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Protection Practices Against Mosquito Among Students of a Tertiary Institution in Southwest Nigeria

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Abstract: Various species of mosquitoes are recognized as vectors of a number of human infections in the tropics. One thousand (490 males, 510 females) self-selected students of a tertiary institution (Olabisi Onabanjo University, Ago-Iwoye) in Ogun State, southwest Nigeria were interviewed between November 2007 and March 2008 to determine their protective measures against mosquitoes and their knowledge of the vectorial role of mosquitoes. Temporary water bodies around the halls of residence of the students were also examined for mosquito larvae. 92.4% (924/1000) of the students used nettings on their windows and /or doors and use of nettings on both doors and windows was the statistically commonest practice ($x^2 = 41.31$, $P < 0.001$). Only 9.2% (85/924) of the netting users also used insecticide-treated bed nets. Most of the students answered having had, at least, one mosquito bite 1-2 weeks earlier ($x^2 = 62.45$, $P < 0.001$). 26.3% (263/1000) of the respondents had fever in the last 1-8 week earlier. 88.4% (884/1000) of the respondents answered correctly that mosquitoes are vectors of the etiological agents of malaria, elephantiasis and yellow fever. 89.8% (132/147) of the halls of residence of the respondents had mosquito larvae in their immediate vicinity. The study shows the need to compliment personal protective measures with regular and adequate environmental sanitation in the bid to successfully check human-mosquito contact among students in the study area.

Key words: Personal protection · Knowledge · Insecticide-treated bed nets · Mosquito · Mosquito larvae · Nigeria

INTRODUCTION

Various species of mosquitoes have long been recognized as vectors of a number of human infections in the tropics. *Anopheles* species transmit the malarial parasite (*Plasmodium*), *Aedes aegypti* and some other species transmit yellow fever and dengue, while both *Anopheles* and *Culex* have been incriminated for the transmission of lymphatic filariasis [1-4]. Therefore, efforts have been consistently made to educate the inhabitants of tropical countries on the dangers of mosquito bites. The motive is to effectively control the infectious diseases transmitted by the insects [5].

Studies have revealed that human knowledge, attitude and adoption of the various recommended applicable methods of personal and household protection against mosquito vary remarkably in different endemic regions of tropical countries [6-10]. Similar recent studies from some parts of Nigeria exist in literature [11, 12]. However, to the best of our knowledge, there is paucity of information on protective measures against human-mosquito contact in Ijebu North area of Ogun State, southwest Nigeria, though *Plasmodium* and *Wuchereria bancrofti* parasitaemia exist in the area (Agbolade *et al*., under review). Moreover, students of tertiary institutions in Nigeria have often been excluded from anti-mosquito protection studies particularly in relation to malaria control.

In view of the foregoing, this study was initiated to ascertain the anti-mosquito protection measures and knowledge of infections transmitted by mosquitoes among students of a tertiary institution in Ijebu North area

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of Ogun State, southwest Nigeria. It is our hope that the findings of this study will enhance the performance of the global Roll Back Malaria project.

MATERIALS AND METHODS

Study Area and Population: The study area consisted of Ago-Iwoye, Oru and Ijebu-Igbo in Ijebu North area of Ogun State, southwest Nigeria. The area lies in the tropical rainforest belt, between latitudes 7°00′ and 6°55′ N, longitudes 3°50′ and 4°00′ E. Ago-Iwoye is the main seat of the Olabisi Onabanjo University (OOU). OOU is, at present, non-residential and most of the students reside in Ago-Iwoye township, while others reside mainly in Ijebu-Igbo and Oru.

Questionnaire Administration: One thousand (490 males, 510 females) self-selected students of OOU were included in the study which took place between November 2007 and March 2008. The students were visited in their halls of residence and each volunteer was enlightened and educated on the purpose of the study and how to answer the questions provided on the questionnaire. However, care was taken to avoid providing clues to the answer of any of the questions. Subsequently, with guidance when necessary, each student was encouraged to fill in the questionnaire which was retrieved immediately afterward. The information obtained through the questionnaire include use of door and window nettings, bed nets, insecticides and any known disease(s) transmitted by mosquito. The data thus generated were analyzed using SPSS Version 11.

Collection of Mosquito Larvae: Larvae of mosquito were collected using a dipping cup from drainages and water collections around 147 halls of residence of the students included in the study. The.larvae were kept in a preservative composed of 70% ethanol, 10% glycerol and 4% acetic acid.

RESULTS

Four hundred and ninety (49.0%) males and 510 (51.0%) females students filled the questionnaires and their age groups are summarized in Table 1, although 103 (10.3%) of them did not indicate their age. Most of the respondents were in the 21-25 years age group ($x^2 = 88.2$, $P < 0.001$). 99.1% (991/1000) of the respondents were undergraduates while 0.9% was in sub-degree programmes.

Table 1: Age distribution of students interviewed on protection against mosquito in southwest Nigeria

Age group (years)	No. of respondents	% of respondents
16-20	207	23.1
21-25	568	63.3
26-30	115	12.8
31+	7	0.8
Unspecified	103	10.3
Total	1000	100

Table 2: Location of nettings in bedrooms of students in southwest Nigeria

Location	No. of respondents	% of respondents
Window	302	32.7
Door	66	7.1
Window + Door	556	60.2
Total	924	100

Table 3: Last experience of mosquito bite by students in southwest Nigeria

When last bitten	No. of respondents	% of respondents
Previous 1-2 weeks	590	59.0
Previous 3-4 weeks	168	16.8
Previous 5-8 weeks	122	12.2
Unknown	120	12.0
Total	1000	100

Table 4: Knowledge of students in southwest Nigeria on diseases transmitted by mosquito

Disease transmitted	No. of respondents	% of respondents
Malaria	877	87.7
Yellow fever	1	0.1
Malaria and Yellow fever	5	0.5
Cholera	1	0.1
Elephantiasis	1	0.1
None	113	11.3
Unknown	2	0.2
Total	1000	100

92.4% (924/1000) of the students used nettings on their windows and /or doors (Table 2). The use of nettings on both doors and windows was the statistically commonest practice ($x^2 = 41.31$, $P < 0.001$). 9.2% (85/924) of the netting users also used insecticide-treated bed nets (ITN) while 1.2% (11/924) used untreated bed nets ($x^2 = 6.15$, $P < 0.02$). 29.7% (297/1000) of the respondents sprayed their bedrooms with insecticides weekly or occasionally while 70.1% never did ($x^2 = 16.35$, $P < 0.001$). Two of the students did not give any answer to the question on spraying of bedrooms with insecticides.

The time of last experience of mosquito bite among the respondents is summarized in Table 3. Most of them had, at least, one mosquito bite 1-2 weeks earlier

($x^2 = 62.45, P < 0.001$). 26.3% (263/1000) of the respondents had fever in the last 1-8 week earlier. The knowledge of the respondents on the specific diseases transmitted by mosquito is summarized in Table 4. 88.4% (884/1000) of the respondents gave one scientifically correct answer or the other while 11.6% gave incorrect answers or did not answer affirmatively ($\dot{x} = 58.98, P < 0.001$).

89.8% (132/147) of the halls of residence of the respondents had mosquito larvae in their immediate vicinity. Out of these 45.5% (60/132) had *Anopheles* while 54.5% (72/132) had culicine larvae.

DISCUSSION

The widespread practice of mosquito net usage among students in this study is commendable and reflects a genuine desire to ward off mosquitoes from their bedrooms. The additional use of bed nets and insecticides by some of the students is also a step in the right direction. All these efforts are possibly due to high level of education of the respondents as has been noted by some workers [6]. This view is supported by the fact that most of the respondents could correctly incriminate mosquitoes as vectors of some human infections particularly malaria. This agrees with some previous findings in Nigeria [12] and elsewhere [6, 7, 9].

However, it is important to note that the use of bed nets, particularly ITN, was not common among the students in agreement with the findings of some previous workers [9, 11, 12]. This observation calls for attention in view of the highest education level of the students. It is possible that many of the students are ignorant of ITN which can meaningfully reduce disease transmission by mosquitoes [2]. Non-usage of bed nets by many respondents may be due to financial impoverishment which is an important common factor among students of many Nigerian tertiary institutions. Studies have shown that many Nigerian pregnant women and nursing mothers did not use ITN due to ignorance and poverty [11].

The common experience of mosquito bites among students in this study is another cause for concern. Improper maintenance of window and door nettings, particularly due to financial constraints, may be an important contributory factor. In addition, like it has been observed in Lagos [13], the vicinity of most of the halls of residence of the respondents provided suitable breeding sites for mosquitoes. In view of this, mosquitoes will naturally conveniently enter and exit the bedrooms of the students to inflict their havocs. This may be the reason many sprayed their bedrooms regularly with insecticides. According to Sharma *et al*. [10], water storage habits may sometimes enhance mosquito abundance in any locality. Nevertheless, it cannot be over-exaggerated that many are exposed to mosquito bites in other places such as lecture rooms/halls, cafeteria, toilets, cyber café and commercial vehicles. Further studies are required to determine window and door nettings maintenance culture and cost among students in southwest Nigeria.

A substantial proportion of the respondents answered having experienced fever in the previous 1-8 weeks. Fever is one the characteristic clinical signs of malaria [5, 14, 15]. The recent occurrence of fever in the affected students may be an indication of recent new *Plasmodium* infection or relapse [5].

This study has shown that although many students adopt one or more personal protection measures, mosquito bite is still common particularly because of presence of breeding sites in the immediate vicinity of the students' halls of residence. It implies that regular and adequate environmental sanitation must be meaningfully addressed in the bid to conquer the unwanted insects in the study area.

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