

## **Factors affecting the utilization of long lasting insecticide treated bed nets among people living with HIV/AIDS in Bassa Local Government area of Plateau State, Nigeria.**

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### **Original Article**

#### **ABSTRACT**

**Objective:** Malaria and HIV account for over four million deaths per year thereby contributing significantly to the current global health burden. Insecticide Treated Nets (ITNs) represent a practical and effective means to prevent malaria in Africa. This study was conducted to determine the factors affecting the utilization of Long Lasting Insecticide Treated bed Nets (LLITNs) among People Living with HIV/AIDS (PLHIV).

**Methods:** An interventional study with a before and after design conducted among PLHIV to determine the factors affecting the utilization of LLITNs. EPI info statistical software version 3.5.4 was used for data analysis. Confidence interval for this study was set at 95% with a corresponding P < 0.05 considered statistically significant

**Results:** This study reported a mean 33.86 + 11.50 years with statistically significant improvement in the consistency of LLITNs use after the intervention. Furthermore, the likelihood of use of LLITNs was 9 times more among respondents with tertiary education when compared to other levels of education (Odd's ratio = 9.3712; 95% CI = 2.5261 – 34.7652; P = 0.0008).

**Conclusion:** This study has demonstrated positive influence of provision of free LLITNs supported with health education on the consistent utilization of LLITNs as well as certain factors that can influence LLITNs use.

**Key words:** Factors, Utilization, LLITNs, PLHIV

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## **Facteurs influent sur l'utilisation à long terme des moustiquaires imprégnées d'insecticide chez les personnes vivantes avec le VIH/SIDA à Bassa, Zone de gouvernement local de l'état du Plateau, au Nigeria.**

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### **Article Original**

#### **RÉSUMÉ**

**Objectif:** Le Paludisme et le VIH Compte Pour plus de 4 millions de décès par an ainsi contribuant ainsi de manière significative à l'augmentation de la charge mondiale de santé actuelle imprégnées (MSA) représentent un moyen pratique et efficace pour prévenir le paludisme en Afrique. Cette étude a été menée afin de déterminer les facteurs qui influent sur l'utilisation à long terme des Moustiquaires imprégnées d'insecticide (LLTNS) chez les personnes vivantes avec le VIH/le SIDA.

**Méthode:** Une étude interventionnelle avec un avant ou après la conception menée auprès de la conception menée auprès de PVVIH afin, de déterminer les facteurs qui influent sur l'utilisation de LTMII EPI info version du logiciel statistique 3.5.4 a été employé pour analyser des données; confiance de l'intervalle pour cette étude a été fixée à 5% avec un correspondant P = 0.05 considéré comme statistiquement significatif.

**Résultat:** Cette étude a signalé une moyenne de 33.86 + 11.50 ans avec l'amélioration statistiquement significative dans la cohérence de LTMII employé après l'intervention. En outre, la vraisemblance de l'utilisation des TMI était 9 fois plus chez les répondants ayant l'éducation supérieure par rapport aux autres niveaux de l'éducation (le ratio = 9.3712, 95% CI = 2.5261 – 34.7652; P = 0.0008).

**Conclusion:** Cette étude avait démontré les influences positives de la provision de LTMII libres, soutenu à l'éducation sanitaire sur l'utilisation cohérente des (LTMII) ainsi que certains facteurs qui peuvent influencer l'utilisation de LTMII.

**Mots Cles:** Facteur, utilisation, LTMII, PVVIH

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## **INTRODUCTION**

Malaria and HIV account for over four million deaths per year thereby contributing significantly to the current global health burden (1,2). Africa as a continent expends an estimated 12 billion Dollar yearly on malaria which in turn has contributed to making poor countries poorer by reversing the developmental gains and retarding economic growth by an estimated 1.3% per year (2,3). These two diseases are the leading causes of poverty globally with shared determinants of vulnerability (2, 4). LLITNs represent a practical and effective means to prevent malaria in Africa. However, its utilization is low and requires priority attention in order to bring to the barest minimum the morbidity and mortality from these this menace (5). Hence, this study was carried out to determine the factors affecting the utilization of LLITNs among PLHIV accessing treatment, care and support services in Seventh Day Adventist (SDA) hospital Jengre Bassa Local Government Area of Plateau State.

## **METHODOLOGY**

### **Study Area**

Plateau State is one of the states in the North Central zone of Nigeria covering an area of 26,899 square kilometers with a population of 3.2 million (6, 7). Plateau State shares boundaries with Bauchi, Kaduna, Nassarawa and Taraba states in the Northeast, Northwest, Southwest and Southeast respectively. Plateau State has 17 Local Government Areas (LGAs) and 3 senatorial zones. There are a total of forty (40) health facilities offering HIV/AIDS treatment, care and support services in Plateau State of which 21 are secondary health facilities across all the 17 LGAs, 16 primary health facilities and 3 tertiary health facilities (6). Seventh Day Adventist Hospital Jengre is one of the secondary health institutions providing comprehensive HIV/AIDS care in the state.

The Seventh-Day Adventist Hospital (SDA) Jengre is a mission hospital which was established in 1947 with bed capacity of 75 and staff strength of 70 (8). It is a secondary health care institution which offers specialist and general medical care. The service units in the hospital are the Outpatient Department (OPD), Emergency Unit and comprehensive HIV/AIDS care unit. The hospital has a wide network of clients particularly in the northern part of the country. Seventh Day Adventist Hospital Jengre commenced provision of comprehensive HIV/AIDS services supported by APIN in the year 2004. The hospital has a total of 563 adults on Anti Retroviral Therapy (ART) as at the time of this study. The ART clinic runs once a week (every Tuesday) (8).

### **Study Population**

This comprised of PLHIV receiving HIV/AIDS treatment, care and support services in SDA Hospital Jengre who were resident in Bassa LGA.

### **Study Design**

This was an interventional study with a before and after design in the same sample using quantitative method of data collection with a pre and post intervention phase.

### **Inclusion and Exclusion Criteria**

PLHIV who were 18 years and above residing in Bassa LGA and who had been enrolled into the adult HIV/AIDS care programme for twelve weeks and above participated in the study. Twelve weeks constituted one of the criteria as the respondents would have made at least three consecutive visits to the hospital since enrolment and the respondents' contact would have been established by the hospital's home based care team.

### **Determination of Sample Size**

The sample size was calculated using standard acceptable formula for

interventional study with a before and after design which is; (9).

$$n = \frac{[Z_{\alpha} P_1 q_1 + Z_{\beta} P_2 q_2]}{(P_2 - P_1)^2}$$

Where n = minimum sample size

$Z_{\alpha}$  is Standard normal deviate at 95% confidence interval which 1.96

$Z_{\beta}$  is the statistical power of the test at 80% which is 0.84

$P_1$  is the proportion of respondents with consistent use of LLITNs from a previous study which was 88% (10) and  $q_1$  as the complementary proportion of consistent use of LLITNs which is  $1 - P_1$ .

$P_2$  is the expected proportion of respondents with consistent use of LLITNs at the end of the study which was 98% and  $q_2$  as the complementary proportion of consistent use of LLITNs at the end of the study which is  $1 - P_2$

$P_2 - P_1$  = expected improvement in consistence use of LLITNs at the end of the study which is 10% (0.1)

A minimum sample size of 84 was obtained following addition of 10% of the calculated value to adjust for attrition.

### Technique of Sampling

Sampling of the respondents was carried out following a multi-stage approach.

#### Stage I

Of seventeen LGAs in Plateau State, Bassa LGAs was selected by balloting using simple random sampling technique.

#### Stage II

From the list of the three secondary health facilities in Bassa LGA offering HIV/AIDS treatment, care and support services, Seventh-Day Adventist hospital was selected using simple random sampling technique by balloting.

#### Stage III

Out of the 563 clients accessing comprehensive HIV care in Seventh-Day

Adventist Hospital drawn from the monthly clinic booking register, 290 PLHIV met the inclusion criteria following which 84 participants were selected randomly using WINPEPI statistical software.

### Preparation for Data Collection

Advocacy visit was paid to the Medical Director and the management of the Seventh Day Adventist Hospital Jengre to solicit for the hospital's support. Four resident trainees in community medicine from Jos University Teaching Hospital (JUTH) were trained as research assistants to aid with the administration of questionnaires as well as participating in the health education. The tool of data collection which was semi – structured and interviewer administered in nature was pre-tested in a secondary health in another LGA of the state. This helped in making appropriate corrections where necessary.

### Ethical Consideration

Informed consent was obtained from all the respondents following assurance of confidentiality of responses. Ethical approval was obtained from JUTH Ethical Review Committee.

### Data Collection

Four trained research assistants participated in the data collection in this study after a detailed explanation as to the purpose of the study had been given to all the eligible respondents.

### Intervention

LLITNs were provided to all the participants including those who already had after a session of health education that focused on types of mosquito nets, benefits of LLITNs and the importance of consistent use of LLITNs as well as actions to be taken to prevention malaria. The session included demonstration on the way the LLITNs should be mounted and used. Pamphlets and posters

providing relevant information on LLITNs were used as tools during the session which were given to all the participants to take home to serve as reminder tools. The LLITNs distributed to the participants had NAFDAC registration A5-0121, with production date 03/2010, expiry date 03/2015, batch number V0844D and produced by Sumitomo Chemical CO. LTD for P-Life® USA.

### Post Intervention

Three months after the intervention, quantitative data was again collected with the same data collection instruments from the respondents.

### Data Analysis

Statistical analysis of data obtained was carried using Epi info software version 3.5.4. A 95% confidence level was used in this study with level of statistical significance set at  $P < 0.05$ .

### Scoring/Grading of Responses

**Knowledge of LLITNs:** There were 5 stem questions on knowledge of LLITNs with 15 possible responses and only 6 of these responses were correct. One mark was awarded for each correct response and no mark was awarded for wrong response or I don't know response. A total of 6 maximum attainable scores were used for the assessment of knowledge of LLITNs. A score of 0 – 2 marks out of 6 marks was graded as poor knowledge of LLITNs and score of 3 – 6 mark out of 6 marks was graded as good knowledge of LLITNs.

### Grading of consistency of use of LLITNs

Use of LLITNs with response of always use all through the study period was assessed as consistent use of LLITNs

Use of LLITNs with responses such as most times, sometimes, rarely and never use all through the study period was assessed as inconsistent use of LLITNs.

## RESULTS

Eighty four (84) PLHIV participated in the study at both the pre-intervention and post-intervention phases of the study. The average age of the respondents was  $33.86 \pm 11.50$  years ranging from 18-67 years. Majority (78.6%) of the respondents were female. Christianity was the predominant religion of the respondents while 54 (64.3%) of the respondents were married. The highest level of education attained by respondents (46.4%) was primary. Only few (19.0%) of the respondents had LLITNs prior to the commencement of the study. See Table 1.

Following the intervention, significant improvement in knowledge of LLITNs was obtained as evident in the proportion of respondents with good knowledge increasing from 63 (75.0%) at pre intervention to 83 (98.85) post intervention ( $\chi^2 = 20.92$ ;  $P < 0.001$ ). Similarly, the mean knowledge on LLITNs among the respondent also increased from  $3.92 \pm 1.34$  pre intervention to  $5.42 \pm 0.63$  post intervention (T test = 9.31;  $P < 0.001$ ). See Table 2.

All the participants were provided free LLITNs at the beginning of the study inclusive of the 16 respondents who had LLITNs prior to the study. The assessment of utilization of LLITNs at post intervention revealed that 69 (82.1%) of the respondents slept under LLITNs the night prior to the assessment which was higher than the 9 (10.7%) at pre intervention ( $\chi^2 = 36.15$ ;  $P < 0.001$ ). The consistency of use of LLITNs showed statistically significant improvement following the intervention as the proportion of the respondents who consistently used LLITNs increased from 5 (6.0%) pre intervention to 41 (48.8%) post intervention ( $\chi^2 = 38.80$ ;  $P < 0.001$ ). See Table 3

Respondents belonging to age groups 28 – 37 and 38 – 47 years respectively were less likely to use LLITNs consistently when compared to other age groups in the study. Furthermore, respondents with tertiary level



of education (Odd's ratio = 9.3712; 95% CI = 2.5261 – 34.7652; P = 0.0008) as compared to other level levels of education were about 9 times more likely to use LLITNs consistently. Similarly, single respondents in this study showed about 4 times fold of consistent use of LLITNs as compared to respondents with other marital statuses ( Odd's ratio = 3.6197; 95% CI = 1.2949 – 10.1181; P = 0.0142). See Table 4

## DISCUSSION

The mean age of respondents in this study was  $33.86 \pm 11.50$  years. This finding is similar to that of a study done in Beira Mozambique which found the mean age to be  $38 \pm 15$  years. (11) Another Nigeria study conducted among PLHIV also found the mean age to be  $33.5 \pm 9$  years showing agreement with what was found in this study (12). Other studies carried out in Uganda and Cameroon were also in agreement with findings of this study (13, 14).

This study had more female respondents which is not far from what was obtained in other African studies (12, 14, 15, 16). However, another Nigerian study had a contrary finding of more male respondents (17). Most of the respondents in this study were married with about a quarter been widowed, this is at variance with the findings of an Ugandan study which revealed that 51% of the respondents were widowed (13). The findings on the proportions of the respondents being widowed could be due to the fact HIV/AIDS was responsible for the mortality among the spouses of the respondents.

Improvement in utilization of LLITNs the night before the assessment was observed after intervention when compared to the pre intervention phase. This high level of use of LLITNs a night before assessment could be attributable to the health education component of the intervention as well as the provision of LLITNs provided to all the respondents. Studies done in Uganda,

Ethiopia, Malawi and Nigeria reported findings similar to that of this study in which more than half of the respondent slept under LLITNs a night prior to assessment (18, 19, 20, 21). Other studies had findings contrary to that of this study as only 12%, 37.2% and 37% of the respondents respectively in some Nigerian studies slept under LLITNs a night preceding the assessment (22, 23, 24). The similarity of the findings of this study on utilization of LLITNs with other studies may be explained by value of the free distribution of LLITNs to the participants in these studies strengthened by provision of repeated health information on its use. Whereas, in the studies with contrary results it could be that LLITNs ownership was low as well as the possibility of unfavorable climatic condition such as heat.

Consistent use of LLITNs improved significantly at post intervention among the respondents corroborating the importance of availability of LLITNs in its use as supported by findings from an Ugandan study (10). Another study conducted in Kenya reported an improved consistency of use in LLITNs though with an entity of seasonal variations to its use (25). This was however not surprising as most of the studies on utilization of LLITNs provided free LLITNs to the respondents and also had health education as well as information reinforcement component targeted at improving utilization of LLITNs

Respondents with tertiary level of education and marital status as single had higher positive chance of consistent LLITNs use in this study while respondents within the age groups 28 – 37 and 38 – 47 were in the category of least likelihood of consistent utilization of LLITNs. Increased educational level could be instrumental to the consistent use of LLITNs as this may have aided the understanding and translation of information on utilization and benefits of LLITNs to its actual use. Similar trend was also observed in a Cameroonian study regarding factors

associated with the consistency of utilization of LLITNs in which levels of education had positive influence as against age of the respondents (26). Other studies also brought bear that level of education, ownership of more than one LLITNs, household headship pattern and knowledge of LLITNs were factors that influenced consistent use of LLITNs (27, 28). Therefore, a well structured health education and information reinforcement methods that will appeal to the interest of the respondents regardless of their ages, marital status and levels of education in addition to other factors identified in other studies will go a long way in improving LLITNs utilization in future studies.

### CONCLUSION

This study has demonstrated positive influence of provision of free LLITNs supported with health education on the consistent utilization of LLITNs as well as certain factors that can influence LLITNs use.

**Conflict of Interest:** There is no conflict of interest declared.

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Table 1: Demographic characteristics of the respondents

Variables	n = 84	
	Frequency	Percentage
<b>Age (years)</b>		
18-27	30	35.7
28-37	33	39.3
38-47	9	10.7
48-57	6	7.1
58-67	6	7.1
Mean age	33.86 ± 11.50 years	
<b>Sex</b>		
Female	66	78.6
Male	18	21.4
<b>Religion</b>		
Christianity	68	81.0
Islam	16	19.0
<b>Marital Status</b>		
Single	9	10.7
Married	54	64.3
Widowed	21	25.0
<b>Level of Education</b>		
Non formal	24	28.6
Primary	39	46.4
Secondary	12	14.3
Tertiary	9	10.7
<b>Ownership of at least one LLITNs prior to the study</b>		
Yes	16	19.0
No	68	81.0

Table 2: Knowledge of LLITNs among the respondents

Parameters	Pre-intervention n = 84 Freq (%)	Post-intervention n = 84 Freq (%)	$\chi^2$	df	P-value
<b>knowledge of LLITNs</b>					
Good	63 (75.0)	83 (98.8)	20.92	1	< 0.001
Poor	21 (25.0)	1 (1.2)			
<b>Mean knowledge score on LLITN</b>			T-test	df	P-value
3.92 <sub>±</sub> 1.34    5.42 <sub>±</sub> 0.63			9.31	167	< 0.001

df = degree of freedom

Table 3: Utilization of LLITNs among the respondents in the study

Parameters	Pre intervention (n = 84) Frequency (%)	post intervention (n = 84) Frequency (%)	$\chi^2$	df	P-value
<b>Use of LLITNs the night prior to the assessment</b>					
Yes	9 (10.7)	69 (82.1)	86.15	1	< 0.001
No	75 (89.3)	15 (17.9)			
Total	84 (100.0)	84 (100.0)			
<b>Consistency of Use of LLITNs</b>					
Consistent	5 (6.0)	41 (48.8)	38.80	1	< 0.001
Inconsistent	79 (94.0)	43 (51.1)			
Total	84 (100.0)	84 (100.0)			

df = degree of freedom, LLITNs = Long Lasting Insecticide Treated Nets

Table 4: Factors affecting use of LLITNs among the respondents

Factors	Odd's ratio	95% confidence Interval	P-value
<b>Age group(years)</b>			
28–37	0.2388	0.1126 – 0.5061	0.0002
38–47	0.2992	0.1029 – 0.8704	0.0268
48–57	1.5895	0.3661 – 6.9012	0.5362
58–67	0.2062	0.0416 – 1.0238	0.0535
18–27	1	-	-
<b>Level of education</b>			
Primary	0.9478	0.3867 – 2.3230	0.9067
Secondary	1.7678	0.6206 – 5.0361	0.2861
Tertiary	9.3712	2.5261 – 34.7652	0.0008
Non formal	1	-	-
<b>Marital status</b>			
Single	3.6197	1.2949– 10.1181	0.0142
Widowed	0.6281	0.2833– 1.3922	0.2521
Married	1	-	-
<b>Sex</b>			
Male	0.4369	0.1754– 1.0886	0.0754
Female	1	-	-
<b>Knowledge of LLITNs</b>			
Good	97739.4281	0.000>1.0E12	0.9604
Poor	1	-	-
<b>Seasonal variation</b>			
Hot season	0.0000	0.000>1.0E12	0.9645
Cold season	1	-	-
<b>Ventilation</b>			
Reduced	124869.886	0.000>1.0E12	0.9676
Normal	1	-	-