

# **KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS USE OF INSECTICIDE TREATED NETS BY UNDERGRADUATES OF A TERTIARY INSTITUTION IN SOUTH-SOUTH NIGERIA**

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## **ABSTRACT**

**Background:** Malaria remains a rising cause of morbidity and mortality - posing a major threat to Nigeria's and indeed Africa's economy. The tertiary institutions which are nurseries for any nation's workforce are not spared. Insecticide treated nets (ITN) have been applied with considerable success in the prevention and control of malaria. This study was to assess the knowledge, attitude and practice of undergraduates of a tertiary institution in South-South Nigeria towards use of insecticide treated bed nets.

**Methods:** Following ethical clearance from the Department of Preventive and Social Medicine University of Port Harcourt, this descriptive cross sectional study had 180 consenting regular undergraduates (from sampled departments) of the University of Port Harcourt, Choba, Nigeria administered pre-tested semi-structured questionnaires which probed their socio-demographics, knowledge, attitude and practice towards the use of insecticide treated nets. The data were entered in an Excel spread sheet and analyzed using descriptive statistical tools.

**Results:** Most participants were aged between 20-24 years with a male to female ratio of 1:1.63. Most participants (99.4%) agreed they were aware of malaria while 97.6% were aware of insecticide treated nets and 92.3% agreed it could prevent malaria. Only 64.3% of respondents owned and used ITN while the main source of ITN was through health workers.

**Conclusion:** Respondents had a good knowledge of insecticide treated nets in the prevention and control of malaria. However, their behaviour towards use of ITN fell short of their level of knowledge. It is recommended that intensive health education and awareness be carried out amongst these students with a view to increasing availability, access to and use of insecticide treated nets.

Key words: Insecticide treated nets, malaria, undergraduates

## **INTRODUCTION**

Malaria is an important cause of ill health and death in many parts of the world, especially in sub-Saharan Africa<sup>1</sup>. It has become a good indicator for the assessment of maternal and child health<sup>5</sup> as it is responsible for approximately 3 million maternal and child deaths yearly. Africa accounts for 90% of the malaria burden<sup>6</sup> and costs the continent as much as \$12 billion and a loss of 1.3% of her Gross Domestic Products (GDP) annually<sup>2</sup>.

In Nigeria, the disease is responsible for 60 per cent of outpatient visits to health facilities, 30 per cent of childhood deaths, 25 per cent of deaths under one year and 11 per cent of maternal deaths. The disease is estimated to cost the country about 132 billion Naira every year, taking into account the cost of treatment and prevention and loss of working hours. It is mainly transmitted by the bite of an infected female anopheles mosquito in man. In a minority of cases, it can be transmitted through blood transfusion or acquired congenitally, so, preventing bites from infecting mosquitoes will expectedly reduce malaria transmission<sup>3,4</sup>.

The recognition of the unacceptable morbidity and mortality arising from malaria in Africa and the availability of evidence-based cost effective interventions led to the launch of the Roll Back Malaria (RBM) initiative in 1988. The RBM movement aimed to half deaths attributable to malaria by 2010 and half it again by 2015 through the use of 3 tools; Insecticide treated bed nets (ITN), effective artemisinin based anti-malarial combination therapy and the use of insecticides which have also been documented to be cost effective interventions<sup>2,5</sup>. Other cost-cutting interventions include advocacy, communications and social mobilization, effective programme management, monitoring and evaluation, and partnerships and collaboration. There has been a renewed emphasis on preventive measures at community and individual levels. Many studies have reported the key role played by insecticide-treated nets (ITNs) in malaria control, especially in sub-Saharan Africa. Their role in reducing human-vector contact and lowering malaria morbidity and mortality is well documented in areas of both high and low endemicity<sup>6,7,8</sup>.

In spite of this, malaria continues to significantly impact negatively on the health of Nigerian children, thus signifying no reduction in the transmission of the disease<sup>9</sup>. Insecticide treated nets were developed in the 1980s for malaria prevention. Newer, longer lasting insecticide nets (LLIN) are starting to replace ITNs in many countries<sup>10</sup>. ITNs are estimated to be twice as effective as untreated nets, and offer greater than 70% protection compared with no net.<sup>11,12</sup> These nets are dip-treated using a synthetic pyrethroid insecticide such as deltamethrin or permethrin which will double the protection over a non-

treated net by killing and repelling mosquitoes. An insecticide-treated net is a mosquito net which repels, disables and (or) kills mosquitoes coming in contact with the insecticide on the netting material. There are two categories of ITNs: conventionally treated nets and long-lasting insecticidal nets viz: the conventionally treated net (a mosquito net that has been treated by dipping in WHO-recommended insecticide. To ensure its continued insecticidal effect, the net should be re-treated after three washes, or at least once a year). The second is the long-lasting insecticidal net (LLINs) - a factory-treated mosquito net which could be a polyester netting with the insecticide bound to the external surface of the netting fibre using a resin or the other which incorporates the insecticide into a polyethylene fibre then releases the insecticide slowly over 5 years. The LLINs can be washed at least 20 times albeit physical durability may vary<sup>13-15</sup>.

A study in Kenya, has shown that expanding the use of the nets to all people in targeted areas, enhances coverage and protection of the vulnerable group while protecting everyone. The most important source of information about mosquito nets is health facilities<sup>16</sup>. Also, a 2010 study among 246 health workers in Enugu showed that 93.5% were aware of ITN, but only 20.9% had correct knowledge and 22.5% were using it in their homes<sup>17</sup>. It also showed although most mothers knew about the insecticide treated bed net, they were not using them. Most of them did not appreciate its usefulness as more than 40% of those not using ITN had no reason for non-use. Education has an influence on the awareness of ITN, but not its use as the educated and the less educated mothers did not appreciate its importance. Similarly, socioeconomic status did not influence the use of ITNs. However, 7.4% of those that knew about ITN attributed cost as reason for non-use. None of the respondents indicated difficulty with sourcing as a reason for non-use. It may suggest the nonchalant attitude of the mothers towards the use of ITN. Data from other parts of the country support these results<sup>17,18</sup>.

Yes! Insecticide treated nets (ITN) reduce malaria's morbidity and mortality, but their actual use has been limited. Barriers to use may include (but not limited to) availability, access, distribution, knowledge and behavior to insecticide treated nets. This study was to assess the knowledge and behavior towards the use of insecticide treated nets (ITN) by undergraduates of the University of Port Harcourt, Choba, South-South Nigeria.

## ***MATERIALS AND METHODS***

Study area and population: The University of Port Harcourt is located in Choba in Obio-Akpor Local Government Area of Rivers state. Obio-Akpor is one of the two local government areas which make up the Port Harcourt City. The area covers 260km<sup>2</sup> and from the 2006 National Census had a population of 464,789 people. The University of Port Harcourt has an estimated student population of 40,000 with 10 faculties and 36 departments. The students reside on the three campuses of the institution and but mainly in the surrounding villages that make up the Choba community.

*Study design and tools:* This descriptive cross sectional study among undergraduates of this institution made use of semi-structured close-ended, self administered questionnaires. The questionnaires were administered and retrieved on the spot by 3 members of the research team and probed socio-demographics, knowledge, attitude and practice of respondents towards the use of insecticide treated nets. Pre-testing of the questionnaires had earlier been carried out among medical students with similar socio-demographic characteristics and necessary amendments made subsequently.

*Inclusion criteria:* These included registered, identity card carrying, regular first degree students irrespective of course of study, who reside on any of the three campuses (Delta, Choba and University Parks) of the University. This was irrespective of their age, year of study and sex.

*Data collection:* A sample size of 180 respondents (including allowance for attrition) out of about 3000 officially allotted residents was derived by applying the formula for proportion. Using stratified sampling which involved proportionate representation of the three campuses as 60 respondents each were randomly selected (by balloting) from each of the campuses following proportionate distribution among the hostels on each campus. Researchers attended the respondents in their rooms, daily and through five working days between 4pm and 6pm (when students were back from lectures and relaxing in their rooms). The weekend was intentionally avoided as most campus resident students usually went to town to spend the weekends and this might affect arriving at the estimated sample size. Data collected were later analyzed using descriptive statistical tools.

*Ethical considerations:* The study was cleared by the Department of Preventive and Social Medicine, University of Port Harcourt. Responding undergraduate students signed informed consent prior to commencement of the study and confidentiality was maintained as no respondent was identified by name. Respondents were later educated on the benefits accruable from regular use of insecticide treated nets in the prevention and control of malaria.

*Limitation:* The research team had three female field members who had some 'social' difficulty attending the male students in their rooms. This was overcome by appealing to one male volunteer to act as chaperon as the researchers went to collect data in the male hostels.

## **RESULTS**

Through the study, a total of 180 questionnaires were administered to respondents out of which 168 were responded to and returned giving a response rate of 93.3% while 12 sampled students opted out (6.6%).

**Table 1: Respondents' socio-demographic data**

Variable		Frequency (n)
<b>Percentage (%)</b>		
<b>Age</b>	<b>15 - 19</b>	16.0
9.5		
	<b>20 - 24</b>	94.0
56.0		
	<b>25 - 29</b>	49.0
29.2		
	<b>30 and above</b>	9.0
5.4		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Sex</b>	<b>Male</b>	104.0
63.8		
	<b>Female</b>	64.0
36.2		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Marital status</b>	<b>Single</b>	160.0
95.2		
	<b>Married</b>	8.0
4.8		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Religion</b>	<b>Christianity</b>	152.0
90.5		
	<b>Islam</b>	16.0
9.5		
	<b>Others</b>	0.0
0.0		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		

<b>Level of</b>	<b>100</b>	12 .0
7.1		
<b>Education</b>	<b>200</b>	17.0
10.1		
	<b>300</b>	25.0
14.9		
	<b>400</b>	52.0
30.9		
	<b>Other</b>	62.0
36.9		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Faculty</b>	<b>Art</b>	2.0
1.2		
	<b>Education</b>	8.0
4.8		
	<b>Engineering</b>	16.0
9.5		
	<b>Health sciences</b>	76.0
45.2		
	<b>Humanities</b>	15.0
8.0		
	<b>Laboratory technology</b>	11.0
6.5		
	<b>Sciences</b>	30.0
17.9		
	<b>Social sciences</b>	10.0
6.9		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		

Table 2: Respondents' knowledge of insecticide treated nets

Variable		frequency (n)
<b>Percentage (%)</b>		
<b>Awareness of malaria</b>	<b>Yes</b>	167.0
99.4		
	<b>No</b>	1.0
0.6		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Transmission</b>	<b>Heat</b>	2.0
1.2		
	<b>Mosquito</b>	165.0
98.2		
	<b>Witches</b>	1.0
0.6		
	<b>Noise</b>	0.0
0.0		
	<b>Excess oil</b>	0.0
0.0		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Malaria can kill</b>	<b>Yes</b>	165.0
98.2		
	<b>No</b>	3.0
1.8		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Preventable</b>	<b>Yes</b>	166.0
98.8		
<b>Malaria?</b>	<b>No</b>	2.0
1.2		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		

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<b>Aware of ITN</b>	<b>Yes</b>	164.0
97.6		
	<b>No</b>	4.0
2.4		
	<b>Tot al</b>	<b>168.0</b>
<b>100.0</b>		
<b>Can ITN prevent</b>	<b>Yes</b>	155.0
92.3		
	<b>No</b>	13.0
7.7		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>Source of Information</b>	<b>Health worker</b>	70.0
29.5		
	<b>Clinic</b>	40.0
16.9		
	<b>Friends/family</b>	44.0
18.6		
	<b>Radio/Television</b>	80.0
33.8		
	<b>Other</b>	3.0
1.3		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		

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Table 3: Respondents' attitude towards the use of insecticide treated nets

Variable		frequency (n)
<b>Percentage (%)</b>		
<b>Those who have used ITN</b>	<b>Yes</b>	<b>108.0</b>
64.3		
	<b>No</b>	<b>60.0</b>
35.7		
	<b>Total</b>	<b>1</b>
<b>100.0</b>		<b>68.0</b>
<b>*Effect of ITN</b>	<b>Less Malaria</b>	<b>102.0</b>
94.4		
	<b>More malaria</b>	<b>1.0</b>
0.9		
	<b>No Change</b>	<b>5.0</b>
4.6		
	<b>Total</b>	<b>108.0</b>
<b>100.0</b>		
<b>Have/use ITN</b>	<b>Yes</b>	<b>75.0</b>
44.6		
	<b>No</b>	<b>88.0</b>
65.6		
	<b>Total</b>	<b>168.0</b>
<b>100.0</b>		
<b>** ? Don't have ITN</b>	<b>too expensive</b>	<b>6.0</b>
6.8		
	<b>Where to get</b>	<b>37.0</b>
42.0		
	<b>No mosquitoes</b>	<b>2.0</b>
2.3		
	<b>Window/door net</b>	<b>22.0</b>
25.0		
	<b>Don't care</b>	<b>21.0</b>
23.9		

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	<b>Total</b>	<b>88.0</b>
<b>100.0</b>		
<b>Acquire if free</b>	<b>Yes</b>	84.0
95.2		
	<b>No</b>	4.0
4.8		
	<b>Total</b>	<b>88.0</b>
<b>100.0</b>		
<b>Pay for ITN</b>	<b>Yes</b>	61.0
69.0		
	<b>No</b>	27.0
41.0		
	<b>Total</b>	<b>88.0</b>
<b>100.0</b>		

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\*Respondents who owned ITN only were considered

\*\*Respondents who did not own ITN only were considered

Table 4: Respondents' use of ITN ( i.e. by those who owned and used bed nets)

Variable		Percentage (%)	Frequency (n)
Use every night	Yes	26.0	
	No	49.0	
	<b>Total</b>	<b>75.0</b>	
		34.7	
		65.3	
		<b>100.0</b>	
Clean your ITN	Yes	42.0	
	No	33.0	
	<b>Total</b>	<b>75.0</b>	
		56.0	
		44.0	
		<b>100.0</b>	
*How often	1 month	9.0	
	3 months	18.0	
	6 months	11.0	
	1 year	2.0	
	Other	2.0	
	<b>Total</b>	<b>42.0</b>	
		21.4	
		42.9	
		26.2	
		4.8	
		4.8	
		<b>100.0</b>	
Source	Ministry	3.0	
	Hospital	17.0	
	Health worker	23.0	
		4.0	
		22.7	
		30.7	

0.0			
		<b>Market</b>	19.0
25.3			
		<b>Gift</b>	13.0
17.3			
		<b>Total</b>	<b>75.0</b>
100.0			
<b>How do you use</b>	<b>Cover</b>	<b>- self</b>	1.0
1.3			
		<b>Hang it</b>	74.0
98.7			
		<b>Total</b>	<b>75.0</b>
100.0			

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\*Respondents who clean their ITNs.

## ***DISCUSSION***

The importance of the use of the insecticide treated net (ITN) cannot be over-emphasized especially in a malaria endemic nation like Nigeria with one of the world's highest malaria burdens. Most respondents fell into the 20-24 years modal age group which captures the age group in most tertiary institutions. It was not surprising that most (45%) respondents were of the faculty (i.e. college) of Health Sciences because the researchers are of the college and were able to easily convince their colleagues to join the study. Also, more respondents came from Health Sciences because this group of students are given preference in the allocation of accommodation.

Table 2 showed that everybody (100%) in the study knew about malaria just as most (95.2%) knew that malaria is caused by mosquito. Worrisome were the 1.2% and 0.6% who believed that malaria is caused by heat and witches respectively. These are undergraduates! Though the percentage was low, this perception coming from this group of respondents, calls for concern.

A very good percentage (64.3%) of respondents had used the nets just as 94.4% of those who had used the ITN agreed that it was effective in reducing the

'frequency' of malaria attacks – Table 3. However, only 44.6% of respondents owned an ITN. This figure is by all account very low considering the fact that malaria ranks high among diseases with high mortality, knowledge was high and yet respondents were 'unwilling' to acquire protective gears for its prevention. There were also respondents (4.8%) who will not acquire the ITN even if free! This underscores the fact that there are still respondents who require a lot of convincing.

Frequency of use has not been as recommended and care of the bed nets was also deficient. The study also showed that despite the knowledge on malaria and ITN, only 44.6% of respondents had ITNs out of which 34.7% used the nets every night and with stress (38%) of putting up the net as the major deterrent to daily use. This was as seen in earlier studies. Interestingly, it was found that 69% of respondents would be willing to pay for the nets at affordable prices, suggesting the need for subsidized pricing (or even free considering the socio-economic impact of the disease). Furthermore, there is need for improvement in availability as most (42%) respondents who did not have the nets claimed not to know where to get them. Also, only 12% of ITN users lived in households where every member of the house used it. Health workers and hospitals were the main sources of free ITN – 30.7% and 22.7% respectively. It showed that faith-based organizations like the churches had not been fully explored and exploited (in a country as deeply religious as Nigeria) as points of distribution.

Conclusion: There is high knowledge of ITNs among undergraduates of the University of Port Harcourt but this has not been matched with commensurate attitude and practice. It is recommended that there be increased and sustained health education matched with availability and accessibility of ITNs among students of this institution and indeed the larger population.

## **REFERENCES**

1. Deressa W, Ali A, Enquoselassie F: Knowledge, attitude and practice about malaria, the mosquito and anti-malarial drugs in a rural community. *Ethiop J Health Dev* 2003, 17:99-104.
2. World Health Organization: The Abuja Declaration on Roll Back Malaria in Africa. African Heads of States and Governments, 25 April 2000, Abuja, Nigeria
3. Adeneye AK, Jegede SA, Mafe MA, Nwokocha EE. A pilot study to evaluate malaria control strategies in Ogun State, Nigeria. *World Health Popul.* 2007;9(2):83–94.
4. Onwujekwe O, Uzochukwu B, Ezumah N, Shu E. Increasing coverage of insecticide treated nets in rural Nigeria: implications of consumers' knowledge, preference and expenditure for malaria prevention. *Malar J.* 2005;4:29.

5. Oreanya OB, Hoshen M, Sofola OT. Utilization of insecticide-treated nets by under-five children in Nigeria: Assessing progress towards the Abuja target. *Malar J.* 2008;7:145
6. Seck I, Fall IS, Faye A, Ba O, Tal-Dia A: Malaria knowledge, attitudes and practices among women living in the rural area of Popoungine, Senegal. *Med Trop (Mars)* 2008, 68(6):629-33
7. Rhee M, Sissoko M, Perry S, Dicko A, Mcfarland W, Doumbo O: Malaria prevention practices in Mopti region, Mali. *East Afri Med J* 2005, 6:52.
8. Onwujekwe O, Uzochukwu B, Ezumah N, Shu E: Increasing coverage of insecticides treated nets in rural Nigeria: implication of consumer knowledge, preference and expenditures for malaria prevention. *Malaria Journal* 2005, 4:29.
9. Afolabi BM, Sofola OT, Fatunmbi BS, Komakech W, Okoh F, Saliu O, Otsemobor P, Oresanya OB, Amajoh CN, Fasiku D, Jalingo I: Household possession, use and non-use of treated or untreated mosquito nets in two ecologically diverse regions of Nigeria-Niger Delta and Sahel Savannah. *Malar J* 2009, 8:30.
10. Abdella YM, Deribew A, Kassahun W: Does insecticide treated mosquito nets (ITNs) prevent clinical malaria in children aged between 6 and 59 months under program setting? *J Community Health* 2009, 34:102-112.
11. Net Mark, 2007. Ethiopia Bed net utilization study: why some nets owned are not used. A project at AED funded by the United States Agency for International Development under Cooperative Agreement No.HRN-A-00-99-00016-00. 22pp.
12. Minakawa, N., O Dida, G., O Sonye, G., Futami, K & Kaneko, S. 2008. Unforeseen misuses of bed nets in fishing villages along Lake Victoria. *Malaria Journal*, 2008, 7:165.
13. Ter Kuile FO, Terlouw DJ, Phillips-Howard PA, Hawlwy WA, Friedman JF, Kolezak MS, Kariuli SK, Shi YP, Kwena AM, value JM, Nahlen BL: Impact of permentrin-treated bed nets on malaria and cause morbidity in young children in an area of intense perennial malaria transmission in western Kenya: cross-sectional survey. *Am trop Med Hyg* 2003, 68:100-7.
14. Okrah J, Traore C, Pale A, Sommerfeld J, Muller O: Community factors associated with malaria prevention by mosquito nets: an exploratory study in rural Burkina Faso. *Trop Med Int Health* 2002, 7(3):240-8.
15. Kyawtt-Swe, K. and A. Pearson, 2004. Knowledge attitudes and practices with regard to malaria control in an endemic rural area of Myanmar. *South East Asian J. Trop. Med. Public Health*, 35: 35-62.
16. Guyyat HL, Corlette SK, Robinson TP, Ochola SA, Snow RW: Malaria prevention in highland Kenya: indoor residual house spraying vs insecticide treated bednets. *Trop Med Int Health* 2002, 7(4):298-303.

17. Dike N, Onwujekwe O, Ojukwu J, Ikeme A, Uzochukwu B, Shu E: Influence of education and knowledge on perceptions and practices to control malaria in Southeast Nigeria. *Soc Sci Med* 2006, 63:103-106.
18. Brieger WR, Ekanem OJ, Nwankwo E, Ezike VI, Robinson T, Sexton JD, Breman JG, Parker KA: Social and behavioural baselines for guiding implementation of an efficient trial of insecticide-treated bed-nets for malaria control at Nsukka, Nigeria. *Intern J Community Health Educ* 1997, 16:47-61