DETERMINANTS OF UTILISATION OF INSECTICIDE TREATED NET AMONG RURAL HOUSEHOLDS IN OYO STATE, NIGERIA

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ABSTRACT
Insecticide Treated Net (ITN) distribution is one of the Roll-Back Malaria interventions meant to prevent mosquito bite and reduce the incidence of malaria cases particularly among children and pregnant women. Despite high ITN ownership among rural households, many are still under the burden of malaria attack. The study therefore examined the determinants of utilisation of Insecticide Treated Net among rural households in Oyo State, Nigeria. The study used four-stage sampling procedure to select 195 respondents within households with at least one Insecticides Treated Net. Parameters assessed include respondents' socioeconomic characteristics, level of knowledge on malaria and ITN, information seeking behaviour towards the use of ITN, constraints to ITN utilisation and level of utilisation of ITN. Data were analysed using descriptive and inferential statistics at $\alpha_{0.05}$. Respondents' age was 43±10 years and 80.0% were married with household size of 6.0±1.0 persons. Close to half had secondary education (44.6%), more than half (50.8%) had low ITN knowledge and majority (70.8%) exhibited unfavourable information seeking behaviour towards the use of insecticide treated net. Frequent sweating, the feeling of choking and the smell of the nets were the main constraints limiting ITN utilisation. Utilisation of ITN was low (38.5%) among rural households. Respondents' sex (χ^2=38.48), educational status (r = 0.141) and information seeking behaviour (r=0.309) were significantly related to utilisation of ITN. Also, sex (β=0.18), information seeking behaviour (β=0.228) and constraints (β=0.611) were the major predictors of ITN utilisation in the study area. The utilisation of ITN was low in the study area. Deliberate efforts by relevant stakeholders should be directed toward product design that will elicit positive information seeking behaviour and utilisation.
Keyword: Insecticide Treated Net, Rural households, Information seeking behaviour, Malaria

INTRODUCTION

There are approximately 214 million cases of malaria worldwide in 2015 and an estimated 438,000 deaths. However, roughly 90 percent of all malaria deaths occur in Africa (Malaria fact sheet, 2015). Malaria accounts for 60 percent of outpatient visit and 30 percent of hospitalization among children less than five years of age in Nigeria (FMOH, 2007). Pregnant women and young children are especially vulnerable to malaria. The disease adversely influences birth outcomes and may lead to spontaneous abortions, pre-term labour, low birth weight, and stillbirth. In the case of young children, malaria has high rate of mortality and even when not fatal, may affect nutrition and growth (MIS, 2015). Pregnant women and children are of particular interest to programmes designed for reducing the burden of malaria. Vector control is the predominant mechanism to prevent and reduce malaria transmission. In general, two forms of vector control: Insecticide Treated Nets (ITNs) and indoor residual spraying are effective in a wide range of circumstances (WHO, 2010).

Government, non-governmental organisation as well as international organisations have made several efforts to combat malaria, which has claimed more lives than HIV/AIDS. These efforts range from financial aid, to the rolling out of numerous anti-malaria campaigns, which includes the distribution of ITNs. The aim is to create awareness, sensitize people to the alarming deaths recorded from malaria and on the other hand, make ITN accessible to households, either through free distribution or through sale at affordable prices. Expectedly, with the massive distribution of ITNs in Nigeria, access has increased although the extent to which this would improve utilisation is unclear (Augustine *et al*, 2012). Of the 677 pregnant women who owned bed nets out of the 2,348 sampled, only one-quarter (25.7%) of the net owners used bed nets the night before the survey (Augustine *et al*, 2012). The 2008 Nigerian demographic and Health Survey also revealed that ITN utilisation rate is below 10% and as such, making ITN utilisation in Nigeria to remain consistently low (NHDS, 2009).

Southwestern Nigeria is the region with the highest prevalence of malaria especially among children below the age of five (Nigeria malaria fact sheet, 2016).According to the MIS (2015) survey, the Southwestern ranked lowest in the utilisation of ITNs in Nigeria despite having the highest prevalence rate. Specifically, the Southwestern comprises 22.7 % of those who slept under a mosquito net the previous night and 21.1% of those who slept under ITN the previous night.

Despite the huge amount of money invested in controlling the scourge of malaria in Nigeria, the Nigeria Institute of Medical Research (NIMR) stated that not less than 51 million Nigerians, equivalent to 30 percent of the population, tested positive to the malaria parasite in 2015 (Vanguard, 2016). It is obvious therefore; that there is a gap that in terms of how much has been spent in the acquisition of ITNs, the distribution of these ITNs to households and the utilisation of the ITNs by the household. Therefore, this study examines the

determinants of utilisation of ITN in South Western Nigeria.

The broad objective of the study was to investigate the determinants to the utilisation of ITN in Oyo state, Nigeria. The specific objectives of the study were to:

1. determine the socioeconomic characteristics of the respondents.
2. determine the respondents' level of knowledge on malaria and ITN.
3. ascertain the respondents' source of information on ITN utilisation.
4. ascertain respondents' information seeking behaviour towards the use of ITN.
5. investigate the constraints to ITN utilisation among the respondents.
6. determine the level of utilisation of ITN among the respondents.

The hypotheses of the study stated in the null form are as follows:

$H_0$1: There is no significant relationship between the respondents' socioeconomic characteristics and the utilisation of ITN.

$H_0$2: There is no significant relationship between respondents' knowledge of Malaria and the utilisation of ITN.

$H_0$3: There is no significant relationship between respondents' information seeking behaviour towards the use of ITN and ITN utilisation.

METHODOLOGY

This study was carried out in Oyo State, Nigeria. The region has the highest prevalence of malaria (MIS, 2015; Malaria fact sheet, 2015). All households that had obtained at least one insecticide treated net in rural and urban communities of Oyo state constituted the study population. The study used four-stage sampling procedure. Randomly, 10% of the Local Government Areas (LGAs) and 30% of the wards in the sampled LGAs were selected. Thereafter, random selection of four rural communities in each selected ward was conducted and systematic sampling method was used to select 195 respondents that were interviewed.

Measurement of variables was done as follows;

i. *Socioeconomic characteristics:* parameters operationalised were age, sex, religion, marital status, educational level, household size, estimated household income and number of children under the age of five, which were measured at the nominal and interval levels of measurement.

ii. *Respondents' level of knowledge on malaria*: respondents reacted to 17 knowledge items on malaria and ITN utilisation. The correct answer was scored 1, while the wrong answer was scored 0 point. The score of each respondent and the mean score of all respondents were obtained. Scores below the mean and above the mean were categorised as low level of knowledge and high level of knowledge respectively. The knowledge questions cover areas such as vectors of malaria, sanitation and hygiene, active periods of the mosquitoes, ITN and the hanging of net.

iii. *Sources of information:* respondents were asked to indicate the sources of their information on ITN utilisation for malaria prevention. A three point Likert-type scale of always = 2, occasionally = 1 and never = 0 was employed for 13 items with the highest score of 26 and a minimum score of 0. The sources of information were categorised as major source and minor source using the mean score as the benchmark. .

iv. *Constraints to the utilisation of ITN:* Respondents identified constraints to ITN utilisation from a set of constraint items. The scores obtained were used to categorise the constraints into major and minor constraints according to the distribution of scores below and above the mean.

v. *Information seeking behaviour:* This was elicited through 15 statements relating to their behaviour using most times, sometimes and never with the score 2, 1, and 0, respectively. The scores and the mean were computed to categorise them as favourable and unfavourable information seeking behaviour, according to the distribution of scores below and above the mean.

vi. *Utilisation of ITN:* Respondents were requested to answer 21 questions in order to determine their usage of ITN. Always, sometimes and never were assigned 2, 1 and 0, respectively. The score of each respondent and the mean scores were obtained. Scores below the mean and above the mean were categorised as low level of utilisation and high level of utilisation respectively.

vii. Contribution of selected independent variables to ITN utilisation: Multiple linear regression analysis was used and presented as follows:

$Y=a + \beta X_1 \ldots \beta_{10} X_{10}$ where

Y= Utilisation of ITN
X1= Age
X2= sex
X3= household size
X4= number of children under 5
X5= educational status
X6= knowledge
X7= awareness
X8= source of information
X9= information seeking behaviour
X10= constraints

RESULTS AND DISCUSSION

Socioeconomic characteristics

As presented in Table 1, the age group of the respondents with the highest proportion was 41-50 years old (34.8%) with the mean age being 42.53 years. This suggests that most of the respondents are getting old and tending towards aged work force. Ages less than 30 years (12.3%) and 31-40 years (21.7%) were sparsely distributed among the respondents. More than half (56.4%) were male, Islam practitioners (51.3%), less than half had secondary education (44.6%) and 30.8% were engaged in farming as primary occupation. The Table further reveals that majority of the respondents (80%) were married, with a mean household size of 5.71±2.09, implying fairly large family that include children under-five and pregnant women, who are the most vulnerable groups to malaria attack.

Table 1: Distribution of respondents by socioeconomic characteristics

Variable	Categories	Frequency	Percentage	Mean
Age (years)	Less than 30 years	24	12.3	42.53±9.52
	31-40 years	45	21.7	
	41-50 years	72	34.8	
	51-60 years	60	29.0	
	61-70 years	18	8.7	
Sex	Male	110	56.4	
	Female	85	43.6	
Marital status	Single	35	17.9	
	Married	156	80.0	
	Divorced	1	.5	
	Separated	3	1.5	
Household size	Less than 5	104	53.3	5.71±2.09
	6-10	89	45.6	
	11-15	1	0.5	
	16-20	1	0.5	
Number of children under 5	less than 2	186	95.4	0.83±0.99
	3-5	8	4.1	
	6 and above	1	.5	
Education	No formal education	6	3.1	1.88±0.79
	Primary education	58	29.7	
	Secondary education	87	44.6	
	Tertiary education	44	22.6	
Religion	Christianity	93	47.7	1.53±0.52
	Islam	100	51.3	
	Traditional	2	1.0	
Primary Occupation	Farming	60	30.8	3.23±2.25
	Teaching	19	9.7	
	Trading	51	26.2	
	Tailoring	12	6.2	
	Civil servant	35	17.9	
	Photography	6	3.1	
	Unemployed	12	6.2	

Source: Field survey, 2018

Knowledge of respondents towards ITN and Malaria

Regarding knowledge of malaria and ITN as shown in Table 2a, 94.9% opined that mosquito thrives and breeds in stagnant water, while 49.7% of the respondents indicated that mosquito was not the only vector of malaria. In addition, respondents exhibited uncertain knowledge on the active periods of malaria. More than half 55.9% believed mosquitoes were not active in the afternoon, 36.4% believed that mosquitoes were more active in the dry season; however, 25.1% claimed that they do not know. The result is consistent with Fuge, Ayanto, and Gurmamo (2015) that only 15.6 % of the mothers associated mosquitoes with malaria and majority of them (65.6 %) submitted that it was transmitted through poor personal hygiene. Singh, Musa, Singh and Ebere (2014) reported that knowledge of the role of mosquitoes in malaria transmission was (11.8%) and knowledge of the cause of malaria was low among the study population (9.6%). While comprehensive knowledge about malaria prevention measures was high (90%), it did not reflect in practice (16%).

Overall, as presented in Table 2b, the knowledge of ITN utilisation as a measure for malaria prevention was low (50.8%) in the study area. This could be because of weak malaria partnership forum and weak implementation of a comprehensive policy on malaria, diagnosis and treatment, as among the major constraints to the health sector and control of malaria (Muganga, 2011)

Table 2a: Distribution of respondents by knowledge of ITN utilisation for malaria prevention

Areas of knowledge	True		False		I don't know		Mean
	F	%	F	%	F	%	
Malaria is caused by mosquito bites	189	96.9	5	2.6	1	0.5	1.94
Other insects such as flies, cockroaches, spiders etc. can spread malaria	85	43.6	103	52.8	7	3.6	1.09
Mosquitoes are the only vectors (carriers) of malaria	92	47.2	97	49.7	6	3.1	0.97
Mosquitoes survive in stagnant water	185	94.9	5	2.6	5	2.6	1.92
A clean environment can reduce the risk of malaria	85	43.6	62	31.8	48	24.6	0.88
Malaria can lead to death	172	88.2	21	10.8	2	1.0	1.77
Malaria affects only children	46	23.6	146	74.9	3	1.5	1.51
A pregnant woman cannot have malaria	55	28.2	135	69.2	5	2.6	1.41
Sleeping under insecticide treated nets helps reduce the risk of having malaria	187	95.9	7	3.6	1	0.5	1.92
Using insecticide treated nets as window covering can prevent malaria	100	51.3	83	42.6	12	6.2	0.91
Symptoms of malaria includes high body temperatures, fevers and head ache	183	93.8	10	5.1	2	1.0	1.89
Stomach pain, frequent stooling, back pain and tooth ache are other symptoms of malaria	79	40.5	102	52.3	14	7.2	1.12
Mosquitoes are very active in the afternoon	73	37.4	109	55.9	13	6.7	1.18
Mosquitoes are more active in the dry season	75	38.5	71	36.4	49	25.1	0.98
We can prevent malaria by using treated nets	177	90.8	12	6.2	6	3.1	0.15
Malaria cannot be prevented by keeping our surroundings clean	37	19.0	153	78.5	5	2.6	1.59
Spraying the house with insecticide is as effective as using treated nets	158	81.0	31	15.9	6	3.1	1.65

Source: Field survey, 2018

Table 2b: Categorisation of respondents by knowledge of ITN utilisation for malaria Prevention

Knowledge	Frequency	%	Min	Max	SD	Mean score
Low (12-22.92)	99	50.8	12.00	32.00	4.16	22.92
High (22.93-32.0)	96	49.2				
Total	**195**	**100**				

Source: Field survey, 2018

Source of information on ITN utilisation for malaria prevention among respondents

Table 3 shows that the respondents' main sources of information were radio (84%), doctors (81.5%) and nearby chemist (pharmaceutical stores) (64.6%). Yahaya (1995, 2002) who reported that radio is the most potent source of information for farmers corroborates this finding. Ajayi (2003), cited in Olajide (2011) also found that radio was the most popular source of information in South-West Nigeria. The use of radio as the principal source of information could be influenced by financial considerations. Table 3 also reveals that drug vendors were important source of medical information. This is probably due to distance to the nearest health facility or pre-existing rapport with drug vendors.

Table 3: Distribution of respondents by sources of Information on ITN utilisation for malaria prevention among respondents

Source of Information	Always		Occasionally		Never		Mean	Rank
	F	%	F	%	F	%		
Libraries	36	18.5	75	38.5	84	43.1	0.75	**12**
Radio	165	84.6	26	13.3	4	2.1	1.83	**1**
Television	111	56.9	35	17.9	49	25.1	1.32	**5**
Associations/clubs/unions	66	33.8	80	41.0	49	25.1	1.09	**8**

Source of Information	Always		Occasionally		Never		Mean	Rank
	F	%	F	%	F	%		
Church/mosque	74	37.9	77	39.5	44	22.6	1.15	**6**
Friends and relatives	78	40.0	104	53.3	13	6.7	1.33	**4**
Newspapers, magazines, bulletins	67	34.4	91	46.7	37	19.0	1.15	**6**
LGA office	38	19.5	83	42.6	74	37.9	0.82	**10**
Internet/social media	68	34.9	64	32.8	63	32.3	1.03	**9**
Nearby chemist	126	64.6	61	31.3	8	4.1	1.61	**3**
Doctors	159	81.5	31	15.9	5	2.6	1.79	**2**
Chief's palace	29	14.9	93	47.7	73	37.4	0.77	**11**
Non-governmental organisations.	30	15.4	21	10.8	144	73.8	0.42	**13**

Source: Field survey, 2018

Constraints to the utilisation of ITN

Table 4 shows that increased sweating (61.5%), choking feeling (60.5%) and odour from the net (33.8%), were severe constraints to the utilisation of ITNs. This corroborates the findings of Yakob and Yan (2009)who found that 52.2 % of their study respondents indicated that the major problem with the usage of ITN was heat and the feeling of suffocation. The tiny holes on the nets coupled with architectural or ventilation issues regarding the building or neighbourhood were possibly responsible for these effects. Saareson (2012) also learnt that most respondents in their study blamed sweating and disruption of sexual activity as reason for non-use of ITN. However, 35.9% of their study respondents considered the size of the net as rather small for the whole family to sleep under.

Table 4: Constraints to the utilisation of ITN

Factors affecting the use of ITN	Severe constraint		Mild constraint		Not a constraint		Mean	Rank
	F	%	F	%	F	%		
Cost of ITN is high	45	23.1	66	33.8	84	43.1	0.80	17th
Belief in ITN as a preventive method	40	20.5	82	42.1	73	37.4	0.83	16th
Sleeping under an ITN could be choking	118	60.5	60	30.8	17	8.7	1.52	2nd
Increased distance to distribution centre	42	21.5	126	64.6	27	13.8	1.08	10th
Difficulty to access ITN	32	16.4	136	69.7	27	13.8	1.03	11th
Mosquitoes have developed resistance to ITN	49	25.1	114	58.5	32	16.4	1.09	9th
Bought ITN is better than the free ITN	29	14.9	110	56.4	56	28.7	0.86	14th
Sleeping under an ITN makes me sweat a lot.	120	61.5	65	33.3	10	5.1	1.56	1st
Not enough room or space to hang ITN	61	31.3	110	56.4	24	12.3	1.19	5th
I feel itchy when I sleep under an ITN	56	28.7	105	53.8	34	17.4	1.11	7th
Low knowledge of how to use ITN	28	14.4	124	63.6	43	22.1	0.92	13th
It is burdensome to hang ITN	35	17.9	129	66.2	31	15.9	1.02	12th
Mosquitoes still bite due to large holes of ITN	64	32.8	87	44.6	44	22.6	1.10	8th
ITN is too small for the family to sleep under	70	35.9	99	50.8	26	13.3	1.23	4th
ITN has an offensive smell	66	33.8	113	57.9	16	8.2	1.26	3rd
The use of ITN is an outdated practice	62	31.8	43	22.1	90	46.2	0.86	14th
ITNs are expensive to maintain.	17	8.7	44	22.6	134	68.7	0.40	18th
My children complain of discomfort when sleeping under ITN	69	35.4	89	45.6	37	19.0	1.16	6th

Source: Field survey, 2018

Information seeking behaviour of respondents

Respondents' information seeking behaviour in Table 5a reveals that information on the sanitation and hygiene of the environment ranked 1st, while information on malaria drugs ranked 2nd. According to the World Health Organisation (WHO, 2010), vector control is crucial to reducing the scourge of malaria. Indeed, vector control begins from sanitation of the environment to clearing of breeding grounds of mosquitoes. Thus, while environmental sanitation was the first ranked preferred information seeking behaviour, malaria drugs which is curative rather than preventive, was the second ranked preferred behaviour. This could be attributed to the number of respondents (74%) that occasionally fell sick to malaria (Table 5a). The results also revealed that 54.9% of the respondents and 49.7% preferred information on new technological discovery for combating malaria and information on the usage of nets, respectively.

Table 5b shows that respondents largely (70.8%) had unfavourable information seeking behaviour towards the use of insecticide treated nets. This might be due to the preference for other mosquito control methods or perhaps, due to widespread perception that everyone falls sick to malaria at some point.

Table 5a: Information seeking behaviour towards the use of ITN

Information needs	Always		Occasionally		Never		Mean	
	F	%	F	%	F	%		Rank
Insecticide treated nets	91	46.7	94	48.2	10	5.1	1.42	6th
Where to get ITN	86	44.1	97	49.7	12	6.2	1.38	7th
The cost of ITN	26	13.3	71	36.4	98	50.3	0.63	15th
Sanitation and hygiene of your environment	160	82.1	28	14.4	7	3.6	1.78	1st
Cheaper or better chemicals to treat nets	72	36.9	100	51.3	23	11.8	1.25	9th
Malaria drugs	156	80.0	32	16.4	7	3.6	1.76	2nd
Malaria prevention	150	76.9	42	21.5	3	1.5	1.75	3rd
How to assist any pregnant relatives prevent malaria	51	26.2	123	63.1	21	10.8	1.15	10th
How to hang ITN	45	23.1	111	56.9	39	20.0	1.03	12th
The latest technological discovery in combating malaria	107	54.9	76	39.0	12	6.2	1.49	4th
The distribution of ITN	46	23.6	128	65.6	21	10.8	1.13	11th
Information for usage of ITN	97	49.7	88	45.1	10	5.1	1.45	5th
Mend damaged ITN	43	22.1	73	37.4	79	40.5	0.82	13th
Preference of ITN to other malaria preventive measure	100	51.3	64	32.8	31	15.9	1.35	8th
Side effect of ITN usage.	58	29.7	35	17.9	102	52.3	0.77	14th

Source: Field survey, 2018

Table 5b: Categorisation of the Information seeking behaviour towards the use of ITN

Level of awareness	Frequency	%	Min	Max	SD	Mean score
Unfavourable (8-19.17)	138	70.8	8.00	30.00	4.03	19.17
Favourable (19.18-30.00)	57	29.2				
Total	195	100				

Source: Field survey, 2018

Utilisation of ITN

Table 6a reveals that substantive number (62.1%) of children and pregnant wife or relative (67.2%) slept under ITN. Curiously, a staggering 74.4% of the respondents occasionally fell sick of malaria. Although mosquitoes are more active at late evenings or nights, mosquito bites might occur during the day or early evenings, thereby exposing the respondents to malaria. The Table further revealed that about 60% of respondents combined the use of ITN with other mosquito control methods such as the use of residual chemical spray, mosquito repellent creams and traditional plants with scent that repel mosquitoes. Similarly, low mosquito activity and high night time temperatures among others, tended to reduce ITN use.

The general low or inconsistent use (38.5%) of ITN among respondents, evident from Table 6b, perhaps explain the high number of respondents that occasionally fell sick of malaria. This low usage agrees with the result of Komomo, Egena, and Irene (2016) who found that utilisation of ITNs among their study respondents was 40.68% which is also lower than the 60% benchmark recommended by the Roll Back Malaria Programme. Other possible reasons for high malaria prevalence included poor environmental sanitation and exposure to mosquito bites during evening sit-outs with family, relations and friends prior to going to bed. Indeed, those averse to ITNs may use other mosquito control methods. Olasehinde, Ojurongbe, Akinjogunla, Egwari, and Adeyeba (2015) reported that insecticides (24.0%), mosquito repellent cream (2.7%), and window/door nets (42.3%) were other mosquito control methods employed by their study respondents.

Table 6a: Distribution of respondents by the utilisation of ITN

Utilisation of ITN	Always		Rarely		Never		Mean
	F	%	F	%	F	%	
I enjoy sleeping under an ITN every day	69	35.4	117	60.0	9	4.6	1.31
My children sleep under an ITN everyday	121	62.1	65	33.3	9	4.6	1.57
I ensure that my pregnant women or relation sleep under an ITN	131	67.2	57	29.2	7	3.6	1.64

Utilisation of ITN	Always		Rarely		Never		Mean
	F	%	F	%	F	%	
Newborn children and children under 5 years of age, sleep under an ITN every day.	127	65.1	61	31.3	7	3.6	1.62
I hang my ITN every day	40	20.5	123	63.1	32	16.4	1.04
I wash my nets when I feel it is dirty	31	15.9	148	75.9	16	8.2	1.08
How many times do you remove the nets from the hanger?	95	48.7	71	36.4	29	14.9	1.34
I check my ITN regularly for tear	100	51.3	85	43.6	10	5.1	1.46
I mend my net as soon as I see a tear or big opening	36	18.5	107	54.9	52	26.7	0.92
How often do you sleep outside the net?	46	23.6	101	51.8	48	24.6	0.99
My net usually falls from the hanger when I sleep.	22	11.3	130	66.7	43	22.1	0.89
ITN has reduced my falling sick of malaria	38	19.5	145	74.4	12	6.2	1.13
I regularly replace my ITN	34	17.4	117	60.0	44	22.6	0.95
I prefer to sleep under ITN than use other mosquito control methods.	31	15.9	156	80.0	8	4.1	1.12
I ensure that my net is in my bag whenever I am to travel	35	17.9	151	77.4	9	4.6	1.13
I try to fold and secure my net after use	93	47.7	90	46.2	12	6.2	1.42
How often does your net tear?	38	19.5	85	43.6	72	36.9	0.83
I consult a health worker or doctor whenever I need help with my net.	90	46.2	91	46.7	14	7.2	1.39
ITN should be distributed by government during periods when mosquitoes are more abundant	135	69.2	51	26.2	9	4.6	1.65
How often do your children fall ill of malaria despite sleeping under ITN	38	19.5	129	66.2	28	14.4	1.05
I combine the use of ITN and other mosquito control methods	117	60.0	58	29.7	20	10.3	1.50

Source: Field survey, 2018

Table 6b: Categorisation of respondents by the utilisation of ITN

Utilisation of ITN	Frequency	Percent	Min	Max	SD	Mean score
Low (0-26.05)	120	61.5	0.00	42.00	5.15	**26.05**
High (26.06-42.0)	75	38.5				
Total	195	100				

Source: Field survey, 2018

Analysis of the relationship between age, household size, educational status, sex, knowledge and utilisation of ITN

Table 7 revealed that sex (χ^2 = 6.0818) and educational status (r=-1.41) were significantly related to utilisation of ITN, while age (r=0.105) has no significant relationship. The significant relationship of sex and education with utilisation explains why women and children constitute a high percentage of those that use treated nets owing to their susceptibility to malaria as authenticated by Mudenyo and Nobuyuki, (2010)and Fettene *et al*., (2009). Utilisation of ITN is influenced by the users' level of education as substantiated by Adebayo, Akinyemi and Cadmus (2013) who found significant relationship between educational status and use of ITN. It is suggestive therefore that ITN utilisation is achievable among households if women are sensitised and mobilised irrespective of their age difference.

Table 7 further shows no significant relationship between the level of knowledge (p=0.429) of the respondents and the use of ITN. This agrees with Ovadje (2014) who reported that the level of malaria knowledge had no significant relationship with adherence to ITN use. However, the study revealed that the main predictor of ITN use was ownership rather than knowledge (Ovadje and Nriagu, 2016).

Table 7: Analysis of the relationship between age, household size, educational status, sex, knowledge and utilisation of ITN

Variable	r-value	χ^2-value	df	p-value	CC-value
Sex	-	6.0818	1	0.014*	0.174
Age	0.105	-	-	0.144	-
Household size	0.032	-	-	0.654	-
Educational status	-141	-	-	0.050*	-
Knowledge	0.057	-	-	0.429	-

*=Significant at p≤ 0.05
Source: Field survey, 2018

Correlation analysis between information seeking behaviour of respondents and the use of ITN

Table 8 reveals that there is a significant relationship between the information seeking behaviour of respondents and the use of ITN. The desire to seek information on ITNs utilisation and disposition to use the acquired information will go a long way to attain the objective of roll back malaria campaign. This information includes manuals inserted in the ITN packet showing systematic guide for installing the hanging nets, instructions for use and directions for obtaining nets for babies etc. Scaling up awareness campaign on the benefits of ITN utilisation during antenatal could promote information seeking behaviour among malaria-infected households. Idowu, Sam-Wobo, Oluwole and Adediran (2011)confirmed a significant relationship between awareness level of respondents and ITN use in Ogun state. However, Musa, Salaudeen and Jimoh, (2009)found no significant relationship between awareness and ITN use among respondents in their study conducted in Northern Nigeria.

Table 8: Correlation analysis between information seeking behaviour of respondents and the use of ITN

Variable	N	r-value	p-value
Information seeking behaviour and Utilisation	195	0.309	0.000*

*=significant at p≤ 0.05
Source: Field survey, 2018

Contribution of selected independent variables to ITN utilisation

Table 9 reveals that sex (β=0.180), number of children under 5 years (β=0.152), knowledge (β=0.146), awareness (β= -0.172), information seeking behaviour (β=0.228), source of information (β=-0.352) and constraints (β=0.611, p=0.000) were significantly related to ITN utilisation. However, sex (β=0.18), information seeking behaviour (β=0.228) and constraints (β=0.611) were the major predictors of ITN utilisation in the study area. This is consistent with Yakob and Yan (2009) and Saareson (2012)who both opined that ITN utilisation is limited in some ways by a number of factors. Also, Mudenyo and Nobuyuki (2010) and Fettene *et al.* (2009)authenticated that the use of ITN is germane at all stages of life. Overall, the independent variables predicted 62% of the variation in the dependent variables ($R^{2=}$ 0.629, adjusted R^2=0.363).

Table 9: Contribution of selected independent variables to the utilisation of ITN

Variable	Standardized error	β-value	T	Sig-value
(Constant)	3.446		4.804	0.000
Age	0.035	-0.085	-1.331	0.185
Sex	0.682	0.180	2.751	0.007
household size	0.161	0.112	1.709	0.089
number of children under 5	0.336	0.152	2.357	0.020
educational status	0.437	-0.063	-0.948	0.344
Knowledge	0.080	0.146	2.266	0.025
Awareness	0.251	-0.172	-2.762	0.006
Source	0.094	-0.352	-4.350	0.000
Information seeking behaviour	0.097	0.228	3.002	0.003
Constraints	0.064	0.611	8.034	0.000

$R^{2=}$ 0.629, adjusted R^2=0.363
*=significant at P≤ 0.05
Source: Field survey, 2018

CONCLUSION AND RECOMMENDATIONS

The utilisation of ITN is generally low in the study area. Low utilisation was attributed to increased sweating, choking feeling and unpleasant odour produced by ITNs. Despite low ITN utilisation, respondents exhibit favourable information seeking behaviour towards the use of ITN. However, sex, information seeking behaviour and constraints were the major predictors of ITN utilisation in the study area. Manufacturers of ITN need to pay cognate attention to the shortcomings identified in subsequent models and designs. Government and non-governmental organisations should scale up information campaign on the benefits of ITN utilisation, active seasons of mosquitoes, comparative advantage of ITN over chemical sprays and mosquito repellents, methods of hanging the nets and folding them after use, etc.

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