 24-page document printed in fully digital colours. There is a "message page", where the written message is displayed and an additional "illustration page" with a pictorial representation of the message. The illustrations are hand drawn pictures. Each page is called CARD. Each CARD has the words IPC Conductor's Guide written boldly on top in bright blue colour. Each CARD contains a written message and a smaller version of the drawing used on the opposite page for illustration. The CARDs have no specific message headlines unlike the RBM IPC Guide.

Generic posters

a. Net Safe was produced by the United States Agency for International Development (USAID) and NetMark and distributed by Womankind FEI, Malaria Parasites: Africa Fights Back and DELIBIMB MALARIA FOUNDATION. It is printed in fully digital colours. The Poster contains the message: "Insecticide Treated Net protects against Malaria, use it always. Be...Net Safe. While "Insecticide Treated Net protects against Malaria, use it always. Be" is composed in black lower-case letters, the slogan "Net Safe" is in light green. The logo of USAID is on the top left-hand corner of the poster while the green coloured NetMark logo is on the right-hand side. The NetMark logo as well as that of DELIBIMB MALARIA FOUNDATION contains a drawing of a mosquito with a green bold mark stretched across the mosquito. The Poster contains a picture /illustration of a mother sleeping inside a LLIN with her baby. The two appear to be fast asleep. Below the illustration are the logos of the three distributors of the LLIN mentioned earlier. A copy of the poster is attached to this study as annexure.

b. Take Good Care of Your Long-Lasting Nets. This Poster was produced by RBM for the states. It is printed in fully digital colours. The title is "Take Good Care of Your Long-Lasting Nets" written in bold white letters reversed on black with the tag line, "They will protect you from Malaria" written in black below the picture used to illustrate the headline. The title is on the left-hand side. A picture of a mosquito over which a 'stop-sign' in red was drawn, is on the right-hand side of the poster. Beneath the headline and mosquito are the pictures of a woman holding a blue-coloured net on her right hand and a white coloured net on the right hand. The poster also contains a small picture of a woman and her baby. The picture of the second woman is however faint while her baby is in bright white underwear. The first woman holding the net is dressed in what looks like Igbo apparel. It is however not clear if they are sleeping under a mosquito net. Across the tag line is a miniature drawing of two people sleeping inside a net while the words "Take Cover from Mosquitoes that spread malaria Sleep inside the NET" are written in a circle around the miniature drawing. The miniature illustration is marked positive in green colour. The Roll Back Malaria logo is printed at the bottom of the poster while the logo of Osun state and the Nigerian coat of arms are on the right-hand side. There is also information on where readers can get more information on the subject matter of the poster. A copy of the poster is attached to this study as annexure.

c. Disease Prevention. This Poster was produced by the Ministry of Health, Osun state through Osun State Health Systems Development Project 11. The logo of Osun state is on the left-hand side while the Nigerian Coat of Arms is on the right. The poster is printed in fully digital colours. The Poster is an instructional material for health personnel providing information on malaria prevention to their audience. The headline is "Disease Prevention" written in bold red colours with the tag line "Child sleep under Insecticide Treated Net (ITN)" written in black colours. Under the headline is a hand drawing showing a figure sleeping inside what looks like a net. A smaller size of the same drawing is repeated at the lower right-hand corner of the poster and illustrated with the words "The picture shows a person asleep on a mattress around which ITN has been well tucked in." The poster contains four "Important Questions to Ask Caregivers" as follows: (1) What do you see in the picture? (Let the caregiver/group discuss) (2) What are the gains of sleeping under an insecticide treated net? (3) Do adults and children in the community sleep under ITN? (Probe the reasons why or why not) (4) Are there places one can buy and retreat ITNs in this community? (Discuss where to get ITNs and how to take care of them).

The Poster also contains a two –paragraph "Introduction" on malaria and how to prevent it as well as three "Notes for CORPs on the "Benefits of Using ITN" "For Maximum protection" and "Ensure you identify and

retreat your net every 6 months at the nearest treatment centre". Five "Benefits of Using ITN" are provided in bullet points. They are, "Reduces man-mosquito contact thereby helping people sleep well/stopping transmission", "Effective against other insects including bedbugs, cockroaches and lies", "Promotes growth and development of children", "ITN costs less than treating malaria" and "Use of ITN reduces sickness and death in children by reducing occurrence and severity of malaria". This last benefit is printed in bold black colour, under "For Maximum Protection", the poster contains the following points: "Have your mosquito nets re-dipped in insecticide every six months", "Buy mosquito nets from reputable dealers" and "Ensure that all children under five years in your household sleep under ITN". A copy of the poster has been attached to this study as annexure.

Sample Size

The survey was made up of 2,200 household members drawn from the 10 local government areas selected from Oyo and Osun states. The Focus Group Discussion (FGD) was made of 96 participants in 16 focus groups involving men, women and expectant mothers. Each discussion group comprised of six participants.

Sampling Procedure

The sample for the survey was drawn using the multi-stage sampling procedure. The first step was to purposively select two neighbouring states from the six in the South-west zone which have contrasting features in their Advocacy, Communication and Social Mobilisation (ACSM) activities. Pre-field investigation indicated that while Oyo state had a functional ACSM team, Osun state did not. The two states therefore met the criterion for selection.

The second stage was through balloting; ten local government areas were selected from a list of 'rural local government areas' supplied by the Malaria Programme office/MAPS (for Oyo state) and Malaria Programme Office /ACCOMIN/AFRICARE (for Osun state) based on the definition of rurality by the National Population Commission (NPC, 2004) The balloting was done by two young girls, aged 7 and 10 years to eliminate the possibilities of bias from an adult. There was no provision for replacement since all the local government areas on the list were prequalified as rural and were supposed to have been exposed to malaria prevention messages through the various RBM Partner organisations working there, particularly Malaria Programme office/MAPS (for Oyo state) and Malaria Programme Office /ACCOMIN/AFRICARE (for Osun state). The result produced the following local government areas: Obokun, Ejigbo, Irepodun, Boluwaduro and Orolu for Osun State and Afijio, Egbeda, Surulere, Orire and Atiba for Oyo state.

In the third stage, two communities hosting Primary Health Centres (PHC) were purposively selected from each local government. They were chosen from a list of available PHCs in each of the selected local government areas on the basis of their being hosts to PHCs which was considered as a strong factor that would have exposed residents in the host communities more to malaria prevention information. The following communities were therefore selected in Osun state: Okeafola and Eyingbo (Irepodun LGA), Ilie and Owode (Orolu LGA), Masifa Ile and Ogbaagba (Ejigbo LGA), Ibokun and Imesi-Ile (Obokun LGA) while from Oyo state, the following communities were selected: Ilora and Awe (Afijio LGA), Igbonla and Ijawaya (Atiba LGA), Olodo and Kute (Egbeda LGA), Olorunda and Alapete (Orire LGA), Gambari and Igbon (Surulere LGA). From each community, the researcher employed the convenient sampling method to select available respondents for the survey questionnaire. The respondents were however in households and not within the PHCs.

For the Focus Group Discussion, the local government areas where the discussion took place were purposively selected on the recommendations of Malaria Programme Office/MAPS (for Oyo state) and Malaria Programme Office /ACCOMIN/AFRICARE (for Osun state) based on the perceived effectiveness of their malaria prevention activities. The result produced the following local government areas: Ogbomosho South, Oyo East, Afijio, Surulere in Oyo state and Irepodun, Orolu, Egbedore and Ejigbo in Osun state. From each local government, two PHCs were also selected purposively with the assistance of the Malaria Programme Officer (MPO) in each local government area based on the MPO's evaluation of the active malaria prevention activities of each PHC. The result produced the following PHCs: Ilogbo and Arowomole (Ogbomosho South), Jabata and Araromi (Oyo East), Fiditi and Akinmorin (Afijio), Iresaadu and Abaya Oje (Surulere) in Oyo state, Anwo and Afolu (Irepodun), Bolorunduro and Odo Oje (Orolu), Popo and Ola (Ejigbo) as well as Ido Osun and Olorunsogo (Egbedore) in Osun state.

Next, the MPO assisted the researcher in selecting six participants from the community hosting the PHC, made up of men, women and expectant mothers, who were duly informed one week ahead of their participation in the respective FGD session. They were men and women well known in the community for their involvement in community activities. Hence the focus group participants were selected through purposive sampling technique. Each PHC hosted one focus group.

Ethical Approval

The study received approval from the Ethical Boards of the Ministries of Health in Oyo and Osun states.

Data collection

The questionnaire was in English and Yoruba Languages to take care of respondents who might not be able to read or write in English. Seven trained Research Assistants administered the questionnaire. Respondents were allowed to fill the questionnaire in the language of their proficiency while those who could not read or write in English or Yoruba were allowed to provide their answers to the trained Research Assistants who thereafter filled such answers on the questionnaire form. A total of 2,200 copies of the questionnaire were distributed to respondents but only 2,120 were retrieved, indicating a 96.3% return rate.

Data for the Focus Group Discussion were collected using a digital tape recorder by the Researcher. The use of a digital tape meant the tape could run on its own while the researcher observed and took notes of the participation. The Focus Group Discussions took place at the Primary Health Centres in the selected communities. The discussions were conducted in Yoruba language and later transcribed and translated into English language for analysis. Participants in the FGD and respondents to the survey questions were not made to disclose their names as part of measures at enhancing confidentiality and freedom in responding to questions.

Data Analysis

Data from the survey was analysed using descriptive statistics; simple percentages, Friedman non-parametric test and Pearson correlation. Voice notes from FGD participants were first translated into English language and thereafter analysed qualitatively by a team of panelists using the explanation building and thematic approaches to bring out their salient points relative to the objectives of the study. Each of the FGD participant was identified by a numerical number along with the name of their respective community, for ease of reference during analysis.

Discussion

Demographic background of Respondents

The study surveyed a total of 2120 respondents made up of 826 males and 1294 females whose age ranged from 20-30 (38.4%), 31-40 (32.1%), 41-50 (16.6%), 51-60 (7.9%) and 60 years plus (5.0%). Those married among them constituted 54.2% while 11.0% reported as single parents, 9.9% as divorced/separated and 24.9% as not married. There were 1094 (51.6%) who reported as Christians, 783 (36.9%) as Muslims, 214 (10.1%) as Traditionalists and 29 (1.4%) as belonging to uncategorized faith. Among the respondents, 165 (7.8%) had no education, 234 (11.0) had primary school education, 480 (22.6%) had secondary school education, 698 (33.0%) had NCE/OND, 449 (21.2%) had HND/BSC. In terms of

occupation, 30.8% reported as civil servants which would include teachers in public primary and secondary schools in the rural areas and other agencies of government, 235 (11.1%) as artisans, 258 (12.2%) as farmers, 529 (25.0%) as traders and 441 (20.8%) as 'others'

Understanding of malaria prevention information among respondents and FGD participants

The study investigated the exposure of respondents to the available communication materials on malaria prevention as mentioned in the two states. We investigated if respondents could easily recall selected radio jingles and their messages, hence they were asked to recall some of the malaria prevention messages they had been exposed to over a period of twelve months prior to the study. Respondents could not identify the specific jingles but could recollect the thematic focus of available jingles in their state. This was accepted for the study particularly where the thematic focus aligned with two key Roll Back Malaria messages, that is, use of ITNs/LLINs and living in a clean environment. Using this yardstick, the 'jingles' with the highest frequency of recall by respondents were the ones that taught the audience about the use of ITNs/LLINs. Five of the radio jingles collected from MAPS (Oyo state) and Osun State Malaria Programme Office analysed in this study focused on the use of LLIN as discussed in preceding paragraphs. Also, the jingle from Osun state focused on living in a clean environment, the use of LLIN as preventive measures against the deadly malaria and visit to the clinic for those already down with the disease.

The result from indicated that respondents had a low recall of the messages. Overall, only 678 (32%) of the respondents could recall any jingle at all, while 1,442 (68%) could recall any of the jingles. Among the 678 who could recall any of the jingles, only 391 (18.4%) could recall jingles that had to do with the use of mosquito nets, 71 (3.3%) recalled jingles focused on spraying the house/environment and only 216 (10%) recalled jingles that had to do with clearing the environment to prevent malaria. (Fig 1 represents the response rates from each of the 10 local governments used for the study) In similar vein, it was observed that most FGD participants in Osun state could not recall the jingle produced by the state's Ministry of Health and Malaria Programme Office. Although the jingle was played to participants in each FGD session to aid their recollection, but majority indicated they had not heard it until that session. However, for FGD participants in Oyo state, three of the jingles, 'Apo Apefon', 'Baba Kemi' and 'Make Una Listen', were played for their recollection and it was observed that in majority of the session's participants indicated they had heard 'Apo Apefon' and 'Baba Kemi'. In fact, in most sessions, participants could be seen nodding their heads in approval or singing along with the song in 'Apo Apefon'. From observations during the sessions, 'Baba Kemi' had the highest rate of recall among the FGD participants.

What was observable during this study was that the jingles had faded from the memories of most respondents, hence their inability to recall them. This could be due to the fact that the jingles had stopped running on the various radio stations in their localities for a long time due to financial constraints faced by the sponsors. The fact that the jingles had faded could be established from the observation that FGD participants, who had the opportunity to hear the jingles again, had the highest rate of recall than survey respondents who did not have the opportunity of hearing them during the data collection period. Thus, although radio was a major source of information to most respondents the jingles on malaria prevention that were supposed to spur them into taking preventive measures against malaria were no longer running on radio stations and therefore, they could not recall most of them during the study.

The exposure of FGD participants to RBM IPC GUIDE, MAPS Inter-Personal Communication Flip Chart for Malaria Control in the Community as well as the three generic posters was also investigated in this study. MAPS Inter-Personal Communication Flip Chart for Malaria Control in the Community was used for respondents in Oyo state while RBM IPC GUIDE was used for respondents in Osun state. Forty-four (92.0%) of the FGD participants in Osun state reported not to have seen the RBM IPC GUIDE when it was shown to them. Similarly, 40 (83.0%) of FGD participants in Oyo state reported not to have seen the MAPS Inter-Personal Communication Flip Chart for Malaria Control in the Community when it was shown to them during the sessions. For the generic posters, 82 (85.4%) of the 96 FGD participants in the two states, reported not to have seen the poster titled "NetSafe", 56 (58.3%) reported not to have seen the one titled "Take Good Care of Your Long-Lasting Net" and 69 (72.0%) claimed not to have seen the poster titled "Disease Prevention".

One probable cause for the low level of exposure to the documents was that the Community Volunteers engaged to use them were not doing as expected. This challenge arose probably because the documents were designed in the English Language, the volunteers did not make them directly available to the rural audience; they merely read the documents written in English and then disseminated the information in the documents among rural dwellers in the local language. Therefore, it is inferred that the exposure to the contents of available malaria prevention information by RBM and Other Partners for the rural dwellers in Oyo and Osun states was low.

This study went further to establish the level of understanding of respondents about the symptoms of malaria. "Understanding" is used here interchangeably with "knowledge". An accurate understanding or knowledge of signs and symptoms of malaria would enable respondents to take the right steps towards proper treatment of the disease. Part of the contents of the malaria prevention information provided by RBM and Other Partners in the zone focused on understanding the signs and symptoms of malaria. For instance, page 1 of RBM IPC GUIDE was on "What is Malaria", page 2 "Myths and Misconceptions" and page 4 on "Symptoms of malaria", while page 10 focused on "Effective malaria treatment" and page 11 sought to answer the question, "Is it malaria?" Similarly, MAPS Inter-Personal Communication Flip Chart for Malaria Control in the Community also devoted some sections to the discussions of the signs and symptoms of malaria. Respondents as well as FGD participants in this study were therefore asked to mention five symptoms of malaria known to them.

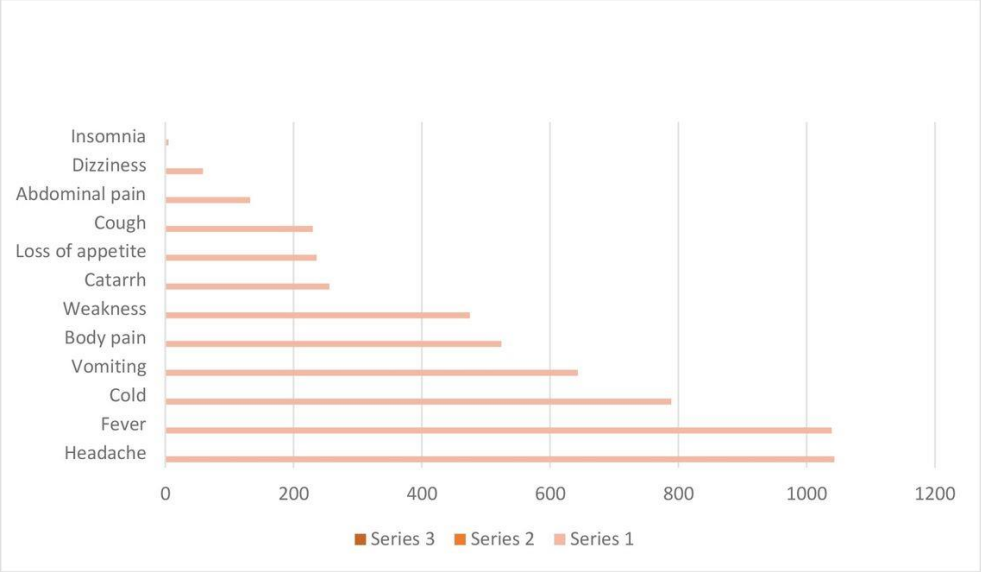

Figure 2: Symptoms of malaria mentioned by respondents.

Fig 2 reveals that respondents identified 12 symptoms of malaria. From the result, headache was the most common symptom identified by respondents, followed by fever, cold, vomiting, and body pain. During the FGD sessions participants also identified most of the symptoms of malaria. 'Fever' headache' and body pain' were the most frequently mentioned by FGD participants. These and the other symptoms mentioned in the survey, with the exception of insomnia, were also highlighted in MAPS Inter-Personal Communication Flip Chart for Malaria in the Community and RBM IPC GUIDE. Thus it can be deduced that survey respondents and FGD participants in this study had a good understanding of the signs and symptoms of malaria, (part of the contents of malaria prevention information provided by RBM and Partners) , despite the fact that the process employed by MAPS and ACCOMIN in communicating their malaria prevention information had made it difficult for the rural dwellers in the two states to actually see and read the malaria prevention information provided in the respective Inter-Personal Communication Flip Charts for Malaria prevention used by the organisations. The result of this study further indicates that although respondents had a good understanding of the symptoms of malaria, a significant percentage still had a wrong perception about its cause.

If respondents had a wrong perception about the cause of malaria, they were most likely to have a wrong perception about its treatment. RBM IPC GUIDE devoted page 10 to the topic 'Effective Malaria Treatment', page 11 to, 'Is It Malaria?' with a focus on the use of ACTs after confirmation of the disease from laboratory test. Page 13 was also on the topic 'ACTs most effective compared to older medicines like SP and CQ' while an extra page was devoted to the discussion of 'Management of severe malaria'. On its part, MAPS Inter-Personal Communication Flip Chart for Malaria Control in the Community focused its CARD11 on 'Malaria Diagnosis' and CARD 12 on 'Effective Treatment of Malaria'. CARD 12 recommended that respondents should 'always treat malaria with ACT within 24 hours of fever' and to 'give ACT based on age'.

Page 10 of RBM IPC GUIDE recommended immediate steps for taking care of a child whose body is hot. The steps are, 'remove the baby's clothes, fan him/her, tepid sponge and give Paracetamol'. Page 13 stated that buying ACT malaria medicine was one of the things a caregiver was expected to do on recognition of fever in children under- five years. Caregivers are asked to 'buy ACT malaria medicine from a nearby chemist/drug store', 'only purchase ACTs that are Artemether+Lumefantrine (AL) or Artesunate Amodiaquine (AA) combinations', crush first dose and sweeten with banana, honey or sugar...', 'ensure the 3days dosage of ACT is completed' and 'Administer paracetamol for fever reduction.'

To measure their level of understanding of the prevention and treatment of malaria as provided by RBM and Partners, respondents in this study were asked to indicate their level of agreement or disagreement with 10 statements while FGD participants were asked if they knew about ACT Therapy, if they understood what it meant and for those who said they understood, if they had been using it to treat malaria. The FGD participants were also asked if they understood the process of malaria treatment for pregnant women. From the results in Fig 3, the statement 'anyone who has malaria should go and see a medical doctor immediately' had the highest frequency of response (80.8%) among respondents, followed by 'living in a clean environment is a major way of preventing malaria' (75.1%), 'using Insecticide Treated Nets (ITNs) is a major way of preventing malaria' (71.7%) and 'the recommended drug for treating malaria is a combination of drugs called ACTs' (62.2%). The option with the least frequency was 'Traditional healers/native doctors know the best cure for malaria' with 27.4%.

A Friedman test was conducted to evaluate the equality of mean scores of different ways to prevent and treat malaria as indicated by the respondents. The results of the test indicated that there were significant differences in the knowledge of respondents about the different ways of preventing malaria (Chi square=3730.708, df=9 p=0.000). The understanding that 'anyone who has malaria should go and see a medical doctor immediately' and that 'living in a clean environment is a major way of preventing malaria' both ranked 7.16, followed by the understanding that 'using Insecticide Treated Nets (ITNs) is a major way of preventing malaria' (6.70), and that 'the recommended drug for treating malaria is a combination of drugs called ACTs' (6.22). The understanding with the lowest rank from the test was that, 'local herbs for malaria can easily clear the disease from the blood' (4.62).

The result on the level of understanding of malaria prevention and treatment earlier discussed indicated that 62.7% of the respondents understood that ACTs is the combination of drug recommended for the treatment of malaria. However, one major observation from the FGD sessions on the level of understanding of malaria prevention was that in most cases, participants were not familiar with the term ACT and thus would deny ever knowing or having heard about the 'drug' but soon after explanation of the term by the facilitator, most of them would chorus they had been using it. Thus, it could be deduced that respondents and FGD participants all of whom were rural dwellers in Oyo and Osun states, Nigeria, knew about the use of ACTs as the recommended medicine for

treating malaria but that their literacy level did not make them to understand the term ACT at first mention.

However, 39.6% of survey respondents still believed that local herbs could easily clear malaria from the human blood. This wrong perception about the treatment of malaria was also prominent among FGD participants in the study. This is the point at which culture and religion conflict with biomedical explanations for the cause and treatment of malaria; and in the development of malaria prevention information. While some participants agreed that visiting the clinic is a good step, several others expressed belief in the use of traditional means, particularly local herbs to treat malaria. For instance, a nursing mother at Akinmorin (AKIN4) said with all boldness during the session:

once you notice you are feeling like having malaria, just as our forefathers have taught us, you enter into the bush, gather some herbs boil and drink and you will sweat it out.

Another participant at Abaya Oje (ABA3) said:

there are two ways to treat malaria in my own understanding because those of us in the village, the old men will ask us to first try herbs and when we have done that for some days without result that is when we come here (clinic) and they will treat us.

These findings indicate that while respondents knew about the use of ITN to prevent malaria and the use of ACT for the treatment of the disease, a significant number still believed however that local herbs could be effective in treating the disease. This type of misconception could hinder the adoption of safe treatment behaviour among such respondents.

Perception about malaria among Respondents and FGD participants

Respondents were asked to indicate their level of agreement or disagreement with 12 statements that covered perceived causes and treatments of malaria. Findings presented in Fig 4 indicated that a majority of the respondents (83.8%) agreed that malaria is caused by bites from mosquitoes while 73.2% also agreed there is a close association between mosquito and malaria. However, there was an almost polarity of opinion on one of the variables; the role of the sun as a cause of malaria, among the respondents. While 41.6% agreed that exposure to sun is a cause of malaria, only 43.4 % disagreed with the statement, representing less than two percentage point difference. Also of interest was the number of respondents that agreed that malaria can be easily treated with local herbs (44.6%) and those who agreed that it could be cured with prayers (42.7%). This means that although a greater number of respondents believed that malaria is caused by mosquito bites and that there is therefore a close association between malaria and mosquito, almost half of the same population nevertheless believed that non-orthodox means are effective in treating the disease.

Friedman nonparametric test of the responses to the 12 statements on respondents' perception about the causes and possible treatment of malaria indicated significant differences in the perception of survey respondents (Chi-Square =5402, p-value =.000). The results showed that perception that malaria is caused by mosquito bites had the highest mean rank (10.64) among subjects, followed by the perception that there is close association between mosquitoes and malaria (9.70), and that prayers can cure malaria (7.80), that malaria can be easily treated with herbs (7.58) and that malaria is caused by too much exposure to sun (7.53). The perception that malaria is caused by not eating enough palm oil in the soup had the lowest rank (mean rank =4.74) among the causative variables tested in the study.

Responses from the FGD also indicated that while many rural dwellers understood the close link between mosquito bites and malaria, the majority nevertheless still attributed the disease to other non-orthodox factors particularly "staying under the sun for long", just like the 41.6% of the survey respondents. Other 'causes' identified by the FGD participants were, "insufficient palm oil intake", "attack by witches", "dirty environment", "exposure to evil air", "working too long in the farm" and "bed bugs". For instance, according to an FGD participant (Akinmorin 1) in Afijio Local government area of Oyo state, someone can have malaria by inhaling a lot of dust during the dry season or while travelling on rural roads that are mostly untarred. Akinmorin 1, a commercial motorcyclist said,

if you look at the present season, we have a lot of dust and it causes malaria. When women are sweeping and dust enters their noses or when you travel on an untarred road and you inhale dust, it causes malaria.

Such line of thinking was supported by other participants such as a female trader (Iresaadu 5) from Surulere local government area of Oyo state and two farmers, (IdoOsun3), from Egbedore local government area of Osun state and (Araromi1) from Oyo East local government area of Oyo state. Iresaadu 5 said:

one can also have malaria if you are cooking and children defecate and you don't clean them up well and flies perch on it and come and land on your food.

On his part, Ido Osun 3 said:

what I believe is that when someone stays for long under the sun, he may get home in the evening and complain about headache; that is what I know

In the same vein, (Araromi1) said:

if you have someone who works mostly under the sun and he does not take good care of himself, it can also cause malaria

Arowomole 4, a retired teacher also from Oyo East local government area of Oyo state, added another dimension to the misconception when he said:

although mosquito is the prime cause of malaria, I still believe that malaria is also present in the air; may God no allow us to collide with evil.

However, there were participants, such as Arowomole 1; also, a retired school teacher, who countered some of the misconceptions thus:

i don't believe that (exposure to sun causes malaria) because if it is true, then all the Okada riders should be having malaria because they work under the sun. I believe it is only when mosquito bites you that you have malaria.

These results therefore indicate that a significant percentage of rural dwellers in South-west Nigeria still have a wrong perception about the cause of malaria which would naturally affect the adoption of preventive measures. It can be concluded therefore, that a significant percentage of rural dwellers in Oyo and Osun states, Nigeria still had wrong perception about the cause of malaria, particularly by attributing the disease to exposure to sun. The results indicate a need for more effective communication that will address the misconceptions if the battle against malaria would be won in the mind of rural dwellers. This is because the wrong perception about the disease also influences the attitude to appropriate prevention and control measures and therefore the continued spread of the disease which is reflected in the percentage of respondents who believed that local herbs can easily treat malaria (44.6%) or that prayer can cure the disease (42.7%).

The misconception about the cause of malaria was included in the Inter-Personal Communication Flip Chart for Malaria Control in the Community used by Community Volunteers engaged by MAPS, and in RBM IPC GUIDE used by volunteers of ACCOMIN and AFRICARE in the conduct of Advocacy, Communication and Social Mobilization (ACSM) activities. Specifically, the RBM IPC GUIDE used by ACCOMIN and AFRICARE in Osun state has a page on "Myths and Misconceptions" and lists the following misconceptions that were meant to be corrected during the ACSM activities: that malaria is caused by witchcraft, working under the sun/rain, eating too much oil, drinking palm wine/alcohol and stress. The Inter-Personal Communication Flip Chart for Malaria Control in the Community used by MAPS in Oyo state also has a page dedicated to addressing misconceptions about malaria. The following misconceptions are highlighted in the document: working under the sun, excessive work, witchcraft, eating too much oil, bad

weather and bad air and sleeping in the afternoon (PMI&fhi360, nd: Card 2). It is significant to note that none of the radio jingles accessed for the current study dealt with any of the misconceptions above, thus creating the impression that the producers worked from the background of an assumption that the respondents had the right understanding about malaria and only needed to understand and accept the use of Long-Lasting Insecticidal nets (LLINs) for protection against mosquito. While they might have succeeded on this given the percentage of respondents who linked malaria with bites from mosquitoes (83.8%) and those who identified a positive link between mosquito and malaria (73.2%), the existence of a significant percentage that still linked the disease with exposure to sun and those who still considered non-orthodox method of treatment as valid should be of concern to developers of prevention messages.

Perception about malaria and the religion matrix

Given the influence of religion in shaping opinions and perception and the finding that many respondents still believed that prayer, a religious exercise, is a major way of preventing malaria, four possible but medically wrong perceptions; "witches can cast spell of malaria on people", "malaria can be caused by exposure to evil air", "prayer can cure malaria" and "malaria can be easily treated with herbs" were statistically tested against the religious background of respondents. This became all the more important given the preponderance of FGD participants who also indicated that they believed witches could still cast spell of malaria on people and that prayers is a major weapon for treating malaria. During the FGD sessions, the researcher asked participants to close their eyes and raise their hands (as if in a voting process) whenever the question about witches and prayers were asked. This was done to safeguard their identity and ensure freedom of expression. During the sessions, 45 (47.0%) participants indicated with a raise of hands that they believed witches could cast a spell of malaria on people. Also 74 (77.1%) of the participants indicated they believe that prayers can cure malaria.

The result of the t-test on the perception that "witches can cast spell of malaria on people" and religion of respondents indicated a significant difference among survey respondents based on their religious background (Chi-square=17.889, DF=8, p=0.022) with Christians (mean score=2.31), Muslims (mean score=2.37) and Others (mean score=2.53). The t-test comparing the means confirmed that the differences are significant at F (2, 2070) =3.264, DF=2, p=.038), thus indicating that there is a strong association between religion of respondents and the perception that links malaria and witchcraft. However, this association is stronger among those who subscribe to 'Other Religions' (mean score=2.53) than those who reported to be Christians (2.31) or Muslims (2.37). The category, 'Other Religions' could refer to atheists, traditional worshipers, or adherents of other religious movements.

The study also tested the association between the religious background of respondents and the wrong perception that, 'malaria can be caused by exposure to evil air'. The result indicated that there was no statistically significant difference among the religious beliefs and the wrong perception (Chi-square=6.557, DF=8, p=0.585). A test of possible association between the religious background of respondents and the perception of prayer as cure for malaria indicated that there was no significant difference among the religious beliefs (Chi-square=6.557, DF=8, p=0.585). The study also tested the statistical association between the religious background of respondents and the use of herbs as cure for malaria. The result indicated that there was no significant difference among the religious beliefs tested in the study (Chi-square=5.685, DF=8, p=0.685).

The major inference from these results is the existence of a wrong perception that promotes malaria as a disease that could be cast upon people by 'witches. This is the only variable with significant differences among the respondents. The continued existence of this perception, despite the availability of information on malaria that denies any link between the disease and witches is an indication of the strength of the belief among the Yoruba people of South-west Nigeria despite their education, civilisation and exposure to technology. This attitude has been of concern to scholars such as Prince (1961), Awolalu (1979), Ogungbemi (1992) and Jayeola-Omoyeni, Oyetade and Omoyeni (2015) among others. Prince (1961) noted that witchcraft has remained an active and vital universal image in the consciousness of the Yoruba people of South-west Nigeria irrespective of their social level, religion or education while Awolalu (1979) was of the view that there is no belief 'more profoundly ingrained' in the mental and social attitudes of the Yoruba than that of the existence of witches. Sickness, misfortunes and even death are often attributed to witches in Yoruba culture.

Unfortunately, both Christianity and Islam, the two prominent religions in the zone, have inadvertently promoted witchcraft by their respective acknowledgement of its existence and the offering of prayers as a potent weapon against the activities of witches. Today several churches attribute some sicknesses to the activities of 'demonic powers', among them witches, and offer various deliverance prayers as a way out for their 'victims'. This was perhaps why Ogungbemi (1992) argued that most of the charismatic churches are increasing in the south-west zone 'because their converts want an abode of refuge from the fear and power of witchcraft.' This position is similar to what Bohannan (1964) had earlier posited, that witchcraft has remained relevant in modern religion because 'it answers many of the same questions about misfortune that religious dogma sets out to answer.'

Currently, religious leaders appear to play insignificant roles in the communication of malaria prevention initiatives in the South-west zone. It appears that those who designed the available malaria information for rural dwellers of South-west Nigeria have not understood the religious views that shape the perception of the people about the disease or incorporated such adequately into the development of prevention information. Religion is part of the culture of a community and must be taken into consideration while preparing communication activities/messages that are meant to change their world view about a behavioural disease like malaria. There is therefore great need to involve religious leaders more in the fight against malaria but this must be first by educating them on their own inadvertent role in promoting the false belief that witches cast malaria on people.

The results of the various statistical tests have indicated that two major issues still need much greater attention in the fight against malaria. These are the wrong perceptions that the disease can be caused by exposure to sun as well as activities of witches. This need becomes more germane when it is noted that both the RBM Guide on Malaria Control and the Inter-Personal Communication Flip Chart for Malaria Control in the Community paid attention to addressing these issues in their respective publications. The result is an indication that firstly, there is need for more education to tackle the perceived relationship between exposure to sun and malaria and secondly, religious leaders have not been properly educated and empowered to educate their own followers, in turn, on the causative factors for malaria by which the wrong perception which arose from an over spiritualising of issues as highlighted earlier would be dealt with appropriately.

Conclusion

Perception is a key element in achieving successful malaria preventive measures. Therefore, in the design of malaria prevention information attention must be given to the perception of the people about malaria, particularly its causes and treatment with specific reference to the wrong perception that exposure to sun can cause the disease and that witches can cast it on their victims. This will help in accelerating the achievement of the SDG Goal 3 of ensuring healthy lives and promoting well-being for all at all ages, among others. This study has indicated the existent of some wrong perception about malaria despite the availability of preventive information to the rural communities in Oyo and Osun states of Nigeria.

Recommendations

Based on the outcome of this study, the following suggestions are made as recommendations for policy makers and practitioners:

Stakeholders in the fight against malaria should devote more resources to communication activities on the disease. State governments should direct their broadcast stations to air malaria prevention jingles regularly as a part of social service.

Producers of malaria prevention information should focus more on correcting the misconceptions about the disease that is common among the rural populace more aggressively and systematically.

Producers of malaria prevention information should be conscious about the attitude of rural audience to the language, models and illustrations used in the production of communication materials for use among rural people.

RBM and other Partners should endeavour to produce enough copies of their respective interpersonal communication flip charts on malaria prevention and more importantly, such materials should be translated into local languages to enhance better access among rural people.

Correlations					
		Perception about Malaria	Knowledge of people of South-west people on information on Malaria prevention	Attitude of people of South-west on information on malaria prevention	Extent to which people of South-west practice the information on malaria prevention
Perception	Pearson Correlation	1	.212**	.064**	-.022
	Sig.(2-tailed)		.000	.006	.350
	N	1888	1811	1853	1785
Knowledge	Pearson Correlation	.212**	1	.143**	-.002
	Sig, (2-tailed)	.000		.000	.917
	N	1811	2021	1987	1912
Utilisation (attitude)	Pearson Correlation	.064**	.143**	1	-.090**
	Sig, (2-tailed)	.006	.000		.000
	N	1853	1987	2073	1964
Utilisation/collection of ITN	Pearson Correlation	-.022	-.002	-.090**	1
	Sig, (2-tailed)	.350	.917	.000	
	N	1785	1912	1964	1991
**. Correlation is significant at the 0.01 level (2-tailed).					

Table 1: Correlation of Knowledge, Attitude and Practice of respondents on information about malaria prevention

Table 1 shows the relationship between all variables. There is positive and statistically significant relationship between the perception about malaria and knowledge of people of South-west people on information on Malaria prevention ($r=0.212$ $p<0.01$), A similar relationship is observed between the perception and attitude. The result also shows a statistically significant and positive relationship between knowledge and attitude ($r=0.143$ $p<0.01$). On the other hand, negative and significant relationship was observed between the attitude of people and the extent to which they practiced the information ($r=-0.090$ $p<0.01$). Low, negative and non-significant correlation coefficients were also observed between knowledge and extent of practice. These weak correlations imply that the variable is not strongly associated.

Table 2 Test of H0: There is no significant relationship between the perception of rural dwellers in Oyo and Osun states, Nigeria, about malaria and their utilisation of malaria prevention information.

Using ITN is best form of prevention								
Radio jingles as info source			SD	D	NAND	A	SA	Total
	Never	Count	2	11	20	47	33	113
		%within radio_1	1.8%	9.7%	17.7%	41.6%	29.2%	100.0%
	Rarely	Count	10	23	82	120	100	335

		%within radio_1	3.0%	6.9%	24.5%	35.8%	29.9%	100.0%
	Sometimes	Count	18	35	145	286	226	710
		%within radio_1	2.5%	4.9%	20.4%	40.3%	31.8%	100.0%
	Often	Count	8	12	38	114	126	298
		%within radio_1	2.7%	4.0%	12.8%	38.3%	42.3%	100.0%
	Always	Count	25	37	103	226	236	627
		%within radio_1	4.0%	5.9%	16.4%	36.0%	37.6%	100.0%
	Total	Count	63	118	388	793	721	2083
		%within radio_1	3.0%	5.7%	18.6%	38.1%	34.6%	100.0%

Pearson Chi-Square (p.value=37.947, DF=16, Asymp.Sig. (2-sided) =.002

Decision Rule: Reject H0 if p-value is less than α- value (.05), otherwise do not reject H0.

Conclusion: Since the p-value (0.02) is less than the standard α- value (.05), then we reject the null hypothesis that says the variables are independent of each other meaning that the perception of rural dwellers in Oyo and Osun states, Nigeria, is significantly associated with their utilization of malaria prevention information.

Declarations

Ethics approval and consent to participate

Ethical approval for the study was received from the Osun State Health Research Ethics Committee, Osogbo, Osun state (OSHREC/PRS/569T/42) and Oyo State Research Ethical Review Committee, Ibadan, (AD/13/479/871)

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The author declares no competing interest relative to this study.

Funding

The author received no funding for this research

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