

Original Research Article

## Knowledge and Utilization of Insecticide Treated Nets in a Rural Community in Southeast Nigeria

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### ABSTRACT

**Background:** Insecticide treated net (ITN) is essential in prevention of malaria parasite transmission. The study aims at determining the knowledge and utilization of ITN in a rural community in Enugu, southeast Nigeria.

**Method:** The study was descriptive cross sectional conducted in October, 2013 among 200 rural dwellers in Nkanu West Local Government Area (LGA) of Enugu state, South-east Nigeria. A pre-tested interviewer-administered structured questionnaire was the study instrument.

**Results:** Out of the 200 participants, 140 (70.0%) were females, the modal age range was 46 - 55 years and 47.0% were married while 36.0% were widowed. Christianity, (95.5%) was the predominant religion and over 60% of respondents had either primary or no formal education. One hundred and thirty eight (69.0%) were aware of ITN, 53.5% could define ITN while 74.0% knew the indications for ITN. Almost 73% knew the mode of transmission of malaria. ITN household possession rate was only 21% mainly from health facilities and free community net distribution. Reasons for non-possession of ITN include among others: lack of knowledge of source (41%) and lack of awareness of ITN (28%). Forty respondents (20%) use ITN but only 24 (12%) use it consistently every night. Reasons for inconsistent use were excessive heat and cumbersome method of use. Respondents with post primary of education were significantly more likely to possess and use ITN

**Conclusion:** Knowledge of ITN was fairly good but possession and utilization were poor. Increased ITN distribution and education on use are recommended.

**Key words:** Insecticide-treated net, malaria, rural community, Nigeria.

### INTRODUCTION

Malaria is a protozoan disease transmitted by the bite of an infected female anopheles mosquito. [1] It is a febrile illness with clinical features which vary from mild to severe according to the species of parasite present, the host's immune status, the intensity of infection and the presence of concomitant conditions such as malnutrition or other diseases. [2] It is a huge problem in Africa where it is responsible for greater than one

million deaths annually. [1] It has also been shown to be responsible for a large percentage of under-5 morbidity and mortality in Nigeria with about 300,000 deaths attributed to it annually. [3] Nigeria falls within the malarious zone and has a climate that favours the growth of the vector of the parasite. In addition to the morbidity and mortality, the economic well-being of the country has been hampered as a result of malaria.

In the bid to reduce the scourge and effects of malaria, a number of programmes and initiatives have been put in place; prominent among them is the Roll Back Malaria (RBM) initiative introduced in 1998. This has as one of its targets: reduction of the malaria burden by 75% by the year 2015 through interventions adapted to local needs and also by reinforcement of the health sector. [4] Several measures have been advocated to achieve this including; prompt and appropriate treatment of identified cases, fixing of window and door screens, use of insecticide-treated nets, environmental management including clearing of bushes and indoor house residual spraying. Of all these, the proper use of insecticide-treated nets (ITNs) has been adjudged an efficacious and cost effective method of controlling malaria having been associated with as much as 25% reduction in child mortality. [3]

Insecticide-treated nets (ITNs) are bed nets impregnated with pyrethroid insecticides (examples of which are deltamethrin, alphamethrin, permethrin) at a target dose of 500mg/m<sup>2</sup> to protect against mosquitoes. [4] The net prevents man-vector contact by preventing mosquitoes' access to people sleeping under it and killing mosquitoes that perch on it. Proper use of ITNs consists of regular use, tucking under sleeping mat or mattress or making it touch the ground and re-treating the nets regularly. For the conventional insecticide-treated nets, re-treatment is every six months. The long-lasting insecticide-treated nets remain effective without treatment for the life of the net.

With the introduction of ITNs, the RBM Initiative had a target of 60% coverage by 2005 but the African report on Malaria in 2005 of the use of ITN was about 5% across Africa which was a far cry from the target. [5] As a result, the World Assembly agreed to a target of providing ITN to 80% of people at risk of malaria by 2010. [6] Since then subsequent

studies on the knowledge and use of ITNs in African communities have indicated improvement in the level of usage. [7] Following successes recorded by ITN particularly in reduction of child's morbidity and mortality, a new target: 'universal coverage' was declared by United Nations in 2009. Universal coverage is defined as one LLIN for every 2 persons in the population [8] or ITN use by >80% of individuals in populations at risk. [9]

Rural communities are important in the assessment of disease prevention practices and in the control of malaria. This is because these communities are hardly accessible for adequate and effective preventive, diagnostic and treatment facilities. [10] In addition deaths resulting from malaria are higher in rural communities especially where proper knowledge about malaria is lacking. There is proof that improved knowledge about effective malaria preventive methods as well as proper usage of these methods especially ITNs help to reduce mortality and morbidity from malaria. [10] While it has been shown that proper use of ITNs reduce morbidity by 25%, studies have equally shown that increasing the awareness of the people concerning malaria and the role of ITNs as well as making available the ITNs could increase the proper use of ITNs in communities. [11] Recently there has been increased procurement and distribution of ITNs and LLINs across the country. However one wonders whether the rural populace is knowledgeable about the nets and if they make use of them. This study hopes to achieve this. The result will also give an indication of ITN coverage in South-east Nigeria.

## **MATERIALS AND METHODS**

This descriptive cross sectional study was conducted in October, 2013 among 200 rural dwellers in Nkanu West Local Government Area (LGA) of Enugu state, South-east Nigeria. Enugu State is

mainly inhabited by Igbo speaking people who are mostly Christians. Most members of the population are farmers, traders or artisans. Ethical permission for the study was obtained from the Ethics committee of Enugu State University Teaching Hospital, Parklane while informed consent was obtained from the traditional leaders and the respondents. The study was carried out using interviewer-administered structured questionnaire which was pre-tested in a community in a different LGA. The questionnaire comprised sections on demographic data, and on knowledge and use of ITNs. Two hundred households were selected by systematic sampling using the PHC (Primary Health Care) household numbering. In each household, the head or his spouse was interviewed. In their absence, the oldest in the household fills the questionnaire provided he/she is a responsible adult above 18years of age and is appointed by the household.

**Statistical analysis:** Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 11. Frequencies and percentages were presented as tables. Level of significance was  $P < 0.05$  and the confidence interval was 95%.

## RESULTS

Two hundred (200) respondents participated in the study. Out of these 140 (70.0%) were females. The age range was 18 – 80 years with a modal age range of 46 - 55 years. Most (47.0%) were married while 72(36.0%) were widowed. Christianity, (95.5%) is the predominant religion and over 60% of respondents had either primary or no formal education. Majority, 116 (58.0%) had a family size greater than 4. Under-5 children were present in about 26% of the households while 13 (6.5%) households had pregnant women (Table 1).

**Table 1: Demographic variables of Respondents**

Variables	Frequency N = 200	Percent
<b>Sex</b>		
Female	140	70
Male	60	30
<b>Age group (years)</b>		
18 – 25	27	13.5
26 – 35	31	15.5
36 – 45	31	15.5
46 – 55	50	25.0
56 – 65	33	16.5
66 - 75	22	11.0
76 and above	6	3.0
<b>Marital status</b>		
Married	94	47.0
Single	33	16.5
Widowed	72	36.0
Divorced/Separated	1	0.5
<b>Religion</b>		
Christianity	191	95.5
African Traditional Religion	8	4.0
Islam	1	0.5
<b>Educational status</b>		
No formal	84	42.0
Primary	43	21.5
Secondary	44	22
Tertiary	29	14.5
<b>Occupation</b>		
Farmer	79	39.5
Trader	46	23.0
Civil servant	24	12.0
Student	24	12.0
Housewife	14	7.0
Artisan	8	4.0
Others	5	2.5
<b>Family size</b>		
1 – 4	84	42
5 and above	116	58
<b>Presence of Under-5 children</b>	51	25.5
<b>Presence of pregnant women</b>	13	6.5

**Table 2: Knowledge of ITN and Cause of Malaria among Respondents**

Variable	Frequency, N = 200	Percent
Awareness of ITN	138	69.0
Definition of ITN	107	53.5
Indications for ITN	148	74.0
Advantages of ITN	112	56.0
Awareness of ITN re-treatment	70	35.0
Timing of ITN re-treatment	42	21.0
<b>Cause of Malaria:</b>		
• Infected mosquito bite	145	72.5
• Poor hygiene	15	7.5
• Too much oil	3	1.5
• Bad air	3	1.5
• Bad food	2	1.0
• Evil spirit	1	0.5
• Do not know	31	15.5

One hundred and thirty eight (69.0%) respondents were aware of ITN mainly from radio (34.1%), hospital (30.4%), friends and relations (23.2%), Church (12.3%). More than half of the respondents could define ITN while 148 (74.0%) knew the indications for ITN. Seventy, (35.0%) knew about ITN re-

treatment while 21% knew the correct timing for re-treatment. Almost 73% knew that malaria is transmitted through the bite of an infected mosquito but a few still believe in certain myths such as: too much oil, bad air and food and evil spirit (Table 2).

ITN household possession rate was only 21% and the sources were mainly health facilities and free community net distribution. Of these, 22 (11%) had only one ITN while 14 (7%) possessed two.

Reasons for non-possession of ITN include: lack of knowledge of source (41%), lack of awareness of ITN (28%), lack of interest (7%) and cost of ITN (24%). Forty respondents (20%) use ITN but only 24 (12%) use it consistently every night. Reasons for inconsistent use were mainly that it reduces air flow and therefore induces excessive heat and that having to let down and tuck the net under the mattress every night is burdensome (Table 3).

**Table 3: Possession and use of ITN among Respondents**

Variable	Frequency, N = 200	Percent
Possession of ITN	42	21.0
Source of ITN	N = 42	
• Hospital	30	71.4
• Purchased from shops	7	16.7
• Free Community net distribution	5	11.9
Number of ITN available per household:	N = 200	
• 1	22	11.0
• 2	14	7.0
• 3	4	2.0
• 4	2	1.0
• None	158	79.0
Reasons for non-possession of ITN:	N = 158	
• Lack of knowledge of source of ITN	65	41.1
• Lack of awareness of ITN	44	27.8
• Too expensive	38	24.1
• Lack of interest	11	7.0
Number of ITN in use per household:	N = 200	
• 1	24	12.0
• 2	10	5.0
• 3	4	2.0
• 4	2	1.0
• None	160	80.0
Consistency in use of ITN:	N = 200	
• Every night	24	12.0
• Occasionally	16	8.0
Reasons for inconsistent use:	N = 16	
• Too much heat	9	56.25
• Tucking the net is tiring	7	43.75

Comparing level of education and possession and use of ITN revealed that respondents with secondary education and above were significantly more likely to possess and use ITN than those with less education,  $\chi^2 = 9.77$ ,  $P = 0.01$ .

**Table 4: Level of Education and relationship to Possession and Use of ITN**

Level of Education	ITN Possession, N = 42	ITN Use, N = 40
	Frequency (%)	Frequency (%)
Non formal and Primary Education	18 (42.86)	16 (40.0)
Secondary and Tertiary Education	24 (57.14)	24 (60.0)

$$\chi^2 = 9.77; P = 0.01$$

## DISCUSSION

As has been reported in a rural Nigerian community, majority of our respondents were females. [12] This could be attributed to rural-urban migration mostly undertaken by males in search of better economic activities. However, some

studies from other rural Nigerian communities showed a preponderance of males. [13,14] Over 60% of our respondents either had only primary education or no formal education. Similar educational trends have been previously reported in Nigeria and has been incited as a major

factor hindering socio-economic development of the country. [13,15] Nevertheless, a recent study in similar settings in Nigeria revealed that majority of the respondents had tertiary education. [14] This could be attributed to the fact that the qualification needed for participation in that study was the First School Leaving Certificate (FSLC). Since Christianity is the predominant religion in South east Nigeria, it is not surprising that most of the respondents were Christians. Most of the households had family size of 5 and above which is consistent with the culture of the people that encourages large number of children to assist in agricultural work.

Sixty nine percent of our respondents were aware of ITN. This level of awareness is higher than 31% reported in a rural community in south west Nigeria and a great improvement on an earlier finding in Enugu state which reported an ITN awareness of only 11%. [5,16] This could be attributed to massive scaling up of ITN distribution in the country as part of global efforts to eradicate malaria. However, present level of ITN awareness is less than 72% found in a rural community in Anambra state as at 2008. [11] This could be because the then government of Anambra state adopted the Millennium Development Goals (MDGs) as its development agenda and a lot of efforts were made in the control of communicable diseases including malaria in line with the MDGs.

Although awareness of ITN was fairly high in this study, in-depth knowledge such as awareness of ITN re-treatment nor its timing were rather poor. Similar poor knowledge has been reported and indicates the need to intensify efforts aimed at improving knowledge and practices of malaria prevention methods. [17] However, present finding is lower than previous report from south west Nigeria which showed that 69% of respondents had good knowledge of ITN. [18] The disparity in knowledge could be drawn from the fact that respondents of the

previous study were pregnant women and caregivers of under-five children who generally more exposed to healthcare settings and health education than other members of the population. In keeping with expectations, knowledge of the indication for ITN was high as most people in this part of the world are conversant with the traditional bed nets.

Over 70% of our respondents knew the cause and mode of transmission of malaria. However, as has been reported in previous studies some of the respondents still believe in malaria myths while others had no knowledge of malaria causation. [2,19] This signifies the need to intensify efforts on malaria awareness campaigns if eradication of malaria from the country is to be actualized. Only 21% of the households possessed at least one ITN and percentage of consistent utilization is even lower. Similar poor ownership and utilization which are a far cry from the 2015 MDG target have been reported. [20] Present finding is nonetheless an improvement on an earlier report from a rural community in southern Nigeria when ITN was newly introduced. [19] It is however lower than a previous report from eastern Ethiopia which showed household ITN ownership and utilization of 62% and 22% respectively. [21]

Unlike a previous study done among beneficiaries of free ITN distribution, lack of knowledge and cost of acquisition were the major factors for non-possession and use of ITN in the present study. [22] This implies that the free net distribution did not gain wide coverage particularly in the rural communities where poverty is high and malaria is prevalent. For the few respondents who possessed ITN, inconsistent use which is a great obstacle in combating malaria was common and like other studies, reasons given were unbearable heat and cumbersome use. [22,23] These challenges to ITN use could be overcome by simple maneuvers like opening windows to let in air. This indicates that ITN distribution

should be done alongside health education on use and how to overcome challenges. Respondents with post primary education were more likely to own and use ITN than those with less education. Similar association has been previously observed [24] and buttresses the importance of education in coping with healthy life style changes.

## CONCLUSION

Knowledge of ITN was fairly good in the present study. However, ITN possession and utilization were unacceptably poor. Increased ITN distribution and education on use and solutions to accompanying challenges are recommended.

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