

Research paper**ASSESSMENT OF ANTIMALARIAL DRUG USE
AMONG THE PATIENTS IN A TERTIARY
HOSPITAL IN NORTHERN PART OF NIGERIA****Modupe I Builders^{1*}, Emmanuel Ogbole¹ and Jonah Y Peter²**

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ABSTRACT

Aims: To assess the pattern of antimalarial drug use among the patients attending the teaching hospital in Jos North local Government of Nigeria.

Study Design: Cross-sectional study.

Place and Duration of Study: Tertiary hospital in Jos North Local Government of Plateau state of Nigeria, between July and September, 2012.

Methodology: A sample size of 441 male and female patients was selected into this study using a universal sampling. Information on the knowledge, attitudes and practices with respect to antimalarial drug use were obtained with the aid of a pre-tested interviewer-administered questionnaire. Data was analyzed using the SPSS software.

Results: Four hundred and forty one of 450 (98%) patients completed the questionnaire. Respondent knowledge of malaria with respect to description of malaria decreased (42.7% to 9.7%). Almost all the patients were able to describe the transmission, causes, symptoms and complications of malaria. Three hundred and ninety (88.4%) of the respondents reported to have used both modern and traditional methods of treatment, one hundred and sixty five (37.4%) frequently treated their malaria with Sulphadoxine-Pyrimethamine (SP) combination, Four hundred and five (91.8%) reported to have used oral preparation, almost half of the respondents (43.1%) obtained these medications from drug shops, only two hundred and eighty nine reported to comply to treatment. There was a statistically significant ($p < 0.05$) association between respondents who always used some methods to prevent malaria and those who sometimes used these methods.

Conclusion: Diagnosis and treatment of malaria take place at home and within community, efforts directed to improve the quality of drug-use practices are essential.

Keywords: Assessment; malaria; antimalarial drug use; Patients; tertiary hospital

1. INTRODUCTION

Malaria is acknowledged to be by far the most important tropical parasitic disease causing great suffering and loss of life. More than two billion people, nearly 40% of the world's population are at risk [1]. The high burden of the disease is associated with mortality and morbidity despite the concerted effort of many countries and the local partners to combat the disease [2]. This has led to the development of newer drug regimen to keep the pace with the evolution of resistance acquired by malaria parasites [3]. WHO has recommended Artemisinin Combination Therapy (ACTs) as first line therapy for the treatment of uncomplicated malaria [4], therefore appropriate use of these agents and attitude of the community to pattern of drug use is important to enhance the goal of treatment and prevent emergence of resistance to therapy [5].

Research had shown that pattern of drug-use in cases of malaria infection either on prescription basis or self-medication can result in high incidence of resistance strain[3]. The knowledge and attitude of patient can influence drug-therapy. Studies in Africa have shown that the initial treatment of malaria fever often takes place at home without consulting trained professionals [6]. Also understanding the knowledge and behaviour of patients and how they actually use antimalarial will aid in devising strategies to increase the correct use of these drugs [7].

Community-based survey is of importance because it helps to assess the pattern of antimalarial drug use and prevalence of the malaria disease in the community, therefore the objective of this study is to assess the pattern of antimalarial drug use among the patients attending the teaching hospital in Jos North local Government of Nigeria. Their knowledge and attitude towards antimalarial drug use were determined with the goal of improving drug usage.

2. MATERIAL AND METHODS

2.1 Study Area and Population

Bingham University teaching Hospital is a missionary hospital located at Zaria bye pass in Jos North Local Government Area of Plateau State. Respondents in outpatients' clinics were drawn from different low to high socio-economic classes consisting of the highly educated, lowly educated and non school educated among the population. The tool for data collection was a pre-prepared questionnaire, which was administered to patients, who had previous malaria episode and used anti-malarial or drug perceived to be an anti-malarial. The questionnaire comprised of questions on socio-demographic characteristics, knowledge and attitude of patients to malaria and antimalarial drug use. Most of the questions were precoded, but the open ended questions were coded when the data had been collected. The purpose of the study and the confidentiality of the information collected were explained to the interviewees who were 11 years and above.

2.2 Study Design

This is a descriptive cross sectional study, assessment of pattern of drug use of antimalarials among the outpatients attending a tertiary hospital in Jos North Local Government of Plateau state of Nigeria.

2.3 Limitation

This study was limited to only one of the 774 LGAs in Nigeria hence cannot be generalizable. However, this has provided useful information on the knowledge and attitude of patients towards antimalarial usage. Another limitation is inability to determine the economic status of the patients due to lack of information on this.

2.4 Data Analysis

Data entry and analysis were performed using Statistical Package for Social Sciences (SPSS) version 16.0 SPSS Inc., Chicago, IL, USA. Data was summarized using frequency tables, means and percentages. Bivariate analysis was done with Chi-square test to compare proportions for variables. Results were considered to be significant when the 2- sided value was < 0.05 .

3.RESULTS

3.1 Demographic Characteristics of the Respondents

Four hundred and forty one patients participated in the study, 244 (55.3%) females and 197 (44.7%) males. Most of the interviewees were aged 31-40 years 137 (31.1%) of the respondent. Most 331 (75.1%) were married, 98 (22.2%) were single, 3

(0.7%) were divorcee and 9 (2%) were widowed. Many of the respondents 220 (49.9%) were graduates. Majority of interviewees 246 (55.4%) were self employed, 126 (28.6%) were civil servants and 69 (16.0%) were unemployed (Table 1).

Table1. Demographic characteristics of the respondents

Variables	Frequency	Percentages (%)
Gender		
Male	197	44.7
Female	244	55.3
Age group(years)		
11-20	16	3.7
21-30	126	28.6
31-40	137	31.1
41-50	79	17.9
> 50	83	18.7
Marital status		
Single	98	22.2
Married	331	75.1
Divorced	3	0.7
Widowed	9	2.0
Level of education		
Primary	46	10.4
Secondary	143	32.4
Undergraduate	30	6.8
Graduate	220	49.9
None	2	0.5
Occupation		
Self employed	246	55.4
Civil servant	126	28.6
Unemployed	69	16.0

3.2 Respondent Knowledge of Malaria

Majority of the respondents 208 (47.2%) described malaria as a disease caused by a parasite, 100 (22.7%) of the interviewee did not know the organism that cause malaria, 90 (20.4%) described malaria as being caused by bacteria while 43 (9.7%) described malaria as a viral disease. 285 (64.6%) of the respondents understood malaria to be a transmissible disease, 112 (25.4%)

understood malaria to be a non transmissible disease while the remaining 44 (10%) of the interviewees did not have idea about the transmission.

The malaria vector as understood by the respondents included mosquito 345 (78.2%), water (dirty, stagnant) 100 (10.7%), food (fruits, groundnut oil) 21 (4.8%), others (genetic, stress, heat, rain and hunger) 7 (1.6%) while 39 (8.8%) of the respondents did not know the vector of malaria. Responses to the question of knowledge of symptoms of malaria, 276 (62.6%) of the respondents reported headache as symptom of malaria followed by fever 260 (59%), other symptoms 218(49.4%) (Dizziness, coloured urine, itching, insomnia, cough, catarrh, drowsiness and hypertension) 218(49.4%), weakness of the body 199 (45.1%), pains (body pain, joint pain and waist pain) 90 (20.4%), while the remaining 1 (0.22%) did not have the idea about the symptom of malaria. Majority of the interviewees 168 (38.1%) reported complications such as loss of consciousness, diarrhea, and loss of appetite, weight loss as the complication of malaria, 130 (29.1%) of the respondents also reported vomiting as a complication, 16 (3.6%) measured weakness of the body and 10 (2.3%) had dizziness as complication while 92 (20.9%) had never had complication of malaria (Table 2).

Table 2. Respondent knowledge of malaria

Variables	Frequency	Percentage
Description		
Parasite	208	47.2
Virus	43	9.7
Bacteria	90	20.4
None	100	22.7
Transmission		
Communicable disease	285	64.6
Non communicable disease	112	25.4
None	44	10
*Causes		
Mosquito	345	78.2
Water	100	10.7
Food	21	4.8
Others	7	1.6
None	39	8.8
*Symptoms		
Headache	276	62.6
Pain	90	20.4
Fever	260	59
Weakness	199	45.1
Others	218	49.4
None	1	0.22
*Complications		

Vomiting	130	29.5
Weakness	16	3.6
Dizziness	10	2.3
Others	168	38.1
None	92	20.9

* Multiple responses

3.3 Respondents' Knowledge of Treatment of Malaria

All the respondents reported treatment for malaria. 26 (5.9%) reported traditional method of treatment, 25 (5.7%) reported modern treatment while 390 (88.4%) reported both traditional and modern method of treatment. Those who mentioned traditional method said it included use of herbs, leaves and roots. Of the 390 respondents who answered modern treatment, 165 (37.4%) frequently used Sulphadoxine/Pyrimethamine (SP) combination, followed by chloroquine 161 (36.5%), artemisinin combination therapy (ACT) 121 (27.4%), artemisinin 37 (8.4%), quinine 6 (1.4%), halofantrine 2 (0.5%), amodiaquine 1 (0.2%) and proguanil 1 (0.2%). 405 (91.8%) of the interviewee administered the antimalarial drug in tablet form, 94 (21.3%) reported to have used the injectable antimalarial drug while 26 (5.9%) reported to have used traditional antimalarial preparation in form of decoction. Majority of the respondents 190 (43.1%) purchased their antimalarial drugs from drug shops, 137 (31.1%) from government hospitals, 103 (23.4%) from mission hospitals, 62 (14.1%) from private hospitals, 30 (6.8%) from traditional medicine, 17 (3.9%) from left over drugs and 3 (0.7%) open market.

Of the 441 patients' interviewed, 289 (65.5%) completed the antimalarial drugs, 150 (34%) did not complete the treatment, and the remaining 2 (0.5%) did not know if they completed the treatment or not. The reasons for preferring a particular source included the following: effectiveness of treatment 127 (28.8%); low cost of drugs 23 (5.2%); recognizable symptoms 73 (16.6%); short waiting time 32 (7.3%); and other reasons 169 (38.3%) (consultation, diagnosis) Table 3.

Table 3. Respondents knowledge of treatment of malaria

Variables	Frequency	Percentage	Valid %	Cumulative %
Types of malaria treatment				
Traditional	26	5.9	5.9	5.9
Modern	25	5.7	5.7	11.6
Both	390	88.4	88.4	100
*Antimalarial drug				
Used				
Chloroquine	161	36.5	36.5	36.5

Sulphadoxine/pyrimethamine	165	37.4	37.4	73.9
Combination				
Quinine	6	1.4	1.4	75.3
Amodiaquine	1	0.2	0.2	75.5
Proguanil	1	0.2	0.2	75.7
Halofantrine	2	0.5	0.5	76.2
Artemisinin	37	8.4	8.4	84.6
Artemisinin combination	121	27.4	27.4	112
therapy(ACT)				
*Antimalarial drug preparation used				
Tablets	405	91.8	91.8	91.8
Injections	94	21.3	21.3	113.1
Decoctions	26	5.9	5.9	119.0
*Sources of malaria treatment				
Traditional practitioners	30	6.8	6.8	6.8
Government hospitals	137	31.1	31.1	37.9
Private hospitals	62	14.1	14.1	52.0
Mission hospitals	103	23.4	23.4	75.4
Drug shops	190	43.1	43.1	118.5
Left over drugs	17	3.9	3.9	122.4
Open market	3	0.7	0.7	123.1
Compliance to treatment				
Correct treatment	289	65.5	65.5	65.5
Incorrect treatment	150	34.0	34.0	99.5
Don't know	2	0.5	0.5	100

Determinant of source of treatment

Low cost	23	5.2	5.2	5.2
Effectiveness	127	28.8	28.8	34.0
Closeness to home	60	13.6	13.6	47.6
Short waiting time	32	7.3	7.3	54.9
Recognizable symptoms	73	16.6	16.6	62.2
Others	169	38.3	38.3	100.5

* Multiple responses

3.4 Respondent Knowledge of Prevention of Malaria

The methods of prevention of malaria reported by the respondents include chemoprophylaxis, staying indoors, mosquito treated nets, insecticides, other methods like clean environments, netted windows and traditional medicine, these methods of prevention are always or sometimes use by the respondents. There was a statistically significant difference among respondents who always prevent malaria and those who sometimes prevent malaria ($X^2 = 12.08$, $P=0.05$) Table 4.

Table 4. Respondent knowledge of prevention of malaria

M1	M2	M3	M4	M5	M6	M7	M8
Always	2	2	0	178	34	45	261
Sometimes	4	2	1	135	75	29	246
Column total	6	4	1	313	109	74	507

M1= Method of Prevention; M2= Chemophylaxis ; M3= Staying indoors ; M4= Making fire/smoke ; M5= Mosquito treated net : M6= Insecticides ; M7= Other methods; M8= Row total
 $P=0.05$, $df=5$, $X^2 = 12.08$ (Significant)

4.DISCUSSION

This study has shown that respondents' knowledge about the description of malaria is poor, majority of the respondents did not know that malaria is caused by a parasite; the interviewees associated the cause of malaria with virus, bacteria and no causative agent. The low level of understanding about the cause of the disease is very surprising because of the high level of education of the respondents; 32.4% of the study population had completed at least primary school, 49.9% were graduands. Almost all the respondents demonstrated good knowledge of the transmission of malaria, this is because the respondents in our study were generally knowledgeable about mosquito as malaria vector, and 78.2% indicated mosquito bite as a possible cause. This is higher than the studies conducted in Kenya and Ethiopia [7, 8], the higher understanding could have been due to higher educational level of the patients, and since almost all the interviewees were literate.

This study has also shown high respondents knowledge on symptoms and complications of malaria, such as fever, headache, vomiting and loss of consciousness. These findings are consistent with other studies carried out in malaria endemic areas in which knowledge on symptoms of malaria was demonstrated [9], also this contrasts with the first Kenyan study, where 35% thought that malaria did not cause any disability [7].

In our study, all the respondents knew malaria could be treated. 88.4% of the interviewees used both traditional and modern treatment of malaria. The findings in the current study further reveal that Sulphadoxine/Pyrimethamine and Chloroquine were the most frequently used antimalarial drug. Consistent with our observations, other studies carried out in malaria endemic region of Nigeria, reveals that despite the change in the National guidelines for treatment of malaria in Nigeria, Sulphadoxine/Pyrimethamine and CQ were the most frequently purchased anti-malarial drugs in the community [4, 6]. Access to ACTs, is still constrained by cost as they cost much more than the previously used antimalarials, with a dose averaging about 504 naira (\$4) [10]. The high cost of ACTs often results in patients opting for a cheaper alternative or not buying the full regimen [11].

Since drug resistance had become a major problem with the emergence of resistance of *P. falciparum* to nearly all used antimalarial drugs [12]. In response to widespread resistance to older antimalarial drugs, WHO has recommended Artemisinin Combination Therapy (ACTs) as first line therapy for the treatment of uncomplicated malaria, but in our survey only (27.4%) of the respondents used this drug. Artemisinin derivatives used as monotherapy is no longer encouraged as WHO in order to preserve the efficacy of artemisinins as an essential component of life-saving ACTs, has called for a ban on the use of oral artemisinin monotherapies at various levels including manufacturers, international drug suppliers, National health authorities and funding agencies involved in the funding of essential antimalarial medicine [3].

The survey of our findings reveals that 21.4 % of the interviewees administered these antimalarials in injectable form; this is not surprising since a total of 43.1% of the respondents sourced their antimalarial from drug shops. These findings are in agreement with study conducted by [8], this shows that injections is exploited by those in the private sector involved in selling drugs, who tend to administer injections for every ailment in order to attract clients [13]. Pharmacokinetics and clinical trials indicated that oral forms of drugs are effective as injections, with oral medications more cost effective [14].

Patients in Nigeria access treatment for malaria in a diverse range of outlets in the public and private sectors. The public sector consists of primary health centres (PHC), secondary and tertiary hospitals while the private sector is large and heterogeneous consisting of a wide range of providers both registered and unregistered such as private hospitals, pharmacies, patent medicine dealers and traditional healers with patent medicine dealers accounting for more than half of all providers [15]. Another study in Anambra state, Nigeria [16], showed that urban-rural geographic differentials exist in access to malaria treatment services, increasing the vulnerability of the rural dwellers to consuming inappropriate treatment which is likely to worsen their disease burden.

This study also revealed that 34.0% of the interviewees did not use the drugs correctly; various published studies showed that inappropriate or inadequate use of antimalarials was associated with treatment failure [17]. Appropriate education is central to safe and effective use of drugs. The risk of harm of the development of drug resistance and irrational use of drug is less when antimalarial or other types of drugs are prescribed by an informed health practitioner [18]. Their knowledge of pharmacology and physiology of the body and how drugs works in different disease states will enable them to have understanding of the appropriate antimalarial in this era or age of fast growing resistant-strain of *P. falciparum* to the older antimalarials and enhance adequate communication or counselling to patients and drug-users [19].

In our study, we also found that all the respondents used many methods for the prevention of malaria; this finding is in agreement with other studies [8]. The correct ideas about the prevention of malaria may have been due to more educated population. Preventing the foci of resistant falciparum malaria from widening requires the rational use of antimalarials [20] and the intensification of vector control, such as source reduction through destruction of mosquito breeding sites, and avoidance of man-vector contact by using protective measures, e.g., bed nets and repellents [21]. These measures call for combined individual and community participation [22], and can be used in developing broader-based control strategies [23].

5. CONCLUSION

Provision of ACTs at subsidized costs will go a long way in improving malaria treatment services in Nigeria, indigenous plantations for cultivating active ingredients and local manufacturing of ACTs is further expected to lower the costs of the drugs and increase its utilization and lower the incidence and impact of malaria. It will be important for interventions to be directed at creating awareness about changes in recommended drugs so as to lessen the use of less efficacious anti-malarials. In addition, the consumers need to be educated on the importance of drug adherence in the community to reduce the emergence and spread of drug-resistant malaria.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

“ ‘Author Builders’ designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. ‘Author Ogbale’ and ‘Author Peter’ managed the analyses of the study. ‘Author Peter’ managed the literature searches..... All authors read and approved the final manuscript.”

ETHICAL APPROVAL

Ethical approval was sought and obtained from the Ethical Committee of the Department of Health Research and Ethics Committee, Bingham University Teaching Hospital, and the interviews were based on the free and informed consent of the study participants.

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