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Assessment of Long Lasting Insecticide Treated Net among Women of Child Bearing Age in a Community in South Eastern Nigeria

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Abstract- Globally, there have been attempts towards improving the coverage of malaria preventive measures with the 2015 goal of the World Health Organization's (WHO's) Roll Back Malaria Partnership centered to reduce global malaria cases by 75% and to reduce malaria deaths to near zero through universal coverage by effective prevention and treatment interventions. Regrettably, malaria still constitutes a serious public health problem in Nigeria. The aim of this study was to assess long lasting insecticide treated net use among women of child bearing age in Nwangele LGA Imo State. A community based descriptive cross sectional study was used for the study. The study involved women of child bearing age aged 15-45yrs at Nwangele LGA as its Target Population. A Probability based multi stage sampling method was adopted for the study. A semi-structured questionnaire was used as the instrument of data collection for this study and Statistical Package for the Social Sciences (SPSS) was used in the analysis of the data gotten from the study. A total of 404 women participated in the study. Results from the study revealed that majority 41.5% (169) of the women were aged between 26-30 years. The study showed that a majority of the respondents with 96.5% (390) are aware and have had heard about malaria prior to the study. The study posited that 74.0% (299) of the participants had knowledge of long lasting insecticide treated nets. Further results of the study showed that 74.0% (299) of the participants had knowledge of long lasting insecticide treated nets. 48.0% (194) agreed towards distribution of LLITNs in the community. Based on the Level of Utilization of Long Lasting Insecticide-Treated Nets among the women, the study revealed that 44.3% (179) of the women said yes when asked if they had ever slept under an LLITN. Considering the association demographic characteristics and utilization of LLITNs the study found that marital status ($p=0.004$), level of education ($p=0.0001$) and income level

($p=0.006$) were associated with uptake of bed nets among pregnant women. The study concluded that the coverage and distribution of long lasting insecticide treated nets in the community among women had low ownership and distribution forming part of the component integration strategy of Malaria prevention. The study recommended that the federal government should train and empower a skilled manpower in surveillance and frequent check up of distribution gaps in LLITNs in the rural communities through the help of agencies and concerned nongovernmental organizations.

I. INTRODUCTION

According to a publication by center for Disease Control (2014), malaria infection is caused by a protozoan (Plasmodiae). However the report posited that malaria infection occurs when favorable environmental conditions of temperature, rainfall, and humidity are created for the female Anopheles mosquitoes, carrying the Plasmodium, to bite a susceptible host (CDC, 2014). Malaria infection is endemic in Nigeria, with a prevalence of 919 per 10,000 of population; it remains one of the leading causes of morbidity and mortality (Ganihu & Jimo, 2013; Oche *et al.*, 2011; Aribodor *et al.*, 2017) It accounts for seven out of ten outpatient visits in Nigerian hospitals as well as being responsible for about 20% and 30% of infant and under-5 mortality rate, respectively (Oche *et al.*, 2011).

Following the attempts towards improving the coverage of malaria preventive measures, the 2015 goal of the World Health Organization's (WHO's) Roll Back Malaria Partnership are to reduce global malaria cases by 75% and to reduce malaria deaths to near zero through universal coverage by effective prevention and treatment interventions (RBM, 2010). Among other preventive interventions, WHO recommends the use of insecticide treated nets (ITNs), particularly Long-Lasting Insecticide Nets, which have been shown to be cost-effective, to reduce malaria episodes among children under 5 years of age by approximately 50% and all-cause mortality by 17%. Universal coverage with ITNs is defined as use by > 80% of individuals in populations at risk (WHO, 2019; RBM, 2010).

Aribodor *et al.* (2017) in a report posited that the usage of long lasting insecticide treated nets is largely

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affected by distribution patterns and also the knowledge of people and their perception about it. Behavioral patterns of people-utilization of the LLITNs are dependent on their socio demographic characteristics on the consequence of nonuse (Aina and Ayeni, 2011; Mbanugo and Okorudo, 2015; Aribodor *et al.*, 2017). Researchers give varied indications on the coverage and use of the LLITNs in various parts of the World and peoples level of knowledge it (Runsewe-Abiodun *et al.*, 2012; Aluko & Oluwatosin, 2012; Iwu *et al.*, 2010; Aina and Ayeni, 2011; Ganihu & Jimo, 2013). Isah and Nwobodo (2009) reported that despite evidence that the use of LLITNs decreases malaria-related morbidity and mortality, the use of LLITNs in Africa remains relatively low. Estimates suggest that in 2005, only 3% of children under five years of age slept under LLITNs, while up to ten times as many are thought to sleep under any bed net (Baley & Deressa, 2008). This shows that the fact that ITNs are very effective in malaria prevention does not necessarily mean that people will use them after they have received those (Baley & Deressa, 2008). While the evidence based on the effectiveness of LLITNs in reducing malaria transmission has grown rapidly in recent years, utilization rates of LLITNs in most African countries have been very low (Chukwuocha *et al.*, 2010; Ganihu & Jimo, 2013). The renewed Abuja, Nigeria, target for roll back malaria (RBM), a control program for malaria, targeted 80.0% of children <5 years of age and pregnant women to use long lasting insecticide-treated mosquito nets (LLITN) between 2006 and 2010 (FMOH, 2015; Deneye *et al.*, 2011).

The millennium development goal 6 has a target of halting and beginning to reverse the incidence of malaria in 2015 (Baley & Deressa, 2008). These control programs are aimed at reducing the morbidity and mortality, resulting from malaria infections in at-risk groups particularly at Households. The past decades have witnessed an increase in international funding for malaria control. This increased funding has led to an increase in accessing LLITNs in Sub-Saharan Africa (Deneye *et al.*, 2011). At the end of 2010, approximately 289 million LLITNs were delivered to the Several Households at Sub-Saharan African region; this is enough to take care of 76% of the 765 million persons at risk (Deneye *et al.*, 2011). Insecticide Treated Nets is currently one of the most cost-effective options for reducing malaria-related morbidity and mortality and has been reported to reduce malaria mortality by 17% in children <5 years of age (Runsewe-Abiodun *et al.*, 2012).

Regrettably, malaria still constitutes a serious public health problem in Nigeria (Aina and Ayeni, 2011; Mbanugo and Okorudo, 2015; Aribodor *et al.*, 2017). Malaria is endemic in the poorest countries in the world, causing 400 to 900 million clinical cases and up to 2.7 million deaths each year (Guyatt & Ochola, 2014). More than 90% of malaria deaths occur in Sub-Saharan

Africa, resulting in an estimated 3,000 deaths each day. Almost all the deaths are among high-risk groups including women of childbearing age, women during pregnancy, non immune travelers, refugees and other displaced persons, and people of all ages living in Household areas of unstable malaria transmission (Mbanugo & Okorudo, 2015; Iwu *et al.*, 2010; Aina & Ayeni, 2011; Ganihu & Jimo, 2013). In highly endemic countries, malaria poses a serious danger to women of child bearing age, women in pregnancy and their unborn children (Mbanugo & Okorudo, 2015). Malaria in pregnancy causes maternal anaemia, miscarriage, and low birth weight. In endemic countries, it is the leading cause of maternal mortality and one of the primary causes of neonatal deaths (Mbanugo & Okorudo, 2015).

According to some reports in Nigeria, malaria is the leading cause of Maternal Mobility contributing 33% of deaths among women of child bearing age and 25% infant mortality (Oche *et al.*, 2011; Iwu *et al.*, 2010). These Problems resulting due to minimal preventive measures especially in poor sub Saharan African regions like Nigeria which include low utility of LLITNs and poor sanitary conditions at Household and residential areas remain an issue of concern and a problem. Despite these interventions, women of child bearing age have reported gaps in uptake noting that LLITNs are effective in the prevention of malaria, ITN coverage and utilization still remain low in Nigeria with few studies have documented household net coverage and utilization in Nigeria (Aina and Ayeni, 2011; Mbanugo and Okorudo, 2015; Aribodor *et al.*, 2017). Most of the published studies available were conducted in other malaria endemic countries in Sub-Saharan Africa and the few published studies in Nigeria were from the urban centers of other states. With women of childbearing age being at significant risk, it is imperative to examine this coverage of long lasting Insecticide treated nets in Nwangele. However, it is due to the magnitude of the problem that the researcher aims to find out Long Lasting Insecticide Treated Nets use among women of child bearing age in Nwangele LGA, Imo state South Eastern Nigeria.

II. METHODS

a) Design

A community based descriptive cross sectional study was used for the study to determine Long Lasting Insecticide Treated Nets among women of child bearing age in Nwangele LGA.

b) Study Setting

Nwangele is a Local Government Area of Imo State, Nigeria. Its headquarters are in the town of Amaigbo. Nwangele Local Government is administered under the terms of the Constitution of the Federal Republic of Nigeria. Imo State it is located at the central part of Amaigbo and it is made up of 11 villages

comprising of Amaigbo Community, Abba Community, Dimnanume community, Isu Ancient Kingdom Community, Umuozu Community, Isiala Umuozu Community, Umunakara Community, Umudurunna Community, Abajah Community, Ogwuaga/Ekitiafor Community and Umunna Community. The urban towns of Nwangele L.G.A. are Abajah, Isu, Amaigbo, Umuozu and Abah, the rest are more of rural towns. Going by the 2006 census, the population of Nwangele L.G.A. was 127,691 people divided as Male 65022, Female 62669 (National Population Commission, 2006). Nwangele Local Government Area Constitutes mainly of Igbo people situated in her Residential territories as well as other minor ethnicities. It has an area of 295 km² and a population of 99,265 at the 2006 census The Coordinates of Nwangele Local Government Area is given as 5.4166° N, 6.9853 °E.

c) *Study Population*

This study on Long Lasting Insecticide Treated Nets among women of child bearing age in Nwangele LGA involved women of child bearing age aged 15-45yrs at Nwangele LGA as its Target Population

d) *Inclusion criteria*

The study included the following

- i. Women of child bearing age at Nwangele LGA who gave in their consent for the study.
- ii. Women of child bearing age at Nwangele LGA who are adults aged 18-45years present as at the time of data collection.

e) *Exclusion criteria*

The study excluded the following;

- i. Women of child bearing age who refused to give in their consent for the study
- ii. Women of child bearing age who were lunatic, sick or disabled during the time of data collection.

f) *Sampling*

i. *Sample size Calculation*

The sample size was determined using the Yamene formula (1967) for sample size determination.

$$n = \frac{N}{1 + Ne^2}$$

Where:

n is the desired sample size

N is the population size (12,389) = population of women of childbearing age at Nwangele LGA (NPC, 2010).

e is margin of error (0.05)

Therefore,

$$n = 392.30362210$$

Furthermore, to adjust for a 10% rate of non response and invalid response (i.e 90% expected response rate =0.9).

$$n = n/\text{expected response rate}$$

$$n = 392/0.90 = 435.5$$

$$n = 436$$

ii. *Sampling Methods*

A Probability based multi stage sampling method was adopted for the study on the coverage of Long Lasting Insecticide Treated Nets among women of child bearing age in Nwangele LGA.

First stage-*Selection of Communities*: A total of Three (3) Out of the communities in Nwangele LGA was selected by the researcher using simple random sampling via balloting to give every community an equal chance of selection. Second stage- *Selection of villages*: Three (2) villages each out of the total number of villages in the selected community was selected via simple random sampling using balloting giving every village in the selected community an equal chance of being selected. Third stage- *Selection of Streets*: A total of Five (5) streets each in the selected Six (6) villages were selected via simple random sampling (balloting) to give every street an equal chance of being selected. Fourth stage: *Selection of households*: A systematic probability sampling method was used to select each household in the selected streets giving each household an equal chance of selection. Fifth stage: *Selection of Respondents*: the researcher selected women of child bearing age in each household or any one present at the time of study. Selection of respondents was done via simple random sampling.

g) *Instrument for data collection*

A semi-structured questionnaire was used as the instrument of data collection for this study on the coverage of Long Lasting Insecticide Treated Nets among women of child bearing age in Nwangele LGA.

h) *Validity of the instrument*

The validity of the instrument of data collection by the researcher took the following shape; the questionnaire as the instrument of data collection was developed by researcher and submitted to the research supervisor for Face validity and proper scrutiny as well as two experts from department of public health for consensus validity in order to ensure that the questionnaire meets the objectives of study before reliability testing.

i) *Reliability of Instrument*

The Reliability of the instrument of data collection was determined using test retest method. Copies of the questionnaire were given to some respondents outside the area of study by the researcher. This area shared similar characteristics with Nwangele LGA that was used for this study. Chrombach alpha test was used to test for the reliability of the questionnaire to determine the consistency of the results with a reliability coefficient of 0.8 obtained.

j) *Method of Data Collection*

Data was obtained using an interviewer based semi structured questionnaire. This will be done with the aid of Two (2) field assistants who will be Hired and



trained to aid the researcher in the data collection process.

k) *Method of Data Analysis*

The Statistical Package for the Social Sciences (SPSS) was used in the analysis of the data gotten from the study. Results will be expressed in percentages, frequencies, tables and charts (Descriptive Statistics). Chi square was used to test the hypothesis statement of the study ($p=0.05$).

l) *Ethical Consideration*

A letter of introduction and ethical clearance was obtained from the School of Postgraduate studies Ethical clearance committee in Federal University of Technology Owerri (FUTO) before the research was conducted. The purpose of the research was explained to each respondent and verbal informed consent obtained from them before inclusion into the study. Also, anonymity of the respondents was assured and ensured. The confidentiality of the information they gave was also maintained.

III. RESULTS

A total of four hundred and thirty six (436) copies of questionnaires were distributed for the study. They were properly filled and crosschecked for correctness, and 404 questionnaires were retrieved and were used for the purpose of the analysis.

a) *Socio Demographic Factors of the Respondents*

From the table 1 below, 41.5% (169) of the respondents were aged between 26-30 years, 20.5%

(83) between ages 15-20, 9.9% (40) were people in their early 20's (21-25), 14.3% (58) were between 31-40 years of age and 13.3% (54) were adults within 41-45 year age bracket. On ethnicity, 38.1% (154) opted for ethnic groups not listed but label 'others', 93.7% (379) were of the Igbo ethnic group, 1.9% (8) Yoruba, and 0.4% (2) of the respondents were Hausa/Fulani. On educational backgrounds, 30.9% (125) of the respondents had Informal education, 12.8% (52) had attained the Tertiary level of Education, and 22.2% (90) had primary education and 37.1% (150) of the respondents with secondary level of education. 50.7% (205) of the respondents did occupations not listed but label 'others', 17.3% (70) were civil servants, 18.8% (76) of the respondents housewives while just 13.1% (53) were self employed. On the marital status of the respondents, 26.2% (106) were widowed, 24.7% (100) were single, 24.5% (99) married while 12.6% (51) of the respondents were separated. 11.8% (48) opted to choose 'others'. 27.2% (110) of the respondents had an income level between 1-10,000, 21.7% (88) had an income level between 31,000-50,000, 20.2% (82) earned above 100,000, 17.0% (69) had an income level between 11,000-30,000, and the least percentage 13.6% (55) earned an income between 51,000-100,000.

Table 1: Socio Demographic Factors of the Respondents

Characteristics	Frequency (n=404)	Percentage (%)
Age		
15-20	83	20.5%
21-25	40	9.9%
26-30	169	41.5%
31-40	58	14.3%
41-45	54	13.3%
Total	404	100
Ethnicity		
Igbo	379	93.8%
Hausa/ Fulani	2	0.4%
Yoruba	8	1.9%
Others	15	3.7%
Total	404	100
Educational level		
Informal education	52	12.8%
Primary	90	22.2%
Secondary	150	37.1%
Tertiary	112	27.7%
Total	404	100
Occupation		
Self employed	53	13.1%
House wife	76	18.8%
Civil servant	70	17.3%

Others	205	50.7%
Total	404	100
Parity		
None	92	22.7%
1-2	169	41.8%
3-5	40	9.9%
Above 5	103	25.4%
Total	404	100
Marital status		
Married	99	24.5%
Single	100	24.7%
Separated	51	12.6%
Widowed	106	26.2%
Others	48	11.8%
Total	404	100
Income Level		
1-10,000	110	27.2%
11,000-30,000	69	17.0%
31,000-50,000	88	21.7%
51,000-100,000	55	13.6%
Above 100,000	82	20.2%
Total	404	100

b) *Level of Knowledge of Long Lasting Insecticide-Treated Nets*

Table 2 considering the level of knowledge of long lasting insecticide treated nets, a majority of the respondents with 96.5% (390) said "Yes" when they were asked if they had heard about malaria at any time prior to the questionnaires, while a small 3.4% (14) denied. When asked if they had suffered from malaria, a majority if the respondents also with 95.2% (385) replied "Yes" while just 4.7% (19) said "No". 61.6% (249) of the respondents believe mosquito bites causes malaria, 26.2% (106) said malaria is caused by dirt/stagnant water, 9.6% (39) chose plasmodium organisms and 4.7% (19) said "germs". Upon question on how malaria is transmitted, 44.0% (178) opted to choose 'Bites of any

Mosquito', 19.0% (77) said "Bites of insect which has bitten a malaria Patient", and 36.8% (149) opted for 'Stagnant water and unclean environment'. 74.0% (299) of the participants replied "Yes" when asked if they had heard about LLITNs, while 25.9% (105) said "No". 24.2% (98) had heard about LLITNs from Health centers, 15.3% (62) from the Media, 17.3% (70) from publications/journals, 18.5% (75) chose options not listed but label 'others', 13.6% (55) heard about LLITNs from school, while 10.8% (44) from Family/Friends. Based on LLITNs is Key in Prevention of Malaria due to its Durability, 75.2% (304) said "Yes", while 24.7% (100) said "No". On if LLITNs is effective in the Prevention of Malaria when it is air dried frequently 73.7% (298) replied "Yes" and 26.2% (106) of the respondents said "No".

Table 2: Level of Knowledge of Long Lasting Insecticide-Treated Nets

Variables	Frequency (n=404)	Percentage (%)
Heard about Malaria		
Yes	390	96.5%
No	14	3.4%
Total	404	100
Have you Suffered from Malaria before		
Yes	385	95.2%
No	19	4.7%
Total	404	100
What causes malaria		
Germs	19	4.7%
Dirts/Stagnant Water	106	26.2%
Mosquito Bites	249	61.6%
Plasmodium Organisms	39	9.6%
Total	404	100
How is malaria Transmitted		
Bites of any Mosquito	178	44.0%
Bites of insect which has bitten a malaria Patient	77	19.0%
Stagnant water and unclean environment	149	36.8%
Total	404	100

Have your Heard about LLITN		
Yes	299	74.0%
No	105	25.9%
Total	404	100
Source of Information		
Health center	98	24.2%
Media	62	15.3%
Family/Friends	44	10.8%
Publications/Journals	70	17.3%
School	55	13.6%
Others	75	18.5%
Total	404	100
LLITNs is Key in Prevention of Malaria due to its Durability		
Yes	304	75.2%
No	100	24.7%
Total	404	100
LLITNs is effective in the Prevention of Malaria when it is air dried frequently		
Yes	298	73.7%
No	106	26.2%
Total	404	100

Overall respondents Knowledge of Long Lasting Insecticide Treated Nets among Respondents

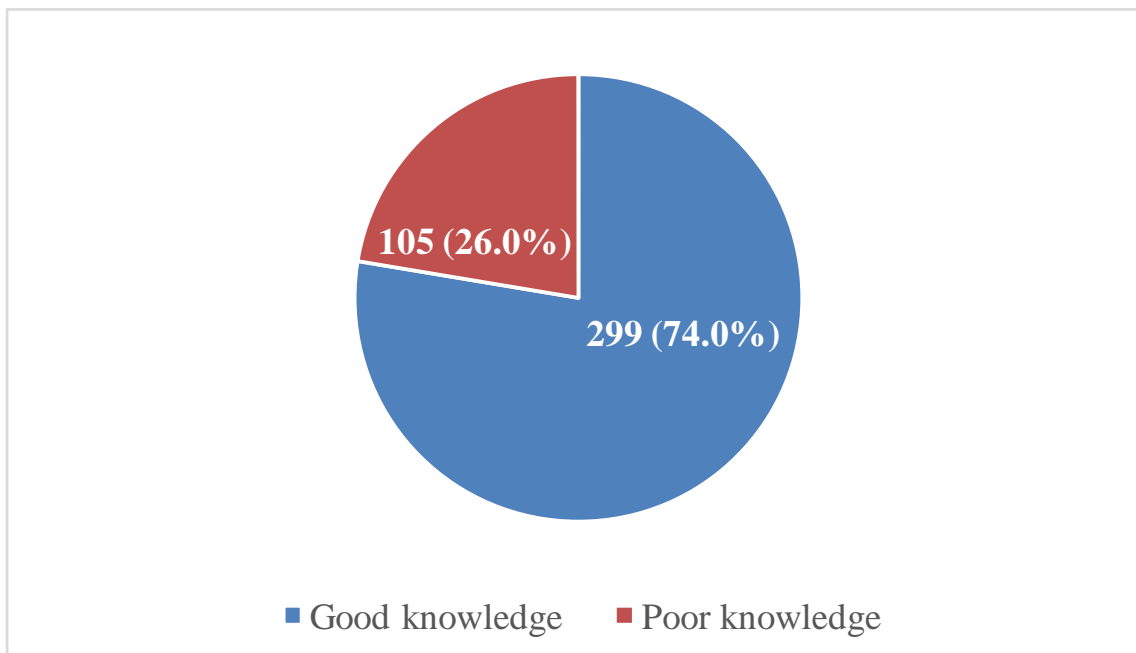


Figure 3: Overall respondents Knowledge of Long Lasting Insecticide Treated Nets among Respondents

Above figure 3 shows that 74.0% (299) of the respondents had good knowledge of long lasting insecticide Treated Nets among respondents while 109 (26.0%) had poor knowledge.

c) *Distribution and Ownership of Long Lasting Insecticide- Treated Nets among Respondents*

The table 3 below revealed the choices of respondents relative to Distribution and Ownership of Long Lasting Insecticide- Treated Nets. When asked if Insecticide Treated Nets had been distributed in their environs, 48.0% (194) replied “Yes” while 51.9% (210) said “No”. When the respondents were asked if they

had any Insecticide Treated Net, 71.2% (288) affirmed, while 28.7% (116) said “No”. The respondents were asked if they owned a Long Lasting Insecticide Treated Nets, 45.0% of the respondents (182) said Yes, while 54.9% (222) denied. On the question ‘How did you get it?’, 38.3% (155) chose Health Centers, 33.1% (134) said “Market”, 7.1% (29) said “Friends”, 15.0% (61) of the respondents replied “School” while some respondents 6.1% (25) chose options not listed but label ‘Others’. When asked How Many ITNs their household Owned, 41.3% (167) of the respondents said “None”, 17.8% (72) replied “1”, 29.9% (121) said between 2-4, 10.8% (44) of the respondents said “Above 4”.

Table 3: Distribution and Ownership of Long Lasting Insecticide- Treated Nets among Respondents

Variables	Frequency (n=404)	Percentage (%)
Insecticide Treated Nets distribution in your Area		
Yes	194	48.0%
No	210	51.9%
Total	404	100
Have any Insecticide Treated Net		
Yes	288	71.2%
No	116	28.7%
Total	404	100
Own Long Lasting Insecticide Treated Net		
Yes	182	45.0%
No	222	54.9%
Total	404	100
How did you get it		
Health Center	155	38.3%
Market	134	33.1%
Friend	29	7.1%
School	61	15.0%
Others	25	6.1%
Total	404	100
How Many ITNs do your household Own		
None	167	41.3%
1	72	17.8%
2-4	121	29.9%
Above 4	44	10.8%
Total	404	100

d) *Level of Utilization of Long Lasting Insecticide-Treated Nets*

Table 4 shows the Level of Utilization of Long Lasting Insecticide-Treated Nets among respondents. When asked if they had ever slept under an LLITN, 44.3% (179) said "Yes", while 55.6% (225) replied "No". The respondents were asked if they slept under an LLITN the previous night, 66.0% (267) confirmed, while 33.9% (137) denied. Respondents that denied were in turn asked when last they slept under an LLITN, 42.3% (58) told less than 7days ago, 33.5% (46) said between

8-29days, 24.0% (33) more than 30 days. When asked if their children/family members sleep under LLITN, 66.0% (267) confirmed "Yes", while 33.9% (137) said "No". The respondents who replied "No" were then asked if their children/family members slept under an LLITN the previous night, 62.8% (254) confirmed, while 37.1% (150) denied. Respondents that denied were in turn asked when last they slept under an LLITN, 32.0% (48) told less than 7days ago, 21.3% (32) said between 8-29days, 46.6% (70) more than 30 days.

Table 4: Level of Utilization of Long Lasting Insecticide-Treated Nets

Variable	Frequency	Percentage
Have you Ever Slept under an LLITN?		
Yes	179	44.3%
No	225	55.6%
Total	404	100
Did you sleep under an LLITN Last Night?		
Yes	267	66.0%
No	137	33.9%
Total	404	100
If No, when was the last time you slept under an LLITN?		
<7days ago	58	42.3%
8-29days	46	33.5%
> 30 days	33	24.0%
Total	137	100
Do your children/family Members sleep under LLITN		
Yes	267	66.0%

No	137	33.9%
Total	404	100
Did they sleep under an LLITN last Night		
Yes	254	62.8%
No	150	37.1%
Total	404	100
If No, when was the last time they slept under an LLITN		
<7days ago	48	32.0%
8-29days	32	21.3%
> 30 days	70	46.6%
Total	150	100

e) *Factors Influencing the Coverage of Long Lasting Insecticide-Treated Nets*

Shown in table 5 below are the Factors Influencing the Coverage of Long Lasting Insecticide-Treated Nets among respondents. When asked if Nets Inflicts Rashes, 74.0% (299) of the respondents confirmed, while 25.9% (105) said "No". Considering the Distance to Facility, 62.8% (254) of the respondents said it was a factor, while 37.1% (150) did not consider distance to facility being a factor influencing coverage of LLITNs. When asked about Cultural Acceptance, 44.3% (179) said "Yes" while 55.6% (225) denied. The respondents were questioned concerning Family

Factors; Study shows 71.2% (288) replied "Yes" while 28.7% (116) said "No". On whether Religious Acceptance influenced the use of LLITNs, 4.7% (19) affirmed "Yes" while majority of the respondents with 95.2% (385) said "No". 59.1% (239) denied Difficulty to install a LLITN was a factor influencing the use of the Nets, while 40.8% (165) confirmed. When asked if the respondents had door nets, 64.3% (260) said "Yes", while 35.6% (144) did not have door nets. On Information during Distribution being a factor influencing use of LLITNs was met with 44.0% (178) confirming among the respondents, while 55.9% (226) replied "No".

Table 5: Factors Influencing the Coverage of Long Lasting Insecticide-Treated Nets

Variable	Frequency (n=404)	Percentage (%)
Nets Inflicts Rashes		
Yes	299	74.0%
No	105	25.9%
Total	404	100
Distance to Facility		
Yes	254	62.8%
No	150	37.1%
Total	404	100
Cultural Acceptance		
Yes	179	44.3%
No	225	55.6%
Total	404	100
Family Factors		
Yes	288	71.2%
No	116	28.7%
Total	404	100
Religious Acceptance/Factors		
Yes	19	4.7%
No	385	95.2%
Total	404	100
Religious Acceptance		
Yes	194	48.0%
No	210	51.9%
Total	404	100
Difficulty to Hang		
Yes	165	40.8%
No	239	59.1%
Total	404	100
Have Door Nets		
Yes	260	64.3%
No	120	35.6%
Total	404	100

Information during Distribution		
Yes	178	44.0%
No	226	55.9%
Total	404	100

f) *Relationship between Socio-demographic characteristics and level of utilization of long lasting Insecticide Treated Nets*

Based on the Relationship between socio-demographic characteristics and level of utilization of long lasting insecticide treated nets, the table below shows that age not significantly associated with level of utilization insecticide treated nets (P = 0.5301). Furthermore, the table 4.6 shows that religion is not significantly associated with utilization of LLITNs (P = 0.115). Also, ethnicity doesn't show significant

association with utilization of LLITNs (P = 0.074). Marital status is significantly associated with utilization of LLITNs (P = 0.0001). Moving further, the table reveals that parity is significantly associated with the level of utilization of LLITNs (P = 0.0001). Also, level of education shows significant association with level of utilization of LLITNs (P = 0.0001). Occupation is not significantly associated with level of utilization of LLITNs (P = 0.942). The level of income of the respondents shows significant association with level of utilization of LLITNs (P = 0.006) (Table 6 below).

Table 6: Association between Socio-demographic characteristics and level of utilization of long lasting Insecticide Treated Nets

Characteristics	X ²	D.F	P value	Decision
Age	106.411	36	0.5301	NS
Religion	33.340	318	0.115	NS
Ethnicity	53.008	36	0.074	NS
Marital status	106.124	127	0.0001	S
Parity	81.645	36	0.0001	S
Education level	153.283	36	0.0001	S
Occupation	31.133	45	0.942	N.S
Level of income	71.977	45	0.006	S

IV. DISCUSSION

Based on the finding of this study on Long Lasting Insecticide Treated Nets among women of child bearing age in Nwangele LGA, considering the socio demographic characteristics, it was revealed that majority 41.5% (169) of the women were aged between 26-30 years. This finding goes in consistent with a study by Odoko *et al.*, (2012), that women of child bearing age have a mean age of 32.4yrs. The study revealed that majority 93.8% (379) of the respondents were Igbo region. This could be due to the fact that the study was conducted in Nwangele LGA which is the southeastern part of Nigeria dominated by people of Igbo origin. The findings of the study revealed that 27.2% (110) of the respondents had an income level between 1-10,000 naira. A study by Kenneth and Amefume (2013) posited a significant improvement in income level among women in rural areas. However this goes in contrast with the study with women of child bearing age mostly involved in petty trading.

Considering the level of knowledge of long lasting insecticide treated nets, the study showed that a majority of the respondents with 96.5% (390) are aware and have had heard about malaria prior to the study in consistence with a similar study conducted among groups of women of childbearing age (WOCBA) in Malawi by Owen *et al* (2018) on the awareness of Malaria among pregnant women. Information on Malaria is now widely open with several source of information existing. The study posited that 74.0% (299) of the

participants had knowledge of long lasting insecticide treated nets. Studies by Kyi *et al.* (2020) and Adebayo *et al* (2014) showed that respondents in an area had 69.6%, 81.5% respectively knowledge of long lasting insecticide treated nets which corroborates with the finding of this study. Women of child bearing age at Nwangele are more likely to get information on the utilization and adequate knowledge following community meetings, hospital visits and at educational institutions. The study further revealed that majority 24.2% (98) had heard about LLITNs from Health centers. This goes against a finding by Atenchong *et al* (2014) that revealed that majority of women had good knowledge of LLITNs and ITNs from a community follow up program. However from this study it implies that health workers proffer information to women on antenatal and other related periodic health visit by women of child bearing age in the community.

From the study it was revealed that the women when asked if Insecticide Treated Nets had been distributed in their environs, 48.0% (194) agreed. However this shows a poor reach of LLITNs in the community. The findings of this study on distribution of LLITNs reveal that women of child bearing age might experience shortfall of these LLITNs. A study by Kenneth and Amefume (2013) demonstrated that distribution of LLITNs was hugely affected in areas where concerned organizations seek for coverage. From the study 45.0% of the respondents (182) owned long lasting Insecticide treated nets in corroboration with a previous study by Owen *et al* (2018) on converge and ownership of LLITNs

by women in rural areas of Nigeria. Decreased ownership has been stated by the World Health Organization in a recent publication (WHO, 2021). These could be due to a lot of factors which this study sought further to find 38.3% (155) of the women of child bearing age opined that they got LLITNs from Health Centers and 33.1% (134) said Market. A finding by Nankinga *et al* (2012) posited that majority of resident's uptake ITNs from the Markets which goes against the finding of this study among women of childbearing age.

Based on the Level of Utilization of Long Lasting Insecticide-Treated Nets among the women, the study revealed that 44.3% (179) of the women said yes when asked if they had ever slept under an LLITN which goes against the finding by Adebayo *et al* (2014) on utilization of insecticide treated nets. Several factors could be responsible for the low uptake of insecticide treated nets among the women which was investigated by the study. According to Bennett *et al.* (2012) usage of LLITNs can be harnessed by several factors which could include, itches, reactions etc.

Furthermore, based on the factors influencing the Coverage of Long Lasting Insecticide-Treated Nets among respondents, when asked if Nets Inflicts Rashes, 74.0% (299) of the respondents opined it does. This finding goes in consistent with previous studies on the factors influencing uptake of LLITNs among women (Iwu *et al.*, 2010; Aina & Ayeni, 2011; Ganihu & Jimo, 2013). However in this study, participants posited that Considering the Distance to Facility, 62.8% (254) of the respondents said it was a factor towards their utilization. This implies that the health center is situated far away from them. When asked about Cultural Acceptance, 55.6% (225) denied it could influence their utilization and the coverage of LLITNS in the area. This goes against a study conducted at rural Dars es Salaam that showed majority of respondents agreeing cultural acceptance as a modifier to Malaria preventive behavior. The study revealed also that information during Distribution being a factor influencing use of LLITNs was met with 44.0% (178) confirming among the women of child bearing age (Charles *et al.*, 2019). A publication by Kyi *et al.* (2020) revealed that source of information on malaria preventive approaches was imperative in determining its uptake. The finding of this study shows that for women of child bearing age, information on utilization is essential for them to utilize LLITNs.

Based on the Relationship between socio-demographic characteristics and level of utilization of long lasting insecticide treated nets, the study revealed that marital status is significantly associated with utilization of LLITNs ($P = 0.0001$). This implies that husbands acceptance of the utilization of LLITNs is a motivating factor. This goes in line with a study by Atenchong *et al* (2014) which found marital status to be associated with uptake of bed nets among pregnant women ($P=0.004$). Moving further, the study also

demonstrated that parity is significantly associated with the level of utilization of LLITNs ($P = 0.0001$). This could be due to the fact that increasing number of children can lead to uptake as well as less number of children. This goes in contrast with a report published by Nankinga *et al* (2012) on Parity and Usage of Nets. Also, from the study among women of child bearing age in Nwangele, it was posited that level of education shows significant association with level of utilization of LLITNs ($P = 0.0001$). Women of child of bearing age with educational level and information on ITNs would likely utilize LLITNs. The study revealed that the level of income of the women shows significant association with level of utilization of LLITNs ($P = 0.006$). A study by Owen *et al* (2018) opined that women with higher income status could afford malaria preventive. This implies that from the findings of this study among women of child bearing age at Nwangele it is more likely for them to purchase LLITNs if they have the money.

V. CONCLUSION

However, from the study, the coverage and distribution of long lasting insecticide treated nets in Nwangele LGA forms part of the component of the 2011 RBM integration which is effective in rapidly increasing household possession and use of bed nets, achieving national bed net coverage goals set by National Health Development Plan (NHDP) 2012-2015. Low Ownership of LLITNs was reported in the study and malaria is a very serious public health problem; prompt treatment alone cannot guarantee the achievement of the goal. All strategies must be strengthened and employed in fight against malaria, if the desired goal is to be achieved. Findings from this study showed that majority of the residents had a considerable good knowledge of the use of insecticide treated nets but low ownership.

VI. RECOMMENDATIONS

The recommendations for this study include the following;

1. Health education on the effective use of long lasting insecticide treated nets among residents and practices to improve ownership and function.
2. Health facilities at Nwangele LGA should liaise with relevant stakeholders and authorities to improvise the distribution of safe insecticide treated nets to residents and patients affected.
3. The federal government should train and empower a skilled manpower in surveillance and frequent check up of distribution gaps in LLITNs in the rural communities through the help of agencies and concerned nongovernmental organizations.
4. Public Health Officers and Environmental health personnel's should develop policies that would mandate the government and legislative bodies to

enact them to help protect the wider community at large.

REFERENCES RÉFÉRENCES REFERENCIAS

- Adebayo, A. M., Akinyemi, O. O., & Cadmus, E. O. (2014). Ownership and utilisation of insecticide-treated mosquito nets among caregivers of under-five children and pregnant women in a rural community in southwest Nigeria. *Journal of Preventive Medicine and Hygiene*, 55(2), 58-64.
- Adeyemi, A. S., Adekande, D. A., & Akinola, S. E. (2007). Use and Prevalence of Insecticide treated Mosquito bed nets among pregnant population in Oshogbo Nigeria. *Nigerian Medical Practice*, 52(2), 29-32.
- Aina, B. A., & Ayeni, F. A. (2011). Knowledge and use of Insecticide treated net as a malaria preventive tool among pregnant women in a local Government area of Lagos State. *Nigerian Journal of Applied Pharmaceutical Science*, 01(07), 162-166.
- Aluko, J. O., & Oluwatosin, A. O. (2012). Randomized Control Trail and Utilization of Insecticide treated nets during pregnancy among postpartum women in Ibadan Kenya: a cross sectional study. *BMC Pregnancy and Child birth*, 12, 21.
- Amedo, E. K. (2016). Utilisation of insecticide treated mosquito nets among caregivers of children under five years in Hohoe township in Ghana [Ph.D. thesis], University of Ghana, Accra, Ghana.
- Aribodor, D. N., Nwaorgu, O. C., Eneanya, C. I., & Aribodor, O. B. (2017). Malaria among Primigravid attending antenatal clinics in Awka Anambra State, South Eastern Nigeria. *Nigerian Journal of Parasitology*, 28(1), 25-27.
- Arnott, A., Barry, A. E., & Reeder, J. C. (2012). Understanding the population genetics of Plasmodium vivax is essential for malaria control and elimination. *Malaria Journal*, 11, 14.
- Atenchong, M., Ngwibete, U., Ozims, I., & James, N. (2014). Attitudes toward Utilization of Insecticide-Treated Bed Nets among Pregnant Women and Care-Takers of Under-Five. *Nigerian Medical Journal*, 88(14), 218-251.
- Attanayake, N., Fox-Rushby, J., & Mills, A. (2018). Household costs of malaria morbidity: a study in Matale district, Sri Lanka. *Tropical Medicine and International Health*, 5(9), 595-606. doi: 10.1046/j.1365-3156.2000.00612.x.
- Azabre, B. A., Teye, K. J. & Yaro, J. A. (2013). Malaria control strategies in the Kasena- Nankana east and west districts of Ghana, *Ghana Journal of Geography*, pp. 102–120.
- Baley, M. & Deressa, W. (2008). Use of insecticide treated nets by pregnant women and associated factors in a predominantly rural population in Northern Ethiopia. *Tropical Medical International Health*, 13(1), 1303-1313.
- Bennett, A., Smith, S. J., Yambasu, S., Jambai, A., Alemu. W. & Kabano, A. (2012). Household Possession and Use of Insecticide-Treated Mosquito Nets in Sierra Leone 6 Months after a National Mass-Distribution Campaign. *PLoS ONE*, 7(5), e37-39.
- Bernard, J., Mtove, G., Mandike, R., Mtei, F., Maxwell, C. & Reyburn, H. (2009). Equity and coverage of insecticide-treated bed nets in an area of intense transmission of Plasmodium falciparum in Tanzania. *Malaria Journal*, 8, 65.
- Center of Disease Control. (2014). CDC Malaria Fact sheet N°94: Malaria vaccine: CDC position paper. (PDF). *Weekly Epidemiological Record*, 91(4), 33-52.
- Charles, N., Njumkeng, Y. & Tobias, O. (2019). Coverage and usage of insecticide treated nets (ITNs) within households: associated factors and effect on the prevalance of malaria parasitemia in the Mount Cameroon area. *BMC Public Health*, 19, 1216.
- Chima, R. I., Goodman, C. & Mills, A. (2013). The economic impact of malaria in Africa: a critical review of the evidence. *Health Policy*, 63:17-36.
- Chukwuocha, U. M., Dozie, I. N. S., Onwuliri, C. O., Nwoke, B. E., Nwankwo, B. O., Nwoke, E. A., Nwaokoro, J. C., Uduji O. G. & Adindu, B. C. (2010). Perceptions on the Use of Insecticide Treated Nets in parts of Imo River basin, Nigeria: Implications for preventing malaria in pregnancy. *African Journal of Reproductive Health*, 14(1):117-28.
- Collins, W. E. and Barnwell, J. W. (2009). Plasmodium knowlesi: finally being recognized. *Journal of Infectious Diseases*, 199 (8): 1107–08.
- Deneye, A. K., Jegede, A. S., Mafe, M. A. & Nwokocha, E. E. (2011). A pilot study to evaluate malaria control strategies in Ogun State, Nigeria. *World Health Population*, 9(2):83-94.
- Diema, K. D., Konlan, M., Aarah-Bapuah, J. A. & Abdulai, K. K. (2015). Barriers to sustained use of the insecticide treated bednet in the upper east region of Ghana.
- Dupas, U. & Cohen, I. O. (2009). Decreased motivation in the use of insecticide-treated nets in a malaria endemic area in Burkina Faso, *Malaria Journal*, 8 (1): 175.
- Espino, F. (2017). Perceptions of malaria in a low endemic area in Nigeria: transmission and prevention of disease. *Acta Tropica*. 1997; 63: 221-239.
- Federal Ministry of Health Nigeria, [FMOH], (2015). Emergency department management of mosquito-borne illness: Malaria, dengue, and west Nile virus. *Emergency Medicine Practice*, 16 (5): 1–23.

24. Federal Ministry of Health Nigeria, [FMOH], (2015). Emergency department management of mosquito-borne illness: Malaria, dengue, and west Nile virus. *Emergency Medicine Practice*, 16 (5): 1–23.
25. Ganihu, A. S. & Jimo, R. O. (2013). Awareness and Use of Insecticide treated nets among women attending antenatal clinic in a Northern state of Nigeria. *Journal of Pak. Medical Association*, 6:4-9.
26. Guyatt, H. & Ochola, S. (2014). Use of bednets given free to pregnant women in Kenya. *Lancet*, 62(9395):1549-1550.
27. Hartman, T. K., Rogerson, S. J. & Fischer, P. R. (2019). The impact of maternal malaria on newborns. *Annals of Tropical Paediatrics*, 30 (4): 271-82.
28. Isah, A. Y., & Nwobodo, R. (2009). Awareness and Utilization of Insecticide treated mosquito nets among pregnant mothers in a tertiary health institution in North- Western Nigeria. *Nigerian Journal of Medicine*, 18(2): 175-178.
29. Iwu, R. U., Ijioma, B. C., Egeruoh, A. S., Awurum, I. N. & Ohalete, C. N. (2010). Awareness and use of Insecticide treated among pregnant women attending antenatal clinic at Federal Medical centre and General Hospital Owerri, Imo State. *Report and Opinion*, 2(12): 154-157.
30. Johnson, A. C., Inyang, U. I., Etuknwa, U. D., Ekanem, U. O., Udo, M. & Ubom, H. (2018). Cost Analysis of insecticide treated nets among households in teh rural community of southern Nigeria, *Scholars Journal of Applied Medical Sciences*, vol. 3, no. 2A, 608-613.
31. Kenneth, W. & Amefume, N. (2013). A cross-sectional survey of Chewaka district settlement area of southwest Oromia. Determinants of the use of ITNs in a southwest area of Ethiopia. *International Journal of Community Medicine and Public Health*, 500–505.
32. Kiwuwa, M. S. & Stergachis, A. (2012). Determination of use of Insecticide treated nets for the prevention of malaria in pregnancy: Jinga Uganda. *PLOS ONE*, 7(6):39-71.
33. Kweku, A., Sodofia, G., Kye-duedo, E., Agboli, I. & Agbemafle, U. (2016). Ownership and utilization of long lasting insecticide treated nets (LLIN) and factors associated to non-utilization among pregnant women in Ho municipality of Ghana. *Central African Journal of Public Health*, 2(1): 35–42.
34. Kyi, V., Thar-Min, C., Thae, H., & Maung, A. A. (2020) Utilization of insecticide-treated bed nets and care-seeking for fever and its associated socio-demographic and geographical factors among under-five children in different regions: evidence from the Myanmar Demographic and Health Survey, 2015–2016 *Malaria Journal*, 19:48-56.
35. Mbanugo, J. I. & Okorudo, O. (2015). Prevalence of Plasmodium infections in Pregnant women in Aguata, Anambra state, South Eastern Nigeria. *Journal of Environmental Health*, 2(2): 64-68.
36. Mueller, I., Zimmerman, P. A. & Reeder, J. C. (2017). Plasmodium malariae and Plasmodium ovale—the "bashful" malaria parasites. *Trends in Parasitology*, 23 (6): 278–83.
37. Musa, O. I., Salaudeen, G. A. & Jimo, R. O. (2017). Awareness and use of Insecticide treated nets among women attending antenatal clinic in a Northern state of Nigeria. *Journal of Pak. Med. Assoc*, 59(6): 354-358.
38. Nankinga, Z. 1., Muliira, J. K., Kalyango, J., Nankabirwa, J., Kiwuwa, S., Njama-Meya, D. & Karamagi, K. (2012). Factors associated with utilization of insecticide-treated nets in children seeking health care at a Ugandan hospital: perspective of child caregivers. *Journal of Community Health*, 37(5): 1006-1014.
39. National Population Commision (2006). Nigerian Census and population committee. Federal Republic of Nigeria.
40. Oche, M. O., Ameh, I. G., Umar, A. S., Gana, G. & Njoku, C. H. (2011). Awareness and Use of Insecticide treated nets among pregnant women attending antenatal at Usman Dan Fodio University Teaching Hospital Sokoto. *Nigerrian Journal Parasitology*, ISSN: 1117-4145.
41. Odoko J. O., Nwose E. U. & Igumbor E. O (2012). Utilization of insecticide treated nets against malaria among pregnant women in Southern Nigeria. *Malaria Journal*, 77(16): 108-117.
42. Odumegwu. L. (2013). Undernutrition as an underlying cause of malaria morbidity and mortality in children less than five years old in Nigeria. *Nigeiran Journal of Tropical Medicine and Hygiene*, 71(2): 55-63.
43. Okoye, C. A., & Isara, A. R. (2011). Awareness on the use of Insecticide treated nets among women attending antenatal clinic in a tertiary heath facility in South- South Nigeria. *Nigerian Medical Practitioners Journal*, 52(2): 67-70.
44. Okwa, O. O. (2004). Preliminary investigations on malaria in sickle cell patients among pregnant women ang infants in Lagos, Nigeria. *Nigerian Journal of Parasitology*, 25: 81-85.
45. Osero, J. S., Otieno, M. E., & Orago, A. S. (2015). Maternal use of Insecticide treated nets in the prevention of malaria among children under 5 years in Nyamira district Kenya. *East African Medical Journal*, 82(10): 495-500.
46. Owen, B., Nkoka, I. F., Ting-Wu, V. O., & Chuang, H. I. (2018). Factors associated with insecticide-treated net usage among women of childbearing age in Malawi: a multilevel analysis, *Malaria Journal*, 17: 372-378.
47. Richard, W. S., Bernard, L., Nah, L., Mornica, E., Parise, U., & Clara, M. (2008). The burden of malaria

in pregnancy in malaria endemic areas. *American Journal of tropical Medicine Hygiene*, 64(12): 28-35.

48. Rijken, M. J., McGready, R., Boel, M. E., Poespoprodjo, R., & Singh, N. (2012). Malaria in pregnancy in the Asia-Pacific region. *Lancet Infectious Diseases*, 12 (1): 75–88.

49. Roll Back Malaria (RBM). (2010). Insecticide treated Mosquito nets WHO2001-2010.

50. Ruben-Diaz, L. O. (2011). Level of awareness, Ownership and Use of Insecticide Treated Bed Nets (ITNs) by Pregnant Women Attending Antenatal Clinics in Anambra state, South Eastern Nigeria. *African Journal of Reproductive Health*, 15(1): 185-190.

51. Runsewe-Abiodun, T. I., Inyanwura, A. C. & Sotimehin, S. A. (2012). Awareness and knowledge about Insecticide treated nets amongst pregnant mothers in Ogun state, Western Nigeria: A descriptive cross sectional study. *Educational Research Journal*, 2(5): 138-145.

52. Salaudeen, G. A., & Jimoh, K. (2009). Awareness and use of insecticide treated nets among women attending antenatal clinics in a Northern state of Nigeria. *Journal of Pak Medicine Association*. Accessed: <http://www.jpma.org.pk>.

53. Sarkar, P. K., Ahluwalia, G., Vijayan, V. K. & Talwar, A. (2009). Critical care aspects of malaria. *Journal of Intensive Care Medicine*, 25 (2): 93–103.

54. Ukibe, U. N., Tailor, E., Nku, D., Duvail, S., Tabala, M., Meshnick, S. & Bechets, E. (2017). Free distribution of insecticide treated bed nets to pregnant women in Kinshasa: an effective way to achieve 80% use by women and their newborns. *Tropical Medical International Health*, 14(1): 20-28.

55. Wagbasoma, V. A., & Aigbe, E. E. (2010). ITNs Ownership and Utilization among pregnant women attending ANC in Manki West, Uganda. *African Journal of Clinical Practice*, 13(2): 144-148.

56. World Health Organization. (2016). Final report of the Commission on Social Determinants of Health. Publications and documents: Towards health-equitable globalization: rights, regulation and redistribution.

57. World Health Organization. (2017). World Malaria Report.

58. World Health Organization. (2019). World Malaria Report. Switzerland: World Health Organization WHO. 11–13.

59. Worrall, E., Basu, S., & Hanson, K. (2012). The relationship between socioeconomic status and malaria: a review of the literature. Background paper for ensuring that malaria control interventions reach the poor; 56.

Questionnaire on the Evaluation of the Coverage of Long Lasting Insecticide Treated Nets Among Women of Child Bearing Age in Nwangele Lga, Imo State, South Eastern Nigeria

SECTION A: SOCIO DEMOGRAPHIC CHARACTERISTICS

INSTRUCTION: Please tick (✓) the correct options besides each question and also fill in the spaces provided where appropriate with the correct options.

1. What is your Age: (a) 15-20 [] (b) 21-25 (c) 26-30 [] (d) 31-40 [] (d) 41-45 []
2. Religion: (a) Christianity [] (b) Muslim [] (c) Traditional [] (d) Others (Please Specify)
3. Ethnicity (a) Igbo [] (b) Hausa [] (c) Yoruba [] (d) Fulani [] (e) Others (please specify).....
4. Marital status (a) Married [] (b.) Single [] (c.) Separated [] (d) Widowed []
5. Number of children (Parity) (a) None [] (b) 1-2 [] (c) 3-5 [] (d) above 5 []
6. Education level (a.) No formal education [] (b.) Primary [] (c.) Secondary [] (d.) Tertiary [] (e) others (specify).....
7. Your occupation: (a) Artisan e.g Carpenter, Hairdresser, Tailor, Driver [] (b) Civil servant e.g Teacher [] (c) Self-employed e.g Trader, Photographer [] (d) Unemployed [] (e) Professionals e.g. Doctor, Nurse, Lawyer, Accountant [] (f) Others (please specify).....
8. What is your Level of Income (a.) 1-10,000 [] (b.) 11,000-30,000 [] (c.) 31,000-50,000 [] (d.) 51,000-100,000 [] (e) above 100,000 []

SECTION B: KNOWLEDGE OF LONG LASTING INSECTICIDE-TREATED NETS

Please tick (✓) the correct options besides each question and also fill in the spaces provided where appropriate with the correct options.

9. Have you heard about Malaria (a) Yes [] (b) No []
10. Have you suffered from Malaria before? (a) Yes [] (b) No []
11. What causes malaria (a) Germs [] (b) Dirts/stagnant water [] (c) Mosquito bites [] (d) plasmodium organisms [] (d) others.....

12. How is malaria Transmitted? (a) Bites of any Mosquito [] (b) Bites of insect which has bitten a malaria Patient [] (c) Stagnant water and unclean environment []
13. Have you heard about Long Lasting Insecticide treated Nets (LLITNs)? (a) Yes [] (b) No []
14. How did you hear about it? (a) Health center [] (b) Media [] (c) Friends/Family [] (d) Publications/Journals [] (e) School [] (f) others.....
15. Long Lasting Insecticide treated Nets (LLITNs) is Key in Prevention of Malaria due to its Durability (a) Yes [] (b) No []
16. Long Lasting Insecticide treated Nets (LLITNs) is effective in the Prevention of Malaria when it is air dried frequently (a) Yes [] (b) No []

SECTION C: DISTRIBUTION AND OWNERSHIP OF LONG LASTING INSECTICIDE- TREATED NETS AMONG RESPONDENTS

17. Has Insecticide Treated Nets been distributed in your Area? (a) Yes [] (b) No []
18. Do you have any Insecticide Treated Net? (a) Yes [] (b) No []
19. Do you Own any Long Lasting Insecticide treated net(a) Yes [] (b) No []
20. How did you get it? a) Health center [] (b) Market [] (c) A Friend [] (d) others.....
21. How Many ITNs do your household Own? (a) None [] (b) 1 [] (c) 2-3 [] (d) 4 [] (e) above 4 []

SECTION D: LEVEL OF UTILIZATION OF LONG LASTING INSECTICIDE-TREATED NETS

Please tick (✓) the correct options besides each question and also fill in the spaces provided where appropriate with the correct options.

22. Have you Ever Slept under an LLITN? (a) Yes [] (b) No []
23. Did you sleep under an LLITN Last Night? (a) Yes [] (b) No []
24. If No, when was the last time you slept under an LLITN? (a) <7days ago [] (b) 8-29days [] (c) > 30 days []
25. Do your children/family Members sleep under LLITN? (a) Yes [] (b) No []
26. Did they sleep under an LLITN last Night?
27. If No, when was the last time they slept under an LLITN? (a) <7days ago [] (b) 8-29days [] (c) > 30 days []

SECTION E: FACTORS INFLUENCING THE COVERAGE OF LONG LASTING INSECTICIDE- TREATED NETS

Please tick (✓) the correct options that influence Utility and coverage of Long lasting Ins ecticide treated Nets in the spaces provided in the Table below.

S/N	Factors Influencing Coverage	Yes	No
1.	Nets Inflicts Rashes		
2.	Distance to Facility		
3.	Cultural Acceptance		
4.	Family Factors		
5.	Religious Acceptance/Factors		
6.	Difficulty to Hang		
7.	Have Door Nets		
8.	Information during Distribution		