

ASSESSMENT OF THE KNOWLEDGE AND ATTITUDE TOWARDS INSECTICIDE TREATED NETS (ITN) AMONG CAREGIVERS OF UNDER-FIVE CHILDREN IN A TERTIARY HOSPITAL IN JOS, PLATEAU STATE, NIGERIA**Idoko Lucy¹, Okafor Kingsley C.*², Amlabu Gift M.³, Idika, Chidindu N.⁴, Oguche, Blessing E.⁵**

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ABSTRACT

Introduction: Key to malaria control is knowledge of and acceptance of use of insecticide treated net. Despite efforts by health authorities to promote the use of ITNs, studies have shown however, that there is still a wide gap between knowledge and utilization of these nets in the endemic areas of the world. Studies have shown that Insecticide Treated Nets awareness in Nigeria varies from State to State with as high as 93% in the Southern States and as low as 36% in the Northern States. 39% had a negative attitude towards ITNs Poor sensitization and wrong perception is responsible for poor attitude in certain areas. Community participation plays an essential role in the control of malaria and whether this succeeds or fails depends greatly on the behaviour of caregivers of young children. This study seeks assess the knowledge and attitude towards insecticide treated nets (ITN) among caregivers of under five children in a tertiary hospital in North Central, Nigeria. **Methodology:** The study is a descriptive cross sectional study conducted among 242 caregivers of under five children in Tertiary Hospital in Jos, Plateau State, Nigeria in 2018. A simple Random Sampling technique was used to select participants. Ethical clearance was obtained from the Ethical Review Committee of BHUTH, Jos. **Findings:** Majority (87.2%) of caregivers were within the age group 25 and 39 years, Majority of care givers had tertiary level of education 155 (64.0%), 235 (97.1%) were married, 124 (51.2%) of the caregivers had 2 under-five children in their household, 123 (50.8%) of the under fives were males while females were 119 (49.2%). Majority of the children 99 (40.9%) were aged between 1-3 months. Almost all 238 (98.3%) of the caregivers had heard of malaria before. Most 220 (68.3%) of the caregivers, agreed that mosquitoes cause malaria responded, majority of the respondents 230 (95%) believed that sleeping inside mosquito nets prevent malaria, 153 (43.6%) got their information on malaria from the health centre/hospital. Knowledge of ITN was 192 (79.3%) however 50 (20.2%) do not know about ITN. Knowledge was positively associated with higher level of education, lower ages of children, higher ages of caregivers and trading as an occupation of caregivers. Half of the caregivers were willing to recommend ITN to a friend/family, majority agreed to use ITNs and majority supported sleeping under mosquito net for everyone. Summarily, 60.3% had positive attitude towards ITN. **Conclusion:** Majority of caregivers knew about ITN. Factors affecting knowledge include higher level of education, lower ages of children, higher ages of caregivers and trading as an occupation of caregivers. Majority supported sleeping under mosquito net for everyone. Summarily, 60.3% had positive attitude towards ITN. There is need for increase in knowledge of Malaria via health education, increase in radio and television campaigns, talks and adverts. Strengthening of teaching about Malaria and other endemic diseases in school curriculum at primary, secondary and tertiary levels will help boost attitude toward ITN.

KEYWORDS: Malaria, Insecticide treated net, Knowledge.**INTRODUCTION**

Malaria is implicated in approximately a quarter of infant mortality and third of under-five mortality within the country (NMIS, 2015). Nigeria is responsible for a third of the global malaria burden with under five children and pregnant women most at risk (WHO, 2017). There are about 110 million clinically diagnosed cases of malaria and 300 thousand malaria-related deaths annually. The

disease overburdens the already weak health system and imposes a severe socioeconomic burden on the nation amounting to approximately 480 billion naira in out-of-pocket expenditure for treatments, prevention and loss of man hours by caregivers, decreasing the gross domestic product (GDP) by 40% every year (NMIS, 2015).

The Roll Back Malaria partnership of the World Health Organization seeks to end preventable deaths of newborns and children of under-five years of age by 2030 (Roll Back Malaria, 2015) and to attain a malaria-free world in line with the United Nations' sustainable development goal 3 target 3 (SDG 3.3). Nigeria has adopted a similar vision of a malaria-free country. To this end, the National Malaria Elimination Programme aims to achieve pre-elimination status (less than 5,000 cases per 100,000 persons) from 33,000 cases per 100,000 persons and reduce malaria-related deaths to zero by 2020 (NMIS, 2015).

A three-pronged approach to malaria control has been advocated which includes: Insecticide Treated Nets (ITN), effective artemisinin based anti-malarial combination therapy and Indoor Residual Spraying (IRS) of insecticides (WHO, 2015). The use of ITN is considered one of the most effective malaria prevention methods in highly endemic areas. It has been reported that insecticide-treated nets when consistently and correctly used, can save approximately 6 child lives per year for every one thousand sleeping under them and reduce clinical malaria episodes by more than 40% (Lengeler, 2004).

Although insecticide-treated nets are readily available in many communities, programmes are still battling with getting people to use them (Adongo *et al.*, 2005). There is often a lack of association between mosquito bites and malaria with 47% of respondents in a survey not aware mosquito bites were the only route for malaria transmission (Opiyo *et al.*, 2007). Knowledge of the transmission of malaria has been strongly linked to use of ITNs as 63.2% of under-five children of knowledgeable mothers used ITNs the previous night compared to 52.3% use by children of mothers who had no knowledge of malaria transmission (Hwang *et al.*, 2010).

The 2009-2013 National Malaria Control Strategic Plan (NMCSP) made attempts to address 3 core interventions in the control of malaria and they include: Integrated Vector Management (IVM) strategy, prompt diagnosis and adequate treatment of clinical cases at all levels and in all sectors of health care, prevention and treatment of malaria in pregnancy (NPC and ICF, 2014).

A new 2014-2020 national strategic plan for control of malaria was developed and includes massive scaling up of interventions (NPC and ICF, 2014). The main vector control methods include: Insecticide-treated nets (ITNs), indoor residual spraying and Larval Source Management (LSM) (Tizifa *et al.*, 2018). Other methods include: House Improvement, Sugar feeding, swarm sprays, targeting livestock, spatial repellents and genetically modified mosquitoes (Tizifa *et al.*, 2018).

An insecticide-treated net is a mosquito net that repels, disables and/or kills mosquitoes that come into contact

with insecticide on the netting material (WHO, 2006). There are 2 categories of ITNs:

1. Conventionally treated nets: These are nets that have been treated before use by dipping in World Health Organisation (WHO) insecticide and it is required that the net be re-treated after three washes or at least once a year to ensure its continued insecticidal effect.
2. Long-lasting insecticidal nets (LLIN): these are factory-treated mosquito nets which have insecticide incorporated within the netting material. It can be effective without re-treatment for at least 3 years of use (WHO, 2006).

Knowledge of Insecticide Treated Nets

Key to malaria control is knowledge of and acceptance of use of insecticide treated net. Although various health authorities have made efforts to promote the use of ITNs, studies have shown however, that there is still a wide gap between knowledge and utilization of these nets in the endemic areas of the world. Studies conducted between 2000 and 2004, showed that while awareness of caregivers on ITN were almost universal 97.3%, 97.6% and 88.3% in Senegal, Uganda and Zambia respectively, it was only 60.3% in Nigeria. (Baume and Marin, 2008).

More recent studies show there is a high level of awareness amongst caregivers of under five children in various parts of sub-Saharan Africa with surveys in Uganda, Ghana and Cameroon recording 98.1%, 98.7% and 99% awareness of ITN respectively (Taremwa *et al.*, 2017; Nyavor *et al.*, 2017; Kimbi *et al.*, 2014).

The prevalence of ITN awareness in Nigeria varies from State to State with as high as 93% in the Southern States and as low as 36% in the Northern States (Musa *et al.*, 2009; Ukibe *et al.*, 2013). This disparity has been attributed to educational status (Bisi-Onyemaechi *et al.*, 2017). In the Nigeria Malaria Indicator Survey (NMIS), only 56% of mothers cited sleeping under any mosquito net as a way of preventing malaria and 33% mentioned ITN as a malaria prevention method (NMIS, 2015). This is an improvement from the 7.3% gotten from a study in the early days of the Roll Back Malaria programme (Baume and Marin, 2008). In a study by Nyavor *et al.* (2017), although the respondent's awareness on malaria prevention was near 100%, it was not translated into ITN use, which is consistent with previous studies in Ghana (Abuaku *et al.*, 2005; de la Cruz, 2006). The extent of ITN use is not as good as their level of knowledge and awareness about ITNs in malaria prevention (Mbonye *et al.*, 2006; Oresanya *et al.*, 2008). This may be due to differences in malaria transmission intensity which varies throughout the year and inadequate access to health information in some localities (Oresanya *et al.*, 2008). The high level of awareness amongst caregivers on ITNs in this study might be attributed to intensification of health education through both micro (ANC, RCH and Community durbar) and the macro (Radio and TV) media. A similar study in a rural

community in Southern Nigerian identified radio/Television and hospital as the main sources of information about ITN use for malaria prevention (Johnson *et al.*, 2015).

Ovadje and Nriagu (2016) showed that the knowledge domains with significant main effects were malaria cause and malaria transmission. There is an assumption that knowledge enhances the ownership and use of ITNs, this may be different as some studies have reported no correlation between malaria knowledge and the use of ITNs (Agyepong and Manderson, 1999; Arogundade *et al.*, 2011). By contrast, several studies have found significant associations between measures of malaria knowledge and ITN use (Biswas *et al.*, 2011; Bennett *et al.*, 2012; Graves *et al.*, 2011; Paulander *et al.*, 2009). Knowledge and behaviour are not necessarily directly related; other variables that may contradict (including beliefs, perceptions, economic and household factors) may be responsible for behaviour consistent and inconsistent with knowledge (Adongo *et al.*, 2005).

Attitude towards Insecticide Treated Nets

Attitude is based on different factors including malaria knowledge and risk (Wiseman *et al.*, 2007). Taremwaa *et al.* (2017) showed that while 98.1% of the caregivers with children under 5 years had a good attitude towards insecticide-treated nets, 39% had a negative attitude towards ITNs. Same level of attitude was obtained in Ogun state with 78.1% of caregivers specifically acknowledging that sleeping under mosquito net is one way to prevent getting malaria (Kio *et al.*, 2016).

Chase *et al.* (2009) examined the drivers of ITN purchase and noted that formal schooling and market knowledge determined higher average willingness to pay for ITNs while use of other malaria prevention methods like indoor residual spraying decreased demand for it. This is similar to another study that observed that majority of the respondents preferred the use of insecticide spray to the use of ITN citing price and availability in the market as possible reasons (Awosan *et al.*, 2013).

Poor sensitization and wrong perception is responsible for poor attitude in certain areas. For instance there were mothers who reserved the net for their unborn grandchildren. In Anambra and Rivers state, there were people who did not use the net and said, "I heard that one man slept inside the net and vomited blood" and "I heard that it causes skin irritation because the chemical is too much". In Bauchi state, some respondents thought the nets were laced with birth control chemicals (Onyeneho, 2013).

Community participation plays an essential role in the control of malaria and whether this succeeds or fails depends greatly on the behaviour of caregivers of young children (Oguonu *et al.*, 2005). Studies have shown that the level of ownership and actual use of insecticide-

treated nets have varied from one locality to another in Nigeria (Isah *et al.*, 2009; Ukibe *et al.*, 2014).

This study seeks to assess the knowledge and attitude towards insecticide treated nets (ITN) among caregivers of under five children attending immunization clinic in Bingham University Teaching Hospital.

MATERIALS AND METHODS

The study is a descriptive cross sectional study conducted for a period of 10 weeks using an interviewer administered structured questionnaire conducted at Bingham University Teaching Hospital (BHUTH), a faith based tertiary health institution in Plateau State with a 250 bed space. It was established in 1959 by the then Sudan Interior Mission (SIM) missionaries but currently owned by Evangelical Church Winning All (ECWA). It is located along Zaria Bye-Pass, off Polo round-about, Jos North Local Government Area of Plateau State. It had operated as a General hospital until the year 2010 when it became a teaching hospital. The Immunization clinic is a service unit of the department of Paediatrics which provides services such as routine immunization for under five children, breastfeeding and nutritional counselling for caregivers of the children. The clinic runs on Wednesdays with an average of 50 under-five children attending weekly.

The study population comprised of all caregivers of under five children attending immunization clinic at BHUTH during the period of the study (23rd August to 7th November, 2018) irrespective of age and sex that consented to participate in the study.

Sample Size was determined using Cochran's formula (Ogbonna, 2016)

$$n = \frac{z^2 pq}{d^2}$$

Where n= minimum sample size

z = standard normal deviation set at 1.96 (Confidence Interval 95%)

p = proportion of under-fives who slept under ITN the previous night in North-central geopolitical zone in a study done from Nigeria malaria indicator survey -59.7% (NMEP *et al.*, 2016)

q = complementary probability (1 - P)

d = degree of accuracy desired usually set at 0.05

$$n = \frac{(1.96)^2 (0.597) (0.403)}{(0.05)^2}$$

The calculated minimum sample size is 370.

10% of the minimum sample size was added to the sample size to give room for errors.

Hence, sample size is 407. A simple Random Sampling technique was used to select participants. A list of registered caregivers who attending immunization session was used as the sampling frame, selection was done by balloting. On each clinic day, the purpose and importance of the study was explained to each caregiver

and thereafter consent (written and/or verbal) was obtained by the interviewers. A questionnaire was then administered to each consenting caregiver by a member of the team. The data was collected from caregivers of under-five children attending immunization clinic using a structured interviewer-administered questionnaire to obtain information from caregivers of under-five children who gave consent on immunization clinic days. The questionnaire was used to gather information on caregiver and child's identification, knowledge, attitude and practice of insecticide treated nets. At the end of the data collection period, 242 participants were interviewed. This made up 65.4% of the minimum sample size.

Ethical clearance was obtained from the Ethical Review Committee of BHUTH, Jos. Findings were based on self

report on their level of knowledge and attitude. As the weeks progressed, we noticed that many of the attendees had been interviewed before, thus not eligible to be interviewed again. The number of eligible respondents was consistently on the decline week after week. Hence, a total sample size of 242 was obtained instead of 370 which was the calculated minimum sample size. The 242 completed questionnaires were analysed using Statistical Package for the Social Science (SPSS) version 20. Statistical significance was determined using chi square. A 95% confidence interval was used for the study and P value <0.05 was considered statistically significant.

RESULTS

Table 1: Sociodemographic characteristics of caregivers of under-five children attending immunization clinic.

Age of Care givers	Frequency (n = 242)	Percent (%)
<19	3	1.2
20-24	20	8.3
25-29	79	32.6
30-34	82	33.9
35-39	50	20.7
≥40	8	3.3
Sex of caregiver		
Female	239	98.8
Male	3	1.2
Religion		
Christianity	229	94.6
Islam	12	5.0
No religion	1	0.4
Occupation of caregivers		
Trader	82	33.9
Unemployed	65	26.9
Civil servant	38	15.7
Teacher	24	9.9
Artisan	16	6.6
Missionary	4	1.7
Farmer	3	1.2
It expert	3	1.2
**Others	7	2.9
Level of education		
Tertiary	155	64.0
Secondary	81	33.5
Primary	4	1.7
None	2	0.8
Total	242	100.0
**Others include: Editor (2), Receptionist (2), Event management (2), literacy consultant (1).		

1A) Sociodemographic characteristics of caregivers of under-five children attending immunization clinic

Table 1.0 shows that majority of the care givers 211 (87.2%) were aged between 25 and 39 years while 3

(1.2%) were less than 19. 98.8% of the caregivers of under-five children that attended immunization clinic in BHUTH were females while males accounted for only 1.2%.

Christians accounted for the highest percentage (94.6%) of the caregivers that attended immunization clinic in BHUTH. Muslims and those with no religion accounted for only 5.0% and 0.4% respectively. Most respondents were Traders, 82 (33.9%), Unemployed 65 (26.9%), civil servants 38 (15.7%) and teachers 24 (9.9%).

Majority of care givers had tertiary level of education 155 (64.0%), 81 (33.5%) had secondary education, 4 (1.7%) had primary education, 2 (0.8%) had no education.

Table 1b: Sociodemographic characteristics of caregivers of under-five children attending immunization clinic.		
Number of years spent in school	Number of caregivers	Percentage (%)
0	2	0.8
1-6	4	1.7
7-12	81	33.5
>12	155	64.0
Marital status		
Married	235	97.1
Never married	6	2.5
Widowed	1	0.4
Location		
Gada biu	73	30.2
Zaria road	41	16.9
Tudun wada	26	10.7
Apata	24	9.9
Bukuru	23	9.5
Bauchi road	18	7.4
Rayfield	11	4.5
Outside jos town	8	3.3
Lamingo	7	2.9
West of mines	6	2.5
Abattoir	5	2.1
Total	242	100.0

1B) Sociodemographic characteristics of caregivers of under-five children attending immunization clinic

Table 1b: Most of the caregivers, 155 (64.0%) have spent more than 12 years schooling while 2 (0.8%) have not been to any school.

Almost all respondents 235 (97.1%) of the caregivers of under-five children that attended immunization clinic in BHUTH were married. Those that were never married accounted for only 2.5%. that 73 (30.2%) of the caregivers reside in Gada Biu, while only 5 (2.1%) reside in Abattoir and 8 (3.3%) live outside Jos town.

Variables	Frequency (n = 242)	Percentage (%)
Number of under fives in household		
1	104	43
2	124	51.2
3	13	5.4
≥4	1	0.4
Sex of child		
Male	123	50.8
Female	119	49.2
Age of child (months)		
<1	13	5.4
1-3	99	40.9
4-6	43	17.8
7-9	33	13.6
10-12	7	2.9
13-15	20	8.3
16-18	14	5.8
19-21	3	1.2
22-24	7	2.9
>24	3	1.2
Number of people in household		
≤3	58	24.0
4-6	150	62.0
7-9	22	9.1
≥10	12	4.9
Total	242	100.0

2) Sociodemographic parameters of Under-fives in Household

Table 2 shows that 124 (51.2%) of the caregivers had 2 under-five children in their household while 104 (43.0%) of the caregivers had at least 1 under-five children in their household. About 123 (50.8%) were males while females were 119 (49.2%).

Majority of the children 99 (40.9%) were aged between 1-3 months while only 3 (1.2%) children were aged 2 years and above. Majority of the caregivers 150 (62%) had 4-6 people in their household while 12 (4.9%) had at least 10 people in their household.

Awareness of malaria	Number of caregivers	Percentage (%)
Yes	238	98.3
No	4	1.7
*Causes of malaria		
Mosquito	220	68.3
Dirty surroundings	54	16.8
Stagnant water	42	13.0
Certain foods	4	1.3
Don't know	2	0.6
Use of ITN prevent malaria		
Yes	230	95
No	8	3.3
**Not applicable	4	1.7
*Sources of information on malaria		
Health centre/hospital	153	43.6
Friend/family/neighbour/school	96	27.4
Radio/television	51	14.5
Internet	46	13.1
Church/mosque	4	1.1
Billboard/posters/leaflets	1	0.3
Knowledge of methods of preventing mosquito		

bites		
Sleep inside mosquito net	213	47.8
Use insecticide spray	102	22.9
Keep surroundings clean	82	18.4
Keep doors and windows closed	35	7.8
Use mosquito coils	8	1.8
Eliminate stagnant water around living area	4	0.9
Use insect repellent	2	0.4
*Multiple response, **Not applicable are those that do not know about malaria		

3) Awareness, knowledge of causes of Malaria, use of ITN, source of information among caregivers

Table 3 shows that almost all 238 (98.3%) of the caregivers had heard of malaria before while only 4 (1.7%) had not heard of malaria. Most of the caregivers, 220 (68.3%) responded that Mosquitoes cause malaria, in addition, some indicated that dirty surroundings 54 (16.8%) and stagnant water 42 (13%) as other causes of malaria.

Majority of the respondents 230 (95%) believed that sleeping inside mosquito nets prevent malaria while 8 (3.3%) did not. Most respondents 153 (43.6%) got their

information on malaria from the health centre/hospital, 96 (27.4%).

Friend/family/neighbour/school and 51 (14.5%) Radio/television. About half 213 (47.8%) of the caregivers are aware of avoid mosquito bites by sleeping inside mosquito net while 2 (0.4%) avoid mosquito bites by using insect repellent.

Knowledge of ITN	Number of caregivers	Percentage (%)
Yes	192	79.3
No	50	20.7
Source of information		
Health centre/ hospital	122	50.5
Media	26	10.7
School	18	7.4
Family and friends	16	6.6
Street campaign and awareness	3	1.2
Work place	2	0.8
Don't know	5	2.1
**not applicable	50	20.7
Ability to differentiate ITN from ordinary mosquito net		
Yes	131	54.1
No	111	45.9
Total	242	100.0

4) Knowledge of Insecticide treated net (ITN) among caregivers

Table 4 shows that 192 (79.3%) of the caregivers knew about ITN however 50 (20.2%) do not know about ITN.

About half 122 (50.5%) of the caregivers learnt about ITN from health centre/hospital while 0.8% learnt about ITN from their workplace, similarly, about half 131 (54.1%) of the caregivers were able to differentiate ITN from ordinary mosquito net, while 111 (45.9%) are unable to differentiate ITN from ordinary nets.

Table 5: Association between knowledge and Level of Education, number of under-fives, age of caregiver and Occupation of caregiver.

	Knowledge of ITN		Total	Test Statistic	P value
	Yes	No			
Level of education					
None	1 (0.4)	1 (0.4)	2 (0.8)	Fischers = 16.3	0.007
Primary	2 (0.8)	2 (0.8)	4 (1.7)		
Secondary	56 (23.1)	25 (10.3)	81 (33.5)		
Tertiary	133 (55.0)	22 (9.1)	155 (64.0)		
Number of under-fives in household					
1	83 (34.3)	21 (8.7)	104 (43.0)	Fischers = 12.2	p = 0.027
2	98 (40.5)	26 (10.7)	124 (51.2)		
3	10 (4.1)	3 (1.2)	13 (5.4)		
4	1 (0.4)	0 (0.0)	1 (0.4)		
Age of caregiver					
≤15	2 (0.8)	1 (0.4)	3 (1.2)	χ ² = 18.8	p = 0.0461
20-24	15 (6.2)	5 (2.1)	20 (8.3)		
25-29	56 (23.1)	23 (9.5)	79 (32.6)		
30-34	69 (28.5)	13 (5.4)	82 (33.9)		
35-39	44 (18.2)	6 (2.5)	50 (20.7)		
≥40	6 (2.5)	2 (0.8)	8 (3.30)		
Occupation of caregiver					
Trader	67 (27.7)	15 (6.2)	82 (33.9)	Fischers exact = 43.7	p = 0.085
Unemployed	46 (19.0)	19 (7.9)	65 (26.9)		
Civil servant	36 (14.9)	2 (0.8)	38 (15.7)		
Teacher	24 (9.9)	0 (0.0)	24 (9.9)		
Artisan	9 (3.7)	7 (2.9)	16 (6.6)		
Farmer	6 (3.1)	2 (0.0)	8 (1.2)		
Missionary	3 (1.6)	3 (1.2)	4 (1.7)		
IT expert	1 (0.5)	2 (0.8)	3 (1.2)		
Total	192 (79.3)	50 (20.7)	242 (100.0)		

5) Association between knowledge and Level of Education, number of under-fives, age of caregiver and Occupation of caregiver

Table 5 shows that a higher proportion of caregivers with tertiary level of education, 133 (55.0%) had knowledge of ITN than those with no formal education 1 (0.4%). This finding was statistically significant (Fischers = 16.3, p = 0.007).

Also, a higher proportion of households with 1 under-five, 83 (34.3%) and 2 under-fives 98 (40.5%) had knowledge of ITN than those with 3 under-fives 10 (4.1%) and 4 under-fives 1 (0.4%) respectively. This finding was statistically significant. (Fischers = 12.2, p = 0.027).

A higher proportion of caregivers aged 25 – 29 years {56 (23.1%)} and 30 -34 years {69 (28.5%)} had knowledge of ITN while a lower proportion of caregivers aged less than 24 years had knowledge of ITN. This was statistically significant (χ² = 18.8, p = 0.0461).

A higher proportion of traders 67 (27.7%) than unemployed 46 (19.0%) had more knowledge of ITN than farmers 6 (3.1%) and missionaries 3 (1.6%). This

finding was not statistically significant. (Fischers exact = 43.7, p = 0.085).

Attitude toward of ITN	Number of caregivers	Percentage (%)
Positive	146	60.3
Negative	96	39.7
Will you recommend ITN to a friend/family		
Yes	122	50.4
No	120	49.6
Will you Use ITN		
Yes	198	81.8
No	44	18.2
Support sleeping under mosquito net for all people		
Yes	220	90.9
No	22	9.1
Total	242	100.0

6) Attitude towards ITN, willingness to recommend and support the use of ITN

146 (60.3%) had positive attitude towards ITN, while 96 (39.7%) had negative attitude towards to ITN.

122 (50.4%) were willing to recommend ITN to a friend/family 120 (49.9%). 198 (81.8%) agreed to use ITNs, 44 (18.2%) said they will not use Majority, 220 (90.9%) supported sleeping under mosquito net for everyone while 22 (9.1%) did not.

DISCUSSION

Majority, (87.2%) of the caregivers were within the age 25 to 39 years. This is comparable to the findings of Asuquo *et al.*, (2016) with majority of caregivers aged 26 to 35 years (56%). In the study by Kio *et al.*, (2016) in Ogun State, majority of the caregivers were age 20 to 30 years (73%). Study by Arogundade *et al.*, (2011) among twenty-one states in Nigeria found almost half of the caregivers to be 30 years and above. A study in Uganda by Taremwa *et al.*, (2017) was also in agreement with majority of the caregivers within age 21-30 years. This similarity is due to the fact that most women of child bearing age belong to this age group. This group can be targeted for insecticide distribution and health education.

Almost all caregivers were females while males accounted for only one percent. This is similar to a study by Esimai and Aluko, (2014) in an urban local government area in Osun State which showed that all caregivers were females. This is attributable to the fact that the role of caregiving is seen in a typical African setting as a role done better by females. Similarly, under five children still need the care of mothers to thrive and survive into adulthood. Thus, mothers play a significant role in the survival of the species of all living organisms.

About three quarters of caregivers were gainfully employed in different occupations, majority of which were traders (33.9%). This is in contrast to a study by Kio *et al.*, (2016) in Olabisi Onabanjo University Teaching Hospital, Ogun State where 35.6% of the caregivers were civil servants and a study done by Malusha *et al.*, (2009) in Makueni district in Kenya

where farmers made up 47.3% of the caregivers. This could be as a result of different sociocultural norms and sociodemographic features in both regions. The finding of trading as a common occupation may be attributable to the fact that women usually will find trading as a suitable occupation to have enough time to take care of their young ones. It can be explained that trading is easy to set up and manage, typically sales of small edible items, provisions, household items, vegetables, etc. About a quarter of the caregivers in this study were unemployed. This presents a precarious situation for the growth of the child especially if the spouses are also unemployed. But with an employed husband, family upkeep may be improved. Summarily, majority of the women were engaged in one form of work or the other.

Caregivers with tertiary education were the highest of caregivers interviewed (64%) This is in contrast with findings in Ogun State where 59.6% of the caregivers had secondary education (Kio *et al.*, 2016). A study by Esimai and Aluko, (2014) in an urban local government area in Osun State showed that caregivers with tertiary education made up the least percentage of caregivers (7.2%). This may be connected with the fact that the area of the study had a tertiary education centre, thus, women had easy access to admission and eventual graduation.

Majority of the caregivers (97.1%) were married while 2.5% had never been married. This corresponds with a study by Esimai and Aluko, (2014) which showed that majority of the caregivers were married (88.7%), also in keeping with Kimbi *et al.*, (2014) with majority of caregivers (66%) married. The institution of marriage presents a responsibility of parents toward their offspring. Handling the growth and developmental needs of under-five is done better in a marital setting with mother and fathers playing important roles in ensuring the growth and survival of their offspring.

Majority (98.3%) of caregivers are aware of malaria which is similar to percentage of women who have heard about malaria in Nigeria (87%) and Plateau State (95%) according to Nigeria Malaria Indicator Survey (NMIS, 2015). Mosquito was the most frequently mentioned

cause of malaria (68.3%) while other causes mentioned were dirty surroundings (16.8%), stagnant water (13%) and certain foods (1.3%). This is in contrast to the report of Nigeria Malaria Indicator Survey where 88% and 98% of women in Nigeria and Plateau State respectively were reported to have mentioned mosquito as a cause of malaria (NMIS, 2015). A study in Uganda by Taremwa *et al.*, (2017) found that 83.3% of caregivers were aware that malaria is transmitted by mosquitoes. It was expected that with the high literacy level, especially with majority attaining tertiary education, majority of the caregivers would know that mosquito was the cause of malaria. However, this contrast with the report of Nigeria Malaria Indicator Survey could be because the caregivers were not educated or properly educated about malaria in their centres of learning. This calls for introduction of short courses on common endemic diseases in Nigeria at Primary school level to shore up the the proportion of caregivers who know what organism causing Malaria from 68% to 100%.

In this study knowledge of ITN among caregivers of under-five was found to be 79.3% which is higher than the knowledge of ITN among caregivers of under-five in some studies done in an Urban local government area in Osun State and rural community in Ekiti State (Esimai and Aluko, 2014; Oluwasogo *et al.*, 2016) which were 54.4% and 28% respectively. Other African countries showed higher knowledge of ITN; Kenya (Malusha *et al.*, 2009) 88.5%, Cameroon (Kimbi *et al.*, 2014) 99%, Uganda (Taremwa *et al.*, 2017) 98.1% and Ghana (Nyavor *et al.*, 2017). The difference in knowledge of ITN among caregivers of under-five could be due to differences in the level of education of caregivers in the study locations. The high level of knowledge compared to studies from some parts of Nigeria could be as a result of factors such as high literacy level. In this study, level of education was a significant factor affecting knowledge of ITN ($p = 0.007$). With 55% of the caregivers with knowledge of ITN had tertiary education, Esimai and Aluko, (2014), in a study to assess the determinants of use of Insecticide treated bed nets among caregivers of under- five in an urban local government area in Osun State showed a lower level of knowledge (54.4%) in comparison with this study with 7.2% of the caregivers having tertiary education. Similar result was shown by James and Ngwibete, (2016) in a study done in Rivers State where caregivers with 91% of secondary and tertiary education having good knowledge of ITN. This reveals that the higher the level of education of caregivers, the better their knowledge of ITN.

Having much younger children drives knowledge of ITN as a higher proportion of households with 1 under-five, and 2 under-fives had knowledge of ITN than those with 3 under –fives and 4 under – fives respectively.

In this study, the attitude towards use of ITN was positive amongst most of the caregivers as seen from the results above where those who were willing to buy ITN

was high (90.9%) as opposed to those who were not willing to buy ITN (9.1%) as shown in table 4.22. This is similar to data obtained from the study done in Calabar by Asuquo *et al.* (2016) where 92.4% of caregivers had a favourable attitude and 7.6% had an unfavourable attitude towards ITN use. Also another study done in Ogun State by Kio *et al.*, (2016) showed that 78% of caregivers had good attitude while 39% had bad attitude (the percentage is greater than 100% as caregivers gave multiple responses). However, this findings are in contrast to the study done by Runsewe-Abiodun *et al.*, (2013) in South West Nigeria where 12.9% had good attitude towards ITN use and 70% had poor attitude. In this study, 60.3% had positive attitude towards ITN. This finding is higher than found in some studies. A positive attitude may increase the use of ITNs and presents a good opportunity for increase utilization of insecticide treated nets.

CONCLUSION

The knowledge of ITN among caregivers of under-five was found to be 79.3%. Majority (98.3%) of caregivers were aware of malaria, two third knew mosquito was the cause of malaria, Majority (95%) of the respondents believed that sleeping inside mosquito nets prevent malaria. About half of the respondents got their information on malaria from the health centre/hospital, About half 213 (47.8%) of the caregivers are aware of avoid mosquito bites by sleeping inside mosquito net. Factors affecting knowledge include higher level of education, lower ages of children, higher ages of caregivers and trading as an occupation of caregivers.

Half of the caregivers were willing to recommend ITN to a friend/family, majority agreed to use ITNs and majority supported sleeping under mosquito net for everyone. Summarily, 60.3% had positive attitude towards ITN.

RECOMMENDATIONS

Though the knowledge of ITN was good (79.3%), it could improve by mass education and health education campaign which can be organised by the government. This calls for introduction of short courses on common endemic diseases in Nigeria at Primary school level to shore up the proportion of caregivers who know what organism causing Malaria from 68% to 100%. Strengthening of teaching about Malaria and other endemic diseases in school curriculum at primary, secondary and tertiary levels is also useful.

There is need for increase in knowledge of Malaria via increase in radio and television campaigns, talks and adverts.

The attitude of caregivers to ITN should be improved by health education, peer support and advocacy to women organizations and groups in order to sustain attitudinal change towards ITNs.

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