

Perceived Threat of Malaria and the Use of Insecticide Treated Bed Nets in Nigeria

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Abstract

*Using multiple qualitative methods, this study investigated the perceived threat and perceived susceptibility of children under five years of age to malaria, and willingness of the caregivers to use the ITNs in the prevention of malaria in selected rural and urban areas of Nigeria. The health belief model (HBM) is the theoretical anchor of the study. Samples included mothers, fathers and grandparents whose child/ward had manifested malaria symptoms at one time or another and who had reported or failed to report such cases at the available health centres. Other respondents were community leaders, health workers and traditional pharmacists popularly known as *elewe-omo*. The study found that malaria was perceived as a serious health problem and a threat to the children by the majority of the respondents. However, high perceived threat of malaria did not guarantee widespread use of the ITNs owing to limited access and poor distribution networks. Some measures for equitable and sustainable distribution and use of the ITNs in local communities have been recommended.*

Keywords: malaria; children; insecticide treated nets; health belief model; caregivers; Nigeria.

Introduction

Sub-Sahara Africa (SSA) is a malaria endemic region. This however varies from one region or country to the other, owing to diverse socio-political and ecological variables. In Nigeria, more than 90% of the population is exposed to malaria infection, out of which over 40% suffers from at least one episode of malaria annually (Abdullahi et al. 2009: 7102). Malaria is said to be responsible for more than 50% of outpatient visits, 40% of hospital admission, and 10% of maternal mortality (Okafor and Amzat, 2007: 156). Children younger than five years of age are the most vulnerable to malaria

infection and it is reported that more than 250 000 children in this age group die from malaria-related complications every year in Nigeria (FMoH, 2009: 10) representing 30% of infant mortality (Okafor and Amzat, 2007: 156) and 25% of the global malaria deaths in children (Abdullahi et al. 2012; Abdullahi, 2011).

The Nigerian government has stepped up its efforts to tackle malaria, with a renewed interest in the past decade. As a result, an integrated approach has been adopted. For instance, Nigeria was a signatory to the Roll Back Malaria Summit (widely known as the Abuja Summit) to achieve universal coverage of insecticide treated bed nets (ITNs) for children younger than five years of age (Amzat, 2011). Consequently, as part of the efforts to encourage mothers to use the bed nets, government of Nigeria, at various levels of governance, has embarked on free distribution of ITNs to caregivers of children younger than five years of age using multiple outlets (Abdullahi, et al. 2012). However, research outputs have consistently shown that apart from limited access to ITN, most parents across the different Nigerian communities have negative attitudes towards the use of the treated nets (see Adedotun et al. 2010; Amzat, 2011; Olasehinde et al. 2010; Oyedeji 2009). The question is why? This question underlies the study.

The study was informed by the relatively high incidence of malaria in the Kwara State of Nigeria and the widespread reservation for the utilisation of treated bed nets. A Surveillance Report on Malaria Cases and Deaths obtained from the state's Ministry of Health indicates that of a total of 150 127 outpatients recorded in children and pregnant women in 2008, children accounted for more than 140 000; of the 7 920 in-patients, children accounted for more than 7 000; and of the 31 deaths recorded, 24 were children (Kwara State Ministry of Health, 2008). Also, the mere passive acceptance of treated bed nets supplied by the health system as well as non-governmental organisations (NGOs) may not guarantee a successful utilisation. Hence, there is the need to examine how people in local communities perceive and define the threat of malaria in children vis-à-vis the utilisation of treated bed nets. An understanding of the nexus between perceived threat and utilisation of treated bed nets is necessary to design appropriate health policy that captures community understanding of perceptions and prevention of malaria in children.

The study is theoretically framed within the health belief model. The need to borrow some insights from social psychological models, particularly the health belief model (HBM), to understand and predict health care seeking behaviour and health behaviour change has been suggested (Jegede, 1998). This follows increased emphasis on interdisciplinary approach to the understanding of health behaviour change. HBM has been adjudged to be a useful tool in predicting health behaviour change. It remains the most widely used theory in predicting and understanding health behaviour change in relation to HIV and AIDS (Family Health International [FHI], 1996) and food handling behaviours (Hanson and Benedict, 2002: 25). HBM assumes that health seeking behaviour or health behaviour change is influenced by certain cognitive variables as well as established mechanisms to minimize the occurrence of disease within the social system. HBM suggests that individuals faced with alternatives would choose the

action that would lead most likely to positive outcomes (Munro et al. 2007: 4). For a change to occur in health behaviour (in this case, for caregivers to use treated bed nets to prevent malaria in children), HBM holds that a person must hold the following beliefs:

- Perceived susceptibility to a particular health problem, in this case malaria – whether the children at risk of malaria.
- Perceived seriousness of the health condition – how severe is malaria in children? What are the social and health consequences of malaria?
- Belief in effectiveness of the new behaviour – whether treated bed nets are effective against malaria transmission.
- Cues to action – witnessing the death or illness of a relative due to malaria.
- Perceived benefits of preventive action – if using treated bed nets can prevent malaria infection in children?”).
- Barriers to taking action – impediments to using bed nets.

Therefore, the health belief model appears to be a landmark and powerful theoretical framework in social psychology capable of predicting and understanding health behaviour change, particularly where the individuals weigh the benefits against the perceived costs and barriers to change, to the extent that, the benefits outweigh costs. However, there is a dearth of malaria studies in Nigeria where HBM has been used to understand and predict the use or non-use of treated bed nets in the prevention of malaria in children. This study attempts to fill this gap.

Study Areas and Methodology

Study Areas

This study was conducted in two selected rural areas and one urban centre in Kwara State, Nigeria. The two rural areas were Okanle and Fajeromi in Ifelodun Local Government and the urban centre was Ilorin, specifically, in Ilorin-South Local Government of the State. There are two main climate seasons in the State: the dry and wet (raining) seasons with an intervening cold and dry harmattan (windy) period usually experienced between December and January. On the one hand, the city of Ilorin is usually characterised by stagnant waters during the raining season which are often important breeding grounds for mosquitoes. These are most common in areas without tarred roads. Similarly, in dry season, drainages are usually blocked thereby constituting environmental hazards and breeding grounds for mosquitoes as well. This is worsened by inhabitants' nonchalant attitude and poor waste management practices. In rural areas on the other hand, the surrounding is often bushy during raining periods also providing enabling environment for mosquito breeding even though it could also serve as sources of health to the local people. Figure 1 and figure 2 show the environmental characteristics of the inner area of Ilorin and Okanle during the raining season.

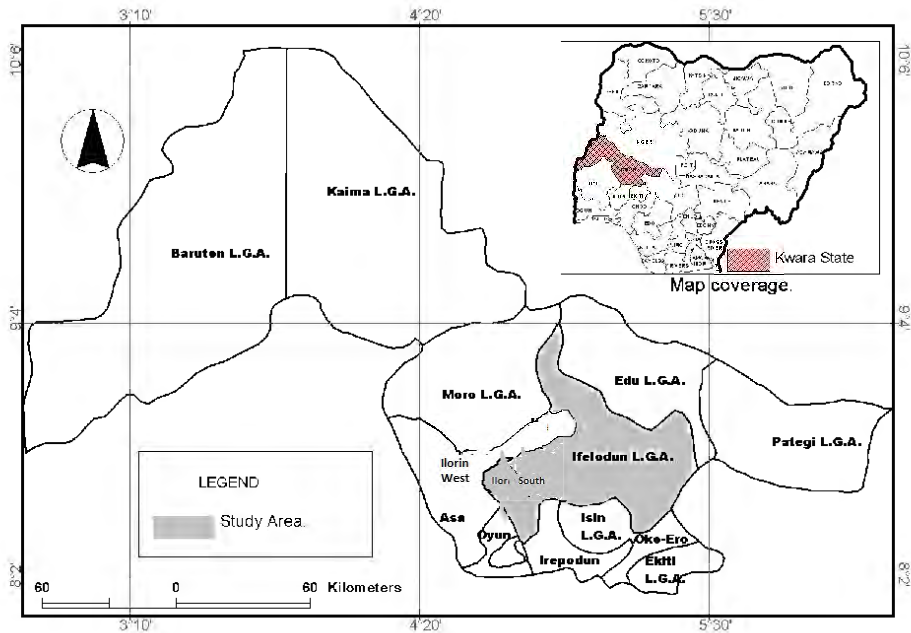
Figure 1: Environmental Characteristic of Inner Area of Ilorin during Raining Season



Figure 2: Environmental Characteristics of the Rural Areas during the Raining Season



Kwara State was created in May 1967. It is located between Latitudes 110 2' and 110 45'N and between Longitude 20 45' and 60 4'E. The State has a population of more than two million people based on the 2006 census (Federal Republic of Nigeria, 2009: 34). It occupies a land area of about 32 500 sq kilometres. The people of the State are divided along four major ethnic groupings with four corresponding languages: Yoruba, Nupe, Baruba and Fulani. The State is bounded in the north by Niger State, Osun and Ondo in the south, Kogi in the east and Oyo in the west and shares an international boundary with the Republic of Benin. Figure 3 presents the map of Kwara State showing the study areas.

Figure 3: Map of Kwara State Showing the Study Areas

Ilorin

Kwara State is divided into 16 local government councils with the headquarters in Ilorin. The topography of the city is generally undulating. The elevation of the land on the western side ranges from 273m to 330m (900ft-1000ft), while the eastern part varies from size 273m to 364m (900ft-1200ft). Ilorin is the political headquarters of the State. The core indigenes of the city are Muslims with a significant number of immigrant Christians. For political and administrative convenience, the city is further divided into three local governments one of which is Ilorin South where the majority of the participants in this study were drawn.

Ilorin South Local Government was created in 1996 with the headquarters located at Fufu; a drive of about 30km from the State Capital. In terms of people, history, culture and geography, Ilorin South is highly complex and heterogeneous. The Local Government occupies a land area of about 174 km² with a population of about 209 251 based on the 2006 census (Federal Republic of Nigeria [FRN], 2009: 34). The Local Government is made up of urban, semi-urban and rural settlements with three districts (Akanbi, Balogun Fulani and Okaka/Oke-Ogun) and at least ten wards.

Living in an urban or semi-urban area in this Local Government ideally places the inhabitants in an advantaged position of a 'high degree' of accessibility to formal health care services that include both private and public health facilities located within these areas as against those in the rural regions who are extremely disadvantaged. However, most of the public health facilities are in appalling conditions; most are ill-equipped, short staffed and lack basic health facilities that could enhance treatment of diseases including malaria. The Children Specialist Hospital, from where the urban respondents were drawn, is located in Centre Igboro in Ilorin South Local Government Area. The facility is one of the oldest meant for children in the State and the Local Government in particular.

At the time of the study, the Children Specialist Hospital had a staff contingent of about 65 nurses with only two permanent medical doctors [a consultant and a general practitioner] assisted by at least four medical doctors of the NYSC. The laboratory scientist is supported by a lab technician; two X-ray technicians with two supportive staff; a pharmacist with about four supporters and a nutritionist. Despite the fact that the hospital is one of the highest revenue-generating hospitals in the State, according to one of the staff interviewed, the hospital is faced with numerous challenges. At the time of the study, the hospital did not have oxygen cylinders or refrigerators. The weighing scale and suction pump were non-functional. There was erratic power supply and insufficient medical doctors. Recently, a non-governmental organisation (NGO) known as the Wellbeing Foundation came to the rescue of the hospital. The NGO helped to give the hospital its present new look when it undertook the renovation with the provision of a borehole for water supply, a children's ward, a doctor's consulting room, nurses' bay and bathrooms in the maternity unit, an ambulance and mosquito netting throughout the facility. Figure 4 presents the pictorial characteristic of the Children Specialist Hospital.

Figure 4: The Children Specialist Hospital



Okanle and Fajeromi

Okanle and Fajeromi are located in Ifelodun Local Government of Kwara State. The Okanle Village Area Council was established in 1956 with other seven villages that included Fajeromi (Okanle Descendant Union [ODU], 2009: 3). Okanle is less than 2km away from Fajeromi. The villages are about 30km from Ilorin along Offa/Ajase Ipo Road and exactly 6km from Idofian town. Although a number of people engage in buying and selling as well as craftsmanship farming remains the primary source of livelihood. Household income is usually generated from farm produce as well as buying and selling.

Like many other rural areas in Nigeria, the people of Okanle and Fajeromi have limited access to basic social amenities including health care facilities. The roads leading to both communities from both Arugbo and Idofian are not tarred and as a result difficult to traverse. The only community health centre that served the people was established in 1978 through the initiatives of both communities. The facility has however been taken-over the State Government. As at the time of the study, the community health centre had no designated medical doctor. The facility was run by a nurse. Thus, health matters, including malaria, were usually handled by the only designated nurse. Indeed, the hospital lacked basic health facilities with just two beds in a dilapidated building (see figure 5 and figure 6). Most of the rooms in the health centre have been abandoned because the roofs were collapsing. The people sometimes travel to Idofian or Ilorin to consult with medical professionals where health problems are beyond herbal medicines and the capacity of the village facility or where health providers are not available for consultation.

Figure 5: The Two Beds Available at the Health Centre



Figure 6: Abandoned Store at the Health Centre.



Data Collection, Sampling Technique and Population of Study

This study design employed was qualitative methodology. The study mainly used data from 40 semi-structured interviews, 20 in-depth interviews and four Focus Group Discussions (FGDs) conducted with caregivers (male and female). Purposive sampling technique was used to select the participants. Subjects were mainly mothers, fathers and grandparents of children under the age of five years whose child or ward had manifested malaria symptoms at one time or another and who could have reported or failed to report such cases at the available health centres. However, the majority of the respondents were women because they were in the best position to discuss the issues under investigation. Other respondents were health workers selected from the Okanle/Fajeromi Basic Health Centre and the Children Specialist Hospital in Centre Igboro in Ilorin as well as traditional pharmacists popularly known as *elewe-omo*. This category of respondents was selected from *Oja-tuntun* in Ilorin. None of them was available in the rural areas. In all, a total of 99 respondents participated in the study out of which 11 of them were health workers and traditional pharmacists. The study employed an 'etic-reflective' approach for the presentation of data collected. This approach of presentation serves two functions; it does not only report the substantive content of the research but also takes seriously issues of reactivity and reflexivity (Darlington and Scott, 2002: 160-161).

Results

Perceived Threat, Severity and Susceptibility to Malaria

Local discourses about malaria are found to be entrenched in indigenous illness representation in various communities - an indication that malaria has been an age-long disease. "Iba" is a popular Yoruba term used to describe malaria among the people studied and used as a general term to accommodate different phases or dimensions of malaria sometimes with some prefixes and suffixes. In the communities' understanding of "iba", a distinction is often drawn between "abo-iba" and "ako-iba" where "abo" refers to "female" and "ako" to "male". Literally, "abo-iba" refers to "female-malaria" which connotes non-severe or mild malaria. "Ako-iba", on the other hand, literally connotes "male-malaria" which can mean "strong", severe or complicated malaria. The "abo - ako" distinction originated from the belief that a male child is "stronger" than a female child. More so, the distinction between "ako"- and "abo-iba" depends on the perceived symptoms, manifestations and duration of malaria at any point in time. For instance, "iba-apanju" (symptoms of typhoid fever) was misrepresented by the majority of the respondents as an example of "ako-iba". This episode of illness, as perceived by the local people, is believed to turn the colour of the eyes-balls into yellow according to the respondents. The distinction between "ako-iba" and "abo-iba" in children was drawn based on the knowledge of malaria in the adult population. However, such distinction does not accurately correspond to the biological distinction of complicated and uncomplicated malaria. The correspondence between biological and local constructions was only observed in the understanding of symptoms of malaria in children. In most cases, "iba" in children is often recognised by vomiting, unnecessary quietness or weakness, chills, anorexia (a prolonged disorder of eating due to loss of appetite), yellow urine, weight loss and body temperature.

Within the context of the current study, perceived threat and severity of children to malaria was overwhelmingly acknowledged by the majority of the caregivers interviewed. A significant number of the caregivers interviewed were of the opinion that malaria is a serious health problem and a major threat to children. The threat posed by malaria to children was articulated by one of the participants in Fajeromi who recalled that her one year old boy had manifested malaria symptoms and treated more than four times since he was born less than a year ago. "This malaria thing is my greatest worry", she said. Another caregiver in Ilorin argued that her presence at the Specialist Hospital where she was interviewed marked the 3rd time she was consulting doctor at the hospital since she gave birth to her daughter a year ago. "I am tired. I don't know what to do again to prevent my children from having malaria", she said. The majority of the caregivers acknowledged the fact that severe complications might develop in children if proper treatment is delayed. However, the treatment

option often adopted by the majority of the caregivers was herbal medicines. The proceeding statements describe the perceived threat, severity and susceptibility of children to malaria infections by the caregivers interviewed.

I believe malaria in children should be taken very seriously because it is very dangerous. It can lead to harmful outcomes. In fact, it can kill. That is why I react quickly when I notice the symptoms in my children. I think what makes malaria a threat to little children is because they cannot tell exactly how they feel when they are sick. Many of them cannot talk convincingly... That is when parents become panic (a mother of one year old child in Fajeroni).

Based on my experience, I do believe that malaria is a very dangerous disease. It is terrible. It causes a lot of distress. It can drain the blood. It causes unnecessary calmness in children. It often affects my children. The elder one was brought back from school just yesterday due to malaria (a mother from Ilorin).

One of the most important variables in the HBM is 'cues to action'. Apart from exposure to information through the mass media, witnessing the death of a relative due to a particular health problem (e.g. malaria) could promote positive health behaviour change (in this case the use of treated bed nets). Thus, when questions were asked about 'cues to action' during the study, that is, whether or not respondents had witnessed deaths of children caused by malaria, a significant number of respondents answered in affirmative. A 28 year old young mother of two in Okanle cited an example of her sister's child who died as a result of what she and other relatives believed was caused by malaria. She mentioned that when the case was initially reported at the community health centre, there were no medical personnel to attend to the patient. The parents were therefore forced to report at the health centre in Idofian which was more than 5km away from the community. The boy, according to her, unexpectedly died the following morning. The woman narrated the incident in the following statement:

There were times when children had died from malaria-related symptoms in this village. This happened to my sister's child very recently. The child died after a brief illness everybody suspected to be malaria. He did not die at the local clinic because when they took him there, there was no doctor or nurse to attend to him. He was rushed to Idofian. He died the following morning. The boy was about two years old. He was living with his grandmother in the village. The biological mother lives in Lagos (a young mother of two children under five years in Okanle).

Perceived Benefits and Barriers to the Use of ITN

The familiar saying that “prevention is better and cheaper than cure” may have driven the invention, development and subsequent popularity attached to the bed nets to prevent malaria occurrences, especially in children. Unlike the untreated traditional bed nets, the ITN is made up of certain chemical combinations that can weaken or kill mosquitoes on contact and this has attracted considerable research interest over the last two decades. In fact, studies have consistently proven that ITN is one of the most effective preventive strategies in malaria control in children and the cheapest modern malaria control strategies (Frey et al. 2006: 3). The use of treated bed nets may however be influenced by some of the variables as proposed in the HBM. They are belief in effectiveness of the new behaviour (“treated bed nets are effective against malaria transmission”); perceived benefits of preventive action (“if I start using treated bed nets, I can avoid malaria infection in my children”); and barriers to taking action (“I don’t like using treated bed nets because it makes me sneeze and makes me feel hot”).

Therefore, the interviews conducted and the FGDs revealed that it is a common knowledge in the communities studied that new born babies are placed under the nets at birth to avoid mosquito bites. One of the grandmothers interviewed posited that “it is a tradition that when mothers give birth they should use net to cover the new born baby because of mosquitoes”. The nets she meant however were the untreated traditional bed nets which were readily available in the markets in the big cities. The use of the net was not necessarily to prevent children from catching malaria. Rather, the net is used to avoid mosquito disturbance and allow children have normal sleep. Unfortunately, untreated nets do not provide adequate and full protection against malaria (Osondu and Jerome, 2009).

Therefore, a significant number of the respondents interviewed in this study had no access to the treated bed nets. The majority were not also aware of their effectiveness and usefulness. A mother in Okanle submitted that “those nets distributed by the government (she meant to say the treated bed nets) are not always available in our hospital. So, we don’t normally see them”. A pioneer member of the community association and a community leader in Fajeromi recalled that “only nine pieces of the bed nets were allocated to the whole community from the headquarters months ago”. Thus, four different categories of users of bed nets were identified. In the first category were caregivers who had heard and used the ITNs for their children in the past. These people were just four in rural areas and three in the urban area. Five out of these got the ITN either through a friend who worked at the Local Government Council or from the market place and not necessarily through the government free distribution channels. However, these respondents had mixed feelings about how effective the bed net was. Some caregivers reported that using bed-nets had helped the family’s well-being in

general and that they and their children did not get ill as often when the bed-nets were being used. One of the fathers in Fajeromi said his wife had informed him prior to the study that mosquitoes had suddenly disappeared from her room. This was attributed to consistent compliance with the usage of the ITN. Yusuf et al (2010) had reported less fever in households with ITN. However, some of this category of respondents felt otherwise. Three of the people who had used the bed nets prior to the study believed it was not effective. They claimed that it is not advisable to use the bed nets when the weather is hot. It makes one to feel hot and sneeze at the same time. This agrees with study where compliance with ITN was reported more during the raining seasons than hot and dry season (Frey et al. 2006).

In the second category were caregivers who had heard of the bed nets but who had not used it for their children. The respondents in this category were the majority. Lack of access was largely due to poverty, scarcity and non-availability. However, some members in this category wished to use ITN but had no access to them. They alleged irregularities in the distribution of the bed nets. In the third category were caregivers who had not heard of the ITN and as such had not used it before. In the last category were caregivers who did not believe in the effectiveness of the ITN. According to these respondents, the use of ITNs was not necessary since children are exposed to mosquitoes both day and night. Thus, studies which found that mosquito bed nets were not perceived as effective in the prevention of malaria infection simply because mosquitoes bite day and night underscores the relevance of the perceived threat as contained in HBM. According to a 48 year old mother in Fajeromi:

Let's face the reality. There is no way we can prevent children from having malaria if malaria is truly caused by mosquitoes. We just have to continue to pray to God for his protection. The belief that the bed net or what do you call it prevents malaria is not true. In a large family like ours there are many children to be covered with the bed net ... So, I don't think we should deceive ourselves. There is no way we can prevent malaria because children play day and night. Most times children move around the village without any clothes on them. The only effort I make is to use broom to chase away mosquitoes before going to bed.

The majority of the caregivers attributed limited access to ITN to certain social vices believed to be common in the way and manner the bed nets are distributed. These include corruption, maladministration, favouritism and nepotism at the government levels. Some respondents accused government officials of hoarding the bed nets only to be sold later to business women in the market who buy and sell them at higher prices. Fortunately, a number of health officials interviewed also accepted that corruption hinders accessibility to the ITNs. However, some of them also pointed accused fingers at some caregivers. They claimed that some caregivers collect the bed nets at the health facilities for free but resell to marketers at the local market for reasons attributed to

poverty and greed. One of the nurses at the Children Specialist Hospital claimed she was aware that bed nets are sold for as much as N400.00 (\$3) at one of the most popular markets in the city of Ilorin where baby materials are usually sold.

Based on these challenges it can be conveniently argued that high perceived threat and susceptibility to malaria may not promote the use of the treated bed nets, especially where there are institutional, cultural and political challenges. In other words, other socio-cultural, political and economic constructs are also important determinant factors. Alternatively, therefore, caregivers depend on alternative preventive kits and strategies. In urban areas there were numerous malaria preventive devices that included different brands and qualities of insecticides but very few were available in the rural areas. The majority of the respondents in the rural areas depend on local plants known as *ewe-efon*, to prevent mosquito bites. The use of local plants was perceived as an age-old practice by the people. A woman in Fajeromi reported that:

In this community we have local plants that are “mosquito chasers”. We use them to prevent mosquito bite. We call it “ewe efon”. Once the mosquitoes perceive the smell they just run away. You can place it by your side when you go to sleep. You can use it when it is wet and dry. When you burn the dry leaves the smoke chases the mosquito away.

Discussion

The most vulnerable populations to the threat of malaria in Nigeria, like other endemic places, are children below the age of five. Similarly, epidemiological studies have consistently shown that morbidity and mortality due to malaria have continued to occur mainly among children in Nigeria (WHO, 2011). This usually occurs during the first and second year of life given the infant’s biological dispositions; when infants are yet to acquire adequate clinical immunity against malaria parasite (Sadiq et al. 2009). Similarly, this study revealed that malaria cases are common in the studied communities. The health officials interviewed provided account of the occurrence, vulnerability and threat of malaria to children in the communities based on the number of casualties and episodes of malaria previously treated at the health facilities. One of the senior nurses at the Children Specialist Hospital in Ilorin recounted that more than 70% of reported cases of illness in children treated at the facility (which included complicated cases such as anemia and convulsions), a day before the interview, were malaria-related. A similar notion was shared by the only designated nurse at the Okanle/Fajeromi Health Centre. She maintained that at least 3 out of every 5 sick children presented at the health facility were malaria-related.

One of the cornerstones to preventing the occurrence of malaria, especially in children, has been through persistent and correct use of ITNs. ITN has been widely acknowledged to be an important and effective malaria preventive device. Correct use of ITNs could prevent as much as 336 000 malaria related deaths in children every year (Alaii, 2003). Based on this positive note, the government of Nigeria has reviewed its malaria policies to reflect the use of ITNs. In Kwara State government has promised to provide ITNs for children younger than five years of age hoping that parents of these children would adopt the ITN as part of strategies to prevent children from contracting malaria (Abdullahi et al. 2012; Saraki, 2009). This was to avert or reduce malaria related morbidity and mortality in children.

Experts in social psychology have gathered a large body of findings suggesting that “while people are seeing and listening to the world around them, social knowledge that corresponds to perceived stimuli is spontaneously and immediately activated in memory without people’s awareness of it” (Ferguson and Bargh, 2004). Therefore, perception is central to the analysis of socio-cultural phenomena as well as health behaviour change (Jegede, 2002). As proposed in HBM perceived susceptibility to a particular health problem, perceived seriousness of the health condition and cues to action are important factors in health behaviour change. In a study of caregivers’ acceptance of using Artesunate suppositories for treating childhood malaria, Hinton et al. (2007) discovered that 29% of caregivers refused to accept the use of this alternative care for fear of side effects (i.e. perception of effectiveness of health behaviour). Respondents in Hinton’s et al. study mentioned lack of spousal approval as well as concerns about safety and the practical challenges of administering to a reluctant child as reasons for rejection (Hinton et al., 2007: 639).

As shown in the current study, the majority of the respondents considered malaria a serious threat to children. They also acknowledged the fact that severe complications might develop in children if proper treatment is delayed. However, the use of insecticide treated bed nets was very low. Even though the majority of the respondents had heard about the bed nets, many had not used it for their children. Among the few who had used the ITN prior to the study a significant had mixed feelings about the effectiveness of the bed nets. While some caregivers reported using the bed nets, a significant number only keep them in the house, reasons attributed, largely, to heat, sneezing and weather. This suggests that sometimes high perceived threat and susceptibility to a particular disease, cues to action may not guarantee the use of the treated bed nets, especially where there are institutional, cultural, ecological and political challenges. Amzat (2011) has succinctly argued that low ITN coverage, ownership and usage in Nigerian communities are due to poor public health system and lack of political will on the part of the government.

Conclusions

Malaria is a serious health problem and one of the major childhood diseases in Nigeria. Following the World Health Organization's recommendation, ITNs have been proposed for all people vulnerable to malaria infection with a special focus on children younger than five years of age by the Nigerian government. Thus, an increased public awareness and health benefits of the ITNs have been reported and documented across African indigenous communities (see Blackburn et al. 2006; Muller et al. 2008; Osondu and Jerome, 2009). For example, in Kenya, ITN coverage increased rapidly from 7% in 2004 to more than 60% in 2006, leading to a significant reduction in childhood mortality (Fegan et al. 2007). A study conducted by Muller et al. (2008) in the North-Western Burkina-Faso demonstrated an overall increased household ownership from 16% to 28%. However, with specific reference to Nigeria, research outputs about household coverage of ITNs and ownership have been discouraging. As shown in the current study and others, there is no certainty that the targeted populations are actually in possession of the ITNs and where they are usage is not guaranteed. Afolabi et al. (2009) reported low levels of ITN usage in Nigeria. Jegede et al. (2006) also found low levels of ITN awareness in Nigeria. Unless the socio-cultural issues as well as individual factors surrounding knowledge, treatment and correct use of the ITNs are resolved, malaria would continue to threaten children and the entire Nigerian society.

Therefore, for equitable distribution of ITNs in Nigeria a number of individual and societal variables need to be improved upon. This is better anchored on behavioural theory of health service utilisation. At the societal level, the alleged allegations of corruption and mismanagement must be addressed very urgently and sincerely. This also requires an urgent need for constant political will to implement health policies aimed at empowering local communities particularly in the prevention of malaria in children in order to reduce morbidity and mortality associated with malaria infections in local communities. This would require a desire to fight against corruption at the level of procurement and distribution of the ITN. Proper machineries need to be put in place to ensure that the ITNs get to the intended population groups. This should include proper monitoring and evaluation.

At the individual levels, the implementation of health education and promotion programmes that are community-friendly and sustainable is also very important. Caregivers should be educated, particularly those with low socio-economic status on the importance, proper and correct use of the ITNs. While the immunization opportunity remains an important avenue through which ITNs can be distributed to caregivers, affected communities through their own social capital and structure could be encouraged to take responsibility for the distribution of ITNs. The Kenyan and Burkina-Faso's experiences clearly demonstrate the importance and effectiveness of a

combined approach of social marketing and mass free distribution of ITNs for a rapid achievement of high and equitable coverage, ownership and use of the ITN.

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