

Insecticide Treated Nets Possession and Utilization among Pregnant Women in Enugu Nigeria: A Descriptive Cross-sectional Study

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Abstract

Background: Pregnant women, particularly the primigravida are doubly at risk of malaria. The use of insecticide treated nets (ITNs) among pregnant women take into account the community attitudes and beliefs about malaria. This study examined the socio-demographic, cultural and economic factors that influence the use of ITN among pregnant women in Enugu, Nigeria. **Methods:** The study design was descriptive cross-sectional and it involved 290 ante natal clinic attendees in three facilities selected by simple random sampling method and data collected using interviewer-administered questionnaires. **Results:** The mean age of respondents was 30±5.9 years and they exhibited an overall ITN knowledge of 254 (87.9%). The overall ITN utilization rate among the pregnant women was 20.7%. About 88.3% had no fear about ITN use, but 50 (18.5%) and 41 (15.2%) of them gave feeling of “suffocation” and “heat” respectively as reasons for not using ITN while 140(49.5%) of respondents expressed preference for white ITN colour. **Conclusion:** Government and other stakeholders should make ITNs available and affordable to all pregnant women, while decisions about the nets should consider their shape, size, designs and colour.

Key words: Insecticide Treated Net, Utilization, Pregnant women, Enugu

Background:

Approximately 40% of the Worlds’ populations, mostly those living in the poorest countries, are at risk of malaria^{1,2}. Throughout Africa, south of the Sahara, infectious diseases are a major barrier to economic and social developments. The socio-cultural considerations of the use of Insecticide treated nets (ITNs) take into account the community attitudes and beliefs about malaria. They include areas of fear and suspicion about ITNs, and the efforts necessary to dissuade areas of misconception in order to address in greater priority the needs of the most vulnerable groups.

Pregnant women and children are the most vulnerable groups to malaria attacks. Pregnant women, particularly those pregnant for the first time are doubly at risk from malaria³. This is because when a woman is pregnant her immunity drops, making her more vulnerable to malaria with dangerous consequences for the mother and her child^{1,4}. Pregnant women and their unborn children are particularly vulnerable to malaria, and this is a major cause of peri-natal mortality, low birth weight and maternal anaemia². Maternal malaria increases the risk of stillbirths, premature delivery, low birth-weight babies and intra-uterine growth retardation^{4,5}. Experts say malaria is a major contributor to the world’s high rates of maternal mortality and accounts for 30 – 35% of preventable low birth-weight among newborn infants^{1,3}. In endemic countries nearly sixty percent miscarriages are attributable to malaria⁴.

Anaemia in pregnancy is one of the main maternal health problems globally, affecting over fifty percent of pregnant women in Sub-Sahara Africa. Although not always shown to have causal link, severe anaemia contributes to maternal morbidity and mortality and poor pregnancy outcomes and infant survival⁶.

The Roll Back Malaria Global Partnership is promoting insecticide treated nets and intermittent preventive treatment (IPT) for pregnant women in endemic areas. One issue about nets and net use that are influenced by cultural factors is net colour. Colour preferences vary between and within cultures such that white nets have traditionally been the most commonly available and preferred. White nets are sometimes preferred in urban environments in Africa; green nets are preferred in Islamic countries while in Asia and the South Pacific people like a variety of colours and multi-coloured nets⁷. Coloured nets are only produced to order in Nigeria. In the past, only UNICEF placed orders for coloured nets. It is however believed that the introduction of specially designed nets would boost net sales and use. The use of romantic motifs in bed net design would facilitate acceptance of bed nets⁸. Ethnic differences suggest that net use can be linked closely to culture and tradition. In The Gambia, the Mandika and Wolof ethnic groups use nets more than the Fula⁹. Similar differences have been reported from South America and the Philippines. In Nigeria, current situation analysis showed wide zoned variations in net use ranging from 0% to 22%¹⁰.

Some of the reasons that are often given for using nets include protecting against nuisance biting and to ensure good night's sleep, to keep out other night time pests, to protect against dust and dirt falling from the ceiling, to provide warmth in cooler areas, to provide decoration and to provide privacy. Treated nets are likely to be embraced on a large scale in areas where mosquito density is high. High net coverage in the Gambia is related to high mosquito biting density¹¹. The privacy provided by nets was perceived to be important in Afghanistan, where several families may sleep outside their houses together⁸. Other reasons are difficulties with erecting nets and the use of alternative products such as coils and sprays (which are more affordable on daily basis), concerns about fire hazards that nets get dirty easily and the concern that insecticide may be hazardous to inhale.

Economic considerations about net use will highlight the factors that will influence community or family payment for treated nets, i.e. the poverty level and the capacity for community or household finance. There may be differences between net users and non-users in terms of economic status and social background. Economic factors will affect immediate and long-term sustainability of the treated net project. People's ability and willingness to pay depend on how much money they have available and whether they want to spend their money on treated nets, i.e. their priority. It is more difficult to change the ability to pay than the willingness to pay. Willingness to pay can be influenced by information, education and communication (IEC) and promotional campaigns.

The objectives of this study are to determine the socio-demographic, socio-cultural and economic factors that influence the use of ITNs among pregnant women in Enugu Nigeria.

Methodology

The research is a descriptive cross-sectional study aimed at determining the socio-demographic, cultural and economic dimensions of mosquito nets utilization by pregnant women living in Enugu municipal area. Enugu is the capital city of Enugu state. The area is divided into districts for ease of locating and communicability, and they include Coal Camp (or Ogbette), Uwani, Iva Valley (or Main market), Ogui, Asata, Obiagu and New Layout. Others are: New Haven, Independence Layout, Agbani Road, Achalla Layout, Garrikki, Trans-Ekulu, G.R.A., Abakpa and Emene. Enugu municipality has an estimated land area of 203.863 square kilometers¹² with an estimated population of about 198,236¹³. Topographically, the area is hilly in nature with many rivers, valleys and streams traversing it. There are many health facilities located in the municipality, among them those owned by the federal, state, local government councils, Christian denominations, private organizations and individuals. The population for the study consisted solely of pregnant women who were attending antenatal clinic. Three health facilities, one from the three local government areas that make up the municipal area had been selected for sampling. The health facilities were selected by simple random sampling method. The health facilities were picked from the forty-one, twenty-five and twenty-one facilities in Enugu North, Enugu South and Enugu-East respectively, which report IDSR and acute flaccid paralysis (AFP) cases to the local governments' Disease Surveillance and Notification Officers (DSNOs, and they include: Parklane Hospital (Enugu North), Polyclinic (Enugu South), and Ntasiobi Ndi No N'afufu Hospital (Enugu East). The women included in the study would have been living in any of the districts within the municipality in the past twelve months, and this is irrespective of their socio-economic status, culture, religion, tribe, education or occupation. Sample size is 290 and is determined using the formula, $N = Z^2 pq / D^2$, where, $Z = 1.96$ at 95% confidence limit and error of 5% tolerated, $P = \text{Proportion of those using ITNs} = 22\%$ ¹³ (from literature), $D = \text{Sample error tolerated} = 5\%$ or 0.05.

$$N = \text{Minimum Sample Size, } q = (I-P) = \frac{1.96^2 \times 0.22(1-0.22)}{0.05^2} = \frac{3.8416 \times 0.22 \times 0.78}{0.0025} = 263.2 = 264$$

Allowing for 10% non-response, this is increased by 26 to 290. Therefore, the sample size = 290. The population of women attending ANC obtained for the month of June 2010 from the health facilities was 374; Parklane hospital 190 polyclinic 100 and Ntasiobi Ndi N'afufu 84. This translates into a sampling interval of three in two months, from a sample size of 290, as follows: Total population = 374 x 2 = 748 (for two months). Sample population = 290. Sample interval = 748/290 = 2.579 ≈ 3 Sampling was done using the probability systematic sampling method in which every third pregnant woman attending antenatal clinic on a particular booking day at the health facilities selected for sampling was chosen. The instrument used for data collection was questionnaire as self or interviewer administered for the literate or illiterate respondents, respectively. They were then pre-tested using recently delivered mothers in the health facilities but who would normally not be included in the study. This was done to test the respondents' comprehensibility of the questions so as to modify areas of ambiguity. Corrections were made where necessary.

Data were analyzed using the Microsoft excel of the computer, and presented in table with statistical analyses done to determine the socio-cultural and economic factors influencing the use of ITNs in the study population.

Ethical clearance and approval for this study was obtained from the Nnamdi Azikiwe University Teaching Hospital Ethical Committee (NAUTHEC). In addition, before the questionnaires were administered, the concept of the study was carefully explained to the respondents and their informed consent obtained.

Result

Table 1: Distribution of subjects according to age and marital status

Age group	Marital status			Total
	Married	Single	Widowed/ Separated	
15-24	38 (15.8)	8	0	46
25-34	157 (65.4)	19	8	184
35-44	39 (16.3)	4	8	51
≥45	6 (2.5)	0	2	8
Total	240 (100)	31	18	289
Mean age is 30±5.9years				

Table 1 shows that 157 (65.4%) of the respondents fall within the age group 25 – 34. The mean age is 30 ± 5.9 years.

Table 2: Effect of socio-demographic variables on knowledge, possession and use of ITN among subjects

Socio-Demographic Variables	Number (%)	Number (%)	Test of significance p-value
Age group (years)	Know about ITN	Do not know about ITN	X^2 DF3=12.7 , P<0.005*
15-24	31 (67.3)	15 (32.7)	
25-34	168 (91.3)	16 (8.7)	
35-44	47 (92.2)	4 (7.8)	
≥45	8 (100)	0 (0)	
Total	254 (87.9)	35 (12.1)	
Formal education	Know about ITN	Do not know about ITN	X^2 (DF3)=19.7 P<0.001*
≤ primary education	12 (54.5)	13 (45.5)	
Secondary education	93 (88.6)	12 (11.4)	
Tertiary education	149 (93.7)	10 (6.3)	
Total	254 (87.9)	35 (12.1)	
Formal education	Possess ITN	Do not possess ITN	X^2 DF3=0.22, P>0.7
≤ primary education	5 (23.8)	19 (76.2)	
Secondary education	35 (33.7)	69 (66.3)	
Tertiary education	62 (39.2)	96 (60.8)	
Total	102 (35.7)	184 (64.3)	X^2 (DF3) =7.82 P=0.05*
Formal education	Used ITN night before	Did not use ITN	X^2 DF2=0.0.7 , P>0.8
≤ primary education	6 (24)	19 (76)	
Secondary education	31 (29.8)	73 (70.2)	
Tertiary education	20 (12.7)	137 (87.3)	
Total	57 (20.7)	219 (79.3)	
Religion	Used ITN night before	Did not use ITN	X^2 (DF2) =7.89 P<0.01*
Christian	55 (20.1)	218 (79.9)	
Trado, muslim & others	2 (20)	8 (80)	
Total	57 (20.7)	219 (79.3)	
Occupation	Used ITN night before	Did not use ITN	
Self employed	35 (32.7)	72 (67.3)	
Civil servant	14 (15.4)	77 (84.6)	
Others	8 (10.3)	70 (89.7)	
Total	57 (20.7)	219 (79.3)	

Table 2 shows overall ITN knowledge among the pregnant women as 254 (87.9%) and indicates that as the age of subjects increased their knowledge of ITN also increased. While 31 (67.3%) of respondents aged 15-24 years knew about the ITN, all 8 (100%) of those aged ≥45 years knew about it (p<0.005). Similarly, whereas 12 (54.5%) of subjects with ≤ primary education knew about the ITN, this knowledge level significantly increased through 93 (88.6%) for those with secondary education, to 149 (93.7%) for those with tertiary education (p<0.001). Conversely, however, the use of ITN the night before was only 20 (12.7%) for those with tertiary education but which significantly increased to 31 (29.8%) and 6 (24%) for those with secondary and primary education respectively (p=0.05). Furthermore, 35 (32.7%) of self employed respondents used ITN the night before as opposed to only 14 (15.4%) of their civil servant counterparts (p<0.01). The overall ITN utilization rate among the pregnant women was 20.7%.

Table 3: Perception of ITN Safety among the Subjects.

Feeling about ITN safety	Frequency	Percent	Z-score, p-value
Perceive ITN is safe	253	94.1	Z= 13.9, p<0.001
Perceive ITN is unsafe	16	5.9	
Total	269	100	

Table 3 shows that 253 (94.1%) of respondents perceive ITN is safe as opposed to 16 (5.9%) who perceived it as unsafe (p<0.001).

Table 4: Reasons for not Using ITN among the Subjects

Reasons	Frequency
No fear	238
Culture barrier	4
Religion barrier	2
Someone shut in	11
Feel suffocated	50
Skin irritation	3
Chemical harmful	10
Feeling of heat	41
Causes nose irritation RTI	3
Not given to me	24

In table 4, a total of 238 (88.3%) of respondents had no fear about ITN use, while religion and culture had little impact on the reasons for not using ITN among the subjects. However 50 (18.5) and 41 (15.2) of the respondents gave feeling of “suffocation” and “heat” respectively as reasons for not using ITN.

Table 5: Consideration of Malaria as a Problem and use of ITN among Subjects.

Use of ITN		Had malaria fever problem		Total
		Yes (%)	No (%)	
Slept under ITN previous night	Yes	29 (15.2)	152(84.8)	191
	No	28 (30.4)	64(69.6)	92
Total		57(20.1)	226(79.9)	283

$X^2(DF1) 9.04, p<0.01^*$

This result (table 5) shows that 28(30.4%) of pregnant women that slept under ITN the previous night had no problem with malaria fever. The difference in ITN usage and consideration of malaria as a problem is statistically significant. ($P < 0.01$).

Table 6: Colour preference for ITN among the subjects

Colour Choice	Frequency
White	140
Blue	93
Green	34
Multi colour	13
Any colour	3
Red	2

Table 6 shows ITN colour preference among the subjects. One hundred and forty (49.5%) of the respondents prefer white ITN colour, while none of the respondent opted for red ITN colors.

Discussion

Pregnant women are one of the groups most at risk of malaria. Insecticide treated nets (ITNs) have been shown to have multi-level benefits in pregnancy; through protection of the pregnant woman, her growing fetus and

subsequently impacting on infant health. ITNs, together with improved campaigns for highlighting the needs of pregnant woman, are indicated as an important way forward to better health¹⁴.

This study showed an overall utilization rate of 21.7%. This is an improvement on earlier findings in most endemic regions where fewer than 10% of children or pregnant women regularly sleep under ITNs¹. However despite the increase in the overall utilization rate observed in this study, it still portends a disappointing picture in the campaign against malaria. This is because the African Heads of state signed the Abuja declaration on malaria in 2005 and set themselves to achieving certain goals such as 60% ITN utilization among pregnant women. Thus the figure, 21.7%, obtained in this study for ITN utilization more than five years away from 2005 portends a gloomy state and showed that this target was not realized. This state of affair affirms that more concerted actions favourable for making ITNs available, affordable, and accessible to a larger proportion of the most at risk groups are put in place and vigorously pursued.

This study also revealed that only 108 (35.7%) of the 283 pregnant women own ITNs. This figure is marginally higher than an earlier report that in most parts of Asia and Africa, net coverage is less than 10%⁸. This ugly state of affair regarding ITN ownership and use, as shown by this study is compounded by the claim that United Nations Children's Fund (UNICEF) is implementing a large-scale demand creation ITN project in Nigeria and is focusing its ITN project in four states of Enugu Ogun, Bauchi and the Federal Capital Territory (FCT). Yet the impact of this project started in 2002, said to attempt to pump-prime the market by providing seed stocks of ITNs to community-based organization such as income generating groups, religious and women groups and through intensive advertising campaigns¹⁵, remains to be felt in the state. If these activities have been on-going, the figure obtained in the study is forlorn-hope, a disappointing indictment of a programme that has not lived up to expectation. UNICEF should therefore do well to put an effective machinery to constantly monitor and evaluate its own effort. The same goes for department for international development (DFID), which is said, through her management consultancy-features group Europe Nigeria, to have launched an ITN awareness project since June 2002. The project is intended to focus on demand creation to be implemented in Ekiti, Jigawa, Benue and Enugu State. This programme apparently has not shown enough commitment toward achieving set objectives and targets in the state. The massive awareness campaigns, envisaged by the combined strategies of UNICEF, DFID and Net-Mark required to promote a rise in ITN use, seem to be sluggish. Awareness of the benefit of ITNs in malaria prevention is markedly high 87.9% in the studied population. It may appear surprising while the rate of ownership (35.7%) and utilization (20.7%) of ITNs are both low in the face of the marked recognition of the benefits of ITN. Other factors may help to explain this trend as shall be seen in due course.

The age distribution in relation to utilization of ITN has shown in this study that the pregnant women in the age group 25- 34 years have the highest rate of utilization 22.7%. Since this study involved a homogenous population (pregnant women) whose age brackets are naturally defined, this observation may not be enough to validate any conclusion. It is however interesting to note that the rate of utilization of ITNs is influenced by the level of education attained revealing that utilization rate is highest amongst the pregnant women that have secondary education followed by those with primary education, then those with tertiary education. Some of the reasons for low utilization rate amongst those with tertiary education despite the fact that they have the highest possession rate are that the net cannot fit their bed, their windows and doors are already fitted with nets and that they use insecticide sprays amongst others.

Most significant among the reasons given for not having ITN as obtained in this study were: inability to afford the prices and not having used ITN before. These findings are consistent with the report that lack of a tradition of net use is commonly the most important reason given for not owning or using a net. Other commonly given reasons for not using nets include cost, lack of availability, net being too hot and uncomfortable to sleep under⁸. The study also shows that 280 (88.3%) of the 283 respondents accepted ITN as being safe to sleep under. Communication, an efficient tool for mass mobilization can be employed and with appropriate motivation and dialogue, a positive swell of attitudinal and behavioural changes can be garnered in favour of ITN use among the people. After all, the demand for health services has been increased through increased awareness and dialogue. Dialogue ensures that the health programme and its implementation are compatible with the social goals and aspirations of the target community and that they are also in concordant with the people's social and cultural background¹⁶. The study revealed the preference for white colours among the respondents, this agrees with the study which showed that white nets are sometimes preferred in urban environments in Africa. Colour preferences vary between and within cultures. White nets have traditionally been the most commonly available and preferred¹⁷.

Conclusions

The bane of most health programmes has been the gap that often existed between what could be done and what is being done, between what is and what could be, and between knowledge and need. This gap is not likely to be closed except through genuine commitment on the side of the government and the health-care providers to objectively mobilize the people at whom the programme is targeted

Recommendations

The use of ITNs has been widely accepted as an essential element in the fight against malaria and the effort to roll it back. In the light of this, it is therefore recommended that for the fight against malaria scourge and the use of ITN as an intervention strategy to succeed, the people must be told what the government and her agencies want to do or achieve. The local government councils and social development agencies must be involved to bring the message of the benefits of ITN to the people. Government, in collaboration with other stakeholders and international agencies, should live up to her promises and make ITNs available to the at-risk group; pregnant women and children less than five years of age, at no costs to them. Decisions regarding nets and insecticide should address the appropriateness of the net in terms of shape, size, designs, colour and fabrics. Net size should reflect the bed or sleeping mat size and the sleeping engagement. Nets must be large enough to cover the bed or sleeping mat to be tucked underneath.

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