SOCIO-DEMOGRAPHIC FACTORS INFLUENCING THE UTILISATION OF INSECTICIDES TREATED NETS (ITNS) AMONG HOUSEHOLDS IN BENUE STATE, NIGERIA

CHINTA TAHAV
+2348133871553
Sociology Dept
Federal University of Lafia
Correspondence Author: chintatahav@gmail.com,

&

MADUGU LAMI DORIS
lamidoris1@gmail.com
Federal university Wukari
Department of sociology,

&

KADUNA, ISAAC DABU
CHT Alushi PMB 03 Akwanga Nasarawa State

&

ALIYU, ISMAILA IBETO
Ibrahim Badamasi Babangida University,
Lapai, Niger State.

Abstract
Malaria is one of the diseases that have claimed a lot of lives across the world. It is unarguably the most important disease of mankind and has remained a thorn in the flesh in Sub- Saharan Africa. Recognizing the morbidity and mortality from malaria in African countries such as Nigeria led to the formation of the roll back malaria (RBM) global partnership. In Nigeria and Benue State, there has been massive distribution ITNs and campaigns about the use of ITN. Yet the rate of malaria is still high in Benue State as a result of low usage of ITNs. Consequently, this study investigated socio-demographic factors influencing the utilisation of insecticides treated nets (ITNS) among households in Benue State, Nigeria. The study was carried out using a cross sectional design. The sample size of this study was determined using Cochran Sample Size formula where 400 respondents were selected. The study adopted cluster sampling technique. The instrument of data collection for this study was structured questionnaire. This study adopted a quantitative method of data analysed using inferential measures. It was found that gender, marital, educational background age and geographical location influenced the utilisation of insecticides treated nets (ITNS) among households in Benue State. Therefore, the suggested for strengthening of the system and structural responses by integrated home based outreach programs. ITN distribution and BCC messages on malaria prevention can be incorporated with other outreach programmes.

Keywords: Socio-Demographic Factors, Insecticides Treated Nets, Households, Benue State, Nigeria

Introduction

Insecticides Treated Nets (ITNs) used for protection against mosquito bites have proved to be a practical, highly effective and cost effective intervention against malaria. The evidence of the public health impact of ITNs, supporting their wide-scale use is drawn from areas of stable malaria transmission where Plasmodium falciparium infection is prevalent in a community is often over 40% (Lengeler, 2004). The World Health Organization's initiative in malaria control such as Roll Back Malaria programme emphasized the use of Insecticide Treated Nets as one of the key strategies for malaria prevention and control in sub–Saharan Africa and other developing countries (Jones, 2005; Ukibe, Ikeako, Mbanugo, Obi-Okaro, and Ukibe, 2014; and Omole,, Ogunfowokokan, and Moses 2017).

Malaria is one of the diseases that have claimed a lot of lives across the world. It is unarguably the most important disease of mankind and has remained a thorn in the flesh in Sub- Saharan Africa especially in pregnant women and children where the disease has taken its tolls (Ukibe et al, 2014). Globally, there are at least 300-600 million acute cases of malaria each year (Agbunu, 2015), resulting in over one million deaths, (WHO, 2010), and well over 92 million cases of malaria occur every year in sub-Saharan Africa alone. Malaria exerts an enormous toll on lives, medical cost and days of labour lost. The disease causes 30-50% of inpatient admissions; it is instrumental to 40% of total public health expenditure and up to 30% of outpatient visits in malarious areas. Malaria contributes to at least 10,000 maternal deaths and to at least 200,000 newborn deaths annually (Nasirumbi, 2016).

Recognizing the morbidity and mortality from malaria in African countries such as Nigeria led to the formation of the roll back malaria (RBM) global partnership in 1998 (WHO RBM, 2002). A large amount of resources have been dedicated to fighting malaria (Sarbib, 2006; Snow and Marsh, 2010; Snow, 2010) by institutions such as the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM), the World Bank, and the US President's Malaria Initiative (PMI) have more than doubled funding for malaria control, especially in Sub-Saharan Africa (SSA) (Grabowsky, 2008; Pigott, 2012). This increase in funding has allowed for measures to prevent and control malaria such as Universal Free Bed Net Distributions in many Sub Saharan African countries.

In African region, the use of ITN was scaled up in two steps. In 2005-2008, ITN distribution focused on the most vulnerable populations which were women who were pregnant and children under five years of age. This was done in order to reduce mortality in this group (World Health Organization, 2016). The ITNs were distributed during the antenatal clinics and during routine immunization for children under the age of five years. In 2009, ITN ownership and use was scaled up through the strategy of universal access and nationwide distribution of ITN was adopted to cover all the populations at risk of getting malaria infection. In 2012, a policy on universal coverage with ITNs was adopted by all the countries which were at the risk of malaria infections. This was defined by one ITN for two people at the risk of malaria infection. As a result, this led to free ITN distribution in 39 out of 44 malaria endemic countries through the antenatal clinics and immunization clinics for children under the age of five years (Gathitu 2014, WHO, 2016).

Insecticide Treated Nets (ITNs) and Indoor Residual Spraying (IRS) have been found to be the most effective methods in prevention of malaria especially in Sub Saharan Africa where IRS which was the main strategy for Global Malaria Eradication Campaign led to elimination of malaria in many countries and reduced the malaria burden in others (WHO,2016) . The use of ITNs led to a decrease in the number of malaria deaths by 49% from 2000 to 2012. It also reduced the new malaria cases by 31% during the same period of time (WHO, 2016). On the other hand, due to scale up of ITNs and IRS in Africa, malaria illness has reduced and also malaria specific mortality reduced by 42% by 2013 (Gimnig, 2016). Insecticide treated nets use reduces malaria transmission in the general population and has been found to be especially effective in pregnant women and children less than 5 years of age (Wiseman 2017). One of the main malaria prevention strategies includes distribution of Long Lasting Insecticide Treated Nets (LLINs) through antenatal clinics and child welfare clinics. In addition, the pregnant women are given Intermittent Preventive Therapy (IPT) using Sulphadoxine–Pyrimethamine (SP) which is part of the antenatal services (Wiseman, 2017).

In Nigeria, TMNs given to pregnant women have been found to be protective to women and their children against malaria in both high and low malaria transmission areas. Now WHO recommends that in

malaria endemic areas, all pregnant women should receive malaria chemoprophylaxis and sleep under TMN. Further to this recommendation, in the year 2000 African countries initiated the Roll Back Malaria strategy to control malaria in the Continent. This recommended increased access to chemoprophylaxis and use of ITNs by pregnant women and children (Chukwuocha, Dozie, Onwuliri, Ukaga, Nwoke, Nwankwo, Nwoke, Nwaokoro, Nwoga, Udujih, Iwuala, Ohaji, Morakinyo and Adindu 2010).

Following the above recommendations, Nigeria's policy on prevention of malaria in pregnancy recommends two doses of chloroquine as Intermittent Preventive Treatment (IPT) in the second and third trimester of pregnancy for women of all parities. The policy also advocates that pregnant women should use ITNs. Several authors have concluded that although ITNs are effective, local perceptions, acceptance of and use of ITNs as well as use of other mosquito methods are invaluable in malaria control programmes. It is also known that even if ITNs are purchased and used correctly, they must be recognized and accepted. Further to this, the local acceptance of the insecticide may be influenced by its toxicity, the local terms used to translate the chemical and the meaning attached to these terms. Current use of malaria preventive measures during pregnancy in Nigeria is low, and calls for serious consideration (Chukwuocha et al, 2010).

A review on community acceptance of bed nets has shown that there are several determinants of utilisation of ITN at community and household level that have been identified by various researchers. They include: age, residence, education level, ethnicity, size of the household, number of children less than five years in the household, access to information, sex of the household head, wealth and occupation among others (Gathitu, 2014, Gimnig. 2016 and Wiseman, 2017). These determinants of ITN utilisation may vary due to various reasons and complex factors are interlinked and related to each other. There is no way of identifying just one or two factors that only affect utilisation of insecticide treated nets.

In Benue State, Nigeria, Amuta, Wama and Ameh (2014) found that there is high level of malaria, 68.3% pregnant women had cases of malaria. According to World Health Organization (WHO, 2003), some countries with a heavy malaria burden, accounted for as much as 30 to 50 percent of inpatient admissions and up to 50 percent of outpatient visits. Studies in Nigeria have shown that there was increase in number of malaria deaths from 4,123 in 1999 to 6,052 in 2004. As at 2007, reported deaths due to malaria increased to 10,239 for all ages (FMOH, 2007 and WHO, 2008).

Previous studies have explored this apparent "gap" between net ownership and use. This means that not everyone who had TMNs uses it. Potential determinants of TMNs use previously identified include: demographic characteristics an individual's knowledge and beliefs related to malaria and bed nets dwelling construction, family size/composition and sleeping arrangements; physical characteristics of bed nets; environmental factors; community and cultural characteristics; and household net density. However, programmatic implications of these findings are not always obvious given that the direction and magnitude of reported associations vary by geographic location, epidemiological setting and method of analysis. Benue state alone contributes 25% of the Nigerian malaria burden (Bisser, 2015). With nearly all of the 5,741800 people at risk, and an estimated 110 million cases a year, malaria is Benue is the most significant public health issue.

Since the first national strategic plan for malaria control was introduced in 2006, ITNs, and more recently LLINs, have comprised the central component of the national malaria control efforts. At the time of the 2010 Malaria Indicator Survey (MIS) in Nigeria, approximately 42% of households owned at least one ITN and 24% of the people in the total population had slept under any net the previous night, well below the targets of >80% (Bisser, 2015). The analysis of net use among people owning an ITN revealed that only 49% slept under an ITN the previous night, indicating that low net use could not be attributed to low household net ownership alone. Since that time, Nigeria has done much to address the problem of low net ownership, distributing around 56 million nets between 2009 and 2013 in the context of a national campaign. However, there is concern that the lack of accompanying Behavior Change Communication (BCC) to support mass distribution may not lead to significant increase in net use. The analysis presented here contributes to the growing body of work on determinants of net use by assessing the characteristics most strongly associated with net use among adult population in a malaria-endemic region that has recently completed a statewide mass LLIN distribution campaign, while controlling for the confounding effects of

household net density. It also provides insights into the potential mechanisms by which community-based programs like the one introduced in Benue State can motivate increased net use.

Despite tremendous efforts made by government and NGOs towards free distribution of TMNs from household to household in Benue state, and several campaigns that accompanied its utilization among the populace, its effective utilisation is still low. In Benue state, many people are still reluctant in using mosquito nets; some people use it to cover their nursery beds, especially farmers while others hang it in their houses yet, do not sleep inside the nets rather, they do sleep under it. By implication, Benue people have negative attitudes towards treated mosquito nets usage. Consequently, the level of malaria is still high in the State. This has affected the physical, mental, economic and social well being of the people on the first hand and that of the government on the other hand. It is in view of this background that this study intends to investigate socio-demographic factors influencing the utilisation of insecticides treated nets (ITNS) among households in Benue State, Nigeria. The study specifically assessed if gender, marital, educational background age and geographical location influence the utilisation of insecticides treated nets (ITNS) among households in Benue State, Nigeria

Methodology

The study was carried out using a cross sectional design. The setting for this study is Benue state. Benue is a State in the middle-East region of Nigeria, it has a population of about 5,741,815 based on the 2016 population projection record; its total land area is 34,059km^2 and it is among the 11th in the country. The population of this study is 1,709,600 people. This population was selected across the six local government areas in Benue State with the following population distribution: Katsina-ala= 304,400, Konshisha= 305,700, Makurdi= 405,500, Tarka= 107,000, Oju= 227, 400 and Otukpo=359,600 (NPC, 2016). However, only 400 respondents, males and females, both single and married within the ages of 18 years and above were sampled for the study. A total of 6 local governments were selected for the study hence the study could not cover the entire population in Benue State. The sample size of this study was determined using Cochran Sample Size formula (1977). This is expressed as:

$$No= \frac{Z^2Pq}{e^2}$$

Where

No= Population size

e= Desired level of precision (Margin of error)

P= The estimated proportion of the population which has the attributes in questions.

Z= The Z value is found in Z table. (See appendix for Z-table)

That is to say

$$no=\frac{(1.96)2\ (0.05)(0.05)}{0.052}=384.16 = 384$$

Therefore the sample size for this study is 384 respondents; however, 16 respondents were added to 384 in case of non willingness by some respondents to respond to the study bringing up to 400 respondents.

The study adopted the Cluster sampling technique. The instruments of data collection for this study was structured questionnaires. This study adopted a quantitative method of data analysed using inferential and descriptive statistical measures.

Data Presentation and Analysis

A total number of 400 copies of questionnaires were distributed to generate data for this study, however, only 389 copies of the questionnaires were completed and retrieved by the researcher, eventually, the quantitative analysis is based on 389 (97%) while 24 key informants were interview and their responses are captured and presented qualitatively.

Socio-Demographic Variables of Respondents

Table 1: Distribution of Respondents by their Socio-Demographic Variables

	Variable	Frequency	Percentage
Sex			
	Male	216	55.5
	Female	173	44.5
	Total	**389**	**100%**
Age			
	18 – 20	38	9.8
	21 – 25	81	20.8
	26 – 30	70	18.0
	31 – 35	32	8.2
	36 – 40	42	10.8
	41 – 45	57	14.7
	46+	69	17.7
	Total	**389**	**100.0**
Educational status			
	No Formal Education	56	14.4
	Primary	65	16.7
	Secondary	84	21.6
	Tertiary	163	41.9
	Others	21	5.4
	Total	**389**	**100.0**
Marital Status	single	158	40.6
	Married	231	59.4
	Total	**389**	**100.0**
Religious Affiliation			
	Christians	264	67.9
	Islam	32	8.2
	Traditional	93	23.9
	Total	**389**	**100.0**
Occupation		92	23.7
	Farming	107	27.5
	Civil Servants	65	16.7
	Business	65	16.7
	Students	60	15.4
	Applicants	**389**	**100.0**
	Total		
Income of Respondents			
	<5,000	29	7.5
	6,000 – 14,000	83	21.3
	15,000 – 30,000	90	23.1
	31,000 – 50,000	136	25.0
	51,000 +	51	13.1

	Total	389	100.0
No of People in Household			1.3
	1	5	18.8
	2-3	73	46.3
	4-6	180	26.0
	7-9	101	7.7
	10	30	**100**
	Total	**389**	
Location			
	Urban	165	42.4
	Rural	224	56.6
	Total	**389**	**100.0**
Ethnic Group			
	Tiv	186	47.8
	Idoma	107	27.5
	Igede	56	14.4
	Others	40	10.3
	Total	**389**	**100.0**

Source: Field Survey, 2019

Data in table 1 indicates that male constituted 55.5% (216) of the total respondents while women were 44.5% (173) respondents. This composition was important because, utilization of mosquito nets requires the two sexes who determine whether, when and how to use TMNS in the family. The data of age shows that majority of the respondents were within the ages of 21 – 25; who constituted 20.8% (81) respondents. Respondents within the ages of 26-30 years were 18.0% (70) respondents, those within the ages of 46 and above were 17.7% (69) respondents, respondents within the ages of 41-45 years were 14.7% (52), those between the ages of 36 – 40 years were 10.8% (42) respondents, those between the ages of 18-20 years were 9.8% (38) while those between the ages of 31 – 35 years were 8.2% (32) respondents. This means that the samples were chosen from various age categorizes of people. It was also found that majority of the respondents had higher education of the learning. From the findings of the study, 41.9% (163) respondents had tertiary educational background, 21.6% (54) respondents had secondary schools, 16.7 % (65) respondents had primary education while 14.4% (56) respondents had no formal education, 5.4% (21) respondents has certificate course such as training in computer, skills, acquisition and belong to the category of others. It was observed also that, 59.1% (230) respondents were married, while 40.6% (158) respondents were single .3% (1) respondent did not revealed his/her marital status. This means that majority of the respondents were married.

Religious compositions of respondents revealed that, majority of the respondents were Christians, 67.9% (264), 23.9% (93) respondents were from traditional religion and Muslims 8.2% (32) respondents. According to the table, 27.5% (17) respondents were civil servants, 23.7% (92) respondents were farmers, 16.7% (65) respondents were business men/women, 16.7% (65) respondents were students while 15.4% (60) respondents were applicants.

The study examine the income status of respondents and found that 35.0% (136) respondents had a monthly income of N31,000 – N50,000, 23.1% (90) respondents had monthly income of N15,000 – N30,000, 21.3% (83) respondents had their monthly income of N51,00 0 and above while 7.5% (29) respondents had a monthly income of N5,000 or less.

The study examined the number of people in a household, and found that 46.3% (480) respondents reported to have a 4-6 people in their household, 26.0% (101) respondents reported to 7-9 people in their household, 18.8% (73) respondents reported that, they had 2-3 people in their household, 7.7% (30) respondents reported that, they had 10 people and above in their household while only 1.3% (5) respondents had only one person in their household. The number of people in a household was measured because, it was

relevant to evaluate whether the larger total number of people in a household may result more use of mud in the study area.

The study examine the location of respondents and found that 42.4% (165) respondents were from urban areas while 49.9% (194) respondents were from rural areas, also 7.7% (30) did not disclosed their location. The location of respondents was examined because, it can influence an individual's decision to use TMNs. This study cut across different ethnic groups in Benue State. The data revealed that 47.8% (186) respondents were Tiv people tribe, 27.5% (107) respondents were Idoma, 14.4% (56) respondents were Igede while other ethnic group like Etulo, Hausa and Jukun constitute 10.3% (40) respondents.

Table 2: Distribution of Respondents by their Knowledge of TMNs by Sex

Knowledge About TMN Utilization				
Sex	**I have**	**I have not**	**Undecided**	**Total**
Male	(99) 45.8	(117) 54.2	0	**(216) 100%**
Female	(117) 67.6	(50) 28.9	(6) 3.4	**(173) 100%**
Total	**216**	**167**	**6**	**(389) 100%**

Source: Field Survey, (2019).

It was also observed from the data on table that 42.9% (167) respondents said that they have heard of TMNs in their areas. Out of this population 30.1% (117) were males while 28.9% (50) respondents were females. It means that, level and rate of unawareness of TMNs, is high among males than women. The implication of this finding is that, when male who are house heads do not have knowledge about TMNs, it can cause damage to the entire family or household in the sense that, are very influential in decision making however, their rate of unawareness about TMN can influence their negative attitude towards prevention and care of malarias while in the leading of maternal and infant motility in Africa.

Table 3: Summary of the Chi-square test of the relationship between Sex and Knowledge about Insecticide Treated Mosquito Nets in Benue State

Sex and awareness of ITMNs	No. of cases	X^2 Value	DF	Sig. at	V. value
	389	29.99	2	0.05	0.050

Source: Field survey, 2019

The test of the relationship between sex and knowledge of TMNs in the table above indicates a weak association between sex and knowledge of TMNs. The calculated X^2 of 29.99 using V value of 0.278 at alpha level of 0.05, DF of 2, implies that other variables rather than sex of individuals can influence ones knowledge about the use of TMNs among the people of Benue State.

In order to determine where the respondents from the findings of the study have acknowledge to knowledge about utilization of TNMs, based on the findings, 19.3%(75) respondents reported that they heard about TMNs from the health institutions; 13.6%(53) respondents reported that they heard about TMNs from the public awareness campaigns; 9.5% (3) respondents said that they heard about TMNs from the community meetings 8.5% (33) respondents reported that they have heard about it in the market centres; while 4.6 (18) respondents reported that they have heard about TMNs in their worship centre and only 2.8% (11) respondents said to have heard about TMNs through their family members and friends.

Based on the above findings, it can be inferred that, the level of awareness about TMNs in health institutions is higher while the level of awareness through family members is lower. It also means there was adequate awareness about the utilization of TMNs in Benue State.

Table 4: Distribution of Respondents based on the Rate of Usage of TMNs in Benue State by Monthly Income

Use of TMNs by Respondents				
Monthly Income of Respondents	**I use**	**I do not use**	**Undecided**	**Total**
5,000 below	(13) 48.1	(13) 48.1	(1) 3.7	**(27) 100%**
6,000 to 14,000	(48) 63.2	(25) 32.9	(3) 3.9	**(76) 100%**
15,000 to 30,000	(43) 51.2	(34) 40.5	(7) 8.3	**(84) 100%**
31,000 to 50,000	(86) 67.2	(40) 31.3	(2) 1.5	**(128) 100%**
51,000 above	(23) 46.0	(26) 52.0	(1) 2.0	**(50) 100%**
Total	**213**	**138**	**14**	**(365) 100%**

Source: Field Survey, (2019).

This study examined the rate of utilization of TMNs among the people of Benue state. The utilization was cross tabulated by income status of respondents, the findings revealed that, a total number 58.4% (213) respondents used TMN. Using the monthly income status of respondents, 48.1% (13) respondents who use TMNs were within the category of those who earned monthly income of N5000; also, 63.2% (48) respondents who used TMNs had monthly income of N6,000 – N14,000; while 51.2% (43) respondents who used TMNs were within the category of those who earned monthly income of N15,000 to N30,000, 67.2% (86) respondents who used TMNs had monthly income of N31,000 to N50,000 and 46.0% (23) respondents who used TMNs had monthly income of N51,000 above. From this findings, it can be inferred that, majority of the respondents who used TMNs were within the category of those who earned N31,000 to N50,000 monthly.

Despite that, 37.8% (138) respondents did not used TMNs, out of which 48.1% (13) respondents had monthly income of N5,000 below, 32.9%(25) respondents who did not use TMNs were within the earners of N6,000 to N14,000 monthly, 40.5% (34) respondents had the monthly income of N15,000 to N30,000 and did not use TMNs; 31.3% (40) respondents with the monthly income status of N31,000 to N50,000 did not use TMNs while 52.0% (26) respondents with the monthly income of N51,000 and above did not use TMNs. Here, it means also that, the major population of people who did not use TMNs had monthly income of N31,000 to N50,000. Also, a total population of 3.9% (14) respondents did not clearly specify whether they used TMNs or not. Based on the above findings, it can be noted that, majority of the respondents who collected TMNs in Benue State used them. From the findings, there is a change in the rate of utilization of TMNs among the people of Benue State. It also means that, there were factors that inhibited people in such places from using TMNs, so factors may not be obtainable in Benue State that is why the use of TMNs is high among the people in the study area.

Table 5: Summary of the Chi-square test of the relationship between Usage of Insecticide Treated Mosquito Nets and Income Status in Benue State

Usage of Insecticide Treated Mosquito Nets and Income	No. of cases	X^2 Value	DF	Sig. at	V. value
	389	16.6	8	0.05	0.137

Source: Field survey, 2019

X^2cal = 16.6; sig. 0.05, DF = 8; V = 0.15; X^2tab =15.507

The table above tested that relationship between income status and rate of utilization of TMNs among the people of Benue State. It was observed that the calculated X^2 value was 16.6, at significant level of 0.05, under the DF 8 and number of cases was 386. This indicates that there is a weak association between income status and rate of utilization of TMNs among respondents. This shows that, others variables rather than income or economic status can influence the decision to use TMN among the people of Benue State. However, it must be restated that, the rate of people who use TMNs is higher than those who do not use it, yet not everyone who owns TMN that use it.

It was observed that, the rate of usage of TMN in Benue State was high, therefore, the study examined the pattern in which respondents used their TMN. This means that, not everyone Benue State used nets in line with the provisions of UNICEF, RBM, USAids and Net-marks. Consequently, there was a need

to evaluate the manner in which TMNs were used. In a study by Okoronkwo (2017), among the users of TMN, few people used it properly while majority used it wrongly.

Table 6: Distribution of Respondents according to Usage of TMNs by Occupation

Occupation of Respondent	Sleep inside	Sleep under	Sleep beside	Use as bed sheets	Use as curtains	Protect Nursery bed	Wall	Total
				Usage of TMNs in Households				
Farming	(1) 1.2	(1) 4.8	(0)	(0)	(1)14.3	(40)66.7	0	**(43)20.2**
Civil servants	(26) 32.1	(6) 25.6	(5) 25.0	(6)40.0	(1)14.3	(1)1.7	0	**(45) 21.1**
Business	(7) 8.6	(7) 33.3	(7) 35.0	(6)40.0	(2)28.6	(11)18.3	(1)11.1	**(41)19.2**
Students	(45)55.6	(2) 9.5	(5) 25	(0)	0	(3) 5.0	(4)44.4	**(57)26.8**
Applicants	(2) 23.8	(5)23.8	(20)100%	(3)20	(3)42.9	(5)8.3	(4)44.4	**(27) 12.8**
Total	**(81)100%**	**(21)100%**		**(15)100%**	**(7)100%**	**(60)100%**	**(9)100%**	**(213)100%**

Source: Field Survey, (2019).

In this study, it was observed that, 100% (81) respondents slept inside the TMNs out of which 1.2% (1) respondent was a farmer, 32.1% (26) respondents who slept inside TMNs were civil servants, 8.6% (7) respondents who slept inside TMNs were business people, 55.6% (45) respondents who slept inside TMNs were students, 23.8% (2) respondents who slept inside TMNs were applicants. This means that majority of the respondents who sleep inside TMNs were students; it means that the rate of correct use of TMNs is high only among students.

Other respondents used TMNs but not really in the manner in which it was meant for. According to the findings of this study, 100% (21) respondent who slept under the net, 4.8% (1) respondent was a farmer by occupation, 2.8% (6) respondents who slept under the net were civil servants; 33.3% (7) respondents who slept under TMNs were business, while 9.5% (2) respondents who sleep under the nets were students; 23.8% (5) respondents who slept inside TMNs were applicants.

There were some respondents who reported that, they slept beside the net; out of which 25.0% (5) respondents were civil servants; 25.0% (7) respondents were business people, 15% (3) respondents were students while another 25.0% (5) respondents who were applicants reported to had slept beside the nets.

According to the findings another category of people used TMN as bed sheet, they constituted 100% (15) of the total respondents; out of which 40.0% (6) respondents; 40.0% (6) and 20.0% (3) respondents were civil servants, business people and students respectively. Some respondents reported that they have their TMNs and use it to hang on their windows. This category constituted 100% (7) respondents, out of which, 14.3% (1) respondent were farmers and civil servants respectively, 28.6% (2) respondents were business people while 42.9% (3) respondents who hanged TMNs on their windows were applicants.

From the findings, some respondents used TMNs to cover their seedbed/nursery beds, cover their kiosks; this category constituted 100% (60) respondents out of which, 66.7% (40) respondents were farmers, and they reported that they used their TMNs to cover their crops in order to prevent it from destructions by pests, insects and animals, 1.7% (1) respondents whose major occupation was civil service reported to used TMN to cover their crops, 18.3% (11) respondents who were business people used their TMNs to cover their kiosks, 5.0% (3) respondents who were students used their TMNs for covering of crops and 8.3%(5) respondents who were students used their TMNs for covering crops or kiosks. Finally, other respondents used their TMNs to decorate their walls, their category had total of 100% (9) respondents; 44.4% (4) respondents each were students are applicants respectively while 11.1 %(1) respondents who used TMNs for decoration was a business person. Based on these findings, the utilization of TMNs for prevention of malaria was only done by 38% (81) respondents, while greater percent of the respondents used TMNs for other purposes which are contrary to the provision of net mark. It was also observed that, majority of the farmers who had TMN used it to cover their farm crops, nursery bed and other things. One will be right to conclude that, Benue people have poor attitude towards TMNs.

It must be noted that, the table below tested the impact of occupation on the pattern of usage of TMNs in Benue State. These findings are summarized in the table below.

Table 7: Summary of the Chi-square test of the relationship between Occupation and Pattern of Usage of Insecticide Treated Mosquito Nets in Benue State

Pattern of Usage of Insecticide Treated Mosquito Nets and occupation	No. of cases	X^2 Value	DF	Sig. at	CC. value
	389	202.3	24	0.05	0.7

Source: Field survey, 2019

X^2 cal = 202.3, sig. at 0.05; DF = 24; Contingency coefficient = 0.7

The cross tabulation of the above variables hat is occupation of respondents and pattern of utilization of TMNs among the people in Benue State indicates a strong relationship. This is affirmed by the X^2 calculated value of 202.3 at significant level of 0.05, DF 24 and C value of 0.7. This means that the use of TMNs in Benue depends on the type of occupation in which an individual has, determined how he/she uses TMNs. From the study, majority of the farmers used TMNs to cover their crops to protect them against damage. While majority of the respondents who slept inside TMNs were students. This is a true confirmation of what happens in Benue State; if you move around the rural areas in the state, TMNs are seen at seed beds.

This study also tested if there is a relationship between age of the people and the use of TMNs in Benue state. In this hypothesis, the calculated chi-square value is 47.2; DF of 12 at sig. level of 0.05 and V value of 0.3. This indicates that the null hypothesis which states that "there is no significant relationship between age and utilization of treated mosquito nets in Benue state" was rejected while the alternate hypothesis which state that "there is a significant relationship between age and utilization of treated mosquito nets in Benue state" was upheld, however the association is weak as indicated by the V value of 0.3. Based on these findings it can be inferred that the age of an individual can weakly influence whether he/she slept inside TMNs or not.

Table 8: Summary of the Chi-square test of the relationship between age and Usage of Treated Mosquito Nets in Benue state".

Ownership and Usage of Insecticide Treated Mosquito Nets	No. of cases	X^2 Value	DF	Sig. at	V. value
	389	47.2	12	0.05	0.3

Source: Field survey, 2019

Chi-square value is 47.2, DF of 12 at sig. level of 0.05 and V. value of 0.3 (see appendix)

This study also tested the relationship between geographical location of the people and the use of TMNs in Benue state. In this hypothesis, the calculated chi-square value is 23.1; DF of 4 at sig. level of 0.05 and V value of 0.2. This indicates that there is a weak relationship between geographical location and utilization of treated mosquito nets among Benue people. Based on these findings it was inferred that the geographical location of an individual can weakly influence whether he/she slept inside TMNs or not. The findings are summarized in the table below:

Table 9: Summary of the Chi-square test of the relationship between geographical location and Usage of Treated Mosquito Nets in Benue state

Ownership and Usage of Insecticide Treated Mosquito Nets	**No. of cases**	**X^2 Value**	**DF**	**Sig. at**	**V. value**
	389	1.9	4	0.05	0.2

Source: Field survey, 2019

Chi-square value is 23.1; DF of 4 at sig. level of 0.05 and V value of 0.2.

Based on these findings it can be inferred that the geographical location of an individual can weakly influence whether he/she sleeps inside TMNs or not.

Conclusion/Recommendations
      Based on the above findings, the following conclusion were made in the study. There is high rate of the knowledge about the use of TMNs among the people of Benue State. That is to say that, many people in Benue State are informed about TMNs in the area. Also, majority of the people in Benue State have TMNs in their household. People in the study area were aware of the importance of using TMNs as well as the effects of not using TMNs, but only few people sleep inside the net on the daily bases. On the whole therefore, the study concludes that, people in Benue State have negative attitude towards sleeping inside TMNs, consequently there is possibility that the rate of malaria in the state cannot be reduced to 0% as was targeted by WHO

      This study demonstrated a wide gap between TMNs ownership and Utilization among the people of Benue state. Therefore, the suggested recommendations arising from this study for the national malaria control efforts are as follows:

1. To reassess the behavioural change communication (BCC) intervention the national malaria control programme has been using for ITN ownership and utilization. This should include behavioural change messages that aim at improving knowledge about the efficacy of consistent ITN utilization. The Ministries of health, education and community development mother and child health should liaise in developing and disseminating information on ITN use and benefits in the language that the audience best understand.
2. To strengthen the system and structural responses by integrated home based outreach programs. ITN distribution and BCC messages on malaria prevention can be incorporated with other outreach programmes.
3. Health education campaigns on ITN programmes should re-enforced the message that pregnant women and under five children are at risk of severe malaria and death for not utilizing ITNs correctly.
4. Free ITN distribution should be extended to pregnant women using service of traditional birth attendants (TBAs) as well.

References
Agbunu, A. (2015). *World Malaria Report,* Switzerland: World Health Organization.
Amuta, E., Houmsou, R.. & Wama, E. (2014).Malarial infection among antenatal and maternity clinics attendees at the Federal Medical Centre, Makurdi, Benue State, Nigeria. *Conference presentation: this paper was presented at the 36th annual conference of the Parasitology Public Health Society of Nigeria, 2012; Sept 25-28; Federal University of Technology, Akure; Ondo State, Nigeria. ©Copyright E. Amuta et al., 2014 Licensee PAGEPress, Italy Infectious Disease Reports 2014; 6:5050 doi:10.4081/idr.2014.5050*
Bisser, R.M. (2010). *National Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya.* Ministry of Public Health and Sanitation and Ministry of Medical Services, Nairobi
Chukwuocha, O., Dozie, E., Onwuliri, T., Ukaga, A.P., Nwoke, Nwankwo, Nwoke, Nwaokoro, Nwoga, Udujih, Iwuala, Ohaji, Morakinyo & Adindu (2010). Sleeping arrangements and mosquito net use among under-fives: Results from the Uganda Demographic Health Survey. *Malaria Journal*, 2:40
Gathitu, P. N. (2014), 'Factors associated with mosquito net use by individuals in households owning nets in Ethiopia', *malaria journal, vol.10 no 354.*
Gimnig, J.E., Otieno, P., Were, V., Marwanga, D., Abong'o, D., Wiegand, R. (2016). The Effect of Indoor Residual Spraying on the Prevalence of Malaria Parasite Infection, Clinical Malaria and Anemia in an Area of Perennial Transmission and Moderate Coverage of Insecticide Treated Nets in Western Kenya. *Snounou G, editor. PLOS ONE. 2016 Jan 5;11(1):e0145282.*

Grabowsky, M., Nobiya, T., Ahun, M., Donna, R., Lengor, M, and Zimmerman D, (2005). Distributing insecticide-treated bednets during measles vaccination: *A low-cost means of achieving high and equitable coverage. Bull World Health Organ. 2005; 83:195-201*

Jones, S.F. (2005). Factors Associated With Use And Non-Use Of Mosquito Nets For Children Less Than 5 Years Of Age In The Mfantseman Municipality, Ghana. *Master's Thesis Public Health School of Medicine Faculty of Health Sciences University of Eastern Finland October, 2012*

Lengeler, C. (2004). Insecticide-treated bed nets and curtains for preventing malaria. *Cochrane Database Syst Rev*. 2004; 2: CD000363

Nasirumbi, P.R. (2016). Determinants Of Insecticide Treated Mosquito Nets Utilization Among Households Of Vihiga Sub-County. *A Research Project submitted to the University of Nairobi, School of Economics Unit in partial fulfillment of the degree of Masters of Science in Health Economics and Policy © November 2016*

Omole, T.M., Ogunfowokokan, O. & moses, A. (2017). Use OF Insecticide-Treated Net And Malaria Parasitemia in Under-Fives at National Hospital Abuja. *International Journal Of Tropical Disease* Www.Sciencedomain.Org

Ukibe, O. B., Ikibe, H. O., Mbanugo, I. O., Obi-Okaro, C. O. & Ukibe. E (2014). Malaria prevention practices among mothers delivering in an Urban hospital in southwest Nigeria. *J Vector Borne Dis*., 45: 217-

WHO. (2008). World Malaria report 2010. Geneva. Available at *http://www.who.int/malaria/world_malaria_report_2010/world_malaria_report_2010.pDF* [accessed on 15 June, 2018].

WHO.(2016).Malariainpregnancy.Availableat*http://www.who.int/malaria/areas/high_risk_ps/pregnancy/en/* accessed on 13 August 2018]

Wiseman V, Scott A, Mcelroy B, Conteh L, & Stevens W. . (2007). Determinants of Bed Net Use in the Gambia: Implications for Malaria Control. Am J Trop Med Hyg. May 1;76(5):830–6. 10.

World Health Organization (2003). www.who.int accessed on 27/03/2019 at 0958 hrs

World Health Organization, (2014). The health of the people: what works: the African regional health report, 2014. Brazzaville, Republic of Congo: World Health Organization, Regional Office for Africa; 2014. 187 p.