

Knowledge, Attitude, Ownership and Utilisation of Long-Lasting Insecticide-Treated Net Among Women of Childbearing Age Accessing Care in a Private Tertiary Hospital in Ogun State, Nigeria

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Abstract

Introduction: Ownership and use of long-lasting insecticide-treated nets (LLIN) are crucial for effective malaria control. However, a disparity exists between the two. This study assessed the knowledge, attitudes, ownership, and use of LLIN among women of childbearing age.

Methods: A descriptive cross-sectional study involving 400 women selected through purposive sampling. Ownership and utilisation of LLIN were assessed with “Yes” or “No” responses. Aggregate scores for knowledge and attitude were calculated, categorising as having good or poor knowledge/attitude, using the mean scores as the cutoff. Data analysis was conducted using IBM SPSS version 23 and presented in tables. A p-value of < 0.05 was considered statistically significant.

Results: The mean age of participants was 33.1 ± 8.3 years. More than three-fifths (62.5%) had LLINs. However, only 71.2% of this group slept under LLIN. Approximately two-thirds (64.8%) of participants demonstrated good knowledge, while 47.5% showed a good attitude. There was a statistically significant association between the level of education and ownership of LLINs ($p = 0.016$). Additionally, a statistically significant association existed between the belief that sleeping under an LLIN was taboo and possessing an LLIN ($p = 0.008$). There was a statistically significant association between the level of education and sleeping under an LLIN ($p = 0.008$).

Conclusion: Education and cultural taboos affect owning and sleeping under LLIN. More priority should be given to female education and debunking negative myths concerning LLIN use by using peer educators and community influencers, such as religious and traditional leaders.

Keywords: Long-lasting insecticide-treated nets, Ownership, Utilisation, Malaria prevention

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Introduction

Ownership and utilisation of long-lasting insecticide-treated nets (LLIN) are germane to effective malaria control. LLIN use is critical in protecting women and both children and foetuses whose health is dependent on the woman (1, 2). LLINs have been shown to reduce clinical episodes of

malaria by about 50% and malaria mortality in children under five by approximately 20% (3).

Nevertheless, an obvious disparity exists between the two, especially in Sub-Saharan Africa (SSA), which has 90% of the global malaria burden (4, 5, 6), with suboptimal LLIN utilisation (1, 2). Similarly, despite large-scale distribution campaigns for LLINs in Nigeria, utilisation rates often lag

significantly behind ownership. For instance, according to the 2018 Nigeria Demographic and Health Survey (NDHS), 60% of households owned at least one LLIN, but only 43% of individuals reported having slept under an LLIN the night before the survey (7). In the same vein, the 2021 Nigeria Malaria Indicator Survey (NMIS) reported that 56% of households had at least one LLIN for every two people, yet only 36% of the population slept under an LLIN the previous night (8). In 2023, a secondary analysis of the NMIS data by Omole et al revealed only 50% of pregnant women and 41.2% of children under 5 years old slept under an LLIN the night before the survey, despite the 56% household ownership (9).

Many factors are responsible for this gap, which include discomfort, fear of suffocation, poor knowledge, and attitude towards using LLIN. Knowledge and attitude have been established as important factors that affect both ownership and utilisation of LLIN (10, 11). Other reported factors associated with the use of LLIN include prior experience of utilisation, monthly income, family size, and level of education (5, 12).

Women of childbearing age are among the vulnerable groups, especially those who are pregnant or who are likely to get pregnant. Pregnant women face immunological changes that reduce their resistance to malaria (13). Furthermore, there is a lack of recent data on LLIN utilisation among women of childbearing age in Ogun State. Also, assessing LLIN use in a hospital setting provides insights into health-seeking behaviours among women accessing formal care.

This study, therefore, aimed to assess the knowledge, attitude, ownership, and utilisation of LLIN among women of childbearing age and identify participants' socio-demographic characteristics associated with ownership and utilisation of LLIN. Also, we will make recommendations to improve LLIN utilisation.

Methods

Study Area, Study Design, Study Population, and Sample Size Estimation

This facility-based cross-sectional study was carried out at Babcock University Teaching Hospital (BUTH), Ogun State, Southwest, Nigeria. The hospital is a 140-bed tertiary health institution that was established by the Seventh-day Adventist church in Nigeria. The hospital is situated at Ilisan-Remo in the Ogun East Senatorial District. The hospital is made up of several departments that offer various levels of care. They include the Community Medicine Department, which offers the primary level of care, including immunisation services, which are provided in the Infant Welfare Clinic. The hospital also includes the Obstetrics and Gynaecology Department, which offers specialised clinical and surgical care, particularly to women. This study was carried out in these two departments. The study participants were women of childbearing age who were at least 18 years old. The selected women were either

pregnant and attending the antenatal clinic (ANC) of the hospital or nursing mothers accessing childhood immunisation services at the Infant Welfare Clinic. Women who were health workers and who were not sleeping on the same bed with their babies were excluded from the study. The minimum sample size was determined using the Cochran Formula (Z^2pq/d^2) for descriptive studies. A standard normal deviation of 1.96, a prevalence of 65.8%, being the proportion of pregnant women sleeping under LLIN in a study conducted in Port-Harcourt,¹⁰ South-south Nigeria, and 5% (0.05) as the margin of error were inputted into the formula, which amounted to a minimum sample size of 345.8. Correcting for a non-response rate of 10%, the final calculation became 384.2. However, a total of 400 women were recruited into the study.

Sampling Method, Data Collection Tools, and Techniques, Study Measures

The purposive sampling method was used to select the study participants. Purposive sampling was used to ensure representation of women meeting the inclusion criteria. Such women who gave consent were recruited consecutively during routine clinic visits at the Infant Welfare and Antenatal Clinics until the desired sample size was reached. Trained research assistants helped in collecting data from the participants using a structured interviewer-administered questionnaire. This tool was constructed from a review of previous similar studies. The questionnaire sought information about the participants' socio-demographic characteristics, ownership, and utilisation of LLIN. Due to questionnaire length constraints, taboo belief was assessed with one item, which may, however, not capture cultural nuances. The questionnaire was pretested among 40 female students and employees of Babcock University.

Data Management and Analysis

The questionnaires were cross-checked for errors and cleaned. Data were entered into the Statistical Package for Social Sciences (SPSS) software version 23 for statistical calculation and analysis. Both ownership and utilisation of LLIN were assessed with "Yes" or "No" responses. Composite variables (aggregate scores) were calculated for knowledge and attitude. For knowledge, items were assessed with "Yes" or "No". A correct answer was scored as "1" while an incorrect answer was scored as "0". Mean score (14) was calculated to be "4.79" or approximately "5". Those who scored 5 or more were categorised as having good knowledge, and below 5, poor knowledge. For attitude, a 5-point Likert scale was used to assess 11 negative items (statements). Those who selected "strongly disagreed" were scored 5, "disagreed" 4, "undecided" 3, "agreed" 2, and "strongly agreed" 1. A mean score of 24.75, approximated as 25, was obtained. Those who had 25 or more were graded as having a good attitude, while those who scored less were categorised as having a poor attitude. The analysed data

were presented as frequency tables. Data summary was done using mean, standard deviation, and proportions. Chi-squares were used to test for associations between categorical variables. The level of significance was set at 5%.

Results

Table 1 shows the socio-demographic characteristics of the participants. The highest proportion, 163 (40.8%) of

participants, was in the age group 30-39 years. The mean age was 33.1 ± 8.3 years. Most 295 (73.8%) of the participants had tertiary education, while only 10 (2.5%) had no formal education. Three-fifths, 239 (59.7%) of the participants were skilled workers and professionals, while about one-tenth, 38 (9.5%) were housewives. The majority, 287 (71.8%) of them, were staying in the urban areas, while the remaining 113 (28.2%) were rural dwellers. A few 7 (1.8%) of them believed that sleeping under an LLIN was taboo.

Table 1: Sociodemographic Characteristics of the Participants

Variable	Frequency	Percentage
Age (Years)		
≤19	14	3.5
20-29	124	31.0
30-39	163	40.8
≥40	99	24.8
Education		
No Formal Education	10	2.5
Primary	38	9.5
Secondary	57	14.2
Tertiary	295	73.8
Marital Status		
Married	268	67.0
Single	110	27.5
Divorced	7	1.8
Separated	6	1.5
Widowed	9	2.3
Religion		
Christianity	347	86.8
Islam	51	12.8
Traditional Religion	2	0.4
Ethnicity		
Yoruba	197	49.3
Igbo	121	30.3
Hausa	25	6.3
Others	57	14.2
Occupation		
Housewife/Unemployed	38	9.5
Unskilled	34	8.5
Semi-skilled	89	22.3
Skilled/Professional	239	59.7
Place of Residence		
Rural	113	28.2
Urban	287	71.8
Spray indoor insecticides		
Yes	342	85.5
No	58	14.5
Sleeping under an LLIN is taboo		
Yes	7	1.8
No	393	98.2

Table 2 shows that 250 (62.5%) of the participants had LLIN. However, only 178 (71.2%) of this figure were sleeping under LLIN. Among those who were sleeping

under LLIN, only about half 91, 51.1%) were sleeping under LLIN daily. More than half 95, 53.4%) of those sleeping under LLIN had done so for only one to five years, while

one-fifth of the participants had slept under LLIN for six to ten years 35, 19.7%). Only a few 12 (6.7%) of those who had slept under LLIN have done so for less than one year.

Table 2: Ownership and Utilisation of LLIN

Variables	Frequency	Percentage
Has LLIN		
Yes	250	62.5
No	150	37.5
Sleep Under LLIN (n=250)		
Yes	178	71.2
No	72	28.8
Number of days of sleeping under LLIN in a week (n=178)		
≤ 3	28	15.7
4-6	59	33.2
Daily	91	51.1
Number of Years of sleeping under LLIN (n=178)		
< 1	12	6.7
1-5	95	53.4
6-10	35	19.7
≥11	36	20.2
Method of maintaining LLIN		
By washing	94	51.9
By hanging outside	72	39.8
Both methods	15	8.3

Table 3 shows that about two-thirds, 259 (64.8%) of the participants had good knowledge, while 141(35.2%) had poor knowledge. The majority, 391 (97%), knew that LLIN is used to prevent mosquito bites, as opposed to the rest (9

(2.3%). The majority, 328 (82%), also know that LLIN is not used for keeping rats away and is not used for fishing (365 (91.3%)).

Table 3: Knowledge of LLIN among Participants

Variable	Frequency	Percentage
LLIN is used to prevent mosquito bites		
Yes	391	97.8
No	9	2.3
LLIN is used to prevent malaria		
Yes	393	98.3
No	7	1.7
LLIN is used to kill mosquitoes		
Yes	277	69.3
No	123	30.8
LLIN is used for chasing flies		
Yes	237	59.3
No	163	40.7
LLIN is used for keeping rats away		
Yes	72	18.0
No	328	82.0
LLIN is used for fishing		
Yes	35	8.8
No	365	91.3
Knowledge Score		
Good	259	64.8
Poor	141	35.2

Table 4 shows that a little above half of the participants had a poor attitude towards the use of LLIN 210 (52.5%, while the rest had a good attitude towards the use of LLIN 190 (47.5%). Most of them strongly agreed that LLIN is the same as window net 310 (80%) and that LLIN makes no

difference in malaria prevention, 314 (78.4%). Most of the respondents think that untreated net is better than LLIN 304 (76.1%) and that having malaria is independent of LLIN use 225 (56.2%).

Table 4: Attitude of participants towards LLIN

Variable	Strongly disagree n (%)	Disagree n (%)	Undecided n (%)	Agree n (%)	Strongly agree n (%)
LLIN is the same as a window net	27(6.8)	22 (5.5)	31(7.8)	122(30.5)	198(49.5)
LLIN makes no difference in malaria prevention	25(6.3)	21(5.3)	40(10.0)	113(28.2)	201(50.2)
LLIN causes a bad odour	22(5.5)	77(19.3)	62(15.5)	125(31.3)	114(28.5)
LLIN causes Irritation	43(10.8)	107(26.8)	58(14.5)	101(25.3)	91(22.8)
LLIN chemical kills children	19(4.8)	46(11.5)	64(16.0)	107(26.8)	164(41.0)
LLIN cannot kill mosquitoes	53(13.3)	42(10.5)	48(12.0)	134(33.5)	123(30.8)
LLIN is not readily available	42(10.5)	52(13.0)	67(16.8)	132(33.0)	107(26.8)
LLIN is expensive	24(6)	31(7.8)	71(17.8)	139(34.8)	135(33.8)
The window and door net is better than LLIN in preventing mosquito bites	24(6)	36(9)	58(14.5)	115(28.7)	167(41.8)
An untreated net is better than an LLIN	17(4.3)	31(7.8)	48(12.0)	129(32.3)	175(43.8)
Having malaria is independent of LLIN use	34(8.5)	79(19.8)	62(15.5)	113(28.2)	112(28.0)
Attitude Category	Frequency		Percentage		
Good	190		47.5		
Poor	210		52.5		

Strongly agreed =1, Agreed=2, Undecided= 3, Disagreed= 4, Strongly Disagreed= 5

Table 5 shows that there was a statistically significant association between the level of education and ownership of LLIN ($p = 0.016$), with people who were more educated having a greater tendency to possess LLIN as compared to those who were less educated. Also, a statistically

significant association existed between the belief that sleeping under LLIN is a taboo and possessing an LLIN ($p = 0.008$), with fewer participants who believed that sleeping under LLIN is a taboo possessing an LLIN.

Table 5: Association Between Participants' Characteristics and Ownership of LLIN

Variable	Owns LLIN		P-value
	Yes n (%)	No n (%)	
Age (Years)			
≤19	10 (71.4)	4 (28.6)	0.406
20-29	74 (59.7)	50 (40.3)	
30-39	98 (60.1)	65 (39.9)	
≥40	68 (68.7)	31 (31.3)	
Education			
No Formal Education	2 (20.0)	8 (80.0)	0.016
Primary	20 (52.6)	18 (47.4)	
Secondary	35 (61.4)	22 (38.6)	
Tertiary	193 (65.4)	102 (34.6)	
Marital Status			
Married	177 (66.0)	91 (34.0)	0.175
Single	58 (52.7)	52 (47.3)	
Divorced	5 (71.4)	2 (28.6)	
Separated	3 (50.0)	3 (50.0)	
Widowed	7 (77.8)	2 (22.2)	
Religion			

Christianity	211 (60.8)	136 (39.2)	0.120
Islam	38 (74.5)	13 (25.5)	
Traditional Religion	1 (50.0)	1 (50.0)	
Ethnicity			
Yoruba	130 (66.0)	67 (34.0)	0.223
Igbo	76 (62.8)	45 (37.2)	
Hausa	15 (60.0)	10 (40.0)	
Others	29 (50.9)	28 (49.1)	
Occupation			
Housewife/Unemployed	19 (50.0)	19 (50.0)	0.362
Unskilled	20 (58.8)	14 (41.2)	
Semi-skilled	57 (64.0)	32 (36.0)	
Skilled/Professional	154 (64.4)	85 (35.6)	
Place of Residence			
Rural	75 (66.4)	38 (33.6)	0.316
Urban	175 (61.0)	112 (39.0)	
Spray indoor insecticides			
Yes	214 (62.4)	129 (37.6)	0.912
No	36 (63.2)	21 (36.8)	
Sleeping under LLIN is a taboo			
Yes	1 (14.3)	6 (85.7)	0.008
No	249 (63.4)	144 (36.6)	
Knowledge			
Good	166 (64.1)	93 (35.9)	0.373
Poor	84 (59.6)	57 (40.4)	
Attitude			
Good	121 (63.7)	69 (36.3)	0.642
Poor	129 (61.4)	81 (38.6)	

Table 6 shows that there was a statistically significant association between the level of education and sleeping under LLIN ($p = 0.008$), with people who were more educated having more tendency to sleep under LLIN as compared to those who were less educated.

Table 6: Association Between Participants' Characteristics and Sleeping under LLIN

Variable	Sleeps under LLIN		P-value
	Yes	No	
Age (Years)			
≤19	7 (70.0)	3 (30.0)	0.520
20-29	50 (67.6)	24 (32.4)	
30-39	75 (76.5)	23 (23.5)	
≥40	46 (67.6)	22 (32.4)	
Education			
No Formal Education	2 (100.0)	0 (0.0)	0.008
Primary	17 (85.0)	3 (15.0)	
Secondary	17 (48.6)	18 (51.4)	
Tertiary	142 (73.6)	51 (26.4)	
Marital Status			
Married	130 (73.4)	47 (26.6)	0.474
Single	36 (62.1)	22 (37.9)	
Divorced	4 (80.0)	1 (20.0)	
Separated	3 (100.0)	0 (0.0)	
Widowed	5 (71.4)	2 (28.6)	
Religion			
Christianity	152 (72.0)	59 (28.0)	0.261
Islam	26 (68.4)	12 (31.6)	
Traditional Religion	0 (0.0)	1 (100.0)	

Ethnicity			
Yoruba	92 (70.8)	38 (29.2)	
Igbo	53 (69.7)	23 (30.3)	
Hausa	11 (73.3)	4 (26.7)	
Others	22 (75.9)	7 (24.1)	0.934
Occupation			
Housewife/Unemployed	12 (63.2)	7 (36.8)	
Unskilled	14 (70.0)	6 (30.0)	
Semi-skilled	39 (68.4)	18 (31.6)	
Skilled/Professional	113 (73.4)	41 (26.6)	0.757
Place of Residence			
Rural	58 (77.3)	17 (22.7)	
Urban	120 (68.6)	55 (31.4)	0.161
Spray indoor insecticides			
Yes	152 (71.0)	60 (29.0)	
No	26 (72.2)	10 (27.8)	0.884
Sleeping under an LLIN is taboo			
Yes	1 (100.0)	0 (0.0)	
No	177 (71.1)	72 (28.9)	0.524
Knowledge Category			
Good	119 (71.7)	47 (28.3)	
Poor	59 (70.2)	25 (29.8)	0.811
Attitude Category			
Good	81 (66.9)	40 (33.1)	
Poor	97 (75.2)	32 (24.8)	0.150

Discussion

The results of our study show that the mean age of the participants was 33.1 ± 8.3 years, with the majority (73.8%) having attained a tertiary education. Most of the participants had LLIN. However, only 178 (71.2%) of those who had LLIN were sleeping under it. Among those who were sleeping under LLIN, only about half (51.1%) were sleeping under LLIN daily. Approximately two-thirds (64.8%) of the participants demonstrated good knowledge, while the remaining 35.2% showed poor knowledge. A little above half (52.5%) of the participants had a poor attitude towards the use of LLIN, while the rest 47.5% had a good attitude towards the use of LLIN. There was a statistically significant association between the level of education and ownership of LLIN ($p = 0.016$), with people who were more educated having a greater tendency to possess LLIN. Also, a statistically significant association existed between the belief that sleeping under LLIN is a taboo and possessing an LLIN ($p = 0.008$), with fewer participants who believed that sleeping under LLIN is a taboo possessing an LLIN. There was also a statistically significant association between the level of education and sleeping under LLIN ($p = 0.008$), with people who were more educated having a greater tendency to sleep under LLIN.

It is proven that LLINs repel and kill mosquitoes, ultimately reducing the transmission of malaria both at the household and community levels (15). This is, however, influenced by factors such as ownership and appropriate utilisation of the

LLIN. This study helps in giving more insight into the ownership and utilisation of LLIN, including the knowledge and attitudes of women of childbearing age towards LLIN.

The mean age and level of education of the participants in this current study are like what was reported in Sudan (16). However, the high level of tertiary education in this current study is in contrast with a study done in Uganda, where over half of the participants had primary level education (17). The higher level of tertiary education in our study compared to the Ugandan study may be because our study was conducted in a semi-urban area while the study in Uganda was conducted in a rural area. People living in urban areas have been shown to have higher levels of tertiary education compared to those living in rural areas. This is because many tertiary institutions are domiciled in the urban areas. Also, there are more white-collar jobs in the urban areas, which often require some level of tertiary education to secure (18). The higher level of tertiary education in our study compared to the Uganda study may also be because our study was facility-based, conducted in a tertiary hospital, while the study in Uganda was community-based. It has been shown that more educated people have better health-seeking behaviour and are likely to utilise hospitals (19). Little wonder most of our participants had tertiary education.

In this current study, 62.5% of the participants owned an LLIN. The prevalence of LLIN use was slightly higher than the data from the country's NDHS, with fifty-nine per cent of households in Nigeria reported to own at least one LLIN

(15). This may also be attributed to the high level of tertiary education among our participants. Although, this may indicate a good level of ownership among the participants of this current study in the Nigerian context; however, on a global scale, this is suboptimal considering the recommendation of the WHO, which states that the goal for all people at risk of malaria remains universal coverage with LLIN (18). This may suggest a need for intensified efforts geared towards mass campaigns on the distribution of LLIN, especially during routine ANC visits and immunisations.

Only a little above two-thirds of those who had LLIN in this current study were sleeping under it, and among these, only about half were sleeping under LLIN daily. This disparity with ownership and use aligns with other Nigerian studies (19, 20). It also agrees with what was reported in other parts of Sub-Saharan Africa (16, 17). Reasons for the discrepancy between owning and utilising LLIN are multifactorial, including various individual and cultural factors, and call for tailored intervention in ensuring behavioural change that favours LLIN use among individuals who own them. There is a need to both identify various cultural contexts that may negatively affect LLIN use and the effective mechanisms to tackle them.

Less than two-thirds of participants in this study had good knowledge of LLIN. This was lower than what was reported in Jos northcentral part of the country, where 73.9% of the respondents had good knowledge (21). It was also lower than what was reported in Jigawa northwestern part of the country, with 82.8% of the women reported to know about LLIN (22). Attitude to LLIN in this study also differs from what was reported in other parts of SSA (17). These differences in knowledge and attitude in our study compared to other African studies may be explained by several individual and cultural factors. Moreover, the proportion of individuals with a poor attitude to ownership and utilisation of LLIN in this current study was much higher than those with poor knowledge. This knowledge-attitude gap may have partly resulted from the cultural belief by some of them that sleeping under LLIN is taboo. This gap signals serious public health implications and might have contributed to the ownership-utilisation disparity. There is, therefore, a need to incorporate behavioural change strategies and models into malaria intervention campaigns.

This current study reported a significant association between the levels of education and owning and utilising LLIN, with people who were more educated having a greater tendency to own and utilise LLIN. This finding corroborates the results found in Oyo State, Nigeria (23), where higher ownership and usage rates were observed in individuals with secondary and tertiary education compared to those with primary or no formal education. It also agrees with studies in Mozambique (5) and Uganda (12). This may be due to a better understanding of the function of LLIN and its subsequent utilisation because of increased literacy status. The implication of this is that with better female enrolment in school, malaria control programmes may become more

effective, ultimately leading to reduced burden of the disease in many endemic areas.

Cultural and traditional myths and misconceptions are significant barriers to many health and health-related behaviours and choices (24). Some of the participants in this current study believed that sleeping under LLIN is taboo, and this belief was significantly associated with the ownership of LLIN, with participants believing in the taboo having a decreased ownership. This further elucidates the fact that some practices and behaviours are rooted in societal norms; therefore, if they are to be tackled, a lot needs to be done in health education targeted at identifying and correcting misinformation at the grassroots levels.

This study provides valuable insights into LLIN ownership and utilisation in Nigeria. It addresses an important intervention strategy to end the malaria epidemic by 2030 per Sustainable Development Goal 3.3. Further areas of research may include a longitudinal study to assess behaviour change over time as it relates to LLIN ownership and utilisation.

Study limitations

Limitations of this study include the difficulty in assessing true temporal relationships between the participants' characteristics and ownership and utilisation of LLIN because of the cross-sectional design of the study. There is also the possibility of recall bias as the women tried to remember their frequency of sleeping under the LLIN. Furthermore, the belief that LLINs are taboo was assessed with a single item. This method of assessment may not be sufficient in a rather culturally complex environment like the study area. Also, the use of a purposive sampling method had the inherent possibility of introducing selection bias to the study. Lastly, this study was facility-based and may have only assessed women with good health-seeking behaviour and possibly higher socioeconomic group (19), therefore, limiting the generalizability of the study to rural populations and those in low socioeconomic class.

Conclusion

Fewer people who owned LLINs utilised them in this study. Since malaria control programmes and interventions are anchored on LLIN distribution, owning but not using them will result in reduced effectiveness of these programmes, with subsequent continued high malaria burden. Moreover, a knowledge-attitude gap was observed in this study, with a much higher proportion of individuals having a poor attitude than knowledge. There is a need to incorporate interventions that focus on attitudinal change in malaria control programmes. Social marketing strategies, for instance, may be considered. Furthermore, behavioural change models such as the Health Belief Model (HBM) may be used to design interventions for LLIN distribution. LLIN education may also be integrated into antenatal care programmes. Education and cultural taboos were key factors in owning and sleeping under LLIN among women in this current

study. More priority should be given to female education as a form of long-term intervention, whereas training peer educators may be done as an immediate intervention. Efforts should also be made to debunk negative myths concerning the use of LLIN. This may be done by engaging peer educators and opinion leaders in the community, such as religious and traditional leaders. Community dialogues led by trusted leaders may address misconceptions relating to the utilisation of LLIN.

Abbreviations

ANC: Antenatal Clinic

BUHREC: Babcock University Health Research and Ethics Committee.

BUTH: Babcock University Teaching Hospital

LLIN: Long-lasting insecticide-treated nets

NDHS: Nigeria Demographic and Health Survey (NDHS),

NMIS: Nigeria Malaria Indicator Survey

SSA: Sub-Saharan Africa

SDG: Sustainable Development Goal

Declarations

Ethics Approval and Consent to Participate: Ethical approval was obtained from the Babcock University Health Research and Ethics Committee (BUHREC 785/22). Verbal and written informed consent were obtained from each participant. None of them received any incentive to participate in this study. Strict confidentiality was maintained throughout the study, which included ensuring auditory privacy during data collection.

Data Availability: Data for this work is available from the authors and may be presented on request.

Competing Interests: The authors have declared no conflict of interest.

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Author contributions: KS, OgO, and OIO conceived the research idea. OgO and OIO collected the data. KS analysed the data, while KS and AF wrote the first draft of the manuscript. All authors reviewed the manuscript and approved the final submission.

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