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Research Article

Behavioral Practice Promoting Malaria Drug Resistant Among Adults in Sokoto Metopolis

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Abstract

Antimalarial drug resistance has emerged as one of the greatest challenges facing malaria control today hence to determine the behavioral practices promoting malaria drug resistance among adults in Sokoto metropolis. A cross-sectional form of descriptive survey research design was used for this study. This is because descriptive studies are used when the characteristics of a population are either unknown or partially known [1], this justified the use of similar design in a study of similar nature. Three hundred (270) copies of the structured interview distributed representing (90%) were returned and used for data analysis. Data collected were analyzed using descriptive statistic of frequency count, normative percentage and grand mean; as well as inferential statistics of chi-square (χ^2). The level of significant was fixed at 0.05. Appropriate degrees of freedom were worked out. There was a statistical significant on the gender chi-square (χ^2 =12764.8, is greater than the tabulated χ^2 =32.671 at df =21, $p<0.05$). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between male and female respondents in the behavioral practices promoting malaria drug resistance. There was a statistical significant chi-square (χ^2 = 12764.8, is greater than the tabulated χ^2 =61.63 at df =49, $p<0.05$). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between the different age groups in the behavioral practices promoting malaria drug resistance. There was a significant statistical difference chi-square (χ^2=12933 is greater than the tabulated χ^2 =61.63 at df =49, $p<0.05$). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between the different educational level in the behavioral practices promoting malaria drug resistance. This was significantly negative influence of gender, age and educational status on the behavioral practices which promote malaria treatment resistance.

Keywords : Antimalaria, Drug resistance, Treatment, Behavioral practices, Sokoto

Introduction

Antimalarial drug resistance has been defined as the "ability of a parasite strain to survive and/or multiply despite the administration and absorption of a drug given in doses equal to or higher than those usually recommended but within tolerance of the subject". This definition was later modified to specify that the drug in question must "gain access to the parasite or the infected red blood cell for the duration of the time necessary for its normal action" [2]. Resistance to antimalarial drugs has been described for two of the four species of malaria parasite that naturally infect humans, P. falciparum and P. vivax. P. falciparum has developed resistance to nearly all antimalarial in current use, although the geographical distribution of resistance to any single antimalarial drug varies greatly. Antimalarial drug resistance has emerged as one of the greatest challenges facing malaria control today. Drug resistance has been implicated in the spread of malaria to new areas and re-emergence of malaria in areas where the disease had been eradicated. Drug resistance has also played a significant role in the occurrence and severity of epidemics in some parts of the world. Population movement has introduced resistant parasites to areas previously free of drug resistance. P. vivax infection acquired in some areas has been shown to be resistant to chloroquine and/or primaquine [3]. Chloroquine-resistant P. falciparum malaria has been described everywhere that P. falciparum malaria is transmitted except for malarious areas of Central America (north-west of the Panama Canal), the island of Hispaniola, and limited areas of the Middle East

and Central Asia. Sulfadoxinepyrimethamine (SP) resistance occurs frequently in South-East Asia and South America. SP resistance is becoming more prevalent in Africa as that drug is increasingly being relied upon as a replacement for chloroquine. Mefloquine resistance is frequent in some areas of South-East Asia and has been reported in the Amazon region of South America and sporadically in Africa [4]. Cross-resistance between halofantrine and mefloquine is suggested by reduced response to halofantrine when used to treat mefloquine failures [5]. Factors that have been associated with antimalarial drug resistance include such disparate issues as human behaviour, vector and parasite biology, pharmacokinetics, and economics. most researchers agree that there seems to be relationship between transmission intensity and development of resistance [6]. It is apparent that there are more genetically distinct clones per person in areas of more intense transmission than in areas of lower transmission [6]. However, the interpretation of this and its implications for development of resistance has been described as resistance being more likely in low-transmission environments [7, 8], high-transmission environments [9, 6 and 10], or either low- or high- but not intermediate-transmission environments [11, 12]. This relationship between transmission intensity and parasite genetic structure is obviously complex and subject to other confounding/contributing factors [12, 13]. What is clear is that the rate at which resistance develops in a given area is sensitive to a number of factors beyond mere intensity of transmission (such as initial prevalence of mutations, intensity of drug pressure, population movement between areas, the nature of acquired immunity to the parasite or its strains, etc.), but that reducing the intensity of transmission will likely facilitate prolonging the useful life span of drugs [10,14]. The use of presumptive treatment for malaria has the potential for facilitating resistance by greatly increasing the number of people who are treated unnecessarily but will still be exerting selective pressure on the circulating parasite population [15]. In some areas and at some times of the year, the number of patients being treated unnecessarily for malaria can be very large [16]. Antimalarial drug resistance causes includes overall drug pressure, inadequate drug intake (poor compliance or inappropriate dosing regimens). Studies have suggested that resistance rates are higher in urban and periurban areas than rural communities, where access to and use of drug is greater [17]. Drug quality has also been implicated in ineffective treatment and possibly drug resistance. Either through poor manufacturing practices, intentional counterfeiting, or deterioration due to inadequate handling and storage, drugs may not contain sufficient quantities of the active ingredients. In an analysis of chloroquine and antibiotics available in Nigeria and Thailand, between 37% and 40% of samples assayed had substandard content of active ingredients, mostly from poor manufacturing practices [18]. Another study in Africa found chloroquine stored under realistic tropical conditions lost at least 10% of its activity in a little over a year [19].

Statement of Problem

WHO estimates that more than 90% of the 1.5 to 2.0 million deaths due to malaria disease worldwide Another study found that Plasmodium falciparum infection prevalence in endemic Africa halved and the incidence of clinical disease fell by 40% between 2000 and 2015. Report that interventions have averted 663 million clinical cases since 2000. Insecticide-treated nets, the most widespread intervention, were by far the largest contributor to the reduction in malaria related deaths (Malaria Control Programme, Ministry of Health. Uganda malaria control strategic plan 2005/6 - 2009/10), [20]. Approximately 300-500 million cases of malaria occur every year, and 1-2 million deaths occur, most of them in young children.

Aims and objectives

The main purpose of the study was to determine the behavioral practices promoting malaria drug resistance among adults in Sokoto metropolis. In specific terms, the objectives of the study include:

1. To ascertain the influence of gender on the behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis.
2. To determine the influence of age on the behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis.
3. To ascertain the influence of level of education on level of behavioral promoting malaria drug resistance adopted by adults in sokoto metropolis.

Significance of the Study

Results of the study would reveal the behavioral practices (risk factors) and preventive measures on malaria among adults in Sokoto metropolis. Specifically, result of the study would be significant to adults (male /female), Public health officers, health counselors, health educators, curriculum planners, medical allied personnel and researchers in assessing behavioral practices and preventive measures on malaria disease and initiating preventive measures programs succeed in adult populace in sokoto metropolis. Although good behavior practices, assessment would motivate effectiveness of program in this locality. Results of the study would motivate public health workers toward identifying behavioral practices (risk factors) that are common in this locality. Health counselors would through the results of this study develops and adapts effective method on the best malaria preventive practices. Health educators, curriculum planners and researchers would be able to identify gaps in behavioral practices that can aid in the development of health education and health promotion concepts that can be utilized in the community to address the deficiencies.

Research Questions

The following research questions gave direction to the study.

1. What is level of influence of gender on the behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis?
2. What is the level of influence of age on the behavioral practices promoting malaria drug resistance adopted

by adults in sokoto metropolis?

3. What is the influence of level of education on level of behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis?

Hypotheses

The following null hypotheses were postulated for the study

There is no significant difference between gender on the behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis.

There is no significant difference in the age on the behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis.

There is no significant difference on level education on behavioral practices promoting malaria drug resistance adopted by adults in sokoto metropolis.

Research Design

A cross-sectional form of descriptive survey research design was used for this study. This is because descriptive studies are used when the characteristics of a population are either unknown or partially known [1], this justified the use of similar design in a study of similar nature.

Study Area and the Population

1 Brigade medical centre, Gingiya barracks, DangeShuni LGA in sokoto South senatorial zone was be taken as study areas. By the virtue of its origin, the state comprises mostly Hausa/Fulani and other groups such as Gobirawa, Zabarmawa, Kabawa, Adarawa, Arawa, Nupes, Yorubas, Igbos and others. The Sokoto township is in dry Sahel surrounded by sandy terrain and isolated hills. Rainfall starts late that is in June and ends in September but may sometimes extend into October. The average annual rainfall is 550 mm with peak in the month August. The highest temperatures of 45°C during the hot season are experienced in the months of March and April. Harmattan a dry, cold and dusty condition is experienced between the months of November and February (Udo and Mamman, 1993).

Ethical Approval

Ethical clearances were obtained from the Ethical Committee of the 1Brigade medical centre, Ginginya barrack, Sokoto and seek permission for collection data. This study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the ethical research committee of the 1Brigade medical Centre, Ginginya barrack, Sokoto.

Population of the Study

The accessible population of the study consisted of an estimated three thousand (3,000) adults (female/male) (18-70 years) in army barrack area.

Sample/Sampling Technique

The sample for the study consisted of 300 (three hundred) adults' females randomly drawn areas in owerri metropolis. Ten percentage (10%) of the accessible population was used as sample size, Nwana (2011) opined that if the population is in few thousand 10% will be appropriate as the sample size.

Instrument for Data Collection

The main instrument for data collection consisted of structured questionnaire. The structured questionnaire was in three sections A and B. Section A, was made up of three questions on demographic data (age, sex, level of education and service status). Section B, contained eight (8) questions on behavioral practices on malaria disease preventive measures.

Scope of the study

The study was delimited to the level behavioral practices on malaria disease preventive measures among adults (18-70years) in Sokoto metropolis. It was delimited to independent variables of age, gender, service status and levels of education. It was further delimited to adults (18-70years) in area such as army barrack area and environs that make up sokoto metropolis. It involved young adult age (18-40), middle adult (41-65) and older adult above 65years. It was delimited to the use of structured questionnaire as the main instrument for data collection. Finally it was delimited to the use of descriptive statistic of frequency and percentage as well as inferential statistic of chi square at 0.05 level of significant for data analysis.

Method of Data Analysis

Data collected were analyzed using descriptive statistic of frequency count, normative percentage and grand mean; as well as inferential statistics of chi-square (χ^2). The level of significant was fixed at 0.05. Appropriate degrees of freedom were worked out.

Data Presentation and Analysis

The chapter deals with data presentation, analysis and discussion of the results obtained based on the objectives, and the research questions of the study as well as the hypotheses. Research questions were answered using percentages (%), null hypotheses were tested using inferential statistics of chi-square. The level of significance was set at 0.05.

Results

Three hundred and seventy (270) copies of the structured interview distributed representing (90%) were returned and used for data analysis.

Research question 1. What is the level of knowledge of risk factors to hypertension possessed by adults in Sokoto Metropolis?

Hypotheses 1. There is no significant difference in the level of knowledge of risk factors to hypertension possessed by adults in sokoto metropolis.

(Table 3). Frequency distribution of respondent's level of knowledge of risk factors to hypertension among adult in Sokoto Metropolis(Table 1) above represent the male and female respondents on behavioral practices promoting ma-

Table 1. Behavioral Practice That Promoting Malaria Drug Resistance Based on Gender

N(%)	Male's n (%)		Female n (%)	
	No	Yes	No	Yes
Is there a stagnant water body or channels around your ho use?	97(36)	43(16)	48(18)	82(30)
Have you had mosquito bite in the past two weeks?	66(24)	74(27)	63(23)	67(25)
Have you had malaria test conducted on you before treatment?	87(32)	53(20)	86(32)	44(16)
Have you had malaria fever within the past two weeks?	99(37)	41(15)	104(39)	26(10)
Where you ever diagnosed with malaria fever by a clinician?	82(30)	58(21)	77(29)	53(20)
Did you take the full dose of malaria fever drug as prescribed by the physician in the last two months?	75(28)	65(24)	78(29)	52(19)
Have you ever taking over dose for malaria fever treatment?	10(4)	130(48)	40(15)	90(33)
Have you done self-treatment for malaria fever before now.	51(19)	109(40)	40(15)	70(26)
Note: (χ^2=12764,χ^2 0.05=32.671;df=21, p<0.05).				

laria drug resistance based on gender. The results show that male respondents yes on present of stagnant water in the environment the male 43(16%) yes while the female 82(30%) yes around their environ, on mosquito bite 74(27%) yes when compared to female 67(25%) yes, on testing before treatment male 53(20%) yes when compared to female of 44(16%) yes, on case of malaria fever male 41(15%) yes while the female had 26(10%), , on clinician diagnosis 58(21%) yes for male while the female 53(20%) yes, on full dose therapy as prescribed the male gender did better than female 65(24%) and 52(19%) respectively, those who had anti malaria over dose were 138(48%) high than female with 90(33%) yes, those who had self-treatment were 140(40%) higher than female 70(26%). Among the female respondents had better behavioral practices that does not promote drug resistance. Therefore, female had significantly good behavioral practices than the male gender. When the data were subject to chi-square analysis to test whether there is significant difference between male and female respondents.

(a) In the behavioral practices promoting malaria drug resistance, the calculated chi-square (χ^2=12764.8, is greater than the tabulated χ^2=32.671 at df=21, p<0.05). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between male and female respondents in the behavioral practices promoting malaria drug resistance.

(Table 2) above represent the18-30years, 31-45years and 46-70years respondents on behavioral practices promoting malaria drug resistance based on age groups. The results show that respondents 74(27%),16(6%) and 35(13%) yes across 18-30years, 31-45years and 46-70years respectively on availability of stagnant water bodied close to the house. On those who had mosquito bite 57(21%), 45(17%) and 39(14%) yes in 18-30years, 31-45years and 46-70years ages respectively. On testing before treatment 41(15%), 29(11%)and 27(10%) said yes in 18-30years, 31-45years and 46-70years age respectively. Basing treatment on the results of a diagnostic test, such as microscopy or a rapid antigen test, however, would result in the greatest reduction of unnecessary malaria treatments and decrease the probability that parasites are exposed to sub therapeutic blood levels of drug [17]. Those who had had malaria fever was low 37(14%), 19(7%) and 11(45) yes in 18-30years, 31-45years and 46-70years ages respectively. Those who were ever diagnosed with fever by clinician was also poor 43(16%), 39(14%) and 11(4%) yes in 18-30years, 31-45years and 46-70years ages respectively this could be due to high cost of medical services at the hospitals and poverty among the populace. Adherence to full dose treatment as prescribed by the physician in the last two months, the responds was low 48(18%), 38(14%) and 31(11%) yes in 18-30years, 31-45years and 46-70years ages respectively. Those who had over dose for malaria treatment were 40(15%), 10(4%) and 0(0%) yes in 18-30years, 31-45years and 46-70years ages respectively. The issue of self-treatment among subject show 55(20%),86(32%) and 34(14%) yes in 18-30years, 31-45years and 46-70years ages respectively. There were slight significantly good behavioral practices across the age groups. When the data were subject to chi-square analysis to test whether there is significant difference across different age groups.

In the behavioral practices promoting malaria drug resistance, the calculated chi-square (χ^2=12764.8, is greater than the tabulatedχ^2=61.63 at df=49, p<0.05). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between the different age groups in the behavioral practices promoting malaria drug resistance.

Table 3 above represent the respondents on behavioral practices promoting malaria drug resistance based on educational levels. The results showed that respondents 2(0.7%),0(0%), 20(7%) and 34(13%) yes across Non-formal educational level., Primary Educational level, Secondary Educational level and Tertiary Educational level respectively on availability of stagnant water bodied close to the house. On those who had mosquito bite 4(1.5%), 4(1.5%), 45(17%) and 119(44%) yes in Non-formal educational level. Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. On testing before treatment 3(1.1%),17(6.3%) 60(22%)and 14(5.2%) said yes Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. Basing treatment on the results of a diagnostic test, such as microscopy or a rapid antigen test, however, would result in the greatest reduction of unnecessary malaria treatments and decrease the probability that parasites are exposed to

Table 2. Behavioral practice that promoting malaria drug resistance based on age group.

N(%)	18-30years		31-45years		46-70years	
	No	Yes	No	Yes	No	Yes
Is there a stagnant water body or channels around your house?	26(10)	74(27)	84(31)	16(6)	15(6)	35(13)
Have you had mosquito bite in the past two weeks?	63(23)	57(21)	55(20)	45(17)	11(4)	39(14)
Have you had malaria test conducted on you before treatment?	79(29)	41(15)	71(26)	29(11)	23(9)	27(10)
Have you had malaria fever within the past two weeks?	83(31)	37(14)	81(30)	19(7)	39(14)	11(4)
Where you ever diagnosed with malaria fever by a clinician?	77(29)	43(16)	61(23)	39(14)	27(10)	29(11)
Did you take the full dose of malaria fever drug as prescribed by the physician in the last two months?	72(27)	48(18)	62(23)	38(14)	19(7)	31(11)
Have you ever taking over dose for malaria fever treatment?	80(30)	40(15)	90(33)	10(4)	50(19)	0(0)
Have you done self-treatment for malaria fever before now.	65(24)	55(20)	14(5)	86(32)	12(4.4)	38(14)
Note: (χ^2=13052, χ2 0.05=61.63; df=49, p<0.05).						

Table 3. Behavioral Practice That Promoting Malaria Drug Resistance Based on Educational Level

N(%)	Non-formal Edu.		Pri. Edu.		Sec. Edu.		Tertiary Edu.	
	No	Yes	No	Yes	No	Yes	No	Yes
Is there a stagnant water body or channels around your house?	2(0.7)	2(0.7)	18(6.6)	0(0)	54(20)	20(7)	140(52)	34(13)
Have you had mosquito bite in the past two weeks?	0(0)	4(1.5)	14(5.2)	4(1.5)	29(10.7)	45(17)	55(20)	119(44)
Have you had malaria test conducted on you before treatment?	1(0.4)	3(1.1)	1(0.4)	17(63)	14(5.2)	60(22)	159(59)	14(5.2)
Have you had malaria fever within the past two we eks?	2(0.7)	2(0.7)	14(5.2)	4(1.5)	54(20)	20(7)	143(53)	31(11.5)
Where you ever diagnosed with malaria fever by a clinician?	1(0.4)	3(1.1)	4(1.5)	14(5.2)	10(3.7)	64(24)	150(56)	24(9)
Did you take the full dose of malaria fever drug as prescribed by the physician in the last two months?	1(0.4)	3(1.1)	1(0.4)	17(6.3)	24(9)	50(19)	147(54)	27(10)
Have you ever taking over dose for malaria fever treatment?	2(0.7)	2(0.7)	18(7)	0(0)	54(20)	20(7)	140(52)	34(13)
Have you done self-treatment for malaria fever before now.	1(0.4)	3(1.1)	18(7)	0(0)	44(16)	30(11)	29(11)	145(54)
Note: (χ^2=12933, χ^2 0.05=61.63;df=49, p<0.05).								

sub therapeutic blood levels of drug [17]. Those who had had malaria fever was low 2(0.7%),4(1.5%),20(7%) and 31(11.5%) yes Non-formal educational level., Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. Those who were ever diagnosed with fever by clinician was also poor 3(1.1%), 14(5.2%), 64(24%) and 24(9%) yes across Non-formal educational level., Primary Educational level, Secondary Educational level and Tertiary Educational level respectively this could be due to high cost of medical services at the hospitals and poverty among the populace. Adherence to full dose treatment as prescribed by the physician in the last two months, the responds was low 3(1.1%),17(6.3%), 50(19%) and 27(10%) yes Non-formal educational level., Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. Those who had over dose for ma-

laria treatment were 40(15%),0(0%), 20(7%) and 34(13%) yes Non-formal educational level., Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. The issue of self-treatment among subject show 3(1.1%),0(0%),30(11%) and 145(54%) yes Non-formal educational level., Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. There were significantly good behavioral practices at secondary educational level followed by those with tertiary educational levels. When the data were subject to chi-square analysis to test whether there is significant difference between different educational levels.

(a) In the behavioral practices promoting malaria drug resistance, the calculated chi-square ($\chi 2=12933$ is greater than the tabulated $\chi 2=61.63$ at df=49, $p<0.05$). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between the different educational level in the behavioral practices promoting malaria drug resistance.

Discussion

Research question 1 sought to ascertain the influence of gender in behavioral practices promoting malaria drug resistance. The result showed that Prevention strategies aimed specifically at preventing malaria infection and those aimed at reducing the likelihood of development of drug resistance are of public health important. The of gender on the behavioral practices promoting malaria drug resistance. 74(27%) males and 67(25%) female had Mosquito bite in the past two weeks this is significantly high. Those who had testing before treatment was 87(32%) and 86(32%) for male and female. This behavioral will reduce wrong diagnosis and treatment thereby reducing drug resistance and treatment failure. The incidence of malaria fever was low 26(10%) and 45(15%) in female and male respectively. These could only be achieved by positive behavior among respondents against malaria. Mackinnon and Hasting [10] had reported that reducing intensity of transmission will likely facilitate prolonging the useful life span of drugs. Among male subject few 43(16%) and high 82(30%) had stagnant water body around the house. Those who had been diagnosed by clinician was low 58(21%) and 53(20%) for male and female respectively. Completion of therapy dose as prescribed by clinician was significantly low 65(24%) and 52(19%) for female and male respectively. Those who had over dose therapy was high 90(33%) and 130(48%) for female and male respectively. Those who had self-treatment was high 109(40%) and 70(26%). Presumptive and self-treatments for malaria has the potential to promote drug resistance by greatly increasing the number of people who are treated unnecessarily by exerting selective pressure on the circulating parasite population [15]. Increasing self-treatment promote drug resistance in this environment 90% malaria related death occur in sub-Saharan Africa (Against malaria foundation, [21, 22] reported a prevalence of 18% among children less than 5 years. The influence of gender on behavioral practices promoting drug resistance was significantly difference chi-square calculated chi-square ($\chi 2=12764$ is greater than the tabulated $\chi 2=32.671$ at df=21, $p<0.05$). Because overall drug pressure is thought to be the single most important factor in development of resistance, following more restrictive drug use and prescribing practices would be helpful, if not essential, for limiting the advent, spread, and intensification of drug resistance [17]. This approach has gained support in North America and Europe for fighting antibacterial drug resistance [23, 24]. The greatest decrease in antimalarial drug use could be achieved through improving the diagnosis of malaria [17]. Basing treatment on the results of a diagnostic test, such as microscopy or a rapid antigen test, however, would result in the greatest reduction of unnecessary malaria treatments and decrease the probability that parasites are exposed to sub therapeutic blood levels of drug [17].

The research question 2 sought to determine the influence of age group on behavioral practices promoting drug resistance. Present of stagnant water body close to house among the subject was high 74(27%), lower 16(6%) and low 35(13%) 18-30years, 31-45years and 46-70years age respectively. Those who had mosquito bite high 57(21%), low 45(17%) and 39(14%) 18-30years, 31-45years and 46-70years age respectively. Those who had test (malaria) before treatment low 41(15%), 29(11%) and 27(10%) in18-30years, 31-45years and 46-70years age groups respectively. Those who had malaria fever in the past two weeks was low 37(14%), 19(7(%) and 11(4%) in 18-30years, 31-45years and 46-70years age respectively. Those who were diagnosed for malaria fever by clinician 43(16%), 39(14%) and 29(11%) in 18-30years, 31-45years and 46-70years age respectively. Those who took full dose as prescribed by the clinician 48(18%), 10(4%) and31 (11%) in 18-30years, 31-45years and 46-70years age respectively. Those who took over dosage 40(15%), 10(4%) and 0(0%) in 18-30years, 31-45years and 46-70years age respectively. Self- treatment was high among 55(20%),86(32%) in 18-30years and 31-45years respectively, very few 38(14%) had self-treatment in 46-70 years In some areas and at some times of the year, the number of patients being treated unnecessarily for malaria can be very large [16]. Antimalarial drug resistance causes include overall drug pressure, inadequate drug intake (poor compliance or inappropriate dosing regimens). Studies have suggested that resistance rates are higher in urban and per urban areas than rural communities, where access to and use of drug is greater (Ettling, Bloland, and Ruebushetal 1995). Factors that have been associated with antimalarial drug resistance include such disparate issues as human behavior, vector and parasite biology, pharmacokinetics, and economics. most researchers agree that there seems to be relationship between transmission intensity and development of resistance [6]. However, the interpretation of this and its implications for development of resistance has been described as resistance being more likely in low-transmission environments [7,8], high-transmission environments [9,6 and 10] or either low- or high- but not intermediate-transmission environments [11,12]. The statistical calculated chi-square ($\chi 2=12764.8$, is greater than the tabulated $\chi 2=61.63$ at df =49, $p<0.05$). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between the different age

groups in the behavioral practices promoting malaria drug resistance. The quality treatment of this approach is dependent on availability of reliable microscopy (to diagnose the illness initially as well as to confirm treatment failure), and either an infrastructure to locate patients in the community or a community willing to return on a given date, regardless of whether they feel ill or not. With this system, patients who fail initial treatment, for whatever reason, are identified quickly and re-treated until parasitological cured, decreasing the potential for spread of resistant parasites [25].

The research question 3 sought the determine influence of educational status on the behavioral practices promoting malaria drug resistance. Few2(0.4%),0(0%), 20(7%) and 34(13%) for Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively respondents had stagnant water bodies close to house. Great amount of had mosquito bite in the past two weeks 119(44%) and 45(17%) in tertiary and secondary education status respectively [26, 27]. These are an indication of increase malaria infection/transmission, which promote malaria drug resistance. On testing before treatment it was observed that subject with tertiary education had malaria test before treatment than those who never had testing before treatment 159(59%) these will reduce drug resistance where the cause of a disease known. Among those with secondary education 60(22%) had test before treatment. This showed that there will be reduce drug resistance among the subjects a behavior that was achieved due to increase medical care. The case of malaria fever was low across 2(0.7%), 4(1.5%), 20(7%) and 31(11.5%) Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. Those who had diagnosed of malaria fever by clinician 3(1.1%), 14(5.2%), 64(24%) and 29((9%) Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively [28, 29 and 30]. Those who had full drug dose as prescribed by the clinician 3(1.1%), 17 (6.3%), 50(19%) and 27(10%) Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. Those who took over dose 2(0.7%), 0(0%), 20(7%) and 34(13%) Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. Those who had self-treatment were low 3(1.1%), 0(0%), 20(7%) and high145 (54%) Non-formal educational level, Primary Educational level, Secondary Educational level and Tertiary Educational level respectively. There was a statistical significance calculated chi-square ($\chi 2=12933$ is greater than the tabulated$\chi 2=61.63$ at df=49, $p<0.05$). Therefore, the null hypotheses were rejected and conclusion drawn that there is a significant difference between the different educational level in the behavioral practices promoting malaria drug resistance [31, 32].

Conclusion

The result obtained from this study shows that the variable subjects (gender, age and educational status) promote malaria drug resistance based on their behavioral practices which could create malaria treatment resistance in future if adequate measure is not taking to curtail this practice (self-medication) .

Recommendation

A. Invest significantly in identifying strategies to improve acceptance of and compliance with drug regimens, especially a combination therapy strategy, at all levels of official and unofficial health care systems, private sector, and community. Similarly, investigate to teach concepts of judicious use of antimicrobials (including antimalarial drugs) to health care providers.

B. Investigate ways to improve effectiveness of drug regulatory systems and ability to control introduction of new antimalarial within endemic countries. This is required to avoid uncontrolled use of new antimalarial resulting in development of resistance before they are needed which could significantly compromise their efficacy when they are needed.

C. Malaria testing and treatment should be made free worldwide as it is for tuberculosis.

D. Improve access to and use of definitive diagnosis-based treatment.

E. The adoption of preventive strategies which includes the use of insecticide-treated bed-nets, indoor residual insecticide spraying, environmental control (mosquito breeding site or "source" reduction), other personal protection measures (e.g. use of repellent soap or screening windows) and chemoprophylaxis in defined populations (use of mass prophylaxis is typically should be recommended). An effective and deliverable vaccine would also be greatly beneficial should be practiced.

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