

# Compliance to the Use of Long-Lasting Insecticide Treated Nets and Occurrence of Malaria Among Students Of Federal University Of Technology Owerri (Futo).

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## Abstract

This study determined the Compliance to the use of long-lasting insecticide treated net (LLITNs) and occurrence of malaria among students of Federal University of Technology Owerri. Four specific objectives with corresponding research questions and 4 hypotheses guided the study. Cross-sectional research design was used for the study. A multi-stage sampling was adopted and simple random sampling technique was used to draw samples of 367 FUTO students living in the school hostels. A structured questionnaire was used for data collection after being validated and its reliability tested. The data collected was analysed using frequencies, and percentages; the hypotheses were tested using chi-square ( $X^2$ ) statistics at  $\leq 0.05$  level of significance. The result revealed that out of 367 students only 145 has LLITN while the rest 222 students do not have. Findings from this study showed that 145 (39.5%) students responded that they use LLITN, while 222 (60.5%) said they do not use LLITN. Among the 222 students who do not use LLITN, financial constraints, negligence and religion were the reasons given for non-usage of LLITN. Findings from this study showed that out of 119 (82.1%) students, who always make use of LLITN, 46 (38.7%) were diagnosed with malaria in the last four months. Among 145 (100.0%) students who responded to sleeping inside LLITN last night, 57 (39.3%) were diagnosed with malaria in the last four months, while 88 (60.7%) were not. However, sleeping inside LLITN showed a significant relationship with occurrence of malaria ( $X^2 = 7.045$ ;  $0.030 < P$ ). Based on the findings, the researcher recommended that more studies should be carried out to determine the level of awareness of LLITN campaign among University students. NGOs involved in the LLITN campaign should include students of Federal University of Technology Owerri residing in the school hostels, in their subsequent malaria prevention program.

**Key Words:** Federal University of Technology Owerri, Nigeria, Compliance, Long-Lasting Insecticide Treated Nets (LLITNs).

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## I. Introduction

Long-lasting insecticide treated bed nets (LLITNs) are the most powerful malaria control tool when used correctly. Long-lasting Insecticide treated bed nets are used for protection against mosquito bites, it has been proven to be, highly effective, practical and cost-effective means of malaria prevention and control (Lowassa, Mazigo, Mahande, Mwang'onde, Msangi & Mahande, 2012). According to World Health Organization (WHO) (2016) there were 216 million malaria cases that led to 440,000 deaths in 2016, about two thirds (290,000) of these cases were children under five years of age and most of these deaths occurred in sub-Saharan Africa. WHO (2014) opined that Nigeria suffers the world's greatest malaria burden, with approximately 51 million cases and 207,000 deaths reported annually (approximately 30 % of the total malaria burden in Africa), while 97 % of the total population (approximately 173 million) is at risk of infection. Moreover, malaria accounts for 60 % of outpatient visits to hospitals, led to approximately 11 % maternal mortality and 30 % child mortality, especially among children less than 5 years. Malaria is caused by Plasmodium falciparum, and the mosquitoes Anopheles gambiae, Anopheles funestus, Anopheles arabiensis, and Anopheles moucheti are the major vectors that cause year-round transmission (WHO, 2014). The World Health Organization advocates the use of LLITN as one of the three-pronged approach for reducing the burden of malaria (WHO, 2015). An insecticide-treated net is a mosquito net that repels, disables and/or kills mosquitoes, coming into contact with insecticide on the netting material. LLITNs thus, work in this case as a vector control intervention for reducing malaria transmission (Oyeyemi, Alawode, & Sogunro, 2011). Despite the concerted efforts made by the various health authorities to promote the access and use of LLITNs, studies have shown that the level of awareness, ownership, and actual use of ITNs/LLIN by people varies from one

locality or zone to the other. Factors such as ownership, correct and consistent use of LLITN may have given rise to increased prevalence of malaria cases (Oyeyemi, Alawode, and Sogunro, 2018). Although the awareness level has improved over time, there are limited studies that show the level of ownership, and actual use of ITNs/LLIN among University students. Long Lasting Insecticidal Treated Nets (ITNs) provide effective barrier or shield between the user and mosquitoes or other biting insects thereby protecting against mosquito bites and malaria transmission. Despite the efficacy of these nets, most of people either neglect or ignore usage of bed nets. Malaria vectors (Mosquito) start biting by late evening when people have not yet gone under bed nets, this present an opportunity to transmit the disease. Outdoor sleeping is a common habit among student, people who sleep outdoors are exposed to mosquito bites which result in developing malaria, this is major problem among young people (Salam, Das, Lassi, and Bhutta, 2014). Therefore, it is on these grounds that the researcher has determined the compliance with the use of long-lasting insecticidal treated net (LLITNs) and occurrence of malaria among student of Federal University of Technology Owerri.

## **II. Methodology**

Cross-sectional study design was employed to determine compliance with the use of long-lasting insecticide treated net (LLITNs) and occurrence of malaria among students of Federal University of Technology Owerri. Cross sectional study research describes characteristics that exist in a community, but not to determine cause-and-effect relationships between different variables. This method is often used to make inferences about possible relationships or to gather preliminary data to support further research and experimentation (Abanobi, 2010). A multi-stage sampling was adopted and simple random sampling technique was used to draw samples of 367 FUTO students living in the school hostels. The structured questionnaire (instrument) contained 18 items. It was prepared in Simple English with the title “COMPLIANCE TO THE USE OF LONG-LASTING INSECTICIDE TREATED NET (LLITNS) AND OCCURRENCE OF MALARIA AMONG STUDENTS OF FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI”. The questionnaire contained three (4) questions to identify the demographic data of the students in section A, section B contained 4 questions to identify Availability of long lasting insecticidal treated mosquito nets, section C contained 4 questions on Use of long lasting insecticidal treated mosquito net, section D sought answer to Consistency of use of LLIT and contained 4 questions, Section E answered questions on Correctness of use of LLITN. The questionnaire was administered to the students by the researcher and a research assistant after an informed consent was obtained. Each questionnaire did not exceed 5-8minutes time to be completed. The validity of the instrument was obtained using Chrombach Coefficient of reliability, and it gave a reliability Coefficient of  $r=0.70$ . Data was analysed using Statistical Progression for Social Sciences computer software version 22. Frequency and percentage was used to analyse the demographics of the respondents and socioeconomic characteristics of the students. While chi-squared test was used to test the relationship, P-value less than 0.05 was considered statistically significant.

## **III. Results**

### **Socio-Demographic Characteristics of the Students**

Presented in Table 1 below is the Socio-demographic characteristics of the students; it indicated that majority of the Students 317(86.4%) were within the age of 20-30 years, while 50(13.6%) were less than 20 years of age. Gender distribution of the students indicated that 213(58.0%) were males, while 154(42.0%) were females. Documentation on the educational attainment of respondents revealed that majority 310(84.5%) of students were undergraduate, while only 57(15.5%) were postgraduate students. With respect to religion 307(83.7%) were Christians, 58(15.8%) were Muslims, while 2(0.5%) of the students practice traditional African religion.

**Table 1: Socio-demographic distribution of the Students**

Socio-demographic characteristics	Frequency (n =367)	Percentage (%)
<b>Age</b>		
Less than 20	50	13.6
20-30	317	86.4
31-40	0	0.0
41-50	0	0.0
50 above	0	0.0
<b>Sex</b>		
Male	213	58.0
Female	154	42.0
<b>Religion</b>		
Christianity	307	83.7
Islam	58	15.8
Traditional	2	0.5
<b>Marital status</b>		
Single	286	77.9
Married	81	22.0
<b>Educational attainment</b>		
undergraduate	310	84.5
Graduate	0	0.0
post graduate	57	15.5

**Ownership of LLITN among Students of Federal University of Technology Owerri**

Presented in Table 2 below is the frequency and distribution of Ownership of long lasting insecticidal net among students of FUTO. 304 (82.8%) responded that they have heard of long lasting insecticidal treated mosquito net, while 63(17.2) said they have not heard of Long Lasting insecticidal treated mosquito net. when asked of the source of information on LLITN. 113(36.2%) said from fellow students, 80(17.2%) said their source of information on LLITN was television, 17(4.6%) said from radio, 81(22.1%) said their source of information is from health staff, 37(15.3%) said its from family members while 19(5.5%) said they have not heard of LLITN before. 145(39.5%) said they have LLITN while 222(60.5%) said they do not have LLITN. 70 (19.1%) said they got their LLITN from market, 2 (0.5%) got their LLITN from hospital, 73 (19.9%) said they got their LLITN from an NGO.

**Table 2: Distribution of Ownership of LLITN among students of Federal University of Technology, Owerri.**

Ownership of LLITN	Frequency (n =367)	Percentage (%)
<b>Those that have heard of Long Lasting Insecticidal Treated Mosquito Net</b>		
Yes	304	82.8
No	63	17.2
<b>From where (Source)</b>		
Fellow students	133	36.2
Television	80	21.8
Radio	17	4.6
Health staff	81	22.1
Family members	37	15.3
None	19	5.5
<b>Thosethathave Long Lasting Insecticidal Treated</b>		

<b>Mosquito Net</b>		
Yes	145	39.5
No	222	60.5
<b>Where they got their Long Lasting Insecticidal Treated Mosquito Net</b>		
Market	70	19.1
Hospital	2	0.5
NGO	73	19.9

**Use of LLITN among Students of Federal University of Technology Owerri.**

Presented in Table 3 below is the frequency and distribution of Use of long lasting insecticidal net among students of FUTO. 145 (39.5%) responded that they use LLITN, while 222(60.5%) said they do not use LLITN. 186 (83.8%) said they do not use LLITN due to financial reasons, 20(9%) said they do not use because of Negligence, while 16(7.2%) said it was due to religious/ personal reasons.

Students who responded to the question on how long they have used LLITN were as follows. 0(0.0%) there was no response for those who used LLITN in less than 1 month, 17(11.7%) said they have used LLITN for 1-2months, 114(78.6%) said they have used LLITN for 3 months, while 14 (9.7%) said they have used LLITN for more than 4 months. No student used the LLITN in the morning and afternoon but 145(100%) used LLITN in the night.

**Table 3: Distribution of Use of LLITN among students of Federal University of Technology Owerri.**

<b>Use of LLITN among students</b>	<b>Frequency (n =367)</b>	<b>Percentage (%)</b>
<b>Those that use Long Lasting Insecticidal Treated Mosquito Net</b>		
Yes	145	39.5
No	222	60.5
<b>Reasons for 'No'</b>		
Financial reasons	186	83.8
Negligence	20	9
Religious/Personal reasons	16	7.2
<b>How long they have used Long Lasting Insecticidal Treated Mosquito Net</b>		
Less than 1 month	0	0.0
1- 2months	17	11.7
3months	114	78.6
4 months and above	14	9.7
<b>When they normally use their Long Lasting Insecticidal Treated Mosquito Net</b>		
Morning	0	0.0
Afternoon	0	0.0
Night	145	100

**Consistency of use of LLITN among Students of Federal University of Technology Owerri.**

Presented in Table 4 below is the frequency and distribution of Consistency of use of long lasting insecticidal net among students of FUTO. 119 (82.1%) responded that they always use LLITN, 15 (10.3%) makes use of LLITN sometimes, there was no response under seasonal use of LLITN, 2(1.4%) said they make use of LLITN only when they remember, while 9 (6.2%) said don't use all the time. When asked what was their reasons for not sleeping under the LLITN last night, 137(37.3%) responded that they don't have, 58 (15.8%) said they can't afford it. 10(2.7%) said it causes cough, 17(4.6%) said it causes excessive heat, while nobody opted for body irritation.

**Table 4: Distribution of Consistency of use of LLITN among students of Federal University of Technology Owerri**

Consistency of use of LLITN among students	Frequency (n =367)	Percentage (%)
<b>Often use Long Lasting Insecticidal Treated Mosquito Net</b>		
	119	82.1
Always	15	10.3
Some times	0	0.0
Seasonal	2	1.4
Only when I remember	9	6.2
Not all the time		
<b>Those that slept inside Long Lasting Insecticidal Treated Mosquito Net last night</b>		
Yes	54	37.2
No	91	62.8
<b>Reason for 'not' sleeping under the Long Lasting Insecticidal Treated Mosquito Net</b>		
I don't have	137	37.3
Didn't sleep at home	58	15.8
It causes cough	10	2.7
It causes excessive heat	17	4.6
It causes body irritation	0	0.0

**Correctness of Use of LLITN among Students of Federal University of Technology Owerri.**

Presented in table 5 is the students who responded on Correctness of use of LLITN, 145 (100%) said they use their LLITN on the bed, nobody accepted using LLITN on the window and door. 52(35.9%) said the LLITN is spread less than 24 hours before use, 53(36.6%) said 24 hours while 40(27.5%) said they spread their LLITN more than 24 hours before use. Students response on LLITN maintenance 35 (24.1%) responded that their LLITN is thrown away once it's dirty, 40(27.6%) said LLITN is retreated with chemical, 30(20.7%) said their LLITN is washed with hot water when dirty, 25(17.2%) agreed washing it with warm water and mild soap when dirty while 15(10.4%) said their LLITN is stitched when torn. In addition, 75 (51.7%) said they were diagnosed with malaria in the last 4 months, while 70(48.3%) said they have not been diagnosed with malaria.

**Table 5: Distribution of Correctness of use of LLITN among students of Federal University of Technology Owerri**

Correctness of Use Of LLITN Among Students.	Frequency (n =367)	Percentage (%)
<b>Where they use Long Lasting Insecticidal Treated Mosquito Nets</b>		
<b>On the bed</b>	145	100
<b>On the window</b>	0	0.0
<b>On the door</b>	0	0.0
<b>Duration of spreading Long Lasting Insecticidal Treated Mosquito Net under the shade before use</b>		
< 24 hours	52	35.9
24 hours	53	36.6
> 24 hours	40	27.5
I don't spread under the shed before use	0	0.0
<b>Maintenance of Long Lasting Insecticidal Treated Mosquito Nets</b>		
By throwing it away when dirty	35	24.1
By retreating it with chemical	40	27.6

By washing it with hot water	30	20.7
By washing it warm water and mild soap	25	17.2
By stitching when torn	15	10.4

**Those that had/diagnosed malaria in the last 4 months**

Yes	75	51.7
No	70	48.3

**Association between Ownership of Long Lasting Insecticidal Treated Mosquito Net and Occurrence of Malaria among Student of Federal University of Technology Owerri**

Presented in table 6 below is the association between Ownership of LLITN and Occurrence of malaria among student of FUTO. Out of 304(82.8%) students who have heard of LLITN, 141(80.6%) was diagnosed of malaria in the last four months while 163(84.9%) was not. Out of 63(100%) students who have not heard of LLITN 34(19.4%) was diagnosed of malaria in the last four months while 29 (15.1%) was not. However, hearing of LLITN showed no significant association with occurrence of malaria among student of FUTO ( $X^2 = 1.204$ ;  $0.332 < P > 0.05$ )

Out of 133 (100%) students, 64 (36.6%) who said they heard of LLITN from their fellow students were diagnosed with malaria in the last four months while, 69(35.9%) said they have not. Out of 80(100%) who said they heard of LLITN via the television, 36(20.6%) was diagnosed with malaria while 44(22.9%) was not. Out of 17(100%) who heard of LLITN through radio, 8(4.6%) were diagnosed with malaria while 9(4.7%) had not. Out of 81(100%) who heard of LLITN through health staff, 37(21.1%) were diagnosed with malaria while 44(22.9%) had not.

Out of 145(100%) who have LLITN, 57(32.6%) were diagnosed with malaria while 88(45.8 %) had not. Out of 222 (100%) who do not have LLITN, 118(67.4%) were diagnosed with malaria while 104(54.2 %) had not. However, having a LLITN showed a significant association with occurrence of malaria among student of FUTO ( $X^2 = 6.737$ ;  $0.009 < P > 0.05$ ). Out of 70 (100%) who has LLTN and bought it from the market 22 (31.4%) were diagnosed with malaria while 88(45.8 %) had not. Out of 2 (100%) who has LLTN and got it from the hospital 1 (50.0%) were diagnosed with malaria while 1(50.0 %) had not. Out of 73 (100%) who has LLTN and got it from an NGO 34 (46.6%) were diagnosed with malaria while 39 (53.4 %) had not.

**Table 6: Association between Ownership of Long Lasting Insecticidal Treated Mosquito Net and occurrence of Malaria Among Students of Federal University of Technology Owerri**

Variables	Have you had/diagnose malaria in the last 4 months		Total	$X^2$ P(=0.05)
	Yes	No		
<b>Have you heard of Long Lasting Insecticidal Treated Mosquito Net</b>				
Yes				
No	141 (80.6%)	163 (84.9%)	304(100)	1.204
	34 (19.4%)	29 (15.1%)	63(100)	0.332
<b>If yes from where</b>				
Follow students	64 (36.6%)	69 (35.9%)	133(100)	
Television	36(20.6%)	44 (22.9%)	80(100)	1.152
Radio	8 (4.6%)	9 (4.7%)	17(100)	0.886
Health Staff	37(21.1%)	44 (22.9%)	81(100)	
<b>Do you have Long Lasting Insecticidal Treated Mosquito Net</b>				
Yes	57 (32.6%)	88 (45.8%)	145(100)	6.737
No	118 (67.4%)	104 (54.2%)	222(100)	0.009
<b>If Yes where did you get your Long Lasting Insecticidal Treated Mosquito Net</b>				
Market	22 (31.4%)	48 (68.6%)	70(100)	10.117
Hospital	1 (50.0%)	1 (50.0%)	2(100)	0.018
NGO	34 (46.6%)	39 (53.4%)	73(100)	
I don't have	11 (867.4%)	104 (54.2%)	222 (100)	

**Association between Consistency of Use of Long Lasting Insecticidal Treated Mosquito Nets and Occurrence of Malaria among Students of Federal University of Technology Owerri**

Presented in table 7 below is the association between consistency of use of LLITN and occurrence of malaria among students of FUTO. Out of 119(100%) students, who always uses of LLITN, 46(38.7%) were diagnosed with malaria in the last four months while, 73(61.3%) were not. Out of 15(100%) students who sometimes uses LLITN, 6(40.0%) were diagnosed with malaria in the last four months while, 9(60.0%) were not. Out of 2 (100.0%) students who uses LLITN only when they remember, 1(50.0%) had malaria while 1(50.0%) had not. Out of 9(100.0%) students who do not make use of LLITN at all times 4(44.4%) were diagnosed with malaria in the last four months while 5(55.6%) had not. How often students make use of LLITN showed no significant relationship with the occurrence of malaria ( $X^2= 6.947$ ;  $0.139 < P > 0.05$ ).

Among 145(100.0%) students who responded to sleeping inside LLITN last night, 57(39.3%) were diagnosed with malaria in last four months, while 88(60.7%) were not. Out of 7 (100%) student who did not sleep inside LLITN last night 3(1.7%) were diagnosed with malaria while 4(2.1%) had not. However, sleeping inside LLITN showed a significant relationship with occurrence of malaria ( $X^2= 7.045$ ;  $0.030 < P > 0.05$ ).

**Table 7: Association between Consistency of use of Long Lasting Insecticidal Treated Mosquito Net and occurrence of Malaria Among Students of Federal University of Technology Owerri**

Variables	Have you had/diagnose malaria in the last 4 months		Total	$X^2$ P(=0.05)
	Yes	No		
<b>How often do you use Long Lasting Insecticidal Treated Mosquito Net</b>				
Always	46 (38.7%)	73 (61.3%)	119 (100 %)	
Some times	6 (40.0%)	9 (60.0%)	15 (100%)	<b>6.947</b>
Seasonal	0.0 (0.0%)	<b>0.0 (0.0%)</b>	<b>0.0 (0.0%)</b>	<b>0.139</b>
Only when I remember	1 (50.0%)	1 (50.0%)	2 (100.0%)	
Not all the time	4 (44.4%)	5 (55.6%)	9 (100.0%)	
<b>Did you sleep inside your Long Lasting Insecticidal Treated Mosquito Net last night</b>				
Yes	57 (39.3%)	88 (60.7%)	145 (100.0%)	<b>7.045</b>
No	3 (1.7%)	4 (2.1%)	7 (100.0%)	<b>0.030</b>

**IV. Discussions**

**Ownership of LLITN among students of Federal University of Technology Owerri**

Findings observed from this study showed that out of 367 students only 145 has LLITN while the rest 222 student do not have. This is alarming as only few students have LLITN in spite of LLITN campaign going across several states. This finding supports the assertion of Grabowsky et al, (2010) and FMOH (2010) that Insecticide Treated Net ownership and use remain low among different socio-economic groups in sub-Saharan Africa particularly in Nigeria and the average number of ITNs per household is however less than one, meaning that high majority of Nigeria households are not effectively covered with the usage of ITNs. However, more studies should determine the level of awareness and campaign on the use of LLITN among university students. This will help public health experts to understand if University students are included in the LLITN campaign.

**Consistency of use of LLITN among student of Federal University of Technology Owerri.**

Findings from this study showed that out of 119(100%) students, who always make use of LLITN, 46(38.7%) were diagnosed with malaria in the last four months while, 73(61.3%) were not diagnosed with malaria in the last four months. Among 145(100.0%) students who responded to sleeping inside LLITN last night, 57(39.3%) were diagnosed with malaria in last four months, while 88(60.7%) were not. However, sleeping inside LLITN showed a significant relationship with occurrence of malaria ( $X^2= 7.045$ ;  $0.030 < P > 0.05$ ). This shows that more consistent and constant use of LLITN goes a long way in the reduction of malaria prevalence and incidence among University students.

## V. Conclusion

This study has determined Compliance with the use of long-lasting insecticide treated net (LLITNs) and occurrence of malaria among student of Federal University of Technology Owerri. Findings from this study has shown a decrease in the ownership of LLITN among FUTO students who reside in the school hostels. It has also shown that a good number of FUTO student who reside in the school hostel do not own LLITN. This study has also shown a strong relationship between ownership, consistent and correct use of LLITN and occurrence of malaria among students of Federal University of Technology Owerri(FUTO).

## VI. Recommendations

Based on the findings of this study, the following were recommended

- 1.) More studies should be carried out to determine the level of awareness of LLITN campaign among University students
- 2.) NGOs involved in the LLITN campaign should include university students in their malaria prevention program.
- 3.) LLITN should be made available especially to FUTO students living in the school hostel at no cost.
- 4.) Prospective and retrospective studies should be carried out to determine the exact factor that exposes these University students to the risk of malaria.
- 5.) More awareness should be created to enlighten students on correct use of LLITN.

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