



CONCURRENT USE OF ORTHODOX AND HERBAL ANTIMALARIALS AMONG SCIENCE-BASED UNDERGRADUATE STUDENTS OF AHMADU BELLO UNIVERSITY, NIGERIA

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ABSTRACT

Many patients combine conventional and herbal drug for malaria treatment. The pattern and extent of such concurrent medication among medical and non-medical science-based undergraduate students of Ahmadu Bello University (ABU), Zaria was evaluated in this study. Three hundred and eighty (380) structured questionnaires were administered based on faculties of study to retrieve data. The study indicates that 60.1% of the students utilize hospitals for treatment, while self-medication and patronage of traditional medicine practitioners account for 30.4% and 9.5%, respectively. Majority (57.3%) use orthodox antimalarials alone, 7.6% utilize herbal antimalarials alone, while 35.1% use both concurrently. Non-medical science-based students recorded highest incidence of concomitant orthodox-herbal drug usage (23.4%). Evaluation of perception on effectiveness revealed that 48.1% ranked concomitant medication as "relatively effective", 28.7% regarded it as "considerably effective", and only 23.3% considered it as "not effective". This study report that concurrent use of orthodox and herbal antimalarials among medical and non-medical science-based undergraduate students of ABU Zaria is not uncommon and that healthcare professionals are not always informed about concomitant drug usage when visited by clients for treatment. Further studies should evaluate the clinical safety and efficacy of such concurrent use of the antimalarials and prescribers should always inquire and counsel potential parallel medications accordingly.

Keywords: Conventional antimalarials; Herbal antimalarials; Concurrent medication; Malaria treatment

INTRODUCTION

Malaria is a devastating infection caused by the parasite *Plasmodium*. Despite the numerous intervention programs launched by various governments and World Health Organization (WHO) to reduce its burden and/or eliminate its transmission, the disease is still endemic in most African sub-regions which account for 90% of total global burden of the infection (Irene *et al.*, 2017).

The most interesting fact about malaria is that, it is curable and preventable. Antimalarial drugs (both orthodox and herbal medicines) have been used successfully for prophylaxis and treatment. Orthodox (conventional) antimalarials are the currently prescribed drugs for treatment of malaria in orthodox medicine (Touyz, 2012). They have a defined chemical structure, a synthetic pathway, well established mechanism of action and a standardized and validated methodology of formulation into various pharmaceutical dosage forms in addition to well characterized side effects, indications and contraindications.

Traditional medicines, notably herbal drugs, derived from plants have been used to treat malaria for centuries based on anecdotal evidences (Adebayo and Krettli, 2011). Several ethnopharmacological studies have demonstrated their antiparasmodial activity (Okokon *et al.*, 2006). Indeed, these set of drugs are the sources of the most potent and widely used orthodox antimalarials particularly the artemisinin derivatives (from *Artemisia annua*) and quinine (from *Cinchona* bark) (Willcox & Bodeker, 2004; Klayman, 1985). In contrast to orthodox (prescribed) antimalarials, crude herbal drugs lack the aforementioned attributes and may therefore compromise rational use of drugs when administered concomitantly.

The use of herbal medicines for disease prevention and treatment is gaining considerable interest not only in Africa and other resource limited regions, but also in the developed world (World Malaria Report, 2003). This is possibly due to lack of affordable and accessible healthcare coverage, perceived

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'efficacy and safety' of natural products compared to synthetic analogues, emergence of resistance to the orthodox drugs, and lack of cure to some life-threatening diseases such as HIV/AIDS and cancer (Ekor, 2014). Moreover, researches have reported concurrent use of herbal medicines with orthodox drugs for disease prevention and treatment particularly in the tropics (Agbabiaka *et al.*, 2016; Ameade *et al.*, 2018). The goal of this research was to evaluate the practice of concurrent use of orthodox and herbal antimalarials among science-based undergraduate students of Ahmadu Bello University, Zaria.

Methods

Definition of terms

Concurrent medication: In this study this term connotes concomitant (or simultaneous) use of prescribed (conventional) antimalarial agents with herbal drugs for malaria treatment.

Source of treatment: The term was used to refer to the principal healthcare provider where the respondent seeks malaria treatment. This was categorized in to "hospital-based treatment", "self-medication" and "Traditional Medicine Practitioners' intervention".

Type of drugs: This refers to the category of drug used in the treatment of malaria. This was further divided into "orthodox antimalarials", "herbal antimalarials", and "concurrent use of both drugs".

Study design

The study population involved science-based undergraduate students of Ahmadu Bello University, Zaria. The students were stratified into two groups: (i) *medical science-based* (MSS) from the faculties of Medicine (now College of Health Sciences), Pharmaceutical Sciences, and Veterinary Medicine, and (ii) *non-medical science-based* (NMS) from the faculties of Engineering, Sciences and Environmental Design. Based on sample size determined by statistical procedure of Glenn (1992), three hundred and eighty (380) semi-structured questionnaires were equally divided and self-administered to each students' group. Data retrieved include: (i) demographics, (ii) sources of treatment, (iii) type of antimalarial drugs (orthodox drugs, herbal medicines or both), (iv) knowledge of the drugs (v) perception on the effectiveness of concurrent use of drugs, and (v) informing healthcare providers on herbal antimalarial usage. Data collected were analyzed using Statistical Data Package for Social Sciences (SPSS) version 20.0 and inferences were made accordingly.

RESULTS

Demographic description of the study groups

The age group of majority (94.3%) of the respondents in both study groups was between 18-29 years (Table1). The gender distribution indicated that 73.9% and 26.1% were males and females, respectively, from the entire study population.

Table 1: Demographic data of the respondents

Parameters	Students' Category	
	MSS	NMS
Age (Years)		
18-23	117 (31.8) *	96 (26.1)
24-29	61 (16.6)	73 (19.8)
30-35	6 (1.6)	14 (3.8)
36-41	0 (0)	1 (0.3)
Gender		
Females	61 (16.6)	35 (9.5)
Males	123 (33.4)	149 (40.5)

*Values in parenthesis are percentages, MS: Medical science-based, NMS: Non-medical science-based

Source of malaria treatment, Type of drugs and Concurrent medication

Majority of the students (60.1%) indicated hospitals as their source of treatment (Figure 1). Self-medication accounted for 30.4% whereas only 9.5% have admitted patronizing traditional medicine practitioners for treatment. Self-medication was more common within the NMS students (19%). Orthodox antimalarials were the most commonly used

(57.3%) drugs for treatment (Figure 2), while the use of herbal medicines as the sole drugs for therapy recorded the least incidence (7.6%). Concurrent medication was 35.1% which was more pronounced in the NMS (23.4%) than in MSS (11.7%). The herbal antimalarials commonly used (Figure 3) concurrently with conventional antimalarials were derived from *Azadirachta indica* (34.5%), *Mangifera indica* (26.0%), *Citrus limon* (13.0%) and *Psidium*

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guajava (7.0%). Registered herbal products (RHP) accounted for 15.5% of total herbal antimalarials used. It has been found that 56.6% of the respondents claimed to have knowledge on the drugs they were taking while 43.4% do not know (Table 2). Up to 57.1% do

not inform their healthcare professional on concomitant drug use (Table 3). Evaluation of perception on effectiveness (Table 4) shows that 48.1% regarded concomitant medication as “relatively effective” while 28.6% responded to be “considerably effective”.

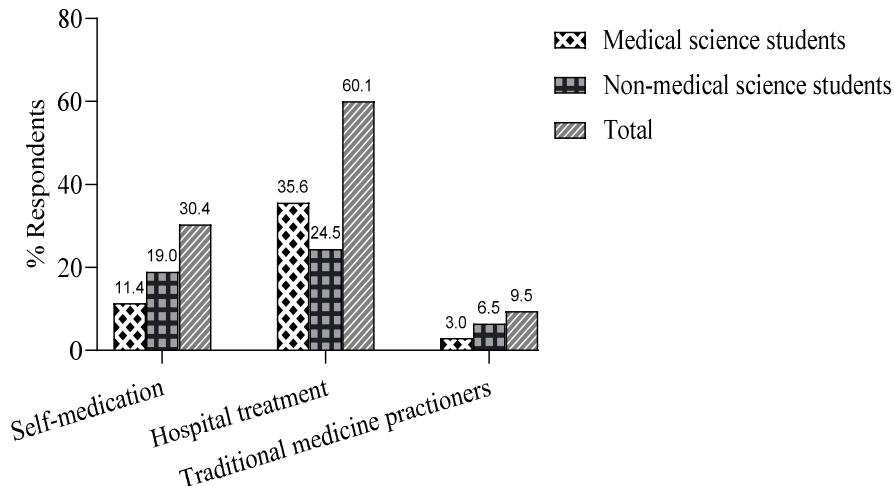


Figure 1: Source of treatment for malaria among science-based undergraduate students of Ahmadu Bello University, Zaria

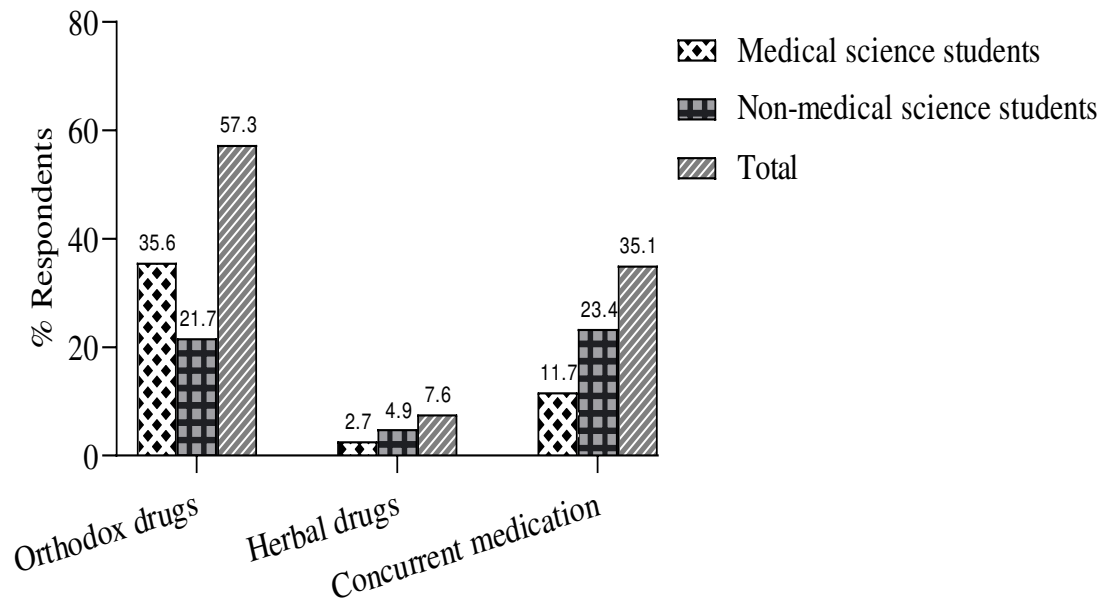


Figure 2: Type of drugs used for malaria treatment among undergraduate students of Ahmadu Bello University, Zaria

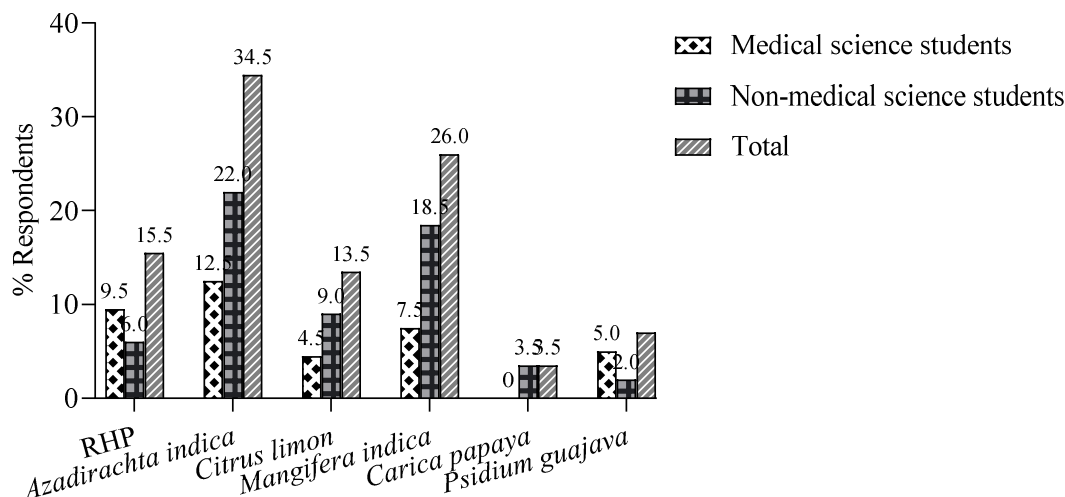


Figure 3: Herbal antimalarials commonly used concurrently with orthodox antimalarials by undergraduate students of Ahmadu Bello University Zaria. RHP: Registered Herbal Products

Table 2: Knowledge of patients on herbal and orthodox antimalarials

Knowledge of medication	Study groups		Total
	MSS	NMS	
Yes	51 (39.5)*	22 (17.1)	73 (56.6)
No	17 (13.2)	39 (30.2)	56 (43.4)

*Values in parenthesis are percentages, MSS: Medical science-based, NMS: Non-medical science-based

Table 3: Informing healthcare professionals on concomitant drug use

Response	Study group		Total
	MSS	NMS	
Yes	22 (18.5)	29 (24.4)	51 (42.9)
No	17 (14.3)	51 (42.9)	68 (57.1)

*Values in parenthesis are percentages, MSS: Medical science-based, NMS: Non-medical science-based

Table 4: Perception of patients on effectiveness of combination of herbal drugs and orthodox antimalarials

Effectiveness	Study group		Total
	MSS	NMS	
Not effective	13 (10.1)	17 (13.2)	30 (23.3)
Relatively effective	22 (17.1)	40 (31.0)	62 (48.1)
Considerably effective	14 (10.9)	23 (17.7)	37 (28.6)

*Values in parenthesis are percentages, MSS: Medical science-based, NMS: Non-medical science-based

DISCUSSION

The pattern of malaria treatment varies considerably among the students. Although utilization of hospital for treatment accounted for the highest incidence (60.1%) compared to the other sources of treatment, there was significant number of students that engaged in self-medication. Self-medication involves the use of drugs without appropriate diagnosis and proper counselling by medical practitioners for treatment or prevention of diseases (Nsagha *et al.*, 2011; Chipwaza *et al.*, 2014; Ocan *et al.*, 2015; Marwa *et al.*, 2018). Self-medication to treat malaria has been extensively reported and is implicated as one of the major factors that predisposes to poor prognosis, undesirable drug-drug interactions, adverse drug reactions, treatment failure and increased risk of

plasmodial resistance (Conte-Schmidt & Cruz-Rivera, 2018).

In comparison to herbal drug usage, orthodox antimalarials were predominantly used by the students for the treatment of malaria. The utilization of herbal antimalarials (alone) was very low considering the number of students patronizing traditional medicine practitioners for malaria treatment. However, concomitant usage of both herbal and orthodox antimalarials was common among the students and this varies significantly with their faculty of study in which the NMS recorded the highest incidence. Several published studies indicated increasing use of herbal medicines as adjunct to prescribed drugs with diverse motives (Ming *et al.*, 2013; Conte-Schmidt & Cruz-Rivera, 2018).

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The herbal antimalarials commonly used concurrently with orthodox antimalarials were listed among the commonly used traditional medicines for malaria treatment (Ajaiyeoba *et al.* 2003; Ehiagbonare 2007), and this may explain their tendency of being easily accessed and utilized by the students in concomitant medication. Several ethnopharmacological studies on these plants have indicated antiplasmodial activity in several animal models (Adebayo & Krettli, 2011).

Knowledge of the constituent of a medication is very crucial to the patient (Ascione *et al.*, 1986). Majority of the respondents do not have *knowledge* on the type of drugs they were taking and this may evoke irrational use of the antimalarials. This study revealed that majority of undergraduate students of A.B.U attending hospitals do not usually disclose concomitant orthodox-herbal medication to their healthcare professional which could prevent them from gaining the best counselling on how to use their medication for better therapeutic outcome.

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CONCLUSION

The prevalence of concurrent use of orthodox antimalarials with herbal medicines among undergraduate students of Ahmadu Bello University, Zaria is significant (35.1%). The NMS recorded the highest incidence of concomitant drug use in malaria treatment because of several predisposing factors identified as considerable self-medication which exposes the patient to take any available means of treatment (orthodox drugs, herbs or both), limited knowledge on the drugs they are taking, and failure to inform their healthcare providers on parallel medication.

It is recommended that patients should have sufficient information on the type of herbal product they are taking in order to know the potential of interaction or otherwise of the medication. Most importantly, the patient should unveil all parallel medication to healthcare providers for appropriate counselling.

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