
Awareness, Accessibility and Utilization of Insecticide Treated Net in Uyo, Akwa Ibom State

Usiplawrence P. E.^{*}, Ekwere U. L.

Department of Animal and Environmental Biology, University of Uyo, Uyo, Nigeria

Email address:

usiplaw01gmail.com (Usiplawrence P. E.)

^{*}Corresponding author

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Abstract: The study on Awareness, accessibility and utilization of insecticide treated nets in Uyo the capital City of Akwa Ibom State Nigeria was investigated between June to November 2015. Randomly selected household were used for the study. Data was collected using pre tested semi – structured interviewer administered questionnaires. Test of statistical significance were carried out using chi square tests of statistical significance. Each respondent represented a household. A total of 600 questionnaires were administered out of which 570 (95%) were completely filled and returned. Findings from this study showed that 250 (45.23%) of the population were within the age range of 21-30yrs. Greater percentage 435 (76.32%) were aware of ITN but there was a comparative reduction in accessibility 327 (57.37%) and utilization 393 (68.95%). Eighty four (19.31%) got their information from radio and 500 (87.72%) acknowledged that malaria is transmitted by mosquito but only 287 (50.35%) recognized *Anopheles* mosquito as the real transmission agent. Some of the barriers for non usage of ITN include inconveniences, Non availability, generation of heat and other difficulties encountered. There is need for educational enlightenment campaign on the sustained use of ITNs in the Area.

Keywords: Malaria, Insecticide Treated Net, Awareness, Accessibility and Utilisation

1. Introduction

Malaria has been one of the world's worst killer disease recorded throughout human history. About 300 million people globally are infected and about 1.5 million deaths occur annually in Africa, South of Sahara (1). Malaria is caused by protozoan parasite of genus *Plasmodium* and is found in regions lying roughly between latitude 60°N and 40°S. In man, malaria is caused by four species of *Plasmodium*; *P. Falciparum*, *P. Malariae*, *P. Vivax* and *P. Ovale*. Of the four species of malaria parasites, *P. Falciparum* is the most common and virulent in Nigeria. It infects humans of all sexes and social status with its attendant economic impact on the working population (2, 3). In Akwa Ibom State, Nigeria, malaria is responsible for one in four child deaths and poses a great economic burden on household and government (4). There are up to 800,000 infantile deaths and a substantial number of miscarriages, as well as very low birth weight babies per year due to the disease (5). The

disease has a crippling effect on the economic growth and perpetuates vicious cycle of poverty (6). Given that malaria is endemic throughout Nigeria and that over 50% of the country's population is living below poverty line, malaria incidence may increase significantly in Nigeria because many may not be able to afford the newly introduced drugs due to poverty (7, 8, 9). Malaria in pregnancy holds severe consequences which range from anaemia to severe complications such as cerebral malaria pulmonary oedema and renal failure in the mother increased still birth, uterine growth retardation etc (10, 11, 12),

Several factors have been reported to influence the vectorial role of mosquitoes in disease transmission like abundance, biting behaviour, host preference and longevity (13, 14). The increase in environmental modification as a result of urbanization is usually being accompanied by creation of more breeding sites for mosquitoes which most often lead to the increase in the incidence of mosquito-borne diseases (15, 16).

The World Health Organization (WHO) has adopted the use of Insecticide Treated Bed Nets (ITN's) as one of the main

strategies for malaria control in their roll back malaria programme (17). At present, ITN's are being applied to many malaria-endemic regions worldwide and their use has replaced the use of indoor house operating with insecticides in many countries. Bed nets have been used traditionally to protect people from the nuisance caused by nocturnal biting insects (14, 18). After the introduction of synthetic insecticides during World War II, it was soon realized that bed nets impregnated with insecticides might provide better protection against mosquitoes and malaria infection than untreated nets (19).

Antimalarial drugs (primaquine, chloroquine, proguanil and pyrimethamine) were initially used in the treatment and prevention of malaria in pregnancy. Currently, intermittent preventive treatment with sulfadoxine/pyrimethamine is in use, but the developments of the drug-resistant strains of falciparum have greatly undermined the use of the earlier mentioned drugs in malarial treatment and prevention. Sleeping under ITN can reduce the risk of a pregnant woman being infected with malaria and is an effective malaria prevention intervention as ITN reduces human contact with mosquitoes (18, 20). Studies examining ITN effectiveness report a reduction in malaria episodes by 48% to 30% shown to reduce the severity and mortality due to malaria in endemic regions as well as cause mortality by approximately 20%. Therefore, the World Health Organization (WHO) strongly recommends the large scale use of ITN for malaria control (21, 22). The Roll Back malaria (RBM) campaign of the WHO and its partners has a major aim to have 80% of pregnant women and children (under the age of 5 years) covered by ITN (20). This derived from the fact that ITN use offers an indirect, protective benefit for the community at large (23).

Despite the knowledge that ITN is effective in preventing malaria, there are known barriers to ITN ownership and use. Some of the difficulties encountered or experienced by

respondents using these nets are the scarcity of new nets, difficulty in getting chemicals for re-treatment of nets, non-availability of quality ITN for purchase, high cost of nets, preference for insecticide sprays, necessary as they had mosquito nets fixed on their doors and windows already discomfort when sleeping under ITN, none use of ITN in pregnancy and the individual experiences of some respondents that hardly come down with malaria (24, 25, 26).

The success of malaria control with ITN's has been bogged down by problems of delivery, distribution, usage and even acceptability of this method in Africa (27). Public awareness and acceptance of insecticide treated nets varies from community to community in countries where the method of malaria control has been adopted (28). The aim of the study is to assess the level of awareness, accessibility and utilization of insecticide treated net in Uyo metropolis.

2. Materials and Methods

2.1. Study Area

This study was carried out in Uyo capital city of Akwa Ibom State, Southern Nigeria between June to November, 2015. It is located in the rain forest belt with an elevation of 1000 mm above sea level. The climatic condition is warm humid, high temperature and heavy rain distribution almost all the year round. The rainy season progresses from May and reaches its peak in August and diminishes by October, while the dry season begins in November and ends in April, (4). The state is located within the lowland coastal plains of Nigeria between latitudes $4^{\circ}32'$ and $5^{\circ}33'$ North and longitudes $7^{\circ} 25'$ and $8^{\circ}25'$ East (Fig. 1). The study population consisted of households in this zone. The people in this area are mostly civil servants, students, farmers, businessmen and women.

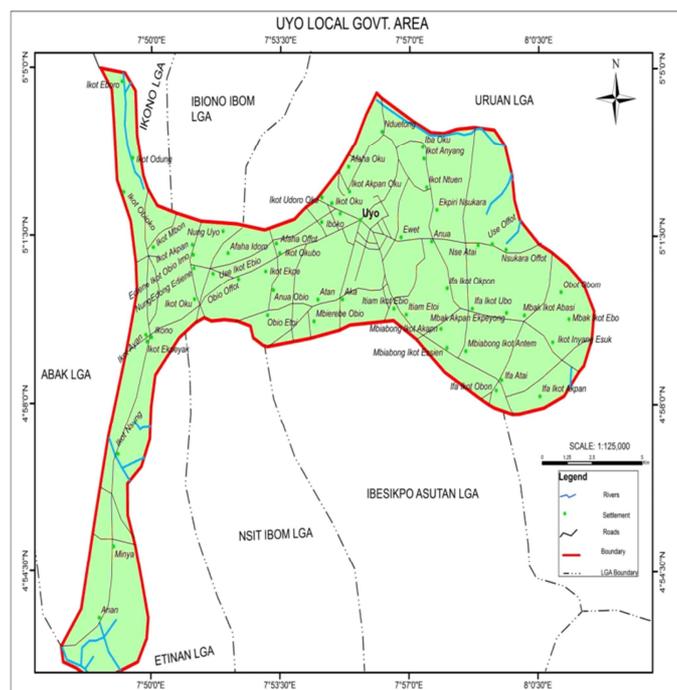


Fig. 1. Map of Uyo showing the study area.

2.2. Ethical Consideration

Prior to the collection of data, a letter of introduction was gotten from the department of Animal and Environmental Biology, University of Uyo. Ethical clearance was gotten from The Ethical Committee, Ministry of Health, Akwa Ibom State, Nigeria and informed consent was also obtained from the heads of households and the specific individuals who participated in the study. In order to maintain confidentiality, names and addresses of the respondents were not utilized.

2.3. Limitations of the Study

Some of the household members were uncooperative as they felt they would not benefit from the data collection, some didn't have time to fill it. Such households were not included in the study. The findings of this study were solely based on the respondents responses which were purely subjective.

2.4. Study Design/Sampling

A pilot study was undertaken in the month of June, 2015 to check the error and validity of the questionnaire. The questionnaires were pretested in a similar community with twenty respondents. Selected household in Uyo metropolis was conducted during the rainy season (July-October) and in semi dry season (November) one type of data collection was made. Collection of information on the demographic, geographical, socio-economic, knowledge, awareness, accessibility and utilization was done using questionnaire with multiple option.

2.5. Administration of Questionnaire

Ten post graduate students in the Department of Animal and Environmental Biology, University of Uyo, Uyo, were trained on administration of the questionnaire and data recording.

Questionnaires were used to collect information about the socio-economic in geographical status of each respondent. Quantitative random sampling method was used. Alternate households were enlisted in the study until the required sample size was achieved. Only one member of each household was interviewed. The research instrument for data collection was asemi-structured interviewer administered questionnaire. The questionnaire consisted of three sections

which reviewed the socio demographic data, awareness, accessibility and utilization of ITNs in Uyo capital city in Akwa Ibom State.

Trained data collectors conducted the interviews using a pretested and structured questionnaire to obtained baseline socio demographic house hold characteristics and information.

The questionnaire was administered in a face to face interview approach in some areas and collected back immediately while at other places were dropped and collected the next day. Included in the questionnaire were variables such as age, sex, education, whether household possess a bed net, whether respondents have ever slept under a bed net, if respondent was aware of bed net and also the reason for not using ITN. Data collection lasted six days.

2.6. Data Analysis

The data were pooled across the certain areas in Uyo so as to yield data sets which were then subjected to statistical analysis. Cross-tabulations and testing of means were used to compare the key variables across different socio-economic and geographical groups. Data was collected using pre tested semi – structured interviewer administered questionnaires. Test of statistical significance were carried out using chi square tests of statistical significance.

3. Results

A total of 570 respondents participated in the study. Each respondent represented a household. Age range of respondents ranges from under 20 years and above 60 years. The result revealed that 50 (8.8%) of the respondents were aged 20yrs and below, while 258 (45.23%) were between 21 – 30yrs of age, with regard to marital status; 268 (47.02%) of the respondents were married while 281 (49.30%) were single. In terms of occupation; 220 (38.59%) were civil servant 31 (5.44%) were framers. With respect to educational status; those with qualification from tertiary institution were 399 (62.95%) while those with primary sector qualification were 46 (8.07%). See table 1. There was no significant difference in marital status (>0.064) but there was significance difference with respect to educational status <0.03 and occupation <0.05 .

Table 1. Socio Demographic Characteristics of Respondents.

Variable	Sex n (%)		Total n (%) (N =570)	Statistical indices
	Male (N = 240)	Female (N = 330)		
Age				
Under 20	21 (8.8)	29 (8.8)	50 (8.8)	
21 – 30	114 (47.5)	144 (43.6)	258 (45.23)	
31 – 40	22 (9.2)	44 (13.3)	66 (11.58)	– value = 0.654 2 3.3
41 – 50	60 (25)	76 (23.)	136 (23.86)	
51 – 60	10 (4.1)	14 (4.1)	24 (4.210)	
60 and above	13 (5.4)	23 (7.)	36 (6.32)	
Marital Status				-value =0.064

Variable	Sex n (%)		Total n (%) (N =570)	Statistical indices
	Male (N = 240)	Female (N = 330)		
Single	108 (45)	173 (52.4)	281 (49.30)	$\chi^2 = 5.511$
Married	119 (49.6)	149 (45.2)	268 (47.02)	
Divorced	13 (5.4)	8 (2.4)	21 (3.68)	
Occupation				-value = 0.05 $\chi^2 = 27.165$
Civil servant	107 (44.58)	113 (31.1)	220 (38.59)	
Farming	3 (1.3)	28 (8.48)	31 (5.44)	
Trading	59 (24.58)	73 (20.1)	132 (23.16)	
Student	40 (16.69)	89 (25.97)	129 (22.63)	
unemployed	31 (12.9)	27 (14.35)	58 (10.18)	-value = 0.003 $\chi^2 = 13.836$
Educational Status				
Primary	18 (7.5)	28 (8.5)	46 (8.07)	
Secondary	20 (8.3)	63 (19.09)	83 (14.56)	
Tertiary	166 (69.2)	193 (58.48)	359 (62.98)	
Illiterate	36 (15)	46 (13.93)	82 (14.39)	

The result on awareness of ITNs indicates that 435 (76.32%) were aware of ITNs while 135 (23.68%) had no idea. With regard to source of information 84 (19.31%) were informed by radio and television, 64 (14.71%) by Hospital and 15 (3.46%) by bill board. Some of the respondent received regular information about ITNs once a week 38 (8.74%), once a month 183 (42.07%) and irregular 97 (22.29%). Majority that is 500 (87.72%) were aware that malaria is transmitted by mosquito but only 287 (50.35%) agreed that malaria is transmitted by *Anopheles* mosquito (table 2).

There was a significance difference in terms of awareness (>0.001).

Table 2. Awareness of ITNs among Respondents.

Variable	Sex n (%)		Total n (%) (N =570)	Statistical indices
	Male (N = 240)	Female (N = 330)		
AWARENESS				
Yes	202 (84.17)	233 (70.61)	435 (76.32)	-value = 0.001 $\chi^2 = 14.136$
No	38 (15.83)	97 (29.39)	135 (23.68)	
Source of Info	n = 202	n = 233	n = 435	-value = 0.315 $\chi^2 = 9.339$
TV/Radio	35 (17.33)	49 (21.03)	84 (19.31)	
Hospital	32 (15.83)	38 (16.31)	70 (16.09)	
Church	5 (2.48)	10 (4.29)	15 (3.46)	
School	29 (14.36)	18 (7.73)	47 (10.80)	
Family/Friend	19 (9.41)	31 (13.30)	50 (11.49)	
Billboard	34 (16.83)	30 (12.88)	64 (14.71)	
Internet	10 (4.95)	9 (3.86)	19 (4.37)	
Books/Mag.	24 (11.88)	29 (12.45)	53 (12.18)	
Not aware	14 (6.93)	19 (8.15)	33 (7.59)	
Regular				-value = 0.124 $\chi^2 = 7.227$
Once a week	13 (6.44)	25 (10.73)	38 (8.74)	
Once in 2 weeks	31 (15.35)	49 (21.02)	80 (18.39)	
Twice a week	21 (10.39)	16 (6.87)	37 (8.510)	
Once a month	93 (46.04)	90 (38.63)	183 (42.07)	-value = 0.703 $\chi^2 = 0.145$
Irregular	44 (21.78)	53 (22.75)	97 (22.29)	
Aware that mosquito transmits malaria parasite	n = 240	n = 330	n = 570	-value = 0.008 $\chi^2 = 9.568$
Yes	212 (88.33)	288 (87.27)	500 (87.72)	
No	28 (11.67)	42 (12.73)	70 (12.28)	
Type of Mosquito responsible for transmission				
<i>Anopheles sp</i>	139 (57.92)	148 (44.85)	287 (50.35)	
<i>Aedes sp</i>	10 (4.17)	20 (6.06)	30 (5.26)	
No idea	91 (37.91)	162 (49.09)	253 (44.39)	

On access to ITN; 322 (57.37%) have access to ITN while 243 (42.63%) do not have access. Their reasons for not having access includes difficult to obtain 15 (6.17%), distances from distribution point 36 (14.81%), Non availability 18 (7.41%), No interest 54/22.22%). For those who have access, the source of their ITNs were Hospital 72(22.01%), Roll Back Malaria Campaign 54 (22.22%), Market 66 (27.16%), and 231 (70.64%) got the ITNs free while 96 (29.36%), purchased the ITN (table 3). There was no significance difference in accessibility <0.0261 .

Table 3. Access to ITN.

Variable	Sex n (%)		Total n (%) (N =570)	Statistical indices
	Male (N = 240)	Female (N = 330)		
Accessibility	n = 240	n = 330		
Yes	150	177	327 (57.37)	-value = 0.261
No	100	143	243 (42.63)	² = 1.261
Reason	n = 100	n = 143		
Difficult to obtain	5 (5)	10 (6.99)	15 (6.17)	
Distance from distribution point	10 (10)	26 (18.18)	36 (14.81)	
Not Available	17 (17)	1 (0.70)	18 (7.41)	
Finance	30 (30)	30 (20.98)	60 (24.69)	-value = 0.000
Health	12 (12)	18 (12.59)	30 (12.35)	² =29.821
Nature of job	10 (10)	20 (13.99)	30 (12.35)	
No interest	16 (16)	38 (26.57)	54 (22.22)	
Source	n = 150	n = 177		
Hospital	46 (30.67)	26 (14.69)	72 (22.01)	
RBM	29 (19.33)	25 (14.12)	54 (22.22)	
Health distributor	32 (21.330)	55 (31.07)	87 (26.61)	-value = 0.226
F/F	25 (16.67)	23 (12.99)	48 (19.75)	² =23.583
Market	18 (12)	48 (27.12)	66 (27.16)	
Cost				
Free	101 (67.33)	130 (73.45)	231 (70.64)	-value = 0.008
Purchased	49 (32.67)	47 (26.55)	96 (29.36)	² = 1.463

The result in table 4 deals with the use of ITNs by respondents 393 (68.95%) used ITNs while 177 (31.05%) did not use ITNs. Out of those who use the ITNs 345 (87.79%) hanged it over their beds (fig. 2) while 48 (12.21%) use ITN to protect their farm (fig. 3). Also 218 (55.47%) used ITN always and 211 (53.68%) used one ITN per household.

There was no significance difference in usage of ITN.

Table 4. Use of ITNs by respondents.

Variable	Sex n (%)		Total n (%) (N =570)	Statistical indices
	Male (N = 240)	Female (N = 330)		
Use ITN				
Yes	158 (65.83)	235 (71.210)	393 (68.95)	-value = 0.171
No	82 (34.17)	95 (28.79)	177 (31.05)	² = 1.878
Method of Use	n = 158	n = 235	n = 393	
Hanging over the bed	140 (88.61)	205 (87.23)	345 (87.79)	-value = 0.683
Using it on the farm	18 (11.39)	30 (12.77)	48 (12.21)	² = 0.166
Frequency of Use				-value = 0.019
Always	99 (62.66)	119 (50.64)	218 (55.47)	² = 5.526
Sometimes	59 (37.34)	116 (49.36)	175 (44.53)	
No. of ITN Used				-value = 0.494
1	82 (51.89)	129 (54.89)	211 (53.69)	
2	35 (22.16)	57 (24.26)	92 (23.41)	² = 1.409
3 and above	41 (25.95)	49 (20.85)	90 (22.90)	

The result in fig. 4 shows the reasons of some respondents refusal to used the net which were as follows; That the feeling of the heat from the net is unbearable 59.47%, inconvenience 27.89% and others 12.63%.



Fig. 2. ITN used to cover bed.



Fig. 3. IT used i the farm.

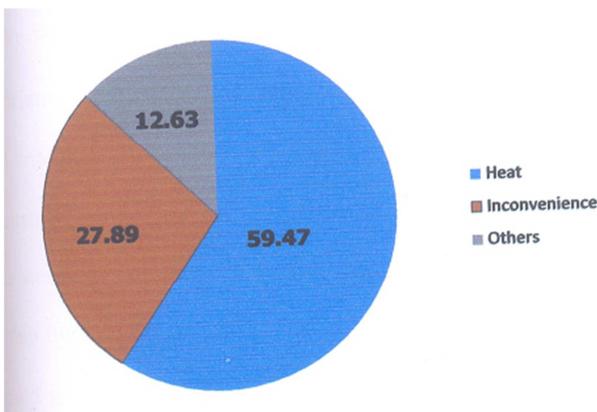


Fig. 4. Reasons for non-use of ITN.

4. Discussion

The use of ITN has been established from different studies to be an effective and cheap way of preventing malaria (14,

17). However, the use of ITN for prevention of malaria has been associated with a lot of difficulties ranging from lack of awareness and knowledge of its role in malaria prevention, to its accessibility, availability and affordability. (28). Findings from this study showed that a greater part of the study population was within the age range of 21 – 30 years. Malaria attack if it occurred, would greatly affect productivity in terms of income generation as this is a very active age group. Since over three quarters of the respondents attained secondary level of education, they were literate enough to assimilate any form of health education that may be given to them. A greater proportion of the respondents were aware of ITN compared to a study done in a northern Nigerian state where only 36% awareness was recorded (15).

Also, a study done in 2008 on benefits of awareness, ownership and use of ITNs in four West African countries which included Nigeria, Senegal, Uganda and Zambia, reported that four to six years after the introduction of ITNs, awareness rose from 7% to 60% in Nigeria (29). Awareness levels of 69% and 73% were recorded among mothers in studies in Edo State (30). This study suggested an increase in awareness over the years.

Also in the present study, approximately half of the respondents had access to ITN which is comparable to findings of a study done in 2012 in Cross-River State, Southern Nigeria, where accessibility of at least one net was reported in 48.2% of the households and net ownership of 49.5% (27). These findings were much higher than the 9.3% reported in the Edo State study in 2010 and 17% in the 2008 National Demographic Health Survey (NDHS) report in Nigeria (30). There seemed to be an upward trend in accessibility over the years.

It is noteworthy in our study, that despite the awareness that ITN is effective in preventing malaria, its use is being inhibited by a lot of factors. These factors include the feeling of discomfort, lack of conviction in its effectiveness in preventing mosquito bites and claim that it causes a lot of heat sensation.

About 43% of the respondents reported that they could not have access to ITN, and the reasons given included high cost, non/irregular availability, long distance from distribution point and other difficulties encountered in obtaining ITN, similar to the reasons given in other studies for poor ITN accessibility (18, 28).

In our study, the most important source of ITN was the health distributors and 70.64% were gotten free in contrast to a similar study done in Cross River State where only 34.43% obtained ITNs free from government and institutions, while 43.96% bought their ITNs from the social market (27). It was to be expected therefore, that many more people should have owned nets in the present study compared to the reports of Usip and Atabia (2014) study but there was only a marginal increase in ownership.

Studies performed in Kenya, Tanzania and Cameroun have also revealed poverty as an impediment to the purchase of mosquito nets (31)

No association was found between ITN ownership and level of education in the study area. Earlier published reports have shown a disparity between socio-economic factors, such as educational level and ownership of nets. However, recent reports which are consistent with our results have suggested that net ownership is not necessarily determined by higher educational status. (32) demonstrated that in Gabon, the percentage of net users was significantly higher among families with lowest educational score.

5. Conclusion

This study has shown that though awareness of ITN was high, accessibility and utilization were comparatively low. Efforts should be made by relevant stakeholders to increase ownership and usage of ITNs in order to reduce morbidity and mortality from malaria. There is need to provide enabling environments for scaling up actions that would make ITN more accessible, affordable and user friendly to people of low socio economic class. If this is achieved, this measure will go a long way in ensuring universal coverage, as well as protection of individual in this area, against mosquito bites.

Recommendations

- a. The government of the day should help to promote a bed net friendly environment or society by embarking on free distribution of bed net or distributing them at highly subsidized rate.
- b. Educational enlightenment campaign on the sustained use of ITN should be enforced seminar on usefulness and instructions on proper use of the ITN should be delivered to the populace on regular barriers.
- c. A number of initiatives to promote ITN through appropriate social marketing technique to address low ITN usage and ownership are required.

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