Factors Affecting Usage of ITN for Malaria Control by Pregnant Women in South East Nigeria.

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Keywords: Malaria, Insecticide treated net, (ITN), pregnancy

Posted Date: October 30th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-98601/v1>

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Abstract

Background

The National Malaria Strategic Plan for Malaria Control in Nigeria conducted an intervention package to reduce malaria-related mortality by 50% by the year 2020, by ensuring that at least 80% of the targeted populations utilize appropriate preventive measures. This study was aimed at reviewing the success of insecticide treated net (ITN) malaria control efforts and understanding the failures and the need to boost up the intervention measures.

Methods

The research design used for this study was the descriptive method. Structured questionnaires were used to collect data from 318 pregnant women receiving antenatal care at the Federal Teaching Hospital Abakaliki.

Results

Amongst the respondents, 180 (56.6%) owned an ITN while 138 (43.4%) did not. A greater percentage (72.9%) of those who had positive attitude resulting in usage of ITNs purchased their nets themselves, only 8.4% of mothers who received their ITNs free of charge used the net, ($P=0.159$). Dislike of usage by spouses (63.3%), hot weather discomfort (17.8%) and forgetfulness (17.2%) were some of the factors that contributed to failures of net usage by the pregnant women.

Conclusion

Cost Free distribution of ITN did not necessarily improve usage. Rather, success of this strategy will require carrying out more awareness campaign.

Introduction

Malaria continues to be a major public health problem in 97 countries and territories in the tropics and subtropics [1]. However, in most of sub-Saharan Africa, malaria infection in pregnancy is frequently asymptomatic and can remain undetected [2], and Nigeria is one of the hardest hit countries among malaria endemic countries of sub-Saharan Africa where the disease accounts for 11.0% of maternal mortality and morbidity [3]. Malaria affects maternal health and pregnancy outcome. It has been confirmed that malaria in pregnancy causes low birth weight, preterm delivery, congenital infection and reproductive loss [4]. It causes anemia in pregnancy which increases the risk of maternal deaths with an estimated 10,000 maternal deaths annually [5].

In Nigeria, approximately 51 million cases and 207,000 deaths is reported annually while 97% of the total population (approximately 173 million) is at risk of infection [6]. Roll back malaria consultative mission stated that malaria is endemic in Nigeria and remains one of the leading causes of morbidity and

mortality, while accounting for 30% and 11% of child and maternal death respectively [7]. It is, therefore, established that children and pregnant women are the most vulnerable to malaria morbidity and mortality [8].

Insecticide-treated bed nets (ITNs) are designed as personal protective barrier in order to reduce malaria illness and mortality in endemic regions. Insecticide treated net (ITN) is a cost effective measure in the prevention of malaria [9]. It provides protection against nuisance mosquito as well as killing of bedbugs which contributes greatly to the acceptance and its usage by the populace [10]. The ITN usage is amongst the effective tools for reducing malaria transmission and related morbidity and mortality. However, utilization rates among some African communities have not improved [11].

In Nigeria it has been a 'journey' of an intense battle of malaria control series since the turn of 21st century. In 2001, a 5 year plan of Roll Back Malaria (RBM) targets was launched under the National Malaria Control Programme (NMCP) aimed at reducing malaria by 25% by 2005. This intervention plan was conducted by National Malaria Strategic Plan (NMSP) for Malaria Control in Nigeria to achieve impact toward a malaria free Nigeria [12]. In 2009 and 2012, mass ITN distribution campaigns were carried out and by April 2012, 50 million long-lasting insecticide treated nets (LLIN) had been distributed. The specific targets for the control during the five-year period (2009–2013) were to reduce malaria-related mortality by 50% by 2013, to increase and sustain net usage to at least 80% of children < 5 years and pregnant women by 2010 and to sustain the coverage until 2013, among others[12]. The last program series till date was the 2014–2020 National Malaria Strategic Plans (NMSP). The major national target was to ensure that at least eighty percent of targeted populations utilize appropriate preventive measures by 2020[12]. This research study is, therefore, aimed at understanding the failures and successes of the ITN malaria control programme by discovering the attitudes of pregnant women towards the use of insecticide treated net and the factors affecting the usage. The study will help evaluate the 'journey so far' in the malaria control program so as to review the ITN malaria control efforts in order to boost up the intervention measures.

Methods

Research design and Setting

The study was carried out at Abakilliki urban in Enugu State. Abakaliki is the capital city of the present-day Ebonyi State in southeastern Nigeria which is located at 64 kilometres (40 mi) southeast of Enugu [13]. It is located between 6° 2'N and 8°06'E. The population was 79,280 by 2006 population data. The inhabitants are primarily members of the Igbo tribe. The study setting is a center of agricultural trade including such products as yams, cassava, and mostly rice which is cultivated in swampy areas that enhances the breeding of mosquito pests. The research design used for this study was descriptive and non-experimental method.

Ethical recruitment and enrolment

Before the starting of the study, the aims and objectives of the research were relayed to the hospital authorities to get their co-operation and permission to conduct the survey. The research team was referred to the Medical officers and Heads of Nursing in charge of ante-natal units who were duly informed. The objectives of the research were also explained to them and the consents of the pregnant women were sought for their involvements.

Population of Study

In this study, the target population was all pregnant women, attending antenatal clinic from Monday to Friday in Federal Teaching Hospital Abakaliki. They were expected to give adequate information about their attitude towards the use of insecticide treated net. The population and sample size was obtained from the antenatal attendance register at the nurses' bay of the antenatal clinic, Federal Teaching Hospital Abakaliki in March-September 2013. The population for the study was 1511

Sampling and Data Collection Procedure

Non probability sampling technique was used [14] and Yaro Yamen's statistical formular was used to calculate the sample size to obtain the number of respondents, as every member of the population could not be researched at the same time.

A sample size of three hundred and eighteen (318) respondents was deduced. The instrument for collection of data for the study was questionnaire. Validity of the instruments was done by examining the items critically to ensure that it was capable of collecting the desired information for the study before sharing to the respondents. A standard questionnaire was given for each respondent. The questionnaires were administered in person and with the help of some nurses in the antenatal clinic.

Data Analysis Techniques

Data was analyzed using SPSS version 16 and chi-squared test was used to compare proportions. Probability values (p-values) were set at 0.05 level of significance and Confidence Intervals (CIs) were calculated at the 95% confidence limit.

Results

The demographic data of the respondents is represented in Table 1. The greatest percentage of respondents 116 (36.7%) were within the age range of 26–35 years while the least percentage 14 (4.4%) fell within the age range of 46–55 years. Age range 15–25 years was 84(26.7%); 36–45 years had 104(33.0%). The 36.8% of the women were at their first pregnancy, 16.7% only had one child while 23.3% each had either two or more children. The respondents that had tertiary educational qualification was 148 (46.5%) while those with no formal education at all had the least percentage 11 (3.5%), those with primary school education alone were 53 (16.7%), while 33.3% qualified from secondary school. The rate of respondents that were self-employed was 43.3%, government employed was 23.3%, the unemployed and student/apprentices both had the percentage occurrence of 16.7% each. Most of the respondents

were low income earners, 33.3% earned below N10, 000, 29.9% earned N100, 000 and above, 23.3% earned between N50,000 and N99,000 while the rest (13.6%) earned from N10,000 – N49,000.

Concerning the awareness of ITN, only 13 (4.1%) of respondents had not heard about ITN, while 305 (95.9%) of the respondents had heard about ITN ($P = 0.017$). There were 180 (56.6%) respondents that owned ITN while 138 (43.4%) respondents did not have ITN. Among the 180 who owned net, 85(4.7%) purchased by themselves while 95 (52.8%) received it through free distribution from government (table 3). The table also shows the attitude of the pregnant women towards the use of ITN, 62 (72.9%) of them who had positive attitude bought their ITNs themselves, and only 8(8.4%) who received their ITNs free of charge used the net ($P = 0.159$).

Table 4 shows the frequency of the ITN usage by age ranges. In rating the usage of net among the 180 owners, 64(35.5%) of the pregnant women did not use their nets at all. Few of them 11.7% each used occasionally or 1–3 times weekly, 42(23.3%) used up to 6 times weekly, while 32(17.8%) used theirs daily. It was observed that the greatest percentage being 20 (62.5%) of those who used ITN's everyday fell into the age range of 26–35 years. None of the pregnant women at age range 46–55 years used the net every day. Amongst those who did not use their ITNS at all, the highest percentage (51.6%) fell into age of 36–45 years. The educational qualification data shows that the correspondents with no education had the least percentage (3.1%) of everyday ITN usage. Amongst the mothers who did not use their ITN, 7.8% had no education but up to 31.3% had university degrees. The greater rates (65.6%) among the everyday or consistent users were also found among the university degree holders (Table 5). Table 6 shows the limitations or the factors affecting the use of ITN. Only 66 (36.7%) of respondents who owned ITNs were encouraged by their spouses to use it, the rest 114 (63.3%) were not encouraged by their spouses to use their ITN ($p = 0.062$). Some of the respondents (29.4%) did not use their ITNs because they had windows guard (mosquito nets) at their doors and windows. Others (17.8%) complained of hot weather, while the 17.2 of the mothers forgot to hang the nets.

Table 1
Demographic Data of Respondents (N = 318)

Age Range	Frequency	Percentage
15–25	84	26.7
26–35	116	36.7
36–45	104	33.07
46–55	14	4.4
Parity	Frequency	Percentage
Nil	117	36.8
One	53	16.7
Two	74	23.3
3>	74	23.3
Education	Frequency	Percentage
Non	11	3.5
Primary	53	16.7
Secondary	106	33.3
Tertiary	148	46.5
Occupation	Frequency	Percentage
Gov. employed	74	23.3
Self-employed	138	43.3
Non-employed	53	16.7
Student	53	16.7
Monthly income(N)	Frequency	Percentage
< 10000	106	33.3
10000–49000	43	13.6
50000–99000	74	23.3
100000>	95	29.9

Table 2
Awareness and Ownership of ITN (n = 318)

Responses	Frequency	Percentage
Those who were aware	13	4.1
Those not being aware	305	95.9
Ownership of nets	180	56.6
No ownership of nets	138	43.3

Table 3: Attitude of Mothers who Purchased their ITN's themselves and Attitude of

Mother who Received their ITNs Free (N = 180)

Attitude towards ITN use	Purchase their ITN		Received theirs free	
Positive	62	72.9%	8	8.4%
Negative	3	3.5%	16	16.8%
Nonchalance	20	23.5%	71	74.4%
Total	85	47.2%	95	52.8%
Grand total = = 180 persons.				

Table 4
Frequency of Net usage by Age Ranges

Age	Usage of ITN				
	Everyday	4-6times weekly	1-3times Weekly	Occasionally	Did not use at all
16-25yrs	5 (15.6%)	8(19.0%)	4(19.0%)	5(23.8%)	8(12.5%)
26-35yrs	20 (62.5%)	24(57.1%)	2(9.5%)	6(28.6%)	14(21.9%)
36-45yrs	7(21.9%)	8(19.0%)	14(66.7%)	9(42.9%)	33(51.6%)
46-55yrs	0 (0.0%)	2(4.8%)	1(4.76%)	1(4.76%)	9(14.1%)

Table 5
The Educational Qualification of Respondents and Their Usage of ITNs (n = 180)

Educational qualification	Usage of ITN				
	Everyday	4–6 times	1–3 times	Occasionally	Did not use at all
No education	1(3.1%)	1(2.4%)	2(9.5%)	2(9.5%)	5(7.8%)
Primary school	2(6.3%)	10(23.8)	8(28.1)	10(47.6%)	13(20.3%)
Secondary School	8(25%)	17(40.5%)	5(23.8%)	5(23.8)	26(40.6%)
Tertiary	21(65.6%)	15(33.7%)	6(28.6)	4(19.1%)	20(31.3%)
Total	32	42	21	21	64

Table 6
Limitations to Use of ITNs

Limitations	Frequency	Percentage %
Hot weather	32	17.8
Dislike of usage by spouse	114	63.3
Presence of windows guard (mosquito net) on doors and windows	53	29.4
Forgetfulness	31	17.2
Other reasons	11	6.1

Discussion

Most respondents being within the age range of 26–35 years clearly shows that these were mostly mothers at child-bearing age. The result of this study shows that a greater part of the respondents, being literates were aware of the ITN. Educational qualification of the respondents was seen to have affected their awareness and attitude towards the use of ITNs. Most respondents were those who attended tertiary institution and with this a high rate of awareness was recorded. Awareness of the malaria disease and the preventive measures can lead to successful implementation of the preventive interventions amongst pregnant women [15]. Amongst those who used their ITNs daily, the highest rate was those that attained tertiary education. Majority of those who used their nets consistently and every day were the tertiary institution graduates, the illiterates who used the net daily and consistently were only a few. This result contrast with that of Edelu and his colleagues [16], who reported that educational status, did not affect the attitude to net usage among children.

Amongst those who got their nets via free distribution some had indifferent attitude. It was disclosed that in Nigerian a total of 10 million ITNs were distributed in 5 years [17], which was actually inadequate. But

yet those who were opportune to get it free misused the offer. In this study many of the respondents purchased the net by themselves. This is expected because they understood the importance of the ITN. This may also be explained by the fact that it was the understanding they had about the importance of the protective effect of the net that motivated their purchasing despite the cost. Though most of those who used the net purchased by themselves, there was no significant difference in the attitude of those who purchased their nets and those who got free gift ($P = 0.159$). This shows that the free ITN did not motivate usage. These findings agree with that of Pettifor *et al* [18], who found out in their research that a large number of the nets freely distributed were not hanged, were improperly deployed and unoccupied. This is also consistent with the findings in a study carried out in Nigeria during the Demographic and Health Survey [9]. However in some other studies the key barriers to pregnant women receiving and using ITNs were low knowledge of ITNs, low socio-economic status, high cost and non-availability [19].

The least percentage of those who used their nets everyday was found amongst mothers aged 16–25 years. Ene *et al* [20] stated that women 30 years and older were nearly 4 times more likely to use their nets compared to women less than 20 years of age. However, in this study, there was no significant difference in every day net usage among the different age groups ($P = 0.480$). Their educational qualification, however, influenced the usage of the net ($P = 0.046$).

Spouse encouragement was seen to grossly affect the attitude of pregnant mothers towards the use of ITNs. In a typical African setting, husbands have a great influence on their wives irrespective of their views on the importance of the ITN. A study on factors influencing utilization of ITNs amongst pregnant women in Kinshasha stated that encouragement by spouses of pregnant women improved their utilization of ITNs [21].

Having already net fitted door/ window were other factors for failure of ITN usage apart from hot weather discomfort. Net-fitted door and window may offer some protection provided the door passages are not opened at all especially at evening sunset or nights when the mosquitoes start flying around. Otherwise, it is commonly noted that this device becomes disadvantageous instead because when once the mosquitoes gain entrance into the house, they hardly leave but stay there and bite for long time as long as they are alive. So in essence, net fitted door and window offer false sense of protection. The issue of hot weather discomfort is an uncontested fact being that netting does not allow enough air in-flow when sleeping under it. Nigeria as of other tropical regions has extreme hot weather most time of the year coupled with the fact that there is incessant electric power failures of such which the government needed to address before setting up ITN control program.

Conclusion

The effective use of insecticide treated net would be of benefit to these vulnerable pregnant women. Cost Free distribution of ITN may not necessarily improve usage. Rather, success of this strategy will require carrying out more awareness campaign, especially among the male spouses emphasizing the importance of encouraging their wives and dangers of defaulting among others.

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