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Prevalence of malaria among users and non users of insecticide treated nets in obowo local government area Imo state, Nigeria

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Abstract
Malaria still constitutes a serious public health problem in Nigeria despite control efforts. This study assessed the prevalence of malaria among users and non users of Insecticide treated net in Obowo Local Government Area of Imo State State, South East Nigeria. Rapid Diagnostic Test (RDT) was used to determine their malaria status and complemented with structural questionnaire and focal group discussion. Result obtained showed that out of the 300 participants 68 representing 22.6% had malaria. One hundred and ninety two representing (64.0%) respondents acquired their ITN from NGOs. However, (60.6%) respondents were ITNs users while (39.3%) were not users of ITNs**.** Males had higher parasitemia than Females (57.3% and 42.6%) respectively (P>0.05). Participants of the age and gender 41-50 years had the highest prevalence of malaria (39.6%). Prevalence of malaria among individuals using ITNs showed that people that never used ITNs had the highest prevalence of malaria compared to people that uses it sometimes and always (85.2%, 10.2% and 4.4%) respectively. Among the reasons for Non use of ITNs Heat inside the net was the commonest reason (43.2%). There is need for community health education to erase negative beliefs, cultural practices and behavioural patterns of the inhabitants.

Keywords: Malaria, usage, treated nets, users, non users

Introduction
Malaria has been estimated to account for up to 40% of public health expenditures and a decrease of the gross domestic products of many African countries by as much as 1.3% annually [1]. In Nigeria, it is responsible for a huge economic loss of about 132 billion naira (US $ 880 million) annually from cost of treatment, loss of man-hours, school absenteeism and other indirect costs [2].

Insecticide-treated bed nets (ITNs) is a mosquito net with insecticides that repels, disables and/or kills mosquitoes coming into contact with insecticide on the netting material. ITN have emerged as a potent and effective weapon in the armory of vector control options for the prevention of morbidity and mortality caused by the bite of mosquito [3]. The use of (ITNs) is one of the global strategies in decreasing the burden of malaria [4]. They have also been found to reduce clinical malaria by over 50% and all cause mortality in children aged 0–59 months by 15–30% when the overall population coverage is >70%, thus, underscoring the benefits of mass effect of net ownership and usage [5,6]. Studies have shown that ITNs are twice as effective as mosquito net, and offer greater than 70% protection [7]. Besides providing personal protection to the users against mosquito bites, ITNs also produce 'mass effect', if comprehensive coverage by ITNs of the community is ensured by killing a large number of malaria vectors, substantially reducing their longevity and entomological inoculation rate. Although ITN distribution has been massively expanded in most parts of endemic sub-Saharan countries since 2005, there is limited information on community based actual ownership and use in rural communities in Nigeria where mosquitoes borne disease like malaria is endemic. Most studies of ITN use are intervention trials that attempt to explain why vulnerable groups, such as children under five or pregnant women, are using or are not using ITN Kornromp *et al*. [8], or which household members use the owned ITN(s) [9].

Materials and Methods
Study area
This study was carried out in two communities (Avutu and Umuariam) in Obowo Local Government Area of Imo State, South East Nigeria. The geographical coordinates of the area

is Latitude $5^{0}10^{1}$N-$5^{0}5^{1}$N and Longitude $6^{0}35^{1}$ E-$7^{0}28^{1}$ E. It has an area of 198 km^2 and the vegetation characteristics are tropical rain forest. It experiences a moderate rainfall, with an annual rainfall of 1500mm and average minimum temperature of 20˚C. It has two distinct seasons; wet and dry season. The major occupation of the people is farming which is done at subsistence level. Also they produce good quantity of vegetable, palm oil, kernel, broom (local ones) and baskets. Some of the people also embraced small scale trading and fishing. Their houses are made of brick walls with corrugated metal sheets roofs, few live in mud houses with thatched roofs. Source of water in these area include village stream, boreholes and roof catch water which are stored in buckets, cans etc. Refuse and materials like discarded plastic cans are heaped around houses, schools, roads, and market square. These causes flood during rainfalls and contribute to the breeding of mosquitoes leading to high malaria transmission rate and prevalence [4]. Non-governmental Organizations in 2015 shared Long Lasting Insecticide treated Nets (LLIN) to these communities and almost 70% of the people benefited.

Ethical considerations

Ethical clearance and permission was obtained from the Post Graduate Research Board of Zoology Department of Imo State University, Owerri, Nigeria. Consent was sought and obtained from the village heads and Churches used. Informed consent was also obtained from the participants.

Study population

The study populations were people residing in Obowo Local Government Area who have lived there for at least 6 months and were 20 years old and above.

Data collection

Data collection involved both blood collection and questionnaire administration.

Blood was collected from the participants using hand pricking methods [10]. In the Churches blood collection and processing was done after church services while in Town halls it was done after village meeting. Malaria test kit used for the research was obtained from the Pharmacy shop. A total of three hundred people's blood were collected and processed. Following manufacture instruction, Care Start™ Malaria Pf (HRP2) Ag RDT test strip was used to test participants for malaria. Questionnaires were given to only the people whose blood was taken for malaria test and filled with the aid of research assistant. The questionnaires administration was complemented with Focal Group Discussion (FGD) held to explain more facts and to strengthen the response of the questionnaire.

Data analysis

The data were analyzed statistically using Chi-Square and ANOVA, p-values greater than or equal to $p \geq 0.05$ were taken not to be significant.

Results

Prevalence of malaria among users and non users showed that non users had malaria than users (85.2% and 14.7%) respectively (Table 1). Respondents status of ownership, usages, mode of acquisition and length of time showed that (73%) respondents agreed to ownership of ITN. One hundred and ninety two representing (64.0%) respondents acquired their ITN from NGOs while (36.0%) had theirs from other sources which include retail shop, health centers etc. According to them (72.3%) respondents said that their net have stayed >2 years while (27.6%) was < 2 years. However, (60.6%) respondents were ITNs users while (39.3%) were not users of ITNs (Table 2). Prevalence of malaria among users and non users of ITNs by Sex and Age shows that people of the age group 41-50 had higher malaria among users with males (4.4%) and females (1.4%) while people of the age group 20-30 years had the least (0.00%) and (1.4%) respectively among male and female. Similarly, people of the age group 41-50 had higher malaria among Non-users with males (17.6%) and females (16.1%) while people of the age group 20-30 years had the least (8.8%) and (4.4%) respectively among male and female. Statistical Analysis showed that there is no significant difference between (Table 3). Prevalence of malaria among individuals using ITNs showed that people that admitted that they never used ITNs had the highest prevalence of malaria compared to people that uses it sometimes and always (85.2%, 10.2% and 4.4%) respectively (Table 4). Reasons for non use of ITNs showed that 43.2% of the respondents were if the view that it does heat while 15.2% said it is not effective (Table 5).

Table 1: overall prevalence of malaria among Users and Non users of treated net

ITN usage	No examined	No +ve	Overall prevalence (%)
Users	182	10	*14.7*
Non users	118	68	*85.2*
Total	300	68	22.6

Table 2: Respondents status of ownership, usages, mode of acquisition and length of time

Variables	No examined	No infected	ITNs Usage (%)	
			Users	Non users
Ownership				
Yes	249	249(73.0)	10	7
No	51	51(17.0)	5	36
Mode of acquisition				
NGO	192	192(64.0)	3	24
Other sources	108	108(36.0)	7	32
Length of time				
>2 years	83	83(27.6)	4	15
<2 years	21	217(72.3)	6	43
Usage				
Yes	182	182(60.6)	3	7
No	118	118(39.3)	7	51

Table 3: Prevalence of malaria among users and non users of ITNs by Sex and Age

Age group (years)	Sex	No Examined	No Infected (%)	*ITNs usage (%)*	
				Users	*Non-Users*
20-30	M	16	6(8.8)	0(0.00)	*6(8.8)*
	F	27	4(5.8)	1(1.4)	*3(4.4)*
31-40	M	28	8(11.7)	2(2.9)	*6(8.8)*
	F	41	5(7.3)	0(0.00)	*5(7.3)*
41-50	M	38	15(22.0)	3(4.4)	*12(17.6)*
	F	61	12(17.6)	1(1.4)	*11(16.1)*
51^{+}	M	37	10(14.7)	2(2.9)	*8(1.7)*
	F	52	8(8.8)	1(1.4)	*7(10.2)*
Total		300	68(22.6)	10(14.7)	*58(85.2)*

Table 4: Prevalence of malaria among individuals using ITNs

Frequency of usage	No examined	No +ve	*Overall prevalence (%)*
Always	102	3	*4.4*
Sometimes	80	7	*10.2*
Never	118	58	*85.2*
Total	300		*22.6*

Table 5: Reasons for non use of ITNs in the study Area

Variables	No examined	Overall prevalence (%)
Heat	51	43.2
Phobia	23	19.4
Lack of protection	26	22.0
Not effective	18	15.2
Total	118	100.0

Discussion

This study assessed the prevalence of malaria among users and non-users of insecticide treated net in Obowo and findings showed that Malaria is still a public health problem with a prevalence rate of 22.6%.

Observation on prevalence of malaria among users and Non-users showed that malaria prevalence was higher among Non-users (85.2%) than users (14.7%). Also it was observed that among respondents who had ITN, more than half were given free of charge by Non Governmental Organization (64.0%) while other sources include Market, Government etc. This is higher than what was reported by Yared *et al.,* [11] who stated that only 3.8% of the respondents obtained their ITN free of charge in a study done in Western Ethiopia.

This study also showed that ITNs users were higher compared to Non-users 60.6% and 39.3% respectively. Reasons given for the use of ITN in the study include keeping mosquitoes and flies away, malaria prevention, to keep rodents away and for fishing. Other advantages mentioned include protection against other bugs and avoiding roof debris falling on the bed and provision of warmth during the cold season. Similar findings were documented in a study carried out in Ghana [12]. In the study, majority of the respondents said they would like to sleep under the ITN and that it was comfortable and there were no cultural limitations to its use. Respondents' perceived disadvantages of bed nets include discomfort due to heat, chemical smell, and the need to mount the nets daily. Similar results were obtained by Blackburn *et al*., [13] in a study carried out in the central part of Nigeria.

Observation from this study showed that people that owe ITNs were higher compared to people that doesn't owe ITNs (83.0% and 17.0%) respectively. Ownership of ITN generally does not necessarily translate to usage. In the present study, three quarters of those who owned nets used them. Although no study have been carried out on community ownership however, related studies have been carried among pregnant women by Awosan *et al.* [14] and Ugwu *et al.* [15] among pregnant women in Sokoto and Enugu, Nigeria who had (27.6% and 39.1%) respectively which is lower than (18.2%) recorded in the present study. A study done in Cote d'Ivoire reported that though a third of the households possessed nets (34.2%), only 3.2% reported actual use [16]. Another study in Kenya reported ownership of 71% and usage of 56.3% [17].

Observation from the study on sex-related prevalence showed that males had more infection than females 57.3% and 42.6% contrary to ownership of ITNs (54.0% and 29.0) respectively. This disagrees with previous reports [18, 19]. Males and Female in this study area hadly engage in the same activities and besides they had different behavioural practices that expose them to the bite of the vectors. It was observed and confirmed too that only men often come out at evening in the play ground to relax. Also, the men engage in night security (Vigitantee). While women stay indoors, men are exposed to activities involving exposure risk such as nocturnal outdoor meeting and storytelling. Gender and age related prevalence showed that people of the Age and Gender 41-50 years of age had the highest prevalence of malaria and ownership of ITNs 39.6% and 26.3% respectively.

From the observation and personal interview it was malaria was higher among participants that never use ITNs (85.2%) compared to people that uses it sometimes and always (10.2%) and (4.4%) respectively which was as a result of illiteracy and lack of health education on the use of ITNs.

Observation on the prevalence of malaria among individuals using ITNs showed that discomfort due to heat and makes one feeling of uncomfortable while in the net (43.2%) was the most reasons for non use of ITNs in the study area. Other reasons given for non-use include Phobia, lack of protection, not effective, difficulty in hanging up the nets and among the pregnant respondents some said they were waiting to deliver before they started using the nets as they felt it will be more beneficial to the newborn. Similar result were documented by Baume and Marin [20] for Nigeria in his study of the use of bed nets in various parts of Africa.

Conclusively, this study has shown that malaria is still a public health problem in the area. Government will have to step up its activities in provision of awareness and knowledge on the benefits of ITNs through radio jingles, social marketing, health education in clinics and hospitals etc. In addition, outlet through private health facilities too would have to be explored considering the fact that the State seems to have more private health facilities than public. It may also be helpful to subsidize the cost of ITNs rather than making it out rightly free. Finally, further studies are recommended to be carried out in the area and parts of Imo State.

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