

A Cross-Sectional Survey On The Pattern Of Community Antibiotics Uses Practices In Niger State, North Central Nigeria

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Abstract

Antibiotic resistance has emerged as one of the most pressing public health threats of the 21st century, undermining the effectiveness of drugs that once revolutionized infectious disease treatment and saved millions of lives. In Nigeria, particularly in North Central regions like Niger State, community practices surrounding antibiotic use exacerbate this issue, driven by factors such as self-medication, over-the-counter availability, and limited awareness. This study aimed to investigate the patterns of community antibiotics use practices and resistance in selected healthcare settings in Niger State. A cross-sectional, closed-ended questionnaire was conducted to assess patterns of community antibiotic use practices in rural and urban healthcare settings. This study revealed that (68%) have a good perception while (32%) have wrong perception on respondents' knowledge of antibiotics. Findings from the present study revealed that there is an association which is statistically significant with general knowledge of antibiotic use ($\chi^2 = 425.698$, $P = 0.000$) ($P < 0.05$) and also a significant correlation existed on the attitude of respondents' practices habit ($r = -0.867$, $P = 0.000$) ($P < 0.05$). Our findings on the causes of antibiotic resistance (ABR), from this study demonstrated that there is a significant correlation with the risk factors attributed to the community's antibiotic use practices of respondents' ($r = -1.000$, $P = 0.000$) ($P < 0.05$). Based on our findings the study concluded that the pattern of community antibiotics use practices poses a substantial public health risk in Niger State due to non-compliance rates of the community populace on knowledge, attitude and practices of antibiotic use.

Keywords: Antibiotic resistance, Knowledge, Community practices, Respondents

INTRODUCTION

Antimicrobial resistance (AMR) has been recognized as a global health issue. AMR is currently on the rise at an alarming rate, considerably increasing global morbidity and mortality (WHO, 2020). As a result, the World Health Organization (WHO) designated it as a major public health challenge with the potential to cause the next global pandemic (WHO, 2019). Furthermore, the WHO has stated that AMR could cause 10 million deaths worldwide by 2050 (WHO, 2019). AMR is also expected to drive 24 million people into extreme poverty by 2030 (WHO, 2019). Antimicrobial resistance (AMR) threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi [4]. The emergence of AMR therefore poses a serious threat to public health resulting in prolonged illness and greater risk of death [4]. In addition, It leads to longer hospital stays, higher medical costs, delayed recuperation, and long-term disability [2,5,6].

Antibiotics are one of the most widely sold medicine classes worldwide. Antibiotic resistance has grown due to the usage and misuse of antibiotics [1]. Antibiotic resistance (ABR) is occurring all across the world, threatening the treatment of infectious diseases and weakening many other gains in health and medicine. It represents one of the biggest threats to global health today, and can affect any one, of any age, in any country [2].

The widespread use, misuse and overuse of antibiotics in human and veterinary medicine have resulted in emergence and spread of antibiotics resistance consequently decreasing its effectiveness and efficacy [7]. The emergence of antibiotics resistance is a major global health threat causing difficult to treat infections, therapeutic failure, increased patient mortality and higher treatment cost and it has been predicted that Nigeria is one of the countries at great risk of suffering these impacts [8]. The inappropriate use of antibiotics is often enhanced by access to antibiotics without a physician's

prescription, economic factor, lack of knowledge and the unregulated sales and consumption of antibiotics as over the counter medicine in most low- and medium-income countries [9]. This situation appears to be worse in Nigeria where regulation concerning drug sales, distribution and supply are weak and almost non-existent. In Nigeria, some of the existing laws and agencies responsible for the regulation and control of drug manufacture, sales, distribution such as the National agency for food and drug administration and control, NAFDAC and the Pharmacists council of Nigeria, PCN but they are far from adequate [6,10].

Drug delivery in Nigeria is chaotic, with several outlets including pharmacy shops, drug chemists, street hawkers, and open drug markets where anybody can walk in and demand antibiotics without a doctor's prescription [10]. Ignorance, greed, high drug costs, corruption, and lax regulatory enforcement all contribute to the widespread indiscriminate sale and usage of antibiotics in Nigeria. Antibiotic misuse includes using antibiotics to treat non-bacterial diseases such as the common cold or flu, as well as failing to stick to treatment regimens [10]. Several studies have shown that community sensitization in the form of antibiotic knowledge and education can help reduce the rapid spread of AMR [3,9]. Furthermore, WHO is coordinating a global campaign to raise awareness of antibiotic resistance and encourage best practices among the public, policy makers, health and agriculture professionals to avoid further emergence and spread of antibiotic resistance [11].

The strategies for managing community-based antibiotic resistance are to promote behavior modification besides providing relevant information on proper antibiotic use [10,11]. Therefore, before implementing any intervention, it is pertinent to understand each target group's beliefs and perceptions about antibiotic use and resistance.

This study therefore aims to investigate the pattern of community antibiotic use practices and associated resistance in Niger State, North Central Nigeria. Findings from this research are expected to inform policy makers, healthcare providers, and public health authorities on strategies to promote rational antibiotic use and mitigate the growing threat of antimicrobial resistance.

LITERATURE REVIEW

Several studies across Nigeria and other sub-Saharan African countries have documented high levels of inappropriate antibiotic use in community settings. Research has shown that antibiotics are frequently obtained without prescription from patent medicine vendors and community pharmacies, with little or no professional guidance [4]. Similar patterns have been

reported in Ghana, Kenya, and Ethiopia, highlighting a regional challenge [6].

Studies have also linked poor antibiotic use practices to increasing resistance among community-acquired bacterial pathogens. Resistance to first-line antibiotics such as ampicillin, tetracycline, and cotrimoxazole has been widely reported, particularly among Enterobacteriaceae isolated from community infections [4,5]. Public awareness of antibiotic resistance remains low, and misconceptions about antibiotic effectiveness against viral infections persist [6].

MATERIALS AND METHODS

Study Area

Niger State is a state in Central Nigeria and the largest state in the country with area of 76,363 km² (29,484 sq mi) and location of 10.000°N 6.000°E Coordinates: The State had population of 3954,772 with the state capital in Minna (Census, 2006). Other major cities are Bida, Kontagora, and Suleja and was formed in 1976 when the then North-Western State was bifurcated into Niger State and Sokoto State.

Cross-sectional Survey (Questionnaire)

A descriptive cross-sectional survey was conducted among Rural and Urban health care settings between October 2021 and April 2022 to assess their knowledge, attitudes, and practices towards antibiotic use and antibiotic resistance in Niger state.

Sample Size Determination

The sample size was determined by Fisher's formula for cross sectional survey study.

Questionnaire survey

To estimate a KAP proportion (good practice $\approx$ 60% in Niger State Abdullahi *et al.*,2022) with $\pm$ 5% margin of error at 95% CI:

Where n = the minimum sample size required

P = (good practice $\approx$ 60% in Niger State Abdullahi *et al.*,2022)

Z= corresponds to significance level (1.96 for 0.05)

d = absolute error or precision = 5% (0.05)

$n = (Z^2 \times p(1-p)) / d^2 = (1.96^2 \times 0.60 \times 0.4) / 0.05^2 = 368$ respondents

Ethical Approval

Ethical approval was obtained from ethics and research committee of Niger ministry of Health Committees (approval number STA (495/vol/141).

Data Analysis

Data were analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 20.0 software (SPSS, IBM Corp, Armonk, NY). The p-value of less than 0.05 was considered significant. Data were presented in tabular form and figures.

FINDINGS

Socio-demographic characteristics of the Study Participants

Result of this present study revealed a total number of 368 participants of which most of the respondents fall within the age range 31-40 (37%) while (54.9%) were male and (45.1%) females. Most of the study participants were residing in urban area (65.5%) and rural respondents (34.5%). A greater number of the participant were married (51.6%). Regarding the educational level, (55.7%) of the respondents had higher level of education (Table 1).

Respondents' General Knowledge on Antibiotics

The general knowledge of respondents' on antibiotics from this study revealed that (68%) have the right perception while (32%) have wrong perception of antibiotics. Therefore, significant differences existed on the tested variables on general Knowledge on antibiotics ($P < 0.05$) (Table 2).

Respondents' Practice habit on Antibiotics Usage

Our findings from this study revealed that (52%) had good practice habit of antibiotics usage, while (29%) had poor practices and those not sure of their practice habit (19%) (figure 1).

The Practice habit on antibiotics usage from present result revealed also that there is an association which is statistically significant ($\chi^2 = 425.698$, $P = 0.000$) ($P < 0.05$). Moreover, there was a significant correlation with antibiotics usage practices habit ($r = -0.867$, $P = 0.000$) ($P < 0.05$) correlation is significant at (0.001) (Table 3)

Knowledge and Perception of Antibiotics Resistance (ABR)

The findings from this study on antibiotic resistance shown on (Table 4) revealed that the majority of respondents in urban (54.3%) area had higher knowledge of ABR than those residing in rural area (45.7%). This present result revealed also that there was an association which was significant with respondents' perception of antibiotics resistance ($\chi^2 = 26.341$, $P = 0.000$) ($P < 0.05$) (Table 4). The knowledge of respondents on the causes of antibiotic resistance (ABR), from this study indicated that there is a significant correlation with risks factors causing resistance (Pearson correlation ($r = -1.000$, $P = 0.000$) ($P < 0.05$) (Table 4).

Respondents' knowledge of the Prevention of Antibiotic Resistance

The result of respondents on the prevention of antibiotic resistance (66.2%) indicated that the respondents had good knowledge of preventing ABR (figure 2).

Table 1. Social demographic characteristic of Respondent's

Demographic Characteristics	Frequency	Percentage (%)
Residence		
Urban	241	65.5
Rural	127	34.5
Age		
18-20	74	20.1
21-30	89	24.2
31-40	136	37
41-50	42	11.4
60 above	27	7.3
Sex		
Male	202	54.9
Female	166	45.1
Educational level		
Unable to read and write	26	7.1
Primary	43	11.7
Secondary	94	25.5
Tertiary	205	55.7
Marital status		
Single	114	31
Married	190	51.6
Widowed	46	12.5
Divorced	18	4.9

Table 2. Respondents' general Knowledge on antibiotics

(n= 368) Knowledge Questions	Correct (%)	Incorrect (%)
Antibiotics can be obtained from any available outlet	221(60.1)	147(39.9)
Antibiotics are medicine effective in treating bacteria infection	287(78)	81(22)
Antibiotics can be taken without prescription	302(82.1)	66(17.9)
Antibiotic resistance can occur using antibiotics when they are not necessary	259(70.4)	109(29.6)
Antibiotics have side effects	294(79.9)	74(20.1)
Antibiotics are useful in treatment viral infection	196(53.3)	172(46.7)
Antibiotics can be used to treat common cold	208(57))	160(43)
Antibiotic can be stopped when symptom stop	234(63.6)	134(36.4)

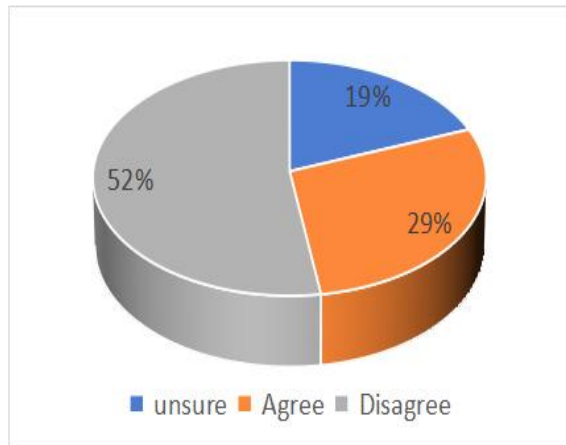


Figure 1: Respondents' good Practice habit on Antibiotic usage

Table 3. Respondents' Practice habit on Antibiotics usage

Statement (n=368)	Agree (%)	Disagree (%)	Unsure (%)
When I get cold, I will take antibiotics to help me get better quickly	71(19.3)	196(53.3)	101(27.4)
I normally stop taking antibiotics when I start feel better	97(26.4)	215(58.4)	56(15.2)
I usually give my antibiotic to a sick family member	87(23.6)	189(51.4)	92(25)
I usually keep antibiotics stocks at home in case of emergency	103(8.3)	225(63.5)	40(16.6)
I will use leftover antibiotics if am sick	87(23.6)	260(70.7)	21(5.7)
Will take antibiotics according to instruction on the label	184(50)	112(30.4)	72(19.6)
Normally look for antibiotic expiring date before using it	234(44.8)	96(15.5)	38(32.1)
I don't need to see a doctor for a prescription if I know the antibiotic to use for my illness	98(26.6)	242(65.8)	28(7.6)

Chi-Square (χ^2) = 425.698, $P = 0.000$, Pearson correlation(r) = -0.867, $P = 0.000$

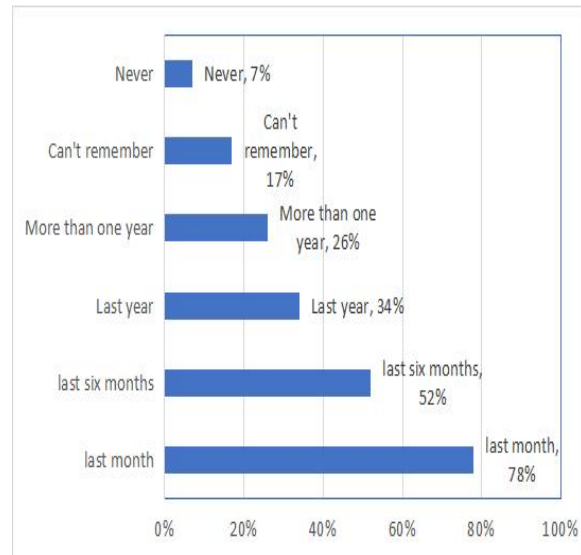


Figure 2: The percentage of persons according to their last intake of antibiotics

Table 4. Respondents' Knowledge on the cause of antibiotic Resistance

Statement	Correct Option	Rural (%)	Urban (%)
Antibiotic resistance is only a problem for people who take antibiotic regularly	False	148(40.2)	220(59.8)
Inappropriate use of antibiotic lead to the growing problem of resistance	True	164(44.6)	204(55.4)
Antibiotic resistance is an issue in other countries not here	False	182(49.5)	186(50.5)
Self medication (Use of antibiotic without doctor's prescription)	True	137(37.2)	231(62.8)
Poor adherence to drugs by patients (e.g., not completing the full course of treatment)	True	176(47.8)	192(52.2)
Fake/Substandard antibiotics	True	180(48.9)	188(51.1)
Infectious diseases which are resistance to antibiotic can be spread from person to person	True	167(45.4)	201(54.6)
Antibiotic resistance infection could make medical procedure like surgery organ transplant & cancer treatment much more difficult to treat	True	193(52.4)	175(47.6)

Chi-Square (χ^2) = 26.341, $P = 0.000$ Pearson correlation (r) = -1.000 $P = 0.000$

DISCUSSION

Globally, antibiotic resistance is a serious public health issue. Antibiotic use and resistance in Africa, namely in Nigeria, are currently poorly understood. This report provides critical information about the level of antibiotic use and resistance in urban and rural communities

The threat of antibiotic resistance is increasing and poses a serious global public health issue. Antibiotic use and resistance in Africa, and Nigeria specifically, are still poorly understood. This provides important information about the degree of antibiotic usage and

resistance behavior and practices in both urban and rural communities.[12]

The study's conclusions showed that participants' understanding of antibiotics differed considerably depending on age, marital status, educational attainment, and a number of personal traits. However, there were notable differences in individuals' opinions regarding antibiotics according to residency. These results are consistent with a Malaysian study that discovered that the general public's knowledge and attitudes on the usage of antibiotics were significantly correlated with their age, educational attainment, and monthly income [13].

Our findings from this survey revealed that more than half of respondents (26.4%) stopped taking antibiotics once their symptoms improved. This behavior is considered a misconception and can lead to further antibiotic resistance and disease relapse (table 3), which is consistent with a similar report found in Jordan by [14], despite the fact that only one-third (32%) of those who participated in the multinational survey engaged in that behavior. This disparity is attributable to cultural and economic differences, since some people who are suffering from antibiotic side effects discontinue use after their disease symptoms resolve, unaware that the disease may resurface severely [13,14].

Additionally, the results of the recent study show that 70% of participants (table 3) misused antibiotics by storing leftover medication. This is different from the findings of a Korean study [15], which claims that only 10% of participants saved leftover medication for later use. This disparity in proportion can be attributed to the cultural differences between the two nations as well as people's desire to hold onto their traditional beliefs and customs.

Most of the participants (75.1%) from this study understood that the antibodies resistance is the resistance of bodies against antibiotics and so the antibiotics can no longer eradicate the infection (table 4). This understanding was apparent in London, where (81%) agreed that the antibiotic resistance is the case in which the antibiotics become unable to treat the infections. [15]

Over half of the respondents in the rural population self-reported having "poor" or "very poor" understanding of antibiotics, whereas the majority of the urban respondents in our study thought they had "very good" or "good" knowledge. There was no significant correlation between the urban respondents' perceived high level of knowledge and their actual ability to recognize antibiotics [16]. A similar conclusion was drawn from a Lithuanian poll in which respondents underestimated their familiarity

with antibiotics and how to use them appropriately [17]. A major contributing cause to the emergence of AMR and the challenge of addressing this worldwide issue is probably the discrepancy between self-reported and actual knowledge

Overuse of antibiotics increases the chance of bacterial resistance. This association is frequently discussed in the literature [18, 19].

On the other hand, it could be seen as a result of self-medication, which is aggravated by the availability of 'over-the-counter' medications, including antibiotics [15,20]. In West Africa, antibiotics are even available in popular markets [21]. There are solutions to limit the unnecessary usage of antibiotics. It comprises public education [3], ongoing in-service education for prescribers, particularly those with limited expertise [22], and pharmaceutical industry regulation [23].

The judicious use of antibiotics has been shown to reduce morbidity and death from infectious illnesses [5,24]. However, more Gram-negative and Gram-positive bacteria have evolved AMR, with some having multiple drug resistance [5]. AMR lowers the efficacy of antibiotics, leading to increased morbidity and death [25]. It is worth noting that numerous resistant bacteria have been reported in various locations of Nigeria. For example, a strain of methicillin-resistant *Staphylococcus aureus* has been discovered in southwestern Nigeria [26]. In addition, fluoroquinolone-resistant *Escherichia coli* has been observed in Nigeria [2]. Furthermore, two cases of multidrug-resistant tuberculosis were recorded in southeastern Nigeria [27]. In another investigation, Okesola and Oni [28] observed

There is constantly significant bacterial resistance to routinely used antibiotics in Nigeria, and it is advised that changes in antibiotic resistance patterns be monitored continuously. Recent research suggests that antibiotic resistance is on the rise among Nigeria's common bacterial pathogens [29]. Unfortunately, Nigeria's antimicrobial stewardship programs (ASP) are still inadequate. Furthermore, there is a high empirical antibiotic use in hospitals and communities, an absence of established antimicrobial stewardship (AMS) teams in most tertiary hospitals, a lack of routine monitoring of antimicrobial susceptibility reports and antimicrobial use, easy and unrestricted access to antibiotics, a lack of a framework for nation-wide monitoring of infection prevention and control, and a lack of awareness among healthcare professionals and the general Nigerian public.

CONCLUSION

The pattern of community antibiotic usage in this region subsequently lead to resistance and this poses

a substantial public health risk in Niger State, Nigeria, which is driven by factors such as inappropriate antibiotic usage, self-medication, over-the-counter availability, and limited awareness and environmental contamination. Therefore, this call for relevant stakeholders to facilitate appropriate health interventions in this region.

ACKNOWLEDGEMENT

We acknowledge the voluntary participation of the residents and cooperation of the community heads in the study areas. We also appreciate the efforts of the research assistants who were diligent in the course of data collection

ETHICAL PERMISSION

Ethical approval was obtained from ethics and research committee of Niger ministry of Health Committees (approval number STA(495/vol/141)

CONFLICT OF INTEREST

The authors declare no conflict of interest in this work

FUNDING

The work was funded by the authors. No external funding received.

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