



Personal Protective Practices Against Mosquito Bites by Undergraduate Students of Federal University of Agriculture Makurdi, North Central Nigeria

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Abstract: Mosquito-borne diseases are of public health significance in Makurdi, Nigeria. Investigations on the protective practices against mosquito bites among Undergraduate students of Federal University of Agriculture Makurdi were conducted from January to April, 2016. Data was collected from a total of 300 students across the University hostels and private accommodation around the campus using structured questionnaires. Of the 300 students interviewed, 171 (57%) were males while 129 (43%) were females, and all of them (100%) had used one or more forms of the protective practices against mosquito bites. The age group 15-25 years had the highest number of responses (67%) while age group 35-45 years recorded the least number of responses (0.7%) respectively. The responses were significantly dependent on the age and sex of respondents ($\chi^2 = 47.247$, $df = 3$, $P > 0.05$). The use of window nets as protection against mosquito bites recorded the highest frequency 233/300(77.7%) while the use of mosquito weeds as repellents had the least number of respondents 2/300(0.7%) respectively. The results showed that there was a significant difference ($P < 0.05$) between male and female respondents. Similarly, the responses varied significantly ($P < 0.05$) across the age groups. There was a significant difference ($P < 0.05$) in the level of effectiveness of the protective measures used among the students. The use of window and door nets, insecticide treated nets and insecticidal sprays were the most commonly used protection against mosquito bites. The fact that a large population of the respondents had used at least one control measure or the other against mosquito bites provided evidence for high rate of mosquito bites in the University community. It is recommended that Insecticide Treated Nets should be distributed free to the students on seasonal basis and proper environmental sanitation should be encouraged to destroy mosquito breeding sites in the community.

Keywords: Mosquito Bites, Mosquito-Borne Diseases, Protection Practices, Makurdi, Nigeria

1. Introduction

Mosquito bites constitute a nuisance to man and his environment [1]. They are as ancient as man himself and have constituted a threat to man's health and not all species bite man readily, some prefer other animals to man and others feed only on plant juices [1, 2]. The female *Anopheles* mosquito transmits malaria parasites, *Aedes aegypti* mosquitoes are known to transmit yellow fever and dengue

fever. *Anopheles* and *Culex* species have also been incriminated in the transmission of lymphatic filariasis [3].

Females of most mosquito species require a blood meal from a vertebrate host to stimulate the development of each clutch of eggs and this behavior potentially places the surrounding human populations at risk of mosquito contacts and bites [2]. Species associated with wetlands exhibit ambushing or hunting behavior to acquire blood [4]. It has also been reported that species that ambush during the day create the greatest demand for control due to public

awareness [4].

Mosquito bites have the potential of several negative consequences on humans including the socio-economic effect; because of this man have developed several protective practices against the mosquito [5]. Bed nets are among the most recognized methods of protective practices against mosquito bites, the bed nets are sometimes treated with chemicals while others are not treated but all serve the same purposes of preventing mosquitoes from biting and are used in almost all households even in villages [6, 7]. Three general methods for protection against mosquito bites have been reported by [8] as traditional anti-mosquito, plant based petroleum oils and conventional protective methods. Further report [8] indicates that the traditional anti-mosquito methods are more frequently used by the inhabitants of rural communities in India because they were available, affordable and due to lack of known more effective alternatives. The demerits of these methods were: laborious to implement, stain dresses, and produce a lot of smoke/repulsive odours when used; those of conventional methods were lack of adequate information about them, high cost and non-availability.

Although, there are reports on prevention practices against mosquito bites elsewhere in Nigeria, specifically from Ogun State [1], Imo State [7], Lagos State [9] and Rivers State [5] respectively, there is paucity of information on the protection

practices against mosquito bites in Benue State generally and particularly among tertiary students.

Therefore, the present study investigated personal protective practices against Mosquito bites by the undergraduate students of Federal University of Agriculture Makurdi, Benue State-North Central Nigeria.

2. Materials and Methods

2.1. Study Area

The study was carried out at the University of Agriculture Makurdi Community. It is located in the Northern part of Makurdi Local Government Area of Benue State. It has a land mass of 8,048 hectares. The University shares common boundaries with river Benue and Makurdi town in the south, in the west with Federal Housing Estate, in the east with Tyodugh village, in the North with Agan village and the north east with Guma Local Government Area. The vegetation is dominated by tall perennial grasses and woody species. The soil is very fertile, rainfall begins in April and ends in October, while dry season begins in November and ends in March. The University has a population of over thirteen thousand people including students and staff [10] and the features of the study area are depicted in Figure 1 [11].

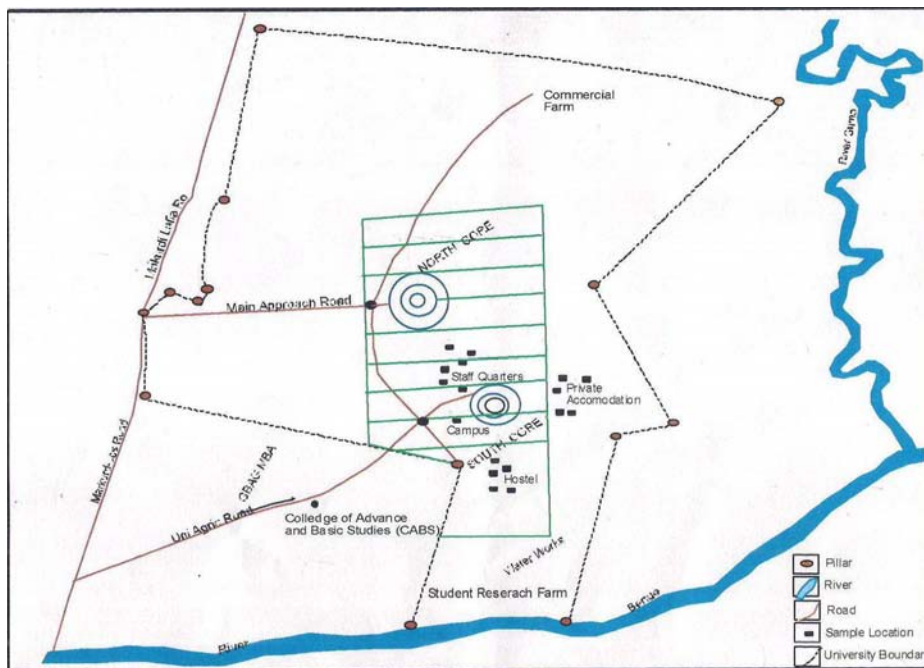


Figure 1. Map of University of Agriculture Makurdi showing the student's Hostels and private accommodation. (Ministry of Land and Survey Makurdi, 2011).

2.2. Study Design and Data Collection

A cross cross-sectional study was conducted from January to April, 2016. A total of 300 students residing in the University hostels, neighboring village and staff quarters were randomly selected for sampling. Standard questionnaires were designed and self-administered to the students. The questionnaires were both open ended and

closed. This was designed to allow the respondent contribute their views as guiding their responses.

2.3. Permission

Permission was granted by the participants by verbal persuasion. They were made to understand the purpose of the study. Only participants who gave their consent were

included in the study.

2.4. Data Analysis

The data obtained was analyzed using simple percentages to explain frequencies and Chi-squared test was used to test for homogeneity across sample parameters, with significance difference considered at P-values of 0.05.

3. Results

Of the 300 students interviewed, 171 (57%) were males while 129 (43%) were females, and all of them (100%) had used one or more forms of the protective practices against mosquito bites. The age group 15-25 had the highest number of responses (67%) while age group 35-45 years recorded the least number of responses (0.7%) respectively. The responses were significantly dependent on the age and sex of respondents ($\chi^2 = 47.247$, $df = 3$, $P > 0.05$) (Table 1).

The use of window nets as protection against mosquito bite recorded the highest frequency 233(77.7%) while the use of mosquito weeds as repellents had the least number of respondents 2(0.7%) respectively. There was a significant difference between the various protective measures against mosquito bites ($\chi^2 = 554.188$, $df = 12$, $P < 0.05$) (Table 2).

On the effectiveness of the practices, participants who were of the opinion that mosquito nets were most effective against mosquito bite recorded the highest frequency of 204 (68%) followed by insect racket 117 (39%) and window nets 117 (39%). Both window and door nets had 115 (38.3%) followed by use of insecticides 104 (34.6%); covering body with cloths 98 (32.6%); closed doors and windows 92

(30.6%) then mosquito repellents 87 (29%) and finally putting on of fans 4 (1.3%) (Table 3).

Table 1. Number of Respondents in Relation to Age and Sex.

Age groups	Males (%)	Females (%)	Total (%)
15-25	87(29.0)	114(38.0)	201(67.0)
25-35	79(26.3)	15(5.0)	94(31.3)
35-45	2(0.7)	0(0.0)	2(0.7)
>45	3(1.0)	0(0.0)	3(1.0)
Total	171(57.0)	129(43.0)	300(100)

($\chi^2 = 47.247$, $df = 3$, $P > 0.05$)

Table 2. Protective Practices used against Mosquito Bites by the study subjects.

Practices	No of respondents	Percentage
Insecticides	177	59.0%
Mosquito nets	194	65.0%
Closed doors and windows	197	65.7%
Mosquito repellents	117	39.0%
Window nets	233	77.7%
Door nets	118	39.3%
Both window and door nets	115	38.3%
Insect racket	88	29.3%
Cover body with cloths	129	43.0%
Putting on of fans	4	1.3%
Use of mosquito weed	2	0.7%
Environmental sanitation	133	44.3%
Removal of breeding sites	24	8.0%

($\chi^2 = 554.188$, $df = 12$, $P < 0.05$)

Table 3. The Effectiveness of Protective Practices among University of Agriculture Makurdi Students (n = 300).

Protective Practices	Very effective (%)	Partially effective (%)	Not effective (%)	Total (%)
Insecticides	104 (34.6)	165 (55.0)	31 (10.3)	300 (100)
ITNs	204 (68.0)	66 (22.0)	30 (10.0)	300 (100)
Closed doors and windows	92 (30.6)	168 (56.0)	40 (13.3)	300 (100)
Mosquito repellents	87 (29.0)	152 (50.6)	61 (20.3)	300 (100)
Window nets	117 (39.0)	145 (48.3)	38 (12.6)	300 (100)
Door nets	83 (27.6)	168 (56.0)	49 (16.3)	300 (100)
Both window and door nets	115 (38.3)	100 (33.3)	85 (28.3)	300 (100)
Insect racket	117(39.0)	145(48.3)	38 (12.6)	300 (100)
Wearing of clothes	98 (32.6)	168 (56.0)	72 (24.0)	300 (100)
Putting on of fans	4 (1.3)	0 (0.0)	296(98.7)	300(100)
Mosquito weeds	0 (0.0)	2 (0.7)	298(99.3)	300(100)
Environmental sanitation	0 (0.0)	133 (44.3)	167(55.7)	300(100)
Removal of breeding sites	0 (0.0)	24 (8.0)	276(92.0)	300(100)

($\chi^2 = 408.051$, $df = 12$, $P < 0.05$)

4. Discussion

This study has revealed a good number of protective practices against mosquito bites as practiced among the students of the Federal University of Agriculture, Makurdi. These protective practices are in consonance with those reported elsewhere [1, 5, 8, and 12]. All the 300 students sampled had used at least one type of protective measure or

the other against mosquito bites. This is in line with the report of [5] in Rivers State. The widespread practice of mosquito net usage among students in this study is commendable and reflects a desire to prevent mosquito bites. In a similar study in southwest Nigeria, [1] reported a high use of mosquito nets to prevent mosquito bites by Undergraduate students in Ogun State, Nigeria. Studies have shown that most Nigerian communities don't use protective

measures against mosquito bites due to financial impoverishment [1, 8]. This may also be responsible for the non-usage of mosquito nets by the students in the present study.

The common experience of mosquito bites among students in this study is a serious cause of concern. Improper maintenance of window and door nettings particularly due to financial constraints and neglect by the University authority may be an important contributory factor to the high frequency of mosquito bites observed in this study. The hostels and some of the student houses in the neighboring village contain water storage tanks, blocked drainages and surrounding bushes that provide suitable breeding sites for mosquito vectors. In view of this, mosquitoes conveniently breed, enter and bite students indiscriminately, forcing the students spray their bedrooms regularly with insecticides. This is in agreement with earlier report by [13] that water storage habits may sometimes enhance mosquito abundance in a locality.

The use of nettings on doors as observed in the present study is also a good step in preventing mosquitoes from coming into the house and if the nettings are well maintained this goes a long way in preventing mosquitoes from getting into the rooms and causing harm [12]. Use of insect racket, removal of breeding sites and environmental sanitation also help in reducing the density and presence of mosquitoes as reported by [14]. The fact that most respondents in the present study answered having used one or more of these methods is a right step in protecting themselves against mosquito bites. Nevertheless, it is worthy of note that many students are yet exposed to mosquito bites in other places on campus such as lecture halls, cafeteria, toilets, cyber café, walk ways, parks, inside commercial vehicles, and the library due to the abundance of mosquito breeding sites and mosquito vectors themselves on campus. The use of mosquito repellents such as creams, soaps and perfumes by respondents outside their halls of residence against mosquito bites was also observed among the students in this study. This agrees with the report by [1] which showed that the use of mosquito repellent cream is useful against mosquito bites out of doors.

5. Conclusion

This study has shown that many students residing on campus of the Federal University of Agriculture Makurdi adapt several personal protective measures against mosquitoes bites, and that mosquito bites are common, particularly because of the presence of breeding sites in the immediate vicinity of the students' halls of residence. It is important that regular and adequate environmental sanitation be meaningfully addressed in the bid to conquering the unwanted insects (mosquitoes) in the study area. Further research should be carried out to check the factors that contribute to the high population of mosquitoes in the study area.

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