

Towards An Effective And Sustainable Malaria Control: Ownership And Use Of Insecticide Treated Nets By Pregnant Women In Ekiti, Southwest, Nigeria.

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Abstract

Malaria is a major factor in maternal reproductive health problems in Nigeria. A key National intervention for malaria control and prevention among pregnant women in Nigeria has thus been access and use of insecticide treated nets (ITNS). The aim of this paper is to describe the level of ITN ownership and use among pregnant women with a view to bringing to fore the effectiveness and sustainability of ITN-related malaria control efforts in Nigeria. A total of 900 pregnant women was selected through multi-stage probability sampling technique. An interviewer-administered questionnaire was used to elicit information on socio-demographic characteristics; knowledge and perception of malaria; malaria preventive behaviour; and ITN knowledge, ownership, use and assessment by the women. Data generated were analysed using descriptive statistics and summarized into percentages. The findings of the study showed that ITN use lagged well behind ITN ownership. This seems to suggest that the focus on universal access to ITN may not necessarily lead to use, unless it is accompanied by behavior change interventions that focus on proper understanding of ITN intervention, ensure proper understanding of ITN intervention by the population, its correct use and the actual risk reduction benefits of using ITNs despite potential inconveniences for the user. It could also be worthwhile to consider a re-positioning and re-packaging of the ITN device and to supplement its use with other preventive methods towards an effective and sustainable malaria control.

Keywords: ITNs, ITN Coverage, Malaria Control.

1. Introduction

Malaria is a global health problem. The global burden of the disease is however not evenly distributed. While sub-Saharan Africa accounts for 90% of the global malaria cases (WHO, 2005; Audrey et al, 2008), it remains a major cause of morbidity and mortality in Nigeria (NPC, 2009; Netmark, 2001; FMOH, 2001; FMOH and NMCP, 2009). Given the high burden and death due to malaria, the Nigerian Government had been involved in several initiatives aimed at mitigating the impact of malaria. For instance, through the National Health Policy, malaria control and prevention were singled out as priority issues. These were also given more prominence following the launching of Roll Back Malaria (RBM) in 1998. Specifically, RBM has the goal of halving the world's malaria burden by 2010 (FMOH, 2004).

Although everyone is at risk, some categories of people, especially pregnant women are the most vulnerable. Malaria can in fact be classified as the leading condition in terms of maternal and reproductive health problems in Nigeria (FMOH and NMCP, 2009). The Nigerian maternal mortality estimate of about 800 per 100,000 live births which is among the highest in the world demonstrates this (WHO, 2003; HERFON, 2006). Studies have also shown that 11% of maternal mortality is associated directly with malaria while it contributes indirectly to additional 11% of all maternal deaths especially through anaemia in pregnancy (Onwujekwe, Chima and Okonkwo, 2000; Longeller, Grabowsky, McGuire and deSavigny, 2007; FMOH and NMCP, 2009). The prevalence of malaria among pregnant women in Nigeria is as shown in Table I.

Therefore, pregnant women have been identified and focused as a key group for malaria control. Universal access and use of ITNS is one of the 4 global RBM strategies (WHO, 2005). Thus, a major National intervention for malaria control and prevention among pregnant women in Nigeria has been free distribution through antenatal care and immunization campaigns (FMOH/NMCP, 2009) and more recently free universal population-based and mass distribution of ITNs coupled with education and information campaigns about the benefits of using ITNS. The adoption of ITNs as strategies for malaria control is premised on its efficacy and effectiveness in reducing malaria-related morbidity and mortality (Binta, Indome and Smith, 1998; Longeller, Grabowsky, McGuire and deSavigny, 2007; Teklehalmanot, Sachs and Curtis, 2007; Augustine, Samson, and Adebayo et al, 2012). Against this background and the fact that ITN coverage constitutes an important indicator

for monitoring progress towards the RBM target and especially malaria control, this paper describes levels of ownership and use of ITNs among pregnant women in Ekiti, a state in the Southwestern part of Nigeria.

2. Study Objectives

The specific objectives of the study are to:

- ❖ ascertain levels of knowledge regarding malaria;
- ❖ investigate practices in the prevention of malaria;
- ❖ describe ITN coverage among pregnant women;
- ❖ identify gaps, constraints and challenges to ITN coverage;
- ❖ assess the unmet needs of pregnant women regarding ITN-related malaria control efforts.

3. Method

3.1 Study Area

The study was conducted in Ekiti State, which is situated in the South-Western geopolitical zone of Nigeria. The State was created on October 1, 1996. It was carved out of the former Ondo State, which itself came out of the old Western State of Nigeria in 1967. Covering a total of 6,353sqkm land area, Ekiti State is situated entirely within the tropics and located between latitude $7^{\circ}15'$ and $8^{\circ}5'$ North of the Equator and longitude $4^{\circ}5'$ and $5^{\circ}45'$ East of the Greenwich Meridian. The state enjoys tropical climate with two distinct seasons namely: rainy season and dry season. The rainy season usually starts in April and ends in October with a short break in August, while the dry season spans from November to March. There are however, considerable variations in the rainfall pattern from year to year. Temperature ranges between 21° and 28°C with high humidity. The southwest and the northeast trade winds blow in the rainy and dry (Harmattan) seasons respectively.

Mainly an upland zone rising over 250 metres above sea level, Ekiti has a rhythmically undulating surface. The landscape consists of ancient plains broken by steep-sided outcropping dome rocks. These rocks may occur singularly or in groups or ridges. An important feature of the state is the large number of hills it possesses, which are often the site of towns in which much of the population resides. In fact, the word 'Ekiti' was derived from the local term for hill.

It lies south of Kwara and Kogi State, East of Osun State and bounded by Ondo State in the East and in the south. Ekiti State is divided into three Senatorial Districts and 16 Local Government Areas (see Figure I). By 2006 Census, the population of Ekiti State was 2,384,212 people (NPC, 2008). The inhabitants are mainly farmers, civil servants, and traders (Ekiti State Government Website).

3.2 Sample

The selection of the respondents for the study was through a combination of stratified, simple random, purposive, cluster and snowball sampling techniques. First, the State was stratified into three according to political Senatorial districts already in existence (see Figure I). Six local government areas (LGAs) namely: Ado, Ijero, Gbonyin, Ekiti Southwest, Ikole and Moba were randomly selected from the Senatorial Districts. The pregnant women were purposively selected from Ado-Ekiti, the State capital and the headquarters of Ikole and Ekiti Southwest LGAs as the urban samples. The rural ones were sampled from two villages in Ijero, Moba and Gbonyin LGAs respectively. The women were primarily identified at health facilities during antenatal clinics when the description of their residences was taken out of informed consent. These samples were also requested to direct interviewers to other pregnant women in their neighbourhood. This was to ensure that non-attendees of antenatal clinics at government health facilities were included in the sample. Such women were selected if they had not been identified at the health facilities visited. In all, a total sample of 900 pregnant women was drawn for the study. This comprised of 150 respondents from each of the three communities constituting the urban component and 75 respondents from each of the six villages identified as the rural component.

Data collection which took place between February and April, 2012 was conducted using an interviewer-administered questionnaire. The questionnaire was pretested among pregnant women in a community outside the ones selected for the study to allow for necessary corrections before the training of the field interviewers. Interviewers were female and selected on the basis of their experience in the conduct of social surveys and fluency in English language as well as the local dialects of the communities sampled. They were also trained to understand the purpose of the study, the questions to be asked and to ask same in an unambiguous manner. To enhance the quality of the data collected, questionnaires administered were reviewed daily for completeness, consistency of responses and to ensure that necessary corrections were made while still on the field. Questionnaires were administered to respondents in their homes and confidentiality was assured. In cases where an eligible respondent was not found at home, subsequent visits were scheduled. Such a respondent was dropped only after 3 attempts had been made to reach her without a success. Data generated were cleaned for

inconsistencies, analysed and summarized into frequencies and means using the Statistical Package for Social Scientists (SPSS Version 17.0).

Visits and interaction with eligible respondents at health facilities was facilitated by the approval of the proprietors and the workers at these facilities. Informed consent was obtained from all respondents by having the interviewer explained the purpose of the study and asking the respondent if she wished to participate, and to volunteer the description of her place of residence if she so wished. Approval for the conduct of the study was also obtained from the selected communities through advocacy visits by the research team. The purpose of the study and the eligible respondents were explained at meetings of community leaders.

4. Results

Although 900 pregnant women were identified and sampled for the study, data collected from 872 respondents (431 urban; 441 rural) were analysed and used in the study. The difference of 28 questionnaires were not usable due to non availability of eligible respondents at home after 3 visits (9) and refusals both to partake and to complete the interview session (19). The results of the study are presented in 4 sections: socio-demographic characteristics; knowledge and perception of malaria; malaria preventive behaviour; and ITN coverage and assessment.

4.1 Socio-demographic characteristics of respondents

The distribution of the respondents by selected socio-demographic characteristics is presented in Table II. Data in the table showed that the respondents were mostly middle aged with their mean and median ages estimated as 28 years and 27 years respectively. They were mostly Christians, ever married, traders and had 2 children on the average. The level of education of the women was fairly high with a significant proportion of them attaining secondary and higher levels.

4.2 Knowledge, perception and prevention of malaria

The women could identify the organism responsible for malaria, its symptoms, and mode of transmission (See Table III). Majority of them acknowledged that mosquito bite and dirty environment (particularly in terms of bushes, and stagnant water which allows for the breeding of mosquitoes) constitute the mode of malaria transmission. The common symptoms of malaria as reported by the women included headache, body pains, high temperature, nausea, loss of appetite and fatigue among others.

The findings of the study as presented in Table IV showed that majority of the respondents perceived malaria as a preventable but deadly disease if it is not treated promptly. The women acknowledged that the probable impacts of the complications of malaria on them are many. They, however, identified impacts such as premature birth and spontaneous abortion, bad health for mother and the unborn child, still birth and complicated labour among others. To prevent themselves from having malaria, therefore, many of the women had used and/or currently one method or the other. The methods widely employed by the women include insecticide spray/coil, door and window nets, and environmental care.

4.3 ITN Coverage and assessment

The distribution of the women by ITN coverage and assessment is presented in Table VI. Majority of the women especially in the urban location have ITN and their major source of supply had been health facilities. However, about a-third of the women had never used it. The proportion of the women not currently using ITN is as high as 62.6% in the villages and 57.4% in the city. Moreover, while 37.6 % of the rural women did not have ITN, 23.2% of the urban ones were currently not using ITN either because it is not same size as their beds or can not be shared.

Moreover, a significant proportion of the respondents knew ITN as well as its benefits over other malaria preventive methods. The benefits correctly identified by the women include protection against mosquito bite, kills mosquitoes, very effective and long lasting. They, however, did not hesitate to highlight the disadvantages of ITN as well. Over a third (67.8%) of the women believed that ITN could be poisonous especially to children. Another major disadvantage of ITN identified especially by urban women is that it will not size every bed and thus the possibility of being shared may be problematic. This may not be out of place as it has become fashionable especially among elites to sleep on a big-sized bed of about 230cm width and 194cm length (commonly called 7feet bed). Other disadvantages identified by the women were, it makes sleeping unnatural and that the treatment is not permanent. Nevertheless, the women currently using ITN believe that it is a very effective means of malaria control.

5. Discussion

The study shows that pregnant women have adequate knowledge about the causes, symptoms and transmission of malaria. There is also the recognition that although malaria is deadly and that its complications impact adversely on pregnant women, it is but a preventable disease. This explains why one method or the other is being employed towards its prevention.

Interestingly, the knowledge of ITN and its possession by pregnant women is quite high. Previous Nigerian studies have demonstrated community knowledge about prevention of mosquito bite by net (Galvin, Petford, Ajose and Davies, 2011). The high rate of ITN ownership could be because of free mass distribution as it has been indicated as an effective strategy to achieving a good ITN coverage (Binta and Adongo, 1997; Oresanya, Hoshen and Sofola, 2008; Baume, and Marin, 2008; Galvin, Petford, Ajose and Davies, 2011). With increased partnership and funding from donor agencies such as USAID, WHO, UNICEF, Global Fund, World Bank and DFID among others, ITN ownership had increased significantly in many sub-Saharan African countries (Wolkon, Vanden, Morgah et al, 2004; Gersti, Dunkley, Mukhtar et al, 2010; Blackburn, Elgege, Gotau et al, 2006; Noor, Amin, Akhwale and Snow, 2007; Teklehalmanot, Sachs and Curtis, 2007, Beer, Alli, deSavigny et al 2010). In Ekiti State, the Yakubu Gowon Centre, an NGO and a principal recipient of the Global Fund distributed over 1million free ITNS to households in all the 16 LGAS between November 2 and December 2, 2009. At the end of the exercise, 96% of households in Ekiti were covered and ownership of at least one ITN increased from 23% before the campaign to 95%. (Ekiti State Website, 2012).

Apart from the fact that possession of ITNs had not translated to wide utilization, it is often not used correctly in many households. For instance, observations at the communities studied as well as others in Ekiti showed that ITNs are being used as door and window nets. It is even used to fence gardens and protect plants against animal invasion. This finding is comparable to several surveys in Africa (Korenronp, Miller and Cibulskis et al; Alonso, Lindsay and Armstrong et al. 1991; Adeyemi, Adekanle, and Akintola, 2007; NPC, 2009). The synthesis of data from malaria control programmes also demonstrated that levels of ITN use by pregnant women in many sub-Saharan African countries had remained far below national and global strategic targets (Baume and Marin, 2008, FMOH/NMCP, 2009).

As much as the women acknowledged the benefits and effectiveness of ITNs in malaria prevention, they equally identified some disadvantages which probably constituted barriers to its use among them. A significant proportion of the women preferred other malaria preventive methods, especially door/ window nets and environmental care. The choice of environmental care is not unexpected as it is mandatory for every resident in Ekiti State to partake in the environmental cleaning exercise which takes place every last Saturday of a month. Human and vehicular movements are usually restricted between the hours of 7.00am and 10.00am on these days, and mobile courts are put in place to try and sanction offenders. Hence, the rate of compliance had not only been high, the culture had been imbibed by all. Moreover, the flair for door and window nets as alternatives to ITNs is not unrelated to the fact these had become common accessories and fittings on every house considered habitable. The findings of this study as being discussed is similar to those of a study conducted in Kenya which showed that though 88% of the respondents knew the benefits of bednets in respect of malaria prevention, only 55% actually used them (Opiyo, Mukabana and Kiche et al. 2007).

6. Conclusion

Nigeria is, no doubt, committed to being free from the burden of malaria particularly to meet the Abuja (RBM) targets and to achieve the relevant and related aspects of the Millenium Development Goals (i.e MDGs 1, 2, 4, 5 & 6 which are directly or indirectly related to malaria control). A key intervention towards this bid has been access and use of ITNs. Thus, there had been aggressive drive towards ensuring that at least there is 1 net to 2 people in the country by 2013. With relevant campaigns coupled with free routine and mass distribution of ITNs, there had been significant successes especially with regard to possession. Given this, ITN is expected to go up. The findings of the study, however, seem to suggest that mass distribution could lead to possession but may not necessarily imply use. At this, more still remains to be done.

7. Policy Implications

Since ITNs is recognised as an effective tool of malaria control, it is pertinent to close gaps between increased coverage and use and to sustain same not only to keep the disease burden low but to potentially move towards making Nigeria malaria-free. It is thus recommended that:

- ❖ ITNs use promotion campaigns and programmes directed at pregnant women should particularly emphasise messages that would make them consider actual risk reduction benefits of using ITNs with regards to protecting her unborn child even if there are potential inconveniences for the woman herself.

- ❖ Community level and antenatal campaigns should be expanded and emphasize more on appropriate behaviour change interventions directed at the efficacy of ITNs and its correct use in Malaria prevention.
- ❖ Education and information campaigns on ITNs should not be the business of only the government and NGOs. Rather, community, local and religious leaders, Community based and faith based organizations (CBOS and FBOs) and all other available channels of communication should be mobilised as means of intensifying campaigns to ensure proper understanding of ITN intervention by the population and promoting positive change of behaviour.
- ❖ There is need for sustained effort and focus on scaling up other proven interventions (access to effective diagnosis and treatment, indoor residual spraying) of malaria control. Since other malaria preventive measures had been shown to be acceptable to Nigerians, the Government should make good her plan (as stated in the 2009 – 2013 Malaria Control Strategic Plan) to extend Indoor Residual Spraying (IRS) to many parts of the country, especially areas where ITNs use had remained low. It could even be made nationwide to complement ITNs.
- ❖ Also, a self supporting net which can be manufactured in varied sizes to suit a range of bed sizes may be a useful way of strengthening ITN intervention for malaria control in Nigeria. The possibility of manufacturing ITNs that can fit windows and doors or can be used as materials for such could be considered.

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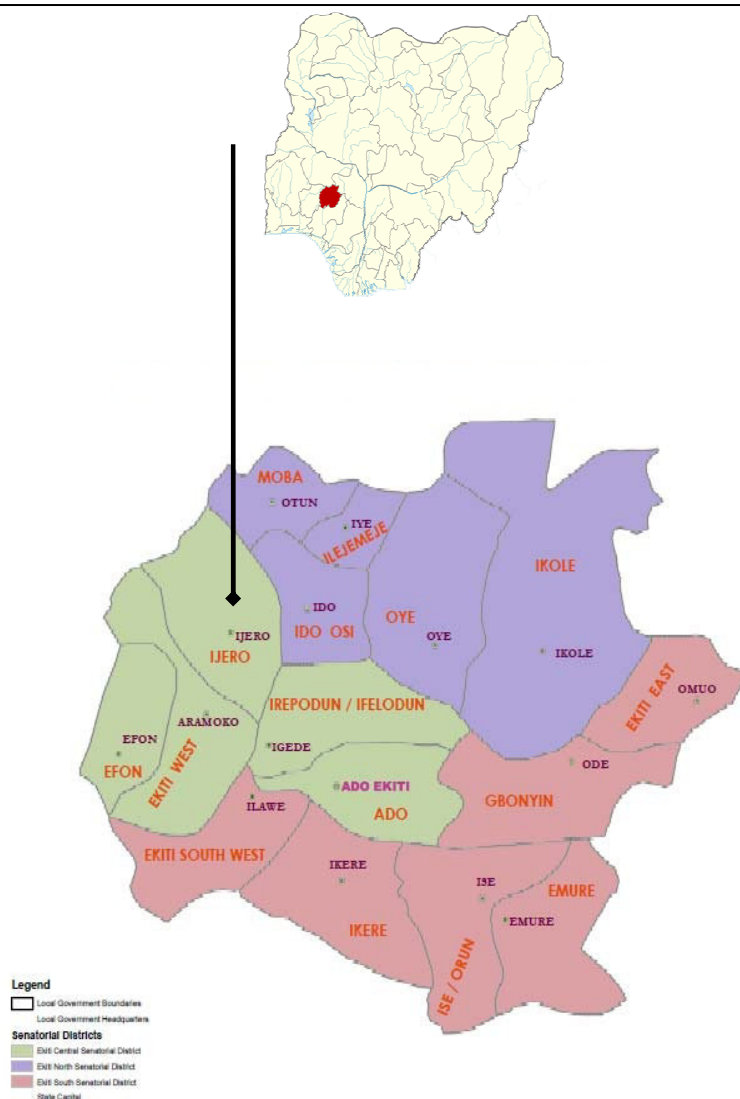


Figure I: Map of Ekiti by location within Nigeria and showing the Senatorial Districts

Table I: Malaria Prevalence among Pregnant women in Nigeria by Geo-Political Zone

Zone	Prevalence
Northeast	64.5
Northwest	46.6
Northcentral	56.4
Southeast	31.0
Southwest	46.0
Southsouth	44.0
All	48.2

Source: FMOH, 2004

Table II: Socio-demographic characteristics of the respondents

Characteristic	All	Rural	Urban
Age in years			
Below 20	28.3	33.4	22.6
20 – 29	59.9	55.0	64.8
30 – 39	11.5	10.4	12.6
40 and above	0.3	0.7	-
Mean	27.8	27.9	27.6
Median	27.0	26.0	27.0
No of children			
Mean	2.1	1.9	2.3
Median	2.0	2.0	2.0
Marital Status			
Married	88.5	94.8	82.3
Single	11.5	5.2	17.7
Education			
Koranic/non-Formal	5.0	2.3	7.7
Below Secondary	32.2	41.3	22.8
Secondary	39.3	37.8	40.9
Above secondary	23.5	18.6	28.6
Occupation			
Farming	5.8	7.3	4.4
Trading	46.8	42.7	50.8
Civil Service	17.0	8.0	26.0
Artisan	15.7	21.0	10.4
Housewife	14.7	21.0	8.4

Table III: Percentage distribution of respondents by knowledge of malaria transmission and symptoms

	All	Rural	Urban
Know mode of transmission			
Yes	89.5	88.2	90.2
No	10.5	11.2	9.8
Mode of transmission			
Mosquito bite	53.5	62.7	44.3
Dirty environment/stagnant water	31.9	25.2	38.6
Others*	14.6	12.1	17.1
Know malaria symptoms			
Headache/body pains	26.7	30.8	22.6
High body temperature	26.0	15.4	36.5
Cold/catarrh	15.1	16.0	14.2
Others**	27.1	31.3	23.0
All	5.1	6.5	3.7

Others* include staying long in sun, stress, eating oily foods etc

** include nausea, bitter taste, loss of appetite, fatigue etc

Table IV: Distribution of respondents by perception of malaria and the impacts of malaria on pregnancy

Variable	All	Rural	Urban
Malaria is Deadly			
Yes	94.0	95.2	92.8
No	6.0	4.8	7.2
Malaria is Preventable			
Yes	89.7	88.4	91.0
No	10.3	11.6	9.0
Impact of malaria			
Premature birth/abortion	21.9	20.0	23.8
Still Birth	10.7	7.4	13.9
Bad health for mother and child	18.6	22.2	15.0
Death of woman	7.5	7.0	8.0
Complicated labour	9.1	5.6	12.6
Dizziness/weakness	7.3	6.2	8.4
Many	24.9	31.6	18.3

Table V: Percentage distribution of respondents by methods ever used or currently used to prevent malaria

Method	Rural		Urban		All	
	Used	Currently	Used	Currently	Used	Currently
All Methods	18.0	14.7	6.2	1.9	12.1	8.3
Insecticide spray/coil	29.9	18.1	31.4	22.0	30.7	20.0
Environmental care	20.3	23.2	23.5	31.2	21.9	27.2
Window/Door Net	5.6	17.9	10.6	33.5	8.1	25.7
Drug	9.8	8.5	15.6	4.8	12.7	6.7
Others*	16.4	17.6	12.7	6.6	14.5	12.1

others* include herbs (used either as repellants or drunk as herbal tea), closing windows and doors and using broom to shake mosquitoes off their hiding places etc..

Table VI: Percentage distribution of respondents by ITN coverage and assessment

	Urban	Rural	All
Know ITN			
Yes	88.8	92.3	90.6
No	11.2	7.7	9.4
Have ITN			
Yes	69.2	84.5	76.9
No	30.8	15.5	23.1
Source of Supply			
Health Facility	80.9	87.0	84.0
Health worker /chemist	2.8	6.7	4.7
Don't Know	16.3	6.3	11.3
Ever used ITN	67.9	64.9	61.4
Currently Using ITN	37.4	42.6	40.0
Reason for non-use			
Don't have	37.6	13.3	25.3
Use other methods	42.6	62.0	52.3
Not bed size	8.6	23.2	15.9
Till I deliver	7.6	1.5	4.6
Environment is mosquito free	3.6	-	1.9
ITN differs from other malaria preventive methods			
Yes	85.5	84.3	84.9
No	12.5	10.9	11.7
Don't Know	2.0	4.8	3.4
Advantages of ITN			
None	7.0	3.4	5.2
Protects against mosquito bite	48.7	46.8	47.8
Kills Mosquito	21.2	26.5	23.9
Others *	12.3	20.4	16.3
Don't Know	10.8	2.9	6.8
Disadvantages of ITN			
None	3.2	2.1	2.6
Chemical is poisonous	38.0	30.9	34.5
Treatment not permanent	17.1	16.8	16.9
Makes sleep unnatural	18.3	12.6	15.5
Not size of bed/can not be shared	10.6	32.8	21.7
Don't Know	12.8	4.8	8.8

Others* include very effective, long lasting etc

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