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Perception and Treatment Practices of malaria among tertiary institution students in Oyo and Osun States, Nigeria

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Abstract

The knowledge, prevention and practices on malaria treatment measures were assessed among 643 tertiary students in Osun and Oyo States in Nigeria. Data were collected using well-structured questionnaires. The study observed that the respondents are aware of the common symptoms of malaria as 26.4% recognised fever as the most noticeable sign of malaria. On the other hand, the knowledge of the severe symptoms of malaria was poor as only 13.1%, 13.5% and 7.9% were aware that convulsion, coma and anaemia respectively were severe symptoms of malaria. Surprisingly very few (14.6%) believed that dirty environment could cause malaria. The knowledge (23.4%) and the use (22.1%) of insecticide treated bed net was low in the studied population. More respondents used Coartem (20.1%; p= 0.002) for malaria treatment than any other drug and most of them will take prescription (67.5%) from a medical personnel. Also, most of the respondents (60.8%) will not go for malaria diagnostic test before taking malaria drug and the difference was highly significant (p=0.001). It is therefore suggested that more efforts should be invested in enlightening the populace on practises that will influence their behavioural pattern in a way that will lead to effective malaria control.

Keywords: Malaria, prevention, practices, symptoms

1. Introduction

Malaria remains an important public health concern in sub-Saharan Africa where over 500 million episodes of malaria occur yearly, predominantly in children under five years of age, resulting in the death of approximately a million of these children (Owusu-Agyei et al., 2009;Breman et al., 2001). The actual number of deaths is not known with certainty, as accurate data is unavailable in many rural areas, and many cases are undocumented (Ojurongbe et al., 2013a). Malaria is commonly associated with poverty and may also be a major hindrance to economic development in tropical and subtropical regions because rainfall, warm temperatures, and stagnant waters provide habitats ideal for mosquito larvae (Sutherland and Hallett, 2009). Tropical areas including Nigeria have the best combination of adequate rainfall, temperature and humidity allowing for breeding and survival of anopheles mosquitoes and Nigeria therefore has one of the largest population at risk of malaria in Africa and around the world. It is estimated that about 50 percent of out-patient consultation, 40 percent of hospital admission, and also prime among the top three causes of death in the country are due to malaria (Ughasoro et al., 2013). Approximately 50% of the Nigerian population experience at least one episode per year (Ogungbamigbe et al., 2007).

Antimalarial drug resistance remain an important factor militating against the successful control of malaria in most endemic areas including Nigeria. Chloroquine used to be the most important antimalarial but the drug is no more recommended because P. falciparum has developed resistance to it (Nuwaha, 2001;Ogungbamigbe et al., 2008). Currently, the most effective new drugs are artemisinin and related compounds being used in a combination known as Artemisinin Combination Therapy (ACT) to delay the development of resistance against the drug (Poinar, 2005;Ojurongbe et al., 2013b). Inappropriate dosing and indiscriminate use of chloroquine was among the factors that was believed to be responsible for chloroquine resistance as there was little incentive to improve the way the drug was used (Ojurongbe et al., 2007). In other to protect the ACTs that are currently in use, there is need to monitor the existing treatment practises so as to be sure that patients are not engaging in practises that will encourage the development of drug resistance parasite strain. For example, some studies have shown that the use of antimalarial monotherapy and patients not going for malaria diagnosis is still a common practise in some areas in Nigeria (Onwujekwe et al., 2009). Such factors if not monitored and corrected can hamper the effective control of malaria.

One of the important items of the millennium development goals (MDGs) is to halt and afterwards begins to reverse the incidence of malaria and other major diseases by 2015 (UNDP, 2013). In other to achieve the goal of halting malaria transmission, there is need for the general populace to indulge in practises that will have strong influence on malaria control. Practises like understanding the importance of diagnosis before treatment, need for accurate dosing and appropriate drug use and understanding malaria transmission. Youths, to which the tertiary institution students belong, are the future of any society and their understanding of the disease and its control will give an indication as to how successful the future elimination of malaria will be. This work therefore evaluated the treatment seeking behaviour, as well as perceptions of malaria among students of tertiary institutions in Nigeria. Using structured questionnaires, the study determined the overall understanding of the students with regards to quality of malaria drug treatment (self-medication and outpatient treatment at official health providers) and compared it to recommended treatment standards. Factors contributing to the actual treatment seeking behaviour were also analysed.

2. Materials and Methods

Data were collected with the aid of questionnaires from 643 respondents from five different tertiary institutions located in Osun and Oyo States of Nigeria. Their knowledge on factors that influence malaria in their area and how malaria is treated were evaluated. A pre-coded questionnaire was administered by visiting each tertiary institution in order to get all the information needed for this work. A thousand questionnaires were administered out of which 643 copies were returned across the five institutions. The purpose of the questionnaire was to assess the knowledge and perception of the respondents on malaria treatment and control. Written informed consent of the respondents were obtained before questionnaire administration.

2.1 Data analyses

The data generated from the questionnaires were analysed using SPSS version 16.0 and R statistical software. The questionnaire was divided into different sections namely, the general characteristics of the respondents, their knowledge on causes of malaria, use of bed net and how long it takes before they recover from malaria, treatment and prevention of malaria. The results were summarized using contingency tables and Chi-square tests. Logistics regression was also used to determine the impact of multiple independent variables presented simultaneously to predict membership of one or other of the two dependent variable categories.

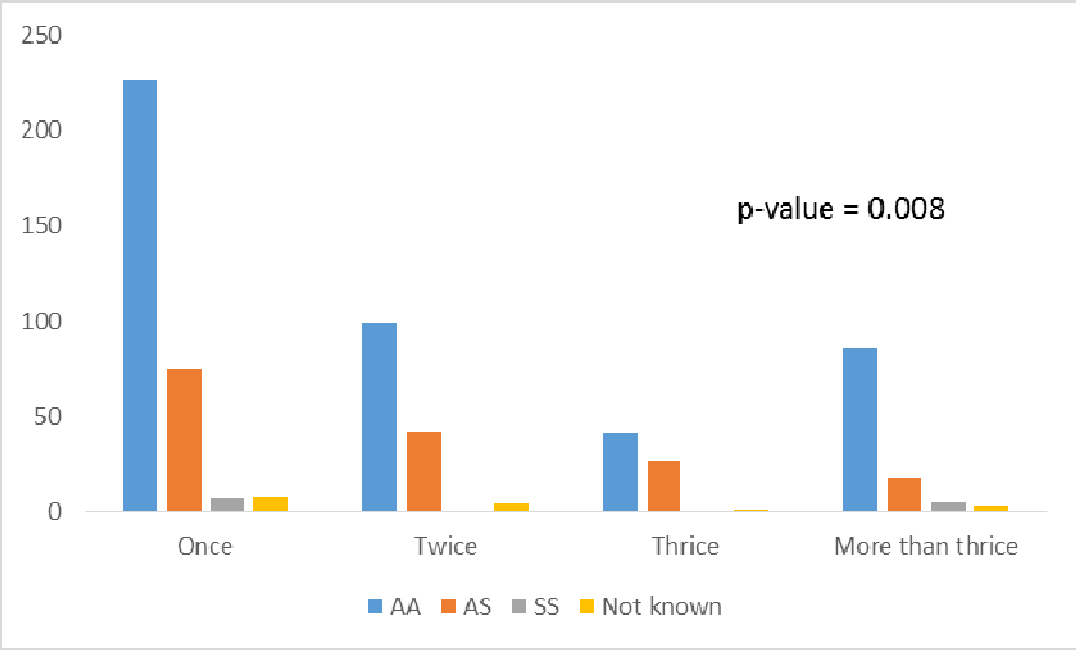

Figure 1. Association between genotype and frequency of malaria

Table 1. General characteristics and frequency of malaria among respondents.

	Number of participants					
Characteristics	**UNIOSUN n=97 (%)**	**UI n=171 (%)**	**OAU n=76 (%)**	**LAUTECH n=199 (%)**	**OSCOED n=100 (%)**	**Total (%)**
Age (years)						
15-20	46(47.4)	106(62.0)	19 (25.0)	112 (56.3)	15 (15.0)	298 (46.3)
21-25	43(44.3)	55 (32.2)	51(67.1)	75 (37.7)	53 (53.0)	277 (43.1)
>25	8 (9.3)	10 (5.3)	6 (7.9)	12(4.0)	32 (32.0)	68 (10.6)
Sex						
Male	26(26.8)	62 (36.3)	72(94.7)	79 (39.7)	45 (45.0)	284 (44.2)
Female	71(73.2)	109(63.7)	4 (5.3)	120 (60.3)	55 (55.0)	359 (55.8)
Tribe						
Yoruba	86(88.7)	122(71.3)	72(94.7)	190(95.5)	80 (80.0)	550 (85.5)
Others	11(11.3)	49(28.7)	4 (5.3)	9 (4.5)	20 (20.0)	93 (14.5)
Genotype						
AA	71(73.2)	135(78.9)	64(84.2)	133 (66.8)	50 (50.0)	453 (70.4)
AS	22(22.7)	35 (20.5)	10(13.2)	49 (24.6)	46 (46.0)	162 (25.2)
SS	0 (0.0)	1 (0.6)	2 (2.6)	8 (4.0)	1 (1.0)	12 (1.9)
Not known	4 (4.1)	0 (0.0)	0 (0.0)	9 (4.5)	3 (3.0)	16 (2.5)
Frequency of malaria in a year						
Once	53(54.6)	71 (41.5)	42(55.3)	110 (55.3)	42 (42.0)	318 (49.5)
Twice	23(23.7)	45 (26.3)	17(22.4)	32 (16.1)	27 (27.0)	144 (22.4)
Thrice	9 (9.3)	16 (9.4)	7 (9.2)	23 (11.6)	14 (14.0)	69 (10.7)
More thrice	12(12.4)	39 (22.8)	10(13.2)	34 (17.1)	17 (17.0)	112 (17.4)

Table 2. Knowledge of Respondents on different areas of malaria

		Number of participants							
	Characteristics	UNIOSUN n=97 (%)	UI n=171 (%)	OAU n=76 (%)	LAUTECH n=199 (%)	OSCOED n=100 (%)	Total (%)	Chi-square	p-value
Causes									
	Mosquito bite	84 (86.6)	155(90.6)	62 (81.6)	165 (82.9)	55 (55.0)	521(81)		
	Too much sun	4 (4.1)	4 (2.3)	4 (5.3)	6(3.0)	10 (10.0)	28 (4.4)		
	Dirty surroundings	9 (9.3)	12 (7.0)	10(13.2)	28 (14.1)	35(35.0)	94 (14.6)	64.24	0.001
Prevention									
	Use mosquito nets	26(26.8)	55(32.2)	12(15.8)	36(18.1)	22(22.0)	151 (23.4)		
	Clean/weed surrounding	25(25.8)	29(17.0)	19(25.0)	31(15.6)	7(7.0)	111 (17.3)		
	Take herbs	5(5.2)	2(1.2)	4(5.3)	5(2.5)	7(7.0)	18 (2.8)		
	Take drugs	11(11.3)	21(12.3)	11(14.5)	19(9.5)	16(16.0)	78 (12.1)		
	Good nutrition	3(3.1)	16(9.4)	6(7.9)	28(14.1)	4(4.0)	57 (8.9)		
	Mosquito coils	8(8.2)	8(4.7)	4(5.3)	7(3.5)	9(9.0)	36 (5.6)		
	Avoid too much sun	5(5.2)	11(6.4)	7(9.2)	6(3.0)	4(4.0)	33 (5.1)		
	Have enough rest	3(3.1)	26(15.2)	8(10.5)	17(8.5)	11(11.0)	65 (10.1)		
	Not sure	11(11.3)	3(1.8)	5(6.6)	50(25.1)	20(20.0)		109.00	0.001
Antimalarial drugs									
	Chloroquine	8 (8.2)	13 (7.6)	9 (11.8)	16 (8.0)	15 (15.0)	61 (9.5)		
	Fansidar	11 (11.3)	27 (15.8)	6 (7.9)	27 (13.6)	11 (11.0)	82 (12.7)		
	Amalar	13 (13.4)	30 (17.5)	13 (17.1)	28 (14.1)	21 (21.0)	105 (16.5)		
	Coartem	22 (22.7)	40 (23.4)	18 (23.7)	41 (20.6)	8 (8.0)	129 (20.1)		
	Lonart	19 (19.6)	26 (15.2)	7 (9.2)	20 (10.0)	7 (7.0)	79 (12.3)		
	Paracetamol	6 (6.2)	4 (2.3)	11 (14.5)	28 (14.1)	11 (11.0)	60 (9.3)		
	Herbs	6 (6.2)	4 (2.3)	3 (3.9)	5 (2.5)	14 (14.0)	32(5.0)		
	Not specified	12 (12.4)	27 (15.8)	9 (11.8)	34 (17.1)	13 (13.0)	95 (14.8)	49.59	0.002
	Reaction to drugs given								
	No	51 (52.6)	125 (73.1)	47 (61.8)	102 (51.3)	42 (42.0)			
	Yes	46 (47.4)	46 (26.9)	29 (38.2)	97 (48.7)	58 (58.0)		30.81	0.001
Prescription									
	No	32 (33.0)	61 (35.7)	28 (36.8)	50 (25.1)	38 (38.0)	209 (32.5)		
	Yes	65 (67.0)	110 (64.3)	48 (63.2)	149 (74.9)	62 (62.0)	434 (67.5)	7.76	0.10
Test before treatment									
	No	56 (57.7)	101 (59.1)	64 (84.2)	119 (59.8)	51 (51.0)	391 (60.8)		
	Yes	41 (42.3)	70 (40.9)	12 (15.8)	80 (40.2)	49 (49.0)	252 (39.2)	30.81	0.001
Use of bed net									
	No	69 (71.1)	146(85.4)	68 (89.5)	156 (34.7)	62(62.0)	501 (77.9)		
	Yes	28 (28.9)	25(14.6)	8 (10.5)	43 (14.1)	38(38.0)	142 (22.1)	28.78	0.001

Table 3. Respondents knowledge on signs and severe symptoms of malaria

Signs	UNIOSUN n=97 (%)	UI n=171 (%)	OAU n=76 (%)	LAUTECH n= 199 (%)	OSCOED n =100 (%)	Total (%)	Chi-square	p-value
Fever	35 (36.1)	55 (32.2)	19 (25.0)	38 (19.1)	23 (23.0)	170 (26.4)		
Chills/shivering	8 (8.2)	24 (14.0)	6 (7.9)	12 (6.0)	3 (3.0)	53 (8.2)		
Yellowish urine	7 (7.2)	17 (9.9)	9 (11.8)	22 (11.1)	10 (10.0)	65 (10.1)		
***Muscle/joint pain**	5 (5.2)	5 (2.9)	5 (6.6)	7 (3.5)	6 (6.0)	28 (4.4)		
Headache	12 (12.4)	20 (11.7)	5 (6.6)	21 (10.6)	5 (5.0)	63 (9.8)		
Abdominal discomfort, jaundice, cough, vomiting & pallor	3 (3.1)	7 (4.1)	5 (6.6)	18 (9.0)	15 (15.0)	48 (7.5)		
Weakness	12 (12.4)	19 (11.1)	11 (14.5)	26 (13.1)	14 (14.0)	82 (12.8)		
Loss of appetite	9 (9.3)	24 (14.0)	11 (14.5)	25 (12.6)	12 (12.0)	81 (12.6)	18.06	0.583
***Others**	6 (6.2)	0 (0.0)	5 (6.6)	30 (15.1)	12 (12.0)	53 (8.2)		
Severe Symptoms								
Convulsions	15 (15.5)	34 (19.9)	2 (2.6)	22 (11.1)	11 (11.0)	84 (13.1)		
***Rapid breathing/difficulties in getting air**	13 (13.4)	3 (1.8)	0 (0.0)	11 (5.5)	10 (10.0)	37 (5.7)		
Persistent vomiting	14 (14.4)	20 (11.7)	6 (7.9)	21 (10.6)	4 (4.0)	65 (10.1)		
High fever	31 (32.0)	49 (28.7)	25 (32.9)	60 (30.2)	33 (33.0)	198 (30.8)		
Unconsciousness/coma	10 (10.3)	36 (21.1)	9 (11.8)	18 (9.0)	14 (14.0)	87 (13.5)		
Anaemia	2 (2.1)	6 (3.5)	5 (6.6)	30 (15.1)	8 (8.0)	51 (7.9)		
Dark red nearly black urine	9 (9.3)	21(12.3)	11 (14.5)	16 (8.0)	8 (8.0)	65 (10.1)		
***Pass no more or very few urine**	2 (2.1)	1 (0.6)	3 (3.9)	9 (4.5)	8 (8.0)	23 (3.8)		
***Persistent cough/diarrhea**	1(1.0)	1 (0.6)	2 (2.6)	12 (6.0)	4 (4.0)	20 (3.1)	52.43	0.001
***Others**	0 (0.0)	0 (0.0)	3 (3.9)	0 (0.0)	0 (0.0)	3 (0.5)		

Table 4. Factors influencing the decision to sleep under bed net, go for malaria diagnostic test and taking prescription from medical personnel. A logistics regression analysis.

Dependent Variable	**df**	**p-value**	**Sleep under bed net (yes or no)**	
Independent Variables			Relative Odds	95% Confidence Interval for the Relative Odds
Sex				
Female (1) Male (0)	1	0.081	1.4	0.96 – 2.10
Age				
>25	1	0.018*	2.0	1.13 – 3.71
15 – 20	1	0.735	1.1	0.71 – 1.61
21 – 25 (reference)				
			Malaria test (yes or no)	
Sex				
Female (1) Male (0)	1	0.004*	1.6	1.17 – 2.26
Age		0.962		
>25	1	0.788	1.1	0.62 – 1.87
15 – 20	1	0.735	1.1	0.71 – 1.41
21 – 25 (reference)				
			Prescription before antimalarial drug (yes or no)	
Sex				
Female (1) Male (0)	1	0.004*	1.6	1.17 – 2.31
Age	2	0.419		
>25	1	0.309	1.4	0.76 – 2.4
15 – 20	1	0.273	1.2	0.86 – 1.74
21 – 25 (reference)				

*Significant at α = 0.05. Age (1) = >25, Age (2) = 15-20, df= degree of freedom

3. Results

A total of 643 questionnaires; 97 from Osun State University (UNIOSUN), 171 from University of Ibadan (UI), 76 from Obafemi Awolowo University (OAU), 199 from Ladoke Akintola University (LAUTECH) and 100 from Osun State College of Education (OSCOED). The age range of the respondents is 15-30 years and 89.4% of the respondents were in the age group 15-25 years. The largest proportion (55.8%) of the respondents were female in the study population and most (85.5%) of them were Yorubas while just 14.5% respondents were not specific about their tribe (Table 1). The highest (70.5%) number of the respondents have genotype AA while 2.5% of the students do not know their blood genotype. (Table 1).

Table 2 shows the knowledge of the respondents on the different causes of malaria. Most (81%) of the students are aware that mosquito bite could result into malaria infection. Surprisingly very few (14.6%) believed that dirty environment could cause malaria. The difference in the respondents' knowledge on the causes of malaria is statistically significant, ($p<0.001$) (Table 2).

On the use of insecticide treated bed nets, 23.4% of the respondents believed that the use of insecticide treated bed net will prevent malaria while only 22.1% actually confirmed that they use insecticide treated bed nets (Table 2).

The knowledge of antimalarial usage among the study population revealed that Coartem (20.1%) and Amalar (16.3) are the most widely used while 2.8% believed in the use of herbs as a preventive measure for malaria. The least mostly used antimalarial is herbs (5%) while 14.8% did not specify the type of antimalarial they use. 9.5% and 16.3% of the respondents still rely on the use of chloroquine and fansidar respectively. Reaction to antimalarial drug is not a common occurrence among the respondents in this study; 42.9% react to drug compared to 57.1% that do not react and the difference was highly significant ($p<0.001$) (Table 2).

The study observed that 26.4% of the respondents recognised fever as the most noticeable sign of malaria. Weakness (12.8%), loss of appetite (12.6%) and yellowish urine (10.1%) are other symptoms recognised to be important signs and symptoms of malaria. Surprisingly muscular/joint pain (4.4%) is the least recognisable symptom by the respondents (Table 3). These observations showed that the respondents are aware of the common symptoms of malaria. On the other hand the knowledge of the severe symptoms of malaria was poor among the respondents and the difference highly significant($p<0.001$) as only 13.1%, 13.5% and 7.9% are aware that convulsion, coma and anaemia respectively are severe symptoms of malaria (Table 3).

The study showed that most of the respondents will take prescription (67.5%) from a medical personnel before using an antimalarial. Also most of the respondents (60.8%) will not go for malaria diagnostic test before taking malaria drug and the difference was significant compared to those that will go for malaria diagnostic test (39.2%). A large proportion (77.9%) of the students that participated in the study do not use insecticide treated bed net and the difference was significant when compared to those that were using the treated bed net (22.1%). (Table 2)

Figure 1 shows that occurrence of malaria is most common among the respondents with blood genotype AA and the difference was statistically significant ($p < 0.001$), (table 1).

A logistics regression analysis (table 4) was carried out to predict the chances of the students sleeping under bed net, who will go for malaria parasite test before treatment and those who take prescription from medical personnel using their gender and ages. A test of the full model against a constant only model with sleeping under bed net as the dependent variable showed that it was not statistically significant indicating that the predictors as a set do not really distinguish between those who slept under bed net and those who did not. (Chi-square = 7.73, $p = 0.05$ with $df = 3$). However, with malaria parasite test and prescription from medical personnel, the tests were significant with Chi-Square = 8.59, $p = 0.035$ with $df = 3$ and Chi-square = 10.71, $p = 0.013$ with $df = 3$ respectively. These two tests showed that the predictors (gender and age) as a set reliably distinguished between

those who will go for malaria parasite test and otherwise as well as those who will take prescriptions from medical personnel and those who would not.

4. Discussion

Our study showed that the general awareness about malaria is not a problem among the study population. In all, 81% of the population are aware that malaria is as a result of mosquito bite and 14.6% also associated malaria with dirty environment. A mere 4.4% of the respondents associated the causes of malaria with too much sun. This high level of awareness on the causes of malaria is not unexpected as the respondents are tertiary institution students who are expected to be familiar with the major causes, treatment and control of malaria. However it is evident from the study that mere awareness of causes is insufficient to influence the behavioural pattern of individuals in such a way that will lead to the control of malaria. It was evident from our study that a number of our respondents still rely on the use of drugs that are no more recommended by WHO for the treatment of malaria. For example the use of sulfadoxine-pyrimethamine (Fansidar and Amalar) and chloroquine in the study was high (38.7%) when compared to the use of artemeter-lumefantrine (coartem and Lonart) (32.4%).

The study participants were quite knowledgeable about the symptoms of uncomplicated malaria. Malaria is described as a manifold symptom complex and fever is perceived as the leading symptom of malaria. In our study, 26.4% of the respondents attributed fever as a major symptom of malaria and another 8.2% attributed chills and shivering which could also be associated with fever. These findings confirm the results of similar studies (Talisuna et al., 2004; Thomson et al., 1996; van Schalkwyk et al., 2013; White, 1999; Whitty et al., 2008), which all found fever to be the leading perceived symptom of malaria, with various co-symptoms reported. The perception of symptoms such as convulsions (13.1%), unconsciousness (13.5%) and anaemia (7.9%) as part of severe malaria was not common as a response to complication of malaria in this study. Whether severe malaria with complications such as convulsions or unconsciousness are perceived as a completely different illness entities in themselves within the local concept of febrile illnesses cannot be explained through the data. In other studies, (Nuwaha, 2001; Slutsker et al., 1994; Smith and Sanford, 1985) symptoms such as convulsions or coma were found to be attributed to other causes and were mainly explained from traditional (religious) points of view. The results indicated that uncomplicated malaria symptoms are well recognized while for severe symptoms, more education is needed to enhance recognition and early referral and subsequently decrease the mortality of the populace.

One of the most striking findings in this survey is the high number (32.5%) who were reported to have received antimalarials without prescription from a medical personnel. Similarly, higher number (60.8%) of the participants take drug indiscrimately without confirming their malaria status through laboratory diagnosis. Laboratory diagnosis can improve rational provision of malaria treatment services (Uzochukwu et al., 2010), but the results of our study showed that few respondents (39.2%), actually go for laboratory diagnosis ($p < 0.000$). The logistics regression analysis showed that sex was a very significant factor ($p = 0.004$, odds ratio 1.6) in determining those who will go for malaria parasite test and those who will take prescription from medical personnel. This could be attributed to the fact that females are more likely to take more care about their health than males. Treatment of malaria without diagnosis will result in unnecessary consumption or prescription of antimalarials (Mubi et al., 2013). Some studies have reported that diagnosis before treatment with antimalarials will reduce unnecessary drug usage and wastage (Ojurongbe et al., 2013a; Mubi et al., 2013; Ikwuobe et al., 2013).

The high figures of self-treatment correlate with other findings from Africa which reported similarly high figures of self-medication (Deressa et al., 2003; Deming et al., 1989; Agyepong and Manderson, 1994; Salako et al., 2001). Also studies in urban settings in Ghana have reported similar figures in urban environments (Molyneux et al., 1999; Agyepong and Manderson, 1994).

Although most of them do not believe in using bed net as a method of prevention of malaria, the regression model for those who sleep under bed net, showed that all other coefficients were not significant except Age (1) (i.e. > 25 years) which was slightly significant. We can conclude that the students in this age group are more likely to sleep under bed net probably because of their exposure, maturity or knowledge of the advantages of using bed net. This was also revealed in the odds ratio (2.0) which indicates that people in this age group are two times as likely to use bed net as the others.

Most of the respondents also had misconceptions about causes of malaria by saying too much sun (4.4%) causes malaria. Some of the respondents believe in self-medication, which explains why they do not take prescription from medical personnel (32.5%). The positive observation of the study is that more that 50% of our study population do believe in taking prescription from medical personnel. This shows that the respondents are aware of the negative consequences of using drugs without appropriate prescription. However, there is need to create more awareness on this issue so as to completely wipe out inappropriate self-medication. Most cases of fever are suspected to be malaria, but it is better and safer to undergo proper test before treatment. This relatively high level of knowledge in this area is probably due to the educational level and economic status of the respondents.

It was also observed that most of the respondents believe in taking herbs to orthodox drugs because they believe it is more powerful and work faster. Another reason some of them prefer herbs is because some people react to drugs (42.9%) given as seen in table 2. Some of the respondents were of the opinion that malaria is easily caused by mosquito bite and they suggested that staying away from stagnant water is the best method of prevention.

This study revealed that there is still a major problem regarding the use of recommended antimalarial drug and conducting diagnosis before antimalarial treatment. It is therefore suggested that more efforts should be invested in enlightening the populace on practices that will influence their behavioural pattern in a way that will lead to effective malaria control.

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