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Knowledge, Attitude and Practice of Malaria Control among FUTO Students

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Abstract

This study to determine the knowledge, attitude and practice of malaria control among students of Federal University of Technology of Owerri living in and outside the campus, was carried out between July and September 2018. A total of 160 students were randomly sampled with the use of structured questionnaires as well as giemsa stained thin and thick films to determine the prevalence of malaria. Among this number, 25% (40/160) of the students were infected with *Plasmodium falciparium*. The highest prevalence of 52% (13/25) was recorded among students living in the school hostel. Based on the questionnaire analysis, 96.25% of the students indicated mosquito bite as the cause of malaria, while 3.13% of them said malaria is caused by too much consumption of oil. There is a great disparity on the knowledge of the method of diagnosis with a total of 29.38% of the students preferring self-diagnosis, 17.5% stated microscopy, 11.88% RDT, while a greater percentage of them 41.25% do not have idea about any method of diagnosis. For control measures, 46.9% of the students do not practice any control measure against malaria. A whopping 56.9% of the students' population takes antimalarial only when they are diagnosed. Some of the students do not fancy the relevance of going for laboratory diagnosis. Based on that, a total of 29.38% of the students rated that it is "barely important" going to laboratory, while 10.63% rated "not important", although a good number (60%) believes on the importance of going for laboratory diagnosis by rating "very importance". However, there seems to be a high level of knowledge about the cause of malaria among the students but the attendant knowledge of diagnosis and practice of control measures are lacking, as a result, this could impact negatively on the health of the students. Greater awareness is needed in order to improve knowledge on the importance of laboratory diagnosis and malaria control which can take care of their attitudes towards malaria. Attitude basically is always influenced by beliefs and existing bodies of knowledge.

Keywords: Malaria; Knowledge; Practice; Attitude; Students; FUTO

Introduction

Malaria is the most important parasitic disease of human being. It is transmitted in 108 countries inhabited by roughly 3 billion people, and, in 2010, caused an estimated 216 million cases and 655 000 deaths [1]. More than 85% of malaria cases and 90% of malaria deaths occur in sub-Saharan Africa, mainly in young children (i.e., those younger than 5 years). Malaria is a protozoan disease transmitted by *Anopheles* mosquitoes. Five species of the genus *Plasmodium* cause all malarial infections in human being. Most cases are caused by either *Plasmodium falciparum* or *Plasmodium vivax*, but human infections can also be caused by *Plasmodium ovale*, *Plasmodium malariae*, and, in parts of south-east Asia,

the monkey malaria *Plasmodium Knowlesi* [2]. Almost all deaths are caused by falciparum malaria.

Scientific investigations revealed many pathological effects of malaria on man which include varying degrees of anaemia, splenic enlargement and various syndromes resulting from physiological and pathological involvements of certain organs like the brain, liver and the kidneys [3]. *Plasmodium falciparum* malaria is the most prevalent and virulent in Nigeria [4], capable of causing mental apathy, weakness and generally slowing down economic development; accounting for up to 98% of severe cases with significant mortality and morbidity [5]. Malaria accounts for several deaths daily in Nigeria, especially in children less than five years of age in the rural, peri-urban and urban settlements; with high index of child mortality from the disease [6].

There have been a considerable number of reports about knowledge, attitudes, and practices relating to malaria and its control from different parts of Africa. These reports concluded that misconceptions concerning malaria still exist and that practices for the control of malaria have been unsatisfactory [7-9]. In their studies, Mgbemena, et al. [10] highlighted differential misconceptions about mosquito and associated diseases as reported by the respondents which included: malaria being caused by yellow fever and mosquitoes carry AIDS virus etc. Some of other studies have reviewed that communities now regard malaria as a dangerous disease that can kill and affects more children under five years than the adults while other qualitative studies have indicated that malaria in pregnancy being a normal thing [11,12]. In a coastal area of Lagos State it was confirmed that the perception of malaria by the inhabitants were not helpful. Many believe that malaria is caused by such factors as excessive heat, malnutrition, eating too much palm oil and other superstitious considerations. Thus, an advanced knowledge of the community beliefs and practices with respect to the disease is required to obtain and maintain its participation in surveillance and control activities [13]. In this same vein, knowledge is improved upon through relevant information feeds while attitude deals with the mindset [14]. Attitude basically is always influenced by beliefs and existing bodies of knowledge. In fact, anything that contributes to stronger attitude may likely increase attitude-behavior consistency. Mgbemena, et al. [10] reported the attitudes of the studied population towards mosquito-borne diseases which revealed that 80(17.4%) believed mosquito-borne diseases were mild diseases, 23(5.0%) considered them 'not a serious diseases' together with 70(15.2%) that reported no knowledge on the seriousness of mosquito-borne diseases, may however, impose a serious impact on control [15]. Appropriate Knowledge is relevant for solving daily challenges and the right knowledge, attitude, and practice towards malaria prevention and control will go a long way to reducing the burden associated with malaria infection in Nigeria and the world in general. This work aims at eliciting information on the knowledge, attitude and practice of malaria control among students of Federal University Technology, Owerri (FUTO).

Materials and Methods

The Study Area

The study area was Federal University Technology Owerri, located at Ihiagwa, Owerri west Local Government Area in Imo State Nigeria. It is bounded in the North by Obinze, in the South-West by Eziobodo and in the South-South by Nekede. Federal University of Technology Owerri is a large institution with an average of not less than 25,000 students, who live at different locations within the perimeters of the school.

Sample Population and Size

The sample population consisted of students of the institution which included those living in the school hostels and off campus residents (Umuchima, Eziobodo, Ihiagwa and other places they indicated in the questionnaire). A total of 160 students were randomly sampled for the exercise. Analysis of the sample tests was done at Pillars Medical Laboratory located at number 8 Umezeronini Street, Ikenegbu layout, Owerri.

Ethical Considerations

Permission from the hostel administrators were sought for after explaining to them the motive of the study. Oral consent of both the students living in the school hostels and off campus were sought and obtained before the commencement of the study.

Recruitment Procedure

Inclusion criteria: Students who gave their consent for this study irrespective of having symptoms or no symptoms of malaria.

Exclusion criteria: Students who are on anti-malarial drugs or have taken any within two weeks prior to sample collection and also those who declined consent.

Laboratory Test

About 2ml of blood was collected from a peripheral vein into an ethamine diamine tetra acetic acid (EDTA) bottle for preparation of thick and thin blood film as well as packed cell volume. Thick and thin blood films were prepared according

to the technique described by Hanscheid, et al. [16] and Cheesbrough, et al. [17]. Two glass slides were labeled for each participant. A drop of blood was then placed on the clean, grease free glass slide and allowed to dry. Precaution was taken to maintain a constant volume as much as possible. Thick and thin blood smear were made together on each slide with 6µl and 2µl of blood respectively. The thin smear was made to spread on the glass slide so that newsprint could be read through it. This was immediately fixed in absolute methanol for 5 seconds and allowed to air dry completely before staining. The dried slides were then placed on a rack in preparation for staining.

Staining Technique for Thick and Thin Blood Films

The thin films were fixed with absolute methanol for 2seconds and the entire smear (both thick and thin films) were air-dried before staining with 10% and 3% Giemsa working solution for 10mins and 45- 60mins respectively [18]. The stained slides were removed and rinsed in buffer water (pH 7.2), kept vertically on the rack to air- dry before examination. The slides stained with 10% Giemsa stain was used for preliminary slide reading while the second slide stained with 3% Giemsa stain was read by two skilled and independent malaria microscopists and archived for relevant records.

Reading of Slides and Counting of Parasites

When the slides were completely dried, a drop of oil immersion was placed on each slide and examined first with low magnification (10X ,40Xobjetive lens) to ascertain a definite field with even distribution of WBC(10-20WBC) before finally examining with X100 oil immersion objective lens [18]. Hundred high power fields were examined before a slide was reported negative and blood samples were reported positive only when the same result was produced by two independent skilled microscopists. Thin blood films were examined to confirm the species identification on the thick films. Parasite densities were documented as a ratio of parasites to WBC in thick films. Malaria parasites (*Plasmodium falciparum*) were counted against 200WBC in thick films. However, 500WBC were counted where less than nine parasites were counted after counting against 200WBC [18]. Parasite densities were calculated as follows:

$$\frac{Parasite\ count\ x\ 8000}{No\ of\ White\ blood\ cell} = Parasite/\mu l$$

Qualitative Data Collection

Structured questionnaires were used. The section A of the questionnaire was for Bio-data such as: age, sex etc. Questions such as Blood group and Genotype were asked in section B. Questions on diagnosis and regularity of antimalarial intake in section C while section D was for knowledge, attitude and control measures.

Data Analysis

The data were analyzed using: tabulations, percentages, and test of statistical significant differences using chi-square (X_2). The statistical software used was the Statistical Program for Social Sciences (SPSS). The significance was taken at p = 0.001, p< 0.05.

Results

Of the 160 students whose peripheral blood was sampled for the infection of malaria parasitaemia, 25% were positive. All were infections of *Plasmodium falciparium.* The result also showed that based on students' residential area, students living in the school hostel had the highest prevalence rate of infection (52.0%). This is followed by Eziobodo (31.3%) and Ihiagwa (25.0%), Umuchima had the lowest prevalence (14.5%) (Table 1).

Residents	No. Examined (%)	No. Infected (%)
School Hostel	25 (15.6)	13 (52.0)
Umuchima	83 (51. 9)	12 (14.5)
Eziobodo	32 (20.0)	10 (31.3)
Ihiagwa	20 (12.5)	5 (25.0)
Total	160	40

Table 1: Prevalence of Parasitaemia based on Residential areas.

Questionnaire Analysis

This was carried out to fulfil the objective of the study which was to identify the knowledge, attitude and practices of the study population towards malaria.

On the degree of knowledge on what causes malaria, significant number (96%) of students of both age brackets claimed that mosquito bite is responsible for malaria. Worthy of note is the fact that some fraction of the students 3.0% & 3.3% between the ages 16 - 22 & 23 – 29 held the belief that too much oil causes malaria. A low percentage 1.0% of the students responded not knowing what causes malaria. Knowledge on mosquito bite being the cause of malaria was very high for the sexes (Male: 96.9% & Females: 95.8%). A total 3.1% of males and females believed that eating too much could cause malaria while 0.6% does not have knowledge of the cause of malaria (Table 2).

Age	No. Examined	Mosquito bite (%)	Too much oil (%)	Don't know (%)
16-22	99	95 (96.0)	3 (3.0)	1 (1.0)
23-29	61	59 (96.7)	2 (3.3)	0 (0.0)
Total	160	154 (96.3)	5(3.1)	1 (1.0)
Sex				
Male	65	63 (96.9)	1 (1.5)	1 (1.5)
Female	95	91 (95.8)	4 (4.2)	0 (0.0)
Total	160	154 (96.3)	5(3.1)	1 (0.6)

Table 2: Age relationship with knowledge on what causes malaria.

On the degree of knowledge on method of diagnosis, majority of students 47.5% & 31.2% from the two age groups denied knowledge of any available method of diagnosis while 29.3% & 19.5% claimed to indulge on self - diagnosis. Their knowledge on Microscopy as a diagnostic method was higher than RDTs.

In the same vein, more males (49.2%) reported lack of knowledge of any method of diagnosis than the females 35.8%. Greater percentage of females seemed to know Microscopy and RDTs better than males though not significantly different ($^{X}_{2,}$ $p< 0.01$) (Table 3).

Age	No. Examined	Self-Diagnosis (%)	Microscopy (%)	RDT (%)
16-22	99	29 (29.3)	15 (15.2)	8 (8.1)
23-29	61	18 (19.5)	13 (21.3)	11 (18.0)
Total	**160**	**47 (29.4)**	**28 (17.5)**	**19 (11.9)**
Sex				
Male	65	35 (53.9)	10 (15.9)	7 (10.8)
Female	95	12 (10.5)	18 (19.0)	12 (12.0)
Total	**160**	**47 (29.3)**	**28 (17.5)**	**19 (11.9)**

Table 3: Knowledge on method of diagnosis based on Age and Sex.

On the degree of importance of laboratory diagnosis, higher number of respondents 52.5% and 72.13% in the two age brackets, 16-22 and 23-20 stated laboratory diagnosis being 'Very important', even as 35.4% & 19.7% considered laboratory diagnosis in malaria control as being 'Barely Important' while the remaining 12.1% and 8.2% insisted that laboratory diagnosis is 'Not Important'. On sex assessment of the importance of laboratory diagnosis, 49.2%of males & 15.8% of females rated laboratory diagnosis barely important but more females (76.8%) rated laboratory diagnosis as 'very important' compared to their male counter - part (35.4%)($X_{2,}$ $p< 0.05$), and 15.4% of males &7.4% of females that rated not important (Table 4).

Age	No. Examined	Barely important	Very important	Not important
16-22	99	35 (35.4 %)	52 (52.5%)	12 (12.1%)
23-29	61	12 (19.7%)	44 (72.1%)	5 (8.2%)
Total	**160**	**47 (29%)**	**96 (60%)**	**17 (10.6%)**
Sex				
Males	65	32 (49.2%)	23 (35.4%)	10 (15.4%)
Females	95	15 (15.8%)	73 (76.8%)	7 (7.4%)
Total	**160**	**47 (29.4%)**	**96 (60%)**	**17 (10.6%)**

Table 4: Age and Sex assessment on importance of laboratory diagnosis.

On the mode of control, significant number of respondents between the ages of 16-22 declared not using any control method against mosquitoes which is significantly higher(X_2, $p<0.05$) than other control methods practiced within that age bracket and those from 23-29. The use of Insecticide ranked highest among the control measures practiced by the students. It was also observed that greater number of males (42.6%) use insecticide as compared to the use of ITN (9.23%), Sanitation (11.4%) and Use of all possible control methods (16.9%). Equally more females (29.5%) do not use any control method against mosquitoes with respect to other measures employed (Table 5).

Age	No. Examined	ITNs (%)	Sanitation (%)	Insecticide (%)	All CM (%)	Don't use any (%)
16-22	99	13 (13.1)	19 (19.2)	15 (15.2)	23 (23.2)	29 (29.3)
23-29	61	15 (24.6)	9 (14.8)	19 (31.2)	4 (6.6)	14 (23.0)
Total	**160**	**28 (17.5)**	**28 (17.5)**	**34 (21.3)**	**27 (16.9)**	**43 (26.9)**
Sex						
Male	65	6 (9.2)	7 (11.5)	26 (42.6)	11 (16.9)	15 (23.1)
Female	95	22(23.2)	21 (22.2)	8 (8.4)	16 (16.8)	28 (29.5)
Total	**160**	**28 (17.5)**	**28 (17.5)**	**34 (21.3)**	**27 (16.9)**	**43 (26.9)**

Table 5: Assessment of control measures (CM) based on Age and Sex.

Based on how often antimalarial is taken, a greater percentage (66.7%) between the ages of 16-22 years responded that they do not take antimalarial except when diagnosed as compared with other respondents who stated 'Once a week', 'Once in two week' and 'Once a month'. With regards to gender assessment, it was also noted that no male students agreed on taking antimalarial once a week, 41.5% responded on once a month, and 53.9% agreed they take antimalarial only when they are diagnosed while a significant number of females (59.0%) (X_2, $p< 0.05$) revealed that they took antimalarial only when they are diagnosed (Table 6).

Age	No. Examined	Once a week (%)	Once in two weeks (%)	Once a month (%)	Except diagnosed (%)
16-22	99	2 (2.0)	7 (7.1)	24 (24.2)	66 (66.7)
23-29	61	0 (0.0)	4 (6.6)	32 (52.5)	25 (41.0)
Total	**160**	**2 (1.2)**	**11 (6.9)**	**56 (35.0)**	**91 (56.9)**
Sex					
Male	65	0 (0.0)	3 (4.6)	27 (41.5)	35 (53.9)
Female	95	2 (2.1)	8 (8.4)	29 (30.5)	56 (59.0)
Total	**160**	**2 (1.3)**	**11 (6.9)**	**56 (35.0)**	**91 (57.5)**

Table 6: Age and Sex Assessment on how often antimalarial is taken.

Discussion

Malaria is a life-threatening disease of man causing great suffering and loss of lives. The days of labor lost, the cost of treatment of patients and the negative impact of the disease make malaria a major social economic burden [19].

Results from this study indicate that one quarter (25%) of the students examined were positive for malaria parasite in their blood. Table 1 shows the prevalence of malaria infections with regards to students' residential areas with students living in school hostels recording the highest prevalence (52%). The trend of this result agrees with Adesina, et al. [20] who reported (80%) for students living in school public hostels. As observed, in these study sites, there is poor and inadequate drainage system while in the school hostels; there is overpopulation with ratio 8 to 12 students per room thus making use of mosquito net as preventive measure cumbersome. The transmission of this parasite in this study area could be enhanced by socio-economic and cultural factors when considering hostel location and its structures which can invariably play a vital role in influencing susceptibility to infection. However; Carter, et al. [21] remarked that malaria transmission is not homogenous through an endemic area but spotty and depends on two primary factors; location of the breeding sites and clustering of humans habitations where people are serving as reservoirs of malaria parasites.

It was impressive to observe that knowledge about what causes malaria was high among the study population, with most respondents indicating mosquito bite as the cause of malaria. This is in line with the observations of Obianumba, et al. [22] in endemic settings. Yet a fraction (3.1%) of the studied population believed eating too much oil (oily food) is responsible for malaria while on the other hand a student stated not knowing the actual cause of malaria. However, it has been widely assumed that local ideas about disease etiology may explain the underlying motivation in the context of disease prevention and control. Generally, the misconception observed in this work may as a consequence impact considerably on the practice of control as their efforts may fail to be directed to proper application of anti - vector and anti - parasitic measures. Evans, et al. [23] corroborated this by stating that the high prevalence of alternative explanation for disease causation has significant implication for the potential efficacy of intervention programme. Community knowledge and attitudes to diagnosis demonstrate the importance of providing patients with a reliable explanation for their illness. This will improve treatment-seeking behaviour and compliance. The WHO Guidelines for the treatment of malaria emphasizes the importance of malaria case management as a vital component of malaria control strategies [18]. It goes to say that early diagnosis and treatment of malaria reduces disease and prevents deaths and also contributes to reducing malaria transmission. The best available treatment, particularly for *P. falciparum* malaria, is artemisinin-based combination therapy (ACT). WHO recommends that all cases of suspected malaria be confirmed using parasite-based diagnostics before treatment. Among the methods of diagnosis examined in this study, RDTs had the lowest respondents. Rapid Diagnostic Tests (RDTs) have been recommended to improve diagnostic efficiency, which is important for preventing indiscriminate use of Artemisinin-Based Combination Therapy (ACT), thereby preventing or delaying the development of parasite resistance to this new first-line drug [24]. RDTs can be used as a stop-gap when microscopy services are not operating (e.g. evenings/ weekends/public holidays) or as a primary diagnostic tool for rural/remote areas without microscopy services [24]. Disappointedly, survey on knowledge of students in this study on malaria diagnostic methods showed that only a few participants (11.9%) in the study area reported knowing what RDTs are or had used this test. This was also seen in work of Rushika, et al. [25] where none of the participants in the urban area and very few from the rural village knew what RDTs were. Their opinion on malaria laboratory diagnosis showed poor mindset towards the importance. This poor attitude to malaria confirmatory diagnosis could possibly be as a result of their poor knowledge of its importance.

On a general attitude towards the control measure for malaria (Table 5), a total of 17.5% students agrees with the use of ITNs and Sanitation as best control methods for mosquito bites, thereby ensuring prevention of this disease. Other students rated other means such as insecticides and the use of every possible control measure as better. Notwithstanding, quite a number of them disagrees with the above options, stating that they do nothing to prevent or control malaria. This may be as a result of the cumbersome processes involved in some control measures or as a result of inconveniences experienced when these methods are apply.

Some of the students do not fancy the relevancy of going for laboratory diagnosis. From the study, a total of 29.38% of the students rated that it is “barely important” going to laboratory, while 10.63% rated “not important”. Although a good number (60%) believes on the importance of going for laboratory diagnosis by rating “very importance”. However, the prevalence of malaria within this university community is moderately high as reflected by the high malaria parasitaemia among the students but their poor attitude/knowledge towards laboratory diagnosis, methods of diagnosis and control measures available could impact negatively on their health. Improving hygienic conditions and periodic insecticides spray in hostels and their surroundings can go a long way in reducing the prevalence of malaria burden alongside creating public awareness on the importance of diagnosis and control measures for malaria.

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