

MALARIA PREVALENCE AND THE USE OF INSECTICIDE TREATED NETS AMONG STUDENTS OF TERTIARY INSTITUTIONS IN JALINGO, NIGERIA

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Malaria remains a major public health problem particularly in many tropical countries, resulting in decreased productive capacity and increased poverty despite the intensive and extensive attempts exerted to control it. In this study, a total of 328 students from three tertiary institutions in Jalingo, were screened for malaria using a Rapid Diagnostic Test (RDT) kit for *Plasmodium falciparum*. Of these, 46(14.02%) tested positive. College of Agriculture had the highest prevalence of 17.02%, with School of Nursing and Taraba State University having prevalence of 13.58% and 10.38%, respectively. An Analysis of Variance (ANOVA) at $P\text{-alpha}=0.05$ showed that, these differences were not statistically significant ($P=0.6643$). A questionnaire was also administered on the use of Insecticide Treated Nets (ITNs). Of the 328 respondents, only 15(4.57%) have not heard of ITNs, 206(62.80%) own ITNs, while 184(56.20%) use ITNs as a measure for the prevention of malaria. However, 40.55% reported that ITNs were not available in their locality while, 46.07% mentioned excessive heat as their reason for not using ITNs. All the respondents, however, said they will recommend the use of ITNs to their family members. It can be concluded that ITNs are widely distributed in urban, peri-urban and rural areas in Taraba State, although acceptability and use still remain a challenge. With this in mind, we recommend that more awareness be created on the importance and best practices of using ITNs among students, who can then take this message to their communities. The distribution of the nets by the Public health stakeholders at the various strata of government should also be intensified in the rural communities.

Index Terms— ITNs, Jalingo, Malaria, *Plasmodium falciparum*, RDT

1 INTRODUCTION

MALARIA is a vector-borne disease caused by a pathogen that is transmitted by female mosquitoes of several species from the genus *Anopheles* [1]. The disease remains a major public health problem particularly in many tropical countries, resulting in decreased productive capacity and increased poverty despite the intensive attempts being exerted to control it, especially, in Sub-Saharan Africa [2]. It also presents major obstacles to social and economic development, with at least 300 million acute cases of malaria each year, globally, resulting in more than a million deaths [3].

In Nigeria, malaria negatively impacts the social and economic development of communities. It is responsible for school absenteeism and low productivity at work places and on farms, and even death[3].

The use of Insecticide Treated Nets (ITN) has proven to be a practical, highly effective, and one of the most cost-effective interventions against malaria [4][5]. To this effect, Nigeria, in 1999 distributed 63 million ITNs and procured an additional 9 million nets under the Roll Back Malaria(RBM) initiative in a bid to ensure a nationwide coverage by 2010[5]. In spite of these strong attempts to eradicate malaria, the disease burden is still on the rise and some estimate that the number of cases could double in the next twenty years without the development of new methods for control[6].

Although ITN distribution has been massively expanded in most parts of malaria endemic Sub-Saharan countries since 2005, there is limited information on community based actual use of nets owned, area specific reasons for non-use, and the possible impact

of the variations in use on malaria vector densities and transmission [3].

STATEMENT OF RESEARCH PROBLEM

Malaria has remained a huge public health problem in this part of the world, including Nigeria, with very devastating impacts on the vulnerable groups in the population. The World Health Organization[7] reported that over forty percent of the world population lives in areas where malaria transmission occurs. It is estimated that 216 million episodes of malaria occur each year worldwide resulting in 655,000 deaths[7].

Insecticide-treated bed nets (ITNs) are known to be highly effective in reducing malaria morbidity and mortality. However, usage varies among households, and such variations in actual usage may seriously limit the potential impact of nets and cause spatial heterogeneity on malaria transmission[4].

Scaling up ITN coverage and use by young children and pregnant women has been made a consensus target of the Millennium Development Goals (MDGs), the Roll Back Malaria(RBM) Partnership, and the US President's Malaria Initiative (PMI)[4]. However, this strategy ignores the potentially greater community wide benefits of broader population coverage[4].

Students of higher institutions in Taraba state come from different cultural, ethnic and religious backgrounds. Thus, their attitude towards the use of these insect treated nets is a reflection of the communities and ethnicities they represent. It is with this in mind, that this study is designed.

AIM

The study was aimed at determining the prevalence of malaria in relation to the use of insecticide treated nets among students of tertiary institutions in Jalingo, Taraba State.

OBJECTIVES

The objectives of this study were to;

Determine the prevalence of malaria in students of tertiary institutions in Jalingo, using commercially available malaria test strips.

Determine the distribution of insecticide treated nets among the students.

Assess the awareness and use of insecticide treated nets in the prevention of malaria by the students.

Determine alternative measures(if any) students use in the prevention and control of malaria.

2 MATERIALS AND METHODS

The study was carried out in Taraba State, North East Nigeria. A total of 328 students were enrolled for this study. Students were selected randomly from 3 selected higher institutions within Jalingo metropolis including Taraba State University, Taraba State College of Agriculture, and Taraba State School of Nursing.

Malaria HRP2 (Pf) (Carestart™ Access Bio, Inc., USA) Rapid Diagnostics Test Kits were purchased and used in this study. After the purpose and scope of the study was explained to each potential participant, the test was carried out by the “finger prick” method, after [8] and [9]. A questionnaire was administered to each participant. The questionnaire aimed at generating the demographic data, information on distribution and use of insect treated nets, other malaria prevention and control methods such as use of insect repellants, insecticide sprays, among others.

Data generated were recorded in form of tables and graphs. A one-way analysis of variance (ANOVA) was used to check for difference in prevalence between the selected institutions and across age groups.

3 RESULTS AND DISCUSSION

A total of 328 students were tested for malaria in this study using a HRP2 *Plasmodium falciparum* Rapid Diagnostic Test (RDT). Of this number, 191(58.23%) were males while, 137(41.77%) were females.

Malaria was found in 46(14.02%) of the students. The overall prevalence of 14.02% obtained in this study agrees with the findings of [5], who obtained a prevalence of 15.5% in their study to determine the prevalence of malaria in relation to the use of ITNs in an urban and a rural settlement in Benue State. However, the prevalence obtained in this study is considerably lower than the prevalence of 37.3% found by[1] in Northwestern Nigeria. The relatively low prevalence of malaria observed in this study may be due to the RDT test used which is not capable of detecting a very low infection. Some other factors that could have influenced the prevalence include the fact that most of the respondents had recently been treated for malaria some were undergoing treatment as at the time of the study.

Of those infected, 31(67.39%) were males and 15(32.61%) were females. Males, had higher prevalence of infection(16.23%) than females(10.95%). This agrees with the findings of [5] that Malaria

was more prevalent among males than females. An Analysis of Variance (ANOVA) showed that the difference in prevalence between males and females however, was not significant, $P > 0.05$ at $F(1, 4) = 0.4685$.

Table 1: Prevalence of Malaria Among Students of Tertiary in Jalingo Metropolis.

INSTITUTION		No. Examined	No. Positive	Prevalence (%)
Taraba State University	Males	69	8	11.59
	Females	37	3	8.13
	Total	106	11	10.38
School of Nursing	Males	11	1	9.09
	Females	70	10	14.29
	Total	81	11	13.58
College of Agriculture	Males	111	22	19.82
	Females	30	2	6.67
	Total	141	24	17.02

Table.1 shows that the highest prevalence (17.02%) of infection was found in College of Agriculture where 141 students were screened and 24 students were positive for *Plasmodium falciparum*. In the School of Nursing, 11(13.58%) were positive and, Taraba State University had the least prevalence of infection, 11(10.38%). An Analysis of Variance (ANOVA), however, showed that the difference in prevalence between the three schools was not significant, $P > 0.05$ at $F(2, 3) = 0.7397$. This difference is not unexpected, as it reflects the level of awareness and use of ITNs by the students of these institutions.

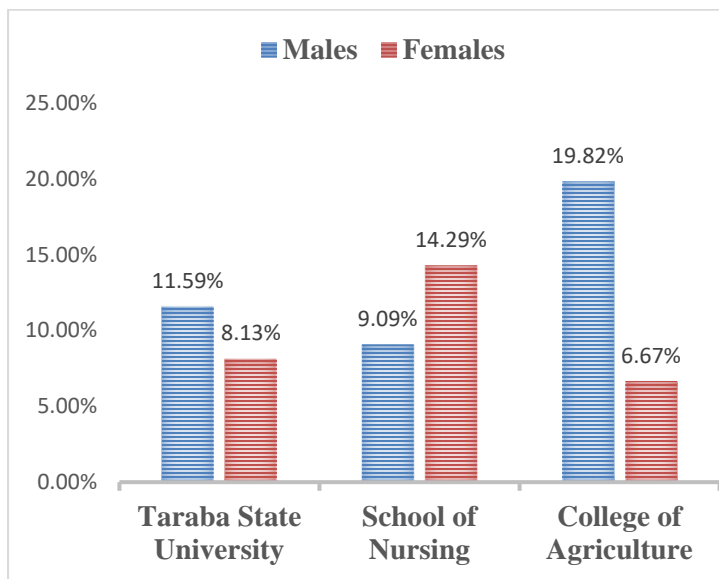


Fig. 1. Malaria Prevalence and Gender of students of tertiary institutions in Jalingo Metropolis

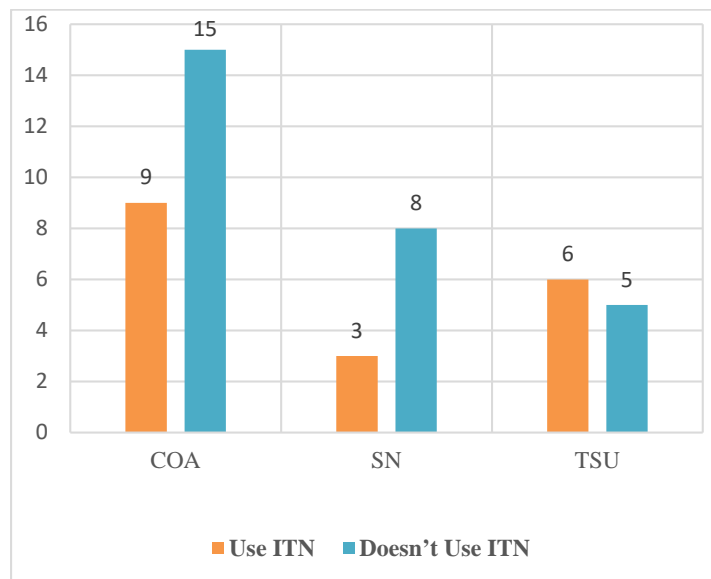


Fig 2. Prevalence of Malaria and the use of ITNs

The result of the study shows that malaria was more prevalent among students who did not use Insecticide Treated Nets (19.44%) than those who used insecticide treated nets (9.78%). Among those that used ITNs, College of Agriculture had the highest prevalence (10.97%), followed by Taraba State University (9.87%), while School of Nursing had the least prevalence (7.32%). Among those that were not using ITNs as at the time of the study, the highest prevalence was from College of Agriculture (25.42%), followed by School of Nursing (20.00%) and the least was from Taraba State University (11.11%). The difference, in prevalence, between those that used ITNs and those who did not use ITNs was not statistically significant ($\chi^2_{cal} = 1.77, \chi^2_{tab} = 3.84, P = 0.412$). This agrees with the findings of previous authors that malaria is more prevalent among non ITNs users [5][1][10].

Table 2: Prevalence of Malaria and the Use of Insect Treated Nets (ITNs)

	Taraba State University			School of Nursing			College of Agriculture		
	Examined	Positive	Negative	Examined	Positive	Negative	Examined	Positive	Negative
Use ITNs	61	6 (9.84%)	55 (90.16%)	41	3 (7.32%)	38 (92.68%)	82	9 (10.97%)	73 (89.03%)
No ITNs	45	5 (11.11%)	40 (88.89%)	40	8 (20.00%)	32 (80.00%)	59	15 (25.42%)	44 (74.58%)
Total	106	11 (10.38%)	95 (89.62%)	81	11 (13.58%)	70 (86.42%)	141	24 (17.02%)	117 (82.98%)

Table 3: Knowledge and Preferences of Methods Used for the Control of Malaria by Students of Tertiary Institutions in Jalingo Metropolis

		Taraba State University	School of Nursing	College of Agriculture	Total
Best Method for controlling Malaria	Cleaning the Environment	50 (47.2%)	25 (30.9%)	102 (72.3%)	177 (53.96%)
	Use of Insecticide Treated Nets	16 (15.1%)	56 (69.1%)	11 (7.8%)	83 (25.30%)
	Spraying with Insecticides	40 (37.7%)	0 (0.0%)	28 (19.9%)	68 (20.73%)
Method Used by Students and Family for	Cleaning the Environment	54 (50.9%)	27 (33.3%)	96 (68.1%)	177 (53.96%)

Malaria Control	ent	Use of	Insecticide Treated Nets	Spraying with Insecticides	Use ITNs	Reason for Not Owning ITNs	Expensive	Not Available	No Reason	Excessive Heat
		14 (13.2%)	48 (59.3%)	42 (29.8%)	104 (31.71%)		26 (24.53%)	35 (33.02%)	45 (42.45%)	28 (26.42%)
Ever Heard of Insect Treated Nets	Yes	103 (97.2%)	77 (95.1%)	133 (94.3%)	313 (95.42%)		24 (29.63%)	35 (43.21%)	22 (27.16%)	21 (25.93%)
	No	3 (2.8%)	4 (4.9%)	8 (5.7%)	15 (4.57%)		32 (24.82%)	63 (44.68%)	43 (30.49%)	35 (24.82%)
Are Insect Treated Nets Different from ordinary Mosquito Nets?	Yes	78 (73.6%)	26 (32.1%)	80 (56.7%)	184 (56.09%)		43 (110%)	43 (110%)	22 (55%)	21 (54%)
	No	14 (14.2%)	13 (16.0%)	42 (29.8%)	69 (21.04%)		43 (110%)	43 (110%)	22 (55%)	21 (54%)
	Not sure	14 (14.2%)	42 (51.9%)	19 (13.5%)	75 (22.87%)		43 (110%)	43 (110%)	22 (55%)	21 (54%)

As shown in Table 3., the students and their families used environmental sanitation (53.96%), Insect Treated Nets (31.76%) and Insecticides (14.33%) for the control of malaria. However, only 15 (4.57%) of the respondents have never heard of Insecticide Treated Nets (ITNs), 69 (21.04%) said insecticide treated nets are not different from ordinary mosquito nets. Also, 75(22.87%) were not sure if ITNs were different from ordinary mosquito nets. This agrees with the findings of[12] who found that 92% of women attending Antenatal Clinic (ANC) at Imo State University Teaching Hospital had knowledge of insecticide treated nets (ITNs). In another study, [13], found that 86.0% of pregnant women had accurate knowledge of ITNs.

Table 4: Ownership and Use of ITNs among Students of Higher Institutions in Jalingo Metropolis.

	Taraba State University	School of Nursing	College of Agriculture	Total
Own ITNs	63 (59.43%)	43 (53.09%)	100 (70.92%)	206 (62.80%)
	43 (40.57%)	38 (46.91%)	41 (29.08%)	122 (37.20%)
Currently	61	41	82	184

Frequency of ITN use	Always	Once in a while	Rainy Season only	Never
Chemicals on the Net	42 (39.62%)	35 (43.21%)	74 (52.48%)	151 (46.04%)
Restriction of Movement	20 (18.87%)	18 (22.22%)	18 (12.77%)	56 (17.07%)
Inconvenience with lowering	16 (15.09%)	7 (8.64%)	14 (9.93%)	37 (11.28%)
Ever Recommend ITNs to family members	106 (100%)	81 (100%)	141 (100%)	328 (100%)
	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	32 (30.19%)	14 (17.23%)	39 (27.66%)	85 (25.91%)
	29 (27.36%)	44 (54.32%)	16 (11.35%)	89 (27.13%)
	25 (23.58%)	15 (18.52%)	48 (34.04%)	88 (26.83%)
	20	8	38	66

(18.87%)	(9.88 %)	(26.9 5%)	(20. 12 %)
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Ownership and appropriate utilization (compliance) of ITNs do not automatically go hand in hand[1]. In this study, Insecticide Treated Nets (ITNs) ownership was highest among students of College of Agriculture (70.92%) and lowest in School of Nursing (53.09%), while a total of 206 (62.80%) owned ITNs. This ownership is slightly lower than an ownership of 71% observed in a study in Ethiopia[4].

A total of 85 (25.91%) used ITNs frequently, 89 (27.13%) once in a while, 88 (16.83%) during the rainy season, and 66 (20.12%) have never used ITNs. 94 (28.66%) of the respondents believed that ITNs cause excessive heat and so would either not use ITNs or only use it when the weather was considerably cold. Other reasons for not using ITNs included; allergies or irritation caused by the chemicals on the nets (151; 46.04%), restriction of movement on the bed (56; 17.07%), and inconvenience with lowering and folding of the nets (37; 11.28%). Surprisingly, however, all the respondents said they have ever recommended or can recommend use of ITNs to their family members.

The study also shows that 313 (95.42%) of the respondents have heard of Insecticide Treated Nets (ITNs), 206 (62.80%) owned the nets while 184 (89.32%) of those who were currently using the nets. The ownership of 62.80% found in this study is lower than the findings of[1] and [14], who found in their studies ownership of 75% and 68.6%, respectively.

4 CONCLUSION AND RECOMMENDATIONS

The ownership of ITNs in this study was higher than the 60% target of the Roll Back malaria initiative. However, not all those who owned ITNs in this study put them to use. A significant number of students in this study attributed their non-usage of ITNs to the chemicals on the nets, inconvenience with lowering and the heat caused by the nets. These perceptions are a reflection of the attitudes of the families and communities from which these students came.

The attribution of the lack of ownership to the cost and unavailability of the nets is a great concern. While some have no just reason for not owning the nets. It is thus obvious that, there is need to create more awareness on the best practices for the use of ITNs in the control of Malaria, in Jalingo and Taraba State, at large.

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