

Factors Affecting Uptake and Utilization of Insecticide Treated Net Among Women of Reproductive Age (15 – 49 years) Group Attending Antenatal Clinics in Nasarawa State Nigeria

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Abstract

Background: Vector control is the main path to preventing and reducing malaria transmission. The ownership and use of Insecticide-Treated Nets (ITNs) is the core vector control method and a proven intervention for the control and elimination of malaria in several malaria-endemic countries. This study determined the factors affecting the uptake and utilization of ITN by women in their reproductive age group in Nasarawa State Nigeria.

Methods: A descriptive cross sectional study among women of reproductive age group (15 – 49 years) attending Ante Natal Clinic at the Dalhatu Araf Specialist Hospital Lafia, General Hospital Akwanga and Medical Centre Mararaba Gurku in Nasarawa State Nigeria. An interviewer administered questionnaire was used after obtaining an informed consent. Ethical approval was gotten from the state research ethics committee. Data analysis was done using SPSS version 23.0.

Results: The mean age of this study population was 27.9 ± 10.6 years. Of the total number of 772 participants in this study, a larger chunk of 707 (91.6%) have heard of insecticide treated net. In addition, most 538 (69.7%) participants said healthcare workers emphasizes the use of insecticide treated net during their antenatal care visits. More than half of the participants, 432 (56.0%) owned an ITN at home. Utilization of insecticide treated nets showed that, 451 (58.4%) sleeps under an insecticide treated net, with 334 (74.1%) of these sleeping under it daily. Reasons for not using ITN for some were; due to heat 137 (30.4%), due to smell 83 (18.3%) and others for no good reason 86 (19.1%) respectively. Beliefs about usefulness of ITN showed 320 (71.0%) felt it is very good and useful in preventing malaria.

Conclusions: Most participants are aware of ITN. More than half owned (56%) and sleeps (58.4%) under the ITN. About 71% believed ITN is useful in preventing mosquito bites and malaria. Reasons for declining using ITN among some were due to the ITN's heat and smell. While more than two-third felt ITN is useful in preventing mosquito bites and malaria.

Keywords: Factors, Insecticide Treated Nets, Uptake, Utilization.

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Introduction

Insect borne diseases such as malaria, yellow fever, dengue fever, sleeping sickness, filariasis etc, have always been a global public health issue with malaria incidence being the commonest of all.¹ The burden of these diseases is highest in tropical and subtropical areas and they disproportionately affect the poorest populations.² Since 2014, major outbreaks of dengue, malaria, chikungunya, yellow fever and Zika have afflicted populations, claimed lives and overwhelmed health systems in many countries.³

Malaria, a major challenge here occurs mostly in the poor tropical and subtropical areas of the world.⁴ It is the leading cause of morbidity and mortality in many developing countries especially in Sub-Saharan Africa, where under-five children and pregnant women are the groups mostly affected.^{3,5} Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes.^{4,6} Transmission is more intense in places where the mosquito lifespan is longer (so that the parasite has time to complete its development inside the mosquito) and where it prefers to bite humans rather than other animals.^{2,7} The long lifespan and strong human-biting habit of the African vector species is the main reason why approximately 90% of the world's malaria cases are in Africa by World Health Organization (WHO).¹ Transmission also depends on certain climatic and environmental conditions such as rainfall patterns, temperature, humidity, presence of bushy areas and stagnant waters around the home which encourage the

breeding of these mosquitoes.^{5,8} In many places, transmission is seasonal, with the peak during and just after the rainy season. Human immunity is also another important factor.⁹ The estimated number of malaria cases stood at 217 million in 2016 and rose to 219 million in 2017.^{1,10} Children under 5 years of age are the most vulnerable group affected and accounted for 61% (266,000) of all malaria deaths worldwide.¹⁰ The effects of malaria are also strong among pregnant women, for whom malaria may cause maternal anaemia, preterm delivery, and low birth weight.¹¹ African region continues to carry a disproportionately high share of the global malaria burden.¹² They (African countries) accounted for nearly half of all malaria cases worldwide with Nigeria contributing 25%.¹ In Nigeria, malaria is responsible for 30% of the under-five mortality and 11% of maternal mortality rate.^{3,10}

Malaria is preventable and curable. Early diagnosis and treatment of malaria reduces disease and prevents deaths. It also contributes to reducing malaria transmission. The best available treatment, particularly for *P. falciparum* malaria, is artemisinin-based combination therapy (ACT).¹³

However, Vector control is the main path to preventing and reducing malaria transmission.⁹ The use of Insecticide-Treated Nets (ITNs) among other forms such as Residual Spraying is one of the core vector control methods for preventing malaria and other vector-borne diseases and has been shown to reduce malaria incidence by 50% in several malaria-endemic countries.¹⁰ Ownership and use of insecticide net is one of the proven interventions adopted by Roll Back Malaria (RBM) partners in Nigeria to stem the high incidence of malaria.¹ The ITN programs depend to a much greater extent on the acceptance and active involvement of individuals and communities. The success or failure of ITN programs may in many cases be related to several human behavioural factors that affect coverage and proper usage.^{7,13} Factors contributing to the uptake and utilization of ITN in recent time need to be evaluated. This study therefore, seeks to assess caregivers' knowledge about ITNs, utilization of ITNs and factors influencing the uptake and use of ITNs among women of child bearing age in Dalhatu Araf Specialist Hospital.

Justification for the Study

Where ITN appear to fail, this is in many cases due to human behavioural factors related to coverage, proper and consistent use of ITNs. These human factors are underrated, not systematically monitored, or at least go underreported in many publications and reports. Also, no such study has been conducted in this locality. This study therefore seeks to evaluate the factors affecting the uptake and utilization of ITNs among women of child bearing age in Dalhatu Araf Specialist Hospital.

Study Objectives

1. To determine the current uptake and utilization of Insecticide Treated Nets among women of reproductive age (15-49years) group attending ANC in DASH.
2. To assess the knowledge and beliefs of caregivers towards the usage of ITNs.

Methodology

Study area

This was a hospital-based prospective cross-sectional study of women of reproductive age group (15 – 49 years) attending the antenatal clinics at the Dalhatu Araf Specialist Hospital Lafia (DASH), General Hospital Akwanga and Medical Centre Mararaba Gurku, all of Nasarawa State over three months period of January 2021 to March 2021. Dalhatu Araf Specialist Hospital is the only state owned tertiary hospital. It is located in Lafia, the state capital of Nasarawa State. The state is one of the six North-Central states. It has border with Federal Capital Territory Abuja, Benue, Kogi, Taraba, Plateau and Kaduna States respectively.

The State has three senatorial zones of Nasarawa South, North and West respectively. The DASH situated in Lafia representing Nasarawa South, General Hospital Akwanga representing Nasarawa North and the Medical Centre Mararaba Gurku representing Nasarawa West.

Study design

This is a prospective descriptive cross-sectional study.

Sample size

Sample size was calculated using the formula below:

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

Where n= sample size

Z is standard normal deviation of 1.96

p is the prevalence which is 60% (Roll back malaria in Africa)

$q = 1 - p$

d is the degree of accuracy desired usually set at 5%.

Therefore

$$n = \frac{1.96^2 \times 0.60 \times 0.4}{0.05^2}$$

$$n = 369$$

$$\text{Non-response} = 10\% \Rightarrow n = \frac{369}{100} \times \frac{10}{1} = 36.9$$

The study was conducted on sample size of 406

Sampling method

All women attending Ante Natal Clinic (ANC) that consented to the study during the period under review were recruited.

Inclusion criteria: all clients undergoing ante-natal care were enrolled during the period of study

Exclusion criteria: all clients who declined participation.

Ethical consideration

Ethical clearance was obtained from Research Ethics Committee of the State. Confidentiality of information collected was treated with utmost regards.

Funding

This study was funded by Saving One Million Lives, Programme For Result (P4R) Nasarawa state.

Data collection: Questionnaires were administered by researchers and three research assistants (one per site) to patient that met the inclusion criteria.

Data analysis

Data was analysed using SPSS (Statistical Package for the Social science) version 23.0. Frequencies and percentages were computed for categorical variables while means and standard deviation were determined for continuous variables. Results obtained after analysis are presented in tables and charts below. Significant p is any value < 0.05 .

Results

Socio-demographic characteristics of study participants

The mean age of this study population is 27.9 ± 10.6 years. Of the total number of 772 participants in this multi-centre study, 406 (52.6%) were from DASH, 160 (20.7%) were from General Hospital Akwanga and 206 (26.7%) were from the Medical Centre Mararaba Gurku respectively. Most 760 (98.4%) of the participants were married while 12 (1.6%) were single pregnant women. An assessment of the educational attainment of participants in the study revealed, 339 (43.8%) had tertiary education, 319 (41.3%) had secondary education, 83 (10.8%) had primary education and 32 (4.1%) having no any form of formal education. Most of the respondent, 648 (83.9%) reside in urban settings. A good number of the participants 325 (42.1%) were either self employed running their business, 117 (15.2%) were civil servants, 13 (1.7%) were farmers, while 166 (21.5%) had other engagements whereas 151 (19.6%) were completely unemployed **Table 1**.

Table 1: Socio-demographic characteristics of study participants

Variables	Frequencies n	Percentages %
Health facilities		
DASH	406	52.6
General Hospital Akwanga	160	20.7
Medical Center Mararaba Gurku	206	26.7
Marital status		
Single	12	1.6
Married	760	98.4
Religion		
Christianity	389	50.4
Islam	383	49.6
Educational level		
None	32	4.1
Primary	83	10.8
Secondary	319	41.3
Tertiary	338	43.8

Variables	Frequencies n	Percentages %
Place of residence		
Rural	124	16.1
Urban	648	83.9
Occupation		
Unemployed	151	19.6
Civil servant	117	15.2
Business	325	42.1
Farmer	13	1.7
Others	166	21.5
Total	772	100.0

The mean age of this study population is 27.9 ± 10.6 years

Assessment of patient's knowledge on Insecticide Treated Nets

Knowledge of insecticide treated nets among the participants revealed that most, 707 (91.6%) have heard or have knowledge of insecticide treated net. Similarly, most 538 (69.7%) participants said healthcare workers emphasize the use of insecticide treated net when they attend antenatal care, and 432 (56.0%) owned an insecticide treated net at home.

On the number of household members of the participants assessed, about a third each of the participants have 3 – 4 [241 (31.2%)] and 5 – 6 [233 (30.2%)] household members respectively. Only 42 (5.4%) of the participants in this study have > 10 household members.

About half 382 (49.5%) have 1 – 2 ITN at home, while 61 (8.7%) had 3 or more ITN in their household.

Assessment of usage of insecticide treated nets showed that, 451 (58.4%) sleeps inside an insecticide treated net, with 334 (74.1%) sleeping in it daily while 117 (25.9%) occasionally sleeps in ITN **Table 2**.

Table 2: Assessment of patient's knowledge on Insecticide Treated Nets (ITN)

Ownership, Knowledge and Use of ITN	Frequencies n	Percentages %
Prior knowledge of ITN		
Yes	707	91.6
No	65	8.4
Do healthcare workers emphasize the use of ITN when you attend antenatal care?		
Yes	538	69.7
No	234	30.3
Ownership of ITN		
Yes	432	56.0
No	340	44.0
Number of household members		
1 – 2	91	11.8
3 – 4	241	31.2
5 – 6	233	30.2
7 – 8	119	15.4
9 – 10	46	5.9
> 10	42	5.4
Number of ITN clients have		
None	329	42.6
1 – 2	382	49.5
3 – 4	48	6.3
5 – 6	9	2.0
7 – 15	4	0.4
Use of ITN		
Yes	451	58.4
No	321	41.6
Frequency of usage		
Daily	334	74.1
Occasionally	117	25.9

ITN= Insecticide Treated Net

Practice and belief on Insecticide Treated Net

Reasons for lack of usage was assessed and most said they are not using it due to heat 137 (30.4%), due to smell

83 (18.3%) and others for no good reason 86 (19.1%) respectively. Other reasons given are as stated in Table 3 below.

Concerning the duration of usage of insecticide treated net among participants, 36 (8.0%) had used insecticide treated nets for less than 6 months, 164 (36.3%) used ITN between 6 months and one year, 160 (35.5%) between one year and five years and 91 (20.2%) used ITN for more than five years.

Perceptions of the participants was assessed about insecticide treated nets and 320 (71.0%) feel it is very good and useful in preventing malaria, 58 (12.8%) said they were using it out of compulsion, 46 (10.2%) prefer spray to insecticide treated net and 27 (6.0%) said it is very uncomfortable to use **Table 3**.

Table 3: Practice and belief on Insecticide Treated Net

Variables	Frequencies n	Percentages %
Reasons for non usage of ITN		
Its itchy	32	7.1
Due to heat	137	30.4
No space to hang it	23	5.1
It smells	83	18.3
It is bad	15	3.3
Not comfortable	24	5.4
No idea of it use	33	7.3
It has expired	18	4.0
No reason	86	19.1
Duration of use		
Less than 6months	36	8.0
6 months to one year	164	36.3
1 to 5 years	160	35.5
Above five years	91	20.2
What is your opinion about insecticide treated net		
Very good in preventing mosquito bite / malaria	320	71.0
Using it because they were mandated to use it	58	12.8
Prefer spray to insecticide treated nets	46	10.2
It is very uncomfortable to use	27	6.0
Total	451	100.0

Discussion

This study revealed that most participants know that insecticide treated net do prevent mosquito bites and malaria. More than half are aware of the ITN and are using it. Among the users, more than two-third used it efficiently. Factors contributing to non usage or inefficient use by some responders were the perceived heat it generates and the chemical smell from the ITN.

The mean age of the study participants was 27.9 ± 10.6 years comparable to the report by Babalola *et al*¹⁴ in Kaduna among women 29.3 ± 6.2 years. Both studies were among women of reproductive age group (15 – 49 years).

The present study showed that 91.6% have heard and are aware of the insecticide treated net, comparable to the 93.2% and 96% reported in other studies.^{14,15} This finding further validates the report of Ezire *et al*¹⁵ that was done across many states of Nigeria with Nasarawa State inclusive. While the similarity with the Babalola *et al*¹⁴ study in Kaduna could be due to the proximity of the two States and to the Federal Capital Territory Abuja. This avails the States with the enabling environment for Non Governmental Organizations, foreign partners and donors to provide the needed awareness on Malaria elimination strategies.

This study showed that slightly more than half of the participants (56%) owned an insecticide treated net. This is better than the 28.8% reported by Ankomah *et al*¹⁶ in a population based survey in Nigeria. The varying study design with the present hospital based study may account for the difference, so also is the variation in time (over a decade). The relative higher level of education of the responders in this study where close to half are with tertiary level of education, may also be a contributor to the finding in this study. Our finding is lower than the 64.6% found by Ezire *et al*.¹⁵ Aside the time difference of ten years which may explain the difference, the varied study population of women of reproductive age only in the current study may also be a factor.

The prevalence of ITN utilization in this study of 58.4% falls short of the minimum standard global coverage target of 60% by 2015. It is slightly higher than the 55.1% reported by Osuchukwu *et al*¹⁷ in Ogoja area of Cross River State. It is equally higher than the 40.68% reported by Komomo *et al*¹⁸ in Calabar. Both studies were in Cross River state in South-south Nigeria, with the discrepancies in climate, culture and beliefs a possible reason for the observation. It is far higher than the 19.2% reported by Ezire *et al*¹⁵, in a multi-state population based study among males and females.

More than two – third (74.1%) of this study population sleeps under the ITN daily. Our finding is very similar to the 74% reported in Kaduna.¹⁴ It is higher than the 24.3% found by Osuchukwu and his colleagues.¹⁷ Geographical similarity and difference with the cited study could explain the finding.

Reasons for the non utilization or the inconsistency in the ITN use were largely due to heat and the smell of chemical from the net. Similar finding was reported in another study.¹⁷ The fear of a possible hazard to the health of its users as well as the discomfort are plausible reasons for the finding.

Conclusions

The prevalence of Insecticide Treated Net (ITN) awareness in this study was 91.6%. Ownership of insecticide treated net was 56.0% while its utilization from this study was 58.4%. The prevalence of participants sleeping consistently under ITN among its users was 74.1%. Reasons for non usage or inconsistency use of ITN were heat (30.4%) and smell (18.3%) of chemical emanating from the nets. More than two-third (71%) of the responders in this study believed that ITN is useful in preventing mosquito bites and malaria.

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