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RESEARCH ARTICLE   **AJHSE-OSWD-15**

ACCESSIBILITY AND USE OF ANTIBIOTICS AMONG PATIENTS VISITING COMMUNITY PHARMACIES IN BENIN CITY, NIGERIA

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ABSTRACT

Antibiotic resistance is an increasing problem worldwide. Among contributory factors is increasing easy access to antibiotics which is a trend in developing countries. The objective of this study is to determine the accessibility and use of antibiotics. A descriptive cross-sectional study was conducted in eight community pharmacies in Benin City, Nigeria. A structured questionnaire was used for data collection. Administrative approval was obtained from the superintendent pharmacists, while informed consent was sought from all study participants. The data obtained from the study were analyzed using IBM SPSS version 22. Of the 450 participants in the study, most [329 (73.11%)] had used antibiotics in the last six months before their current visit to the pharmacy, 207 (46%) of them took the antibiotic without laboratory investigation. Many [274 (60.89%)] of the participants had an antibiotic among the medications they got from the pharmacy on their current visit. More than half [289 (64.22%)] of the participants sometimes got antibiotics without prescription. More Pharmacists recommended antibiotics for participants compared to doctors (44.11%: 24.44%), while more than half of the study population (62.89%) got their antibiotics from pharmacies. Many [295 (65.56%)] of the participants think that the country should regulate antibiotic use. This study has shown that community pharmacy is a major outlet where patients source antibiotics sometimes without a prescription, thus denoting that many patients self-medicate with antibiotics. The need for incorporating community pharmacists in developing guidelines for prescribing and using antibiotics is crucial.

Keywords: *Antibiotics, Pharmacists, community pharmacy, Patients, Accessibility*

INTRODUCTION

World Health Organization estimated that about 20–50% of antibiotics used worldwide are either used or prescribed inappropriately (WHO 2001; 2015). The remarkable effectiveness of antibiotics leads to their widespread usage, and a persistent belief among the general public that antimicrobials are universally efficacious and should therefore be applied in the first instance to virtually all ailments. The belief in the universal applicability of antimicrobials has resulted in their exuberant use and so has applied a widespread, strong, and polarized selective pressure on the microbial world. This has resulted in the increasing rates of antibiotic or antimicrobial resistance (AMR) seen today (Carolyn *et al.,* 2014). Antibiotic resistance is rising to dangerously high levels in all parts of the world. New resistance mechanisms are emerging and spreading globally, threatening our ability to treat common infectious diseases. A growing list of infections such as pneumonia, tuberculosis, blood poisoning, gonorrhea, and foodborne diseases are becoming harder, and sometimes impossible, to treat as antibiotics become less effective (WHO 2017). Where antibiotics can be bought for human use without a prescription, the emergence and spread of resistance is made worse. Similarly, in countries like those in low- and middle-income regions, without standard treatment guidelines, antibiotics are often over-prescribed by health workers and veterinarians and over-used by the public (WHO 2017; Carolyn *et al.,* 2014). In developing countries, antibiotics can be readily purchased without any control; such countries usually experience more cases of AMR, in contrast to what occurs in western nations where tight regulations of antibiotic use are in place. Self-medication practices have a major pitfall, which is that users do not follow a prescribed course of drug dosage and usually stop the drug regimen once they are relieved of symptoms of illness (Ayukekbong *et al.,* 2017).

In Nigeria, there is poor regulatory control of antibiotic sales, and purchases can be carried out without the prescription of a clinician. In addition, there is a preponderance of counterfeit drugs in the market which makes it difficult to achieve effective treatment of self-diagnosed illnesses thus increasing the propensity for more use of antibiotics (Olumide *et al.,* 2018). This study aims to investigate the accessibility and use of antibiotics in community pharmacies in Benin City.

METHODOLOGY

Study setting/design: This was a Cross-sectional study carried out at different community pharmacies in four local government area of Benin City, Edo state of Nigeria. Four local government areas were used for this study. Different community pharmacies were selected using convenience sampling along the four local government areas of Benin City, Edo State. The different local government areas that were selected for this study are Ovia North east local government area, Egor local government area, Oredo local government area, and Ikpoba local government area.

STUDY PARTICIPANTS

Participants were clients or patients visiting selected community pharmacies and are above 18 years of age. All study participants were informed on study objectives and those who granted permission were recruited for the study. Administrative approval was obtained from the superintended pharmacist of the visited community pharmacy.

DATA COLLECTION

A structured interview questionnaire was used for data collection. The questionnaire had three sections. The first section was used to collect information on patients demographics, while the second and third sections were used to

obtained information of patient knowledge and attitude on different antibiotics used, different medical condition that warrant the usage of the antibiotics and assessment of patients knowledge on antibiotics resistance.

DATA ANALYSIS

The data obtained from the survey were entered into Microsoft excel and transferred in IBM SPSS version 22. Descriptive statistical analysis was performed.

RESULTS

A total number of 450 respondents participated in the study, of which majority (55.33%) were between the ages of 18-29 years. There was almost equal proportions of male (44.67%) and female (49.78%) participants in the study. About a third (33.33%) of the respondents were unemployed. While about half (47.56%) of the respondents had post-secondary education, other characteristics of the study participants are as shown in Table 1.

Table 1: Social Demographic of Respondents

Variables	Frequency (Percentage) N (%)
Age (years)	
18-29	249(55.33)
30-39	68(15.11)
40-49	66(15.11)
50-59	44(9.78)
≥60	20(4.44)
Sex	
Male	201(44.67)
Female	224(49.78)
Level of education	
No formal	25(5.55)
Primary	27(6.00)
Secondary	69(15.33)
Post-secondary	214(47.56)
Occupation	
Government Sector	65(14.44)
Private Sector	92(20.44)
Self employed	125(27.78)
Umemployed	150(33.339)
Retired	(2.00)
Marital status	
Single	297(66.45)
Married	145(32.22)
Health Insurance	
Yes	137(30.44)
No	300 (66.67)

More than half 274(60.89%) of the respondents visiting community pharmacies at the time of this study had an antibiotic as part of medications in their prescription. When asked if they used antibiotics before their current visit to the pharmacy, many [204(45.33%)] took antibiotics one month before, 207 (46%) of those who took antibiotic did not do any laboratory investigation warranting the use of antibiotic. About half [185(44.1%)] of those who had an antibiotic as a past medication history said a pharmacist recommended it for them compared to 110 (24.4%) of the participants who got a doctor's prescription. The source of the antibiotics they used was mostly from pharmacy outlets

(62.89%) compared to 12% of the respondents who got their antibiotics from hospitals. More details are shown in Table 2.

Table 2. Responses on Past Antibiotic Use

Variables	Frequency (Percentage) N (%)
Does your current visit to pharmacy/prescription include an antibiotic	
Yes	274(60.89)
No	164(36.44)
When last did you take an antibiotic	
A month ago	204(45.33)
In the last six months	125(27.78)
About a year ago	19(4.22)
More than a year	20(4.44)
Cannot remember	79(17.56)
On that occasion was test conducted to warrant antibiotic use	
Yes	207(46)
No	217 (48.22)
On the occasion who prescribed/recommended the antibiotics	
Self-medication	60(13.33)
Patent medicine dealer	32(7.11)
Nurse	37(8.22)
Doctor	110(24.44)
Pharmacist	185(44.11)
On that occasion where did you get the antibiotics prescribed	
Patent medicine store	64(14.22)
Hospital	34(12.00)
Pharmacy	283(62.89)
Left over antibiotics	17(3.78)

Table 3 portrays ailments respondents took antibiotics for. Typhoid fever, urinary tract infection and malaria (24.44%: 22%: 16.89%) were top on the list for which participants used antibiotics to treat.

Table 3. Ailment for which respondent use antibiotics

Variable	Frequency(percentage)
	N (%)
What do you usually take antibiotics for	
Fever	62(13.78)
Urinary tract infection	99(22.00)
Cough	66(14.67)
Malaria	76(16.89)
Typhoid	110(24.44)

More than half [289 (64.22%)] of the respondents sometimes get antibiotics without a prescription, while majority [295 (65.56%)] of them recommended that regulation of antibiotics should be considered in Nigeria such that they are gotten only with prescription (Table 4).

Table 4. Accessing Antibiotics without Prescription

Variable	Frequency (Percentage)
	N (%)
Do you sometimes get antibiotics without a prescription	
Yes	289(64.22
No	149(33.11)
Do you think antibiotic use should be regulated such that they are gotten	
Only by prescription	
Yes	295(65.56)
No	44(9.78)
Can't say	105(20.33)

Respondents perception or attitude on antibiotics use as shown in Table 5 reveals that majority [326 (72.44%)] of them usually adhere to instruction to finish dose of antibiotic, on the other hand, 205 (45.56%) of the respondents buy antibiotics used for past ailments when similar symptoms present. Similar response from 241 (53.56%) of the participants was given on using antibiotics taken by close relatives or friends who may have used an antibiotic for illnesses that mimic respondent's complaint.

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Table 5. Perception on Antibiotic Use

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Variable	Frequency (Percentage) N (%)
When do you think you should stop taking antibiotic?	
When I feel better	99 (22.00)
When I have completed the dose as instructed	326 (72.44)
Don't know	18 (4.00)
Is it okay to buy the same antibiotic that you have used before when you	
have similar complaint in the past	205 (45.56)
Yes	153 (34.00)
No	82 (18.22)
Can't say	
Is it okay to use antibiotic given to a friend or family as long as they were	
used to treat the same illness	130 (29.89)
Yes	241 (53.56)
No	68 (15.11)
Can't say	

In Table 6, participant's perception on antibiotic resistance is outlined. It appears that majority [326 (71.78%)] of the respondents have heard about antibiotic resistance, and more than half of them seem to have some knowledge on what antibiotic resistance is and some factors that encourage it. For example, 278 (61.78%) of the respondents agree that resistance to antibiotics can occur if full treatment with the antibiotic is not completed, while more than half of them [256 (56.89%)] realize that antibiotic resistance is an issue in Nigeria.

Table 6. perception on Antibiotic Resistance

Variable	Frequency (Percentage) N (%)
Have you heard of antibiotic resistance before	
Yes	326 (71.78)
No	118 (26.22)
Antibiotic resistance occur when the body become resistant to them and they no longer work well	295 (65.56)
True	30 (6.67
False	91 (20.22)
Can't say	
If bacteria are resistant to antibiotic it can become difficult or impossible to treat infections they cause	
True	308 (68.44)
False	18 (4.00)
Can't say	84 (18.67)
Many infections are becoming resistant to antibiotics	
True	289 (64.22)
False	24 (5.33)
Can't say	98 (21.78)
Antibiotic resistance is an issue in Nigeria	
True	249 (55.33)
False	23 (5.11)
Can't say	138 (30.67)
Antibiotic resistance can occur if antibiotic are taken when they are not needed	
True	256 (58.89)
False	36 (8.00)
Can't say	121 926.89)
Antibiotic resistance can occur when the full treatment of antibiotic is not completed	
True	278 (61.78)
False	28 (6.22)
Can't	114 (25.33)

DISCUSSION

This study investigated the accessibility and use of antibiotics by a section of the public who visit community pharmacies. Prevalence of antibiotic use from the study participants is high, it can be deduced from the results of this study that many participants are involved in the frequent usage of antibiotics, as about half of the participants had used antibiotics within a month of their current visit to the pharmacy, and also had an antibiotic among the medications they got from their current visit. This trend could be attributed to the fact that the presumed infection or disease that the respondents were treating still persisted. It can be inferred that either they were treating the condition with the wrong drug (antibiotic) or resistance to the antibiotic has occurred, this assumption is further strengthened with the fact that more than half of the participants did not conduct a laboratory investigation before taking the antibiotics (Kuehn, *2013*). Studies on antibiotic use by the public have shown that using antibiotic to treat the wrong infection or disease condition is rampart. In Southwestern Nigeria, a study revealed high usage of antibiotics for treating menstrual symptoms by women (Amy *et al.,* 2010), other regions of the country have reported high usage and self-medication with antibiotics. In Northwestern Nigeria among university undergraduates, authors in a study found that more than 60% of their participants used antibiotics irrationally, similar findings was reported in a rural setting (Olumide *et al.,*

2018; Abdulraheem *et al.,* 2016). This trend is common in Low and Middle-Income Countries (LMICs). In Congo, about 67.8% of patients visiting pharmacies bought antimicrobials without a prescription, either on demand by patient or given by the dispensers (Aimerance *et al.,* 2020). In a systematic review of 85 studies, 59 of which was done in LMICs, found that more than 60% of antibiotics were dispensed without a prescription in 49 (83%) of the studies (Wertheim *et al.,* 2017).

Several factors are responsible for increase public usage of antibiotics in Nigeria and other LMICs. Over-the-counter sale of antibiotics, the cost of medical consultation, low satisfaction with medical practitioners, misconceptions regarding the efficacy of antibiotics, severity of illness, economic status, past successful antibiotic use and educational level are some contributory factors. High perceived appropriateness of self-medication with antibiotics and attitudes favouring antibiotic use for minor ailments are also predisposing factors for use of self-medication (Cliodna *et al.,* 2007; Larissa *et al.,*2008). The perceived availability of antibiotics from pharmacies without a prescription has been the main enabling factor at the individual level, in this study, it seems that more participants visit community pharmacies more than hospitals, as majority of the participants got antibiotics from pharmacies or on pharmacist's recommendation compared to the hospital, even patent medicine dealers have more patronage than hospitals as seen in this study. According to Nigeria's legislation, antibiotics and other antibacterial should only be dispensed with prescription. However, a combination of factors ranging from a shortage of licensed prescribers, pressure to meet up in community pharmacies with some employed dispensers who lack pharmacotherapeutics and appropriate dispensing training, poor access to quality medicines in some areas, to proliferation of under-regulated patent medicine vendor, drug markets and hawkers among others, means that Nigeria suffers severe access problems whilst simultaneously facing a crisis of irrational drug use. Drug misuse extends to the agricultural sector where antimicrobials are liberally used therapeutically and for growth promotion. All of these drug-use problems are exacerbating resistance and complicating infectious disease management. Enforcement of the laws regulating the sale of antibiotics will help in curtailing the health danger posed by antibiotic resistance and some of its causes (Goossens *et al.,* 2006; Jones *et al.,* 2008; FDA 2013). It is noteworthy that majority of the respondents in this study are quite knowledgeable regarding the issue of antimicrobial (antibiotic) resistance and the fact that it is a serious issue in Nigeria, thus calling out that their use should be regulated.

Dispensing regulations for prescribed antibiotics in pharmacies is another enabling factor. Dispensing antibiotics per package size can produce leftovers, which, in a previous study, have been shown to substantially contribute to self-medication, with 36% of those who self-medicated using leftovers (Larissa *et al.,* 2008; Nga *et al.,* 2021; Olumide *et al.,* 2018). In this study, some participants used left over antibiotics. To reduce self-medication with leftovers antibiotics, it is suggested that prescribed antibiotics should not be dispensed according to the package size. Dispensing exact numbers of antibiotic tablets in pharmacies as implemented in some countries such as the UK, the Netherlands, Czech Republic and Israel, as well as in the USA, could be promoted in other countries (Larissa *et al.,* 2008). While in other countries like Bangladesh, Ghana, and Vietnam, unused antibiotics could be returned and refunded (Nga *et al.,* 2021).

Participants in this research used antibiotics for ailments such as urinary tract infections, malaria, typhoid fever, cough (upper respiratory tract infections and fever, with the highest usage for malaria infection likely with antimalarial drug. Previous studies show a wide range of illnesses that patients use antibiotics for as self-medication to include gastrointestinal, respiratory, genitourinary, skin, fever, typhoid, malaria and dental illnesses (Olumide *et al.,*2018; Abdulraheem *et al.,*2016; Aimerance *et al.,* 2020). Results from this study on high usage of antibiotics for

malaria treatment is quite disturbing, it further explains the serial use of antibiotics by the participants (Cliodna *et al.,*2007). Aside exposing the misconception that antibiotics treat varied disease conditions including malaria, the frequent use for malaria exposes patients and the public to resistance, since malaria is an infection that is recurring and some patients will have need to treat malaria very often. The objective of permanently changing public perception, and behavior of antimicrobial usage is necessary in the light of the growing AMR crisis. However, such an initiative will require coordination at local, national, and global levels to ensure a consistent "message" and also culturally appropriate local implementation (Carolyn *et al.,* 2014). Such behavioral campaign should target ways to lessen the demand for the immediate application of antimicrobials for non-acute use, discouraging the public from irrational use of antibiotics by enlightening them on the dangers of antimicrobial resistance, and encourage the use of appropriate diagnostics. These measures in addition to promoting appropriate prescribing through regulation will in the long run preserve the limited antibiotics available.

CONCLUSION

This study reveals a high use of antibiotics without a prescription, partly due to easy access from community pharmacy outlets. The need for regulation of antibiotic prescription in Nigeria is crucial in slowing the rate of resistance. Participant's use of antibiotics for malaria treatment is a public health concern with respect to tackling antimicrobial resistance; measures to increase public behavioral change towards antibiotic use can help to forestall this menace.

ACKNOWLEGDMENT

CONFLICT OF INTEREST

The authors declare no conflict of interest

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