



## Article

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*Auta, Asa ORCID: 0000-0001-6515-5802, Banwat, Samuel, David, Shalkur, Ogbole, Esther and Tor-anyiin, Amom (2013) Antibiotic Use in Some Nigerian Communities: Knowledge and Attitudes of Consumers. Tropical Journal of Pharmaceutical Research, 12 (6). pp. 1087-1092. ISSN 1596-5996*

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<http://dx.doi.org/10.4314/tjpr.v12i6.33>

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## Original Research Article

# Antibiotic Use in Some Nigerian Communities: Knowledge and Attitudes of Consumers

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Received: 29 May 2012

Revised accepted: 30 September 2013

### Abstract

**Purpose:** To assess the knowledge and attitude of consumers in Jos, Nigeria towards the use of antibiotics.

**Methods:** A cross-sectional questionnaire survey involving 430 clients of registered community pharmacy outlets located in some communities in Jos, Nigeria was conducted in November, 2011. Data collected were analysed using SPSS version 16 and logistic regression was used to determine independent predictors of low antibiotic knowledge.

**Results:** About 56.5 % of respondents reported using an antibiotic within a month preceding the survey, with a prevalence of 22.3 % of self-medication use of antibiotics among respondents. The antibiotic knowledge assessment test revealed that 30.5% of respondents had low knowledge; while 40.9% and 28.6 % of respondents had intermediate and high knowledge levels respectively. Respondents' educational level was the only demographic predictor ( $p < 0.01$ ) of low antibiotic knowledge found, as those with primary level of education were more likely (OR = 13.224; CI = 3.296-53.052) to have low antibiotic knowledge than those with tertiary education. Respondents showed negative attitude (< 50 % positive response rate) in about 60 % of the attitude statements they responded to. The most common negative attitudes demonstrated by respondents were their expectation to be prescribed an antibiotic for cold (66.3 %) and taking an antibiotic when they have cold to get better quickly (60.9 %). However, respondents demonstrated positive attitudes in looking at the expiry dates of antibiotics before using them (93.3 %), and taking antibiotics according to the instructions on the label (84.2 %).

**Conclusion:** The study showed that inadequate antibiotic knowledge and negative attitudes towards antibiotics use exists among consumers.

**Keywords:** Antibiotic use, knowledge, attitude, Nigerian consumers.

Tropical Journal of Pharmaceutical Research is indexed by Science Citation Index (SciSearch), Scopus, International Pharmaceutical Abstract, Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Journal Citation Reports/Science Edition, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

## INTRODUCTION

Antibiotics are cost effective interventions for the treatment and prevention of infectious diseases. Their use has however, been accompanied by increased prevalence of resistance which presents a threat to public health. Resistance to antibiotics is a common problem worldwide and it

has been associated with inappropriate use including failure to complete treatment, skipping of doses, re-use of leftover medicines, and overuse of antibiotics [1].

Resistance to antibiotics have been reported in Nigeria. Ghebremedhin *et al* [2], reported the emergence of a community-associated methicillin-resistant *Staphylococcus aureus* in southwest

Nigeria while Lamikanra *et al.* [3], reported the rapid evolution of flouoroquinolone-resistant *Escherichia coli* in a Nigerian community. Okesola and Oni [4], also reported high antibiotics resistance rates among common Gram-positive and Gram-negative isolates from various clinical specimens brought in a tertiary hospital in Nigeria.

Appropriate use of antibiotics in the society requires correct knowledge and attitude. Public knowledge and attitude towards antibiotics usage have been investigated. Sun *et al* [5], studied the knowledge and attitude of South Koreans towards antibiotic use and concluded that a general misunderstanding and lack of knowledge exists among the studied population. Oh *et al.* [6], conducted a survey on antibiotics knowledge and attitude among Malaysian adults and concluded that educational interventions are needed to promote appropriate use of antibiotics among the public.

There is limited data concerning the knowledge and attitude of Nigerians towards the use of antibiotics. Hence, this study was carried out to assess the knowledge and attitude of Nigerian consumers towards the use of antibiotics.

## METHODS

### Study setting

The study was conducted in 4 communities (Angwan Rukuba, Tina, Naraguta and Angwan Rogo) around the University of Jos, located in Jos, north-central, Nigeria. There are about 10 registered community pharmacy outlets in these communities. This study utilised 6 of the registered community pharmacy outlets as sites for the recruitment of study participants.

### Study design

A descriptive, cross sectional survey was conducted in November 2011 on 430 community pharmacy clients. The study population was obtained through a convenience sampling design. Six registered community pharmacies were selected and used as study sites for this study based on their accessibility and client's volume. Clients from these pharmacy outlets were recruited for the study if they were at least 18years old; understood English language and were aware of the term antibiotics.

The questionnaire used for this study was adapted from previous studies and adjusted to fit into the local context [6-8]. The questionnaire was pretested on 40 members of the general

public and then adjusted as appropriate. The pre-tested questionnaire was administered to participating pharmacy clients. The questionnaire administered was divided into four domains. The first domain consisted of the demographic details of the respondent; the second domain consisted of questions related to antibiotic use within a month preceding the survey; the third domain consisted of statements related to the attitude of respondent towards antibiotics use and was assessed using a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree". The fourth domain was a knowledge assessment test consisting of 14 dichotomous knowledge items to test respondents' knowledge on key areas of antibiotics indication, identification, dangers and administration.

### Ethical consideration

Approval to carry out the study in each community pharmacy was obtained from the managers of the community pharmacies. Verbal informed consent was sought from each participant before administering the questionnaire and participants were told that participation in the study was voluntary and information obtained would be anonymous and confidential.

### Data analysis

Data were entered into the Statistical Package for Social Sciences (SPSS) version 16.0 (SPSS Inc, Chicago IL) to generate descriptive statistics. Relationships between variables were tested using chi-square test. The knowledge assessment test was evaluated by scoring each correct response as one (1) while an incorrect response was scored zero (0). Thus, there were 0 to 14 possible scores. The percentage distribution of the antibiotics knowledge scores was determined and then used to classify respondents' knowledge levels based on percentiles. Those whose scores were  $\leq 25^{\text{th}}$  percentiles were considered to have low antibiotics knowledge while those whose scores were  $\geq 75^{\text{th}}$  percentiles were considered to have high antibiotics knowledge. Respondents whose knowledge scores were greater than  $25^{\text{th}}$  percentile but less than  $75^{\text{th}}$  percentile were regarded to have an intermediate knowledge level. Logistic regression analysis was used to determine the independent predictors of low antibiotics knowledge in the studied population.

## RESULTS

A total of 478 questionnaires were distributed to community pharmacy clients but only 430 of

them were completely filled and returned, thus representing a response rate of 89.96%. Most of the respondents were young people (between 18 – 30 years old) and students (table 1).

**Table 1:** Demographic characteristics of respondents

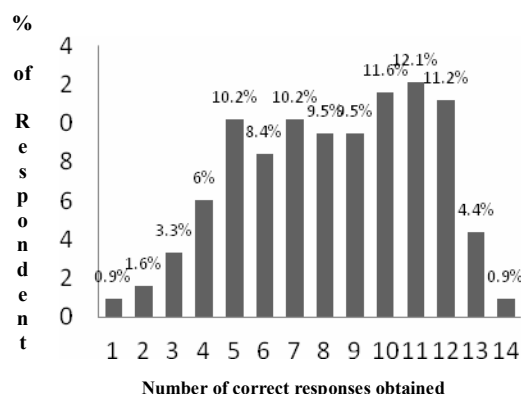
Variable	n (%)
<b>Gender</b>	
Male	211 (49.1)
Female	219 (50.9)
<b>Age (years)</b>	
18-30	303 (70.5)
31-40	81 (18.8)
41-50	31 (7.2)
51-60	15 (3.5)
<b>Educational level</b>	
Primary	13 (3.0)
Secondary	90 (20.9)
Tertiary	327 (76.0)
<b>Occupation</b>	
Students	249 (57.9)
Civil servants	72 (16.7)
Business men/women	49 (11.4)
Private sector employee	28 (6.5)
Unemployed	15 (3.5)
Others	17 (4.0)

N=430

About 56.5 % (n = 242) of respondents reported using an antibiotic within a month preceding the survey. Only 60.3 % (n = 146) of those that reported using an antibiotic within a month preceding the survey got it from a doctor's prescription while 39.7 % (n = 96) reported getting them on self-medication, which represents a prevalence of 22.3 % of self-medication use of antibiotics in the studied population.

The antibiotic knowledge assessment test revealed that 30.5 % of respondents had low knowledge level and scored between 0 – 6 points while 40.9 % (scored between 7-10 points) and 28.6 % (scored between 11 - 14 points) of respondents had intermediate and high knowledge levels respectively. No respondent scored zero point but a few patients (0.9 %) had a total score of 14 points which was the maximum score. The modal knowledge assessment score was 11 (Figure 1).

Respondents in this study had high knowledge in the use of antibiotics in the treatment bacterial infections (91.2 % correct response), identification of ampicillin as an antibiotic (85.3 % correct response) and in recognising that overuse of an antibiotics can cause resistance (75.8 %). However, about 70.7 % of respondents wrongly reported that antibiotics are used in the treatment of viral infections (Table 2).



**Figure 1:** Distribution of correct knowledge responses

**Table 2:** Antibiotic knowledge assessment items and percentage of respondents with correct response

Knowledge assessment item	Response option*	% Correct response
<b>Antibiotics indication</b>		
Antibiotics are medicines that can kill bacteria	True	91.2
Antibiotics can be used to treat viral infections	False	29.3
Antibiotics can cure all infections	False	60.7
Antibiotics are used to relieve body pain	False	57.4
Antibiotics are used to stop fever	False	51.2
<b>Antibiotics identification</b>		
Paracetamol is an antibiotic	False	71.6
Ampicillin is an antibiotic	True	85.3
Piriton is an antibiotic	False	36.5
Aspirin is a new generation antibiotic	False	47.4
<b>Dangers associated with antibiotics</b>		
Overuse of antibiotics can cause antibiotic resistance	True	75.8
Antibiotics can cause allergic reaction	True	59.3
All antibiotics do not have side effects	False	68.1
<b>Antibiotics administration</b>		
Antibiotics may be effective even if you did not complete treatment	False	50.7
You can stop taking antibiotics if you are well	False	42.5

\*Correct response option indicated in bold and underlined

Low knowledge level was prevalent among respondents with primary education (76.9 %), and when logistic regression was applied to the data obtained from this study, the educational level of respondents was found to be the only demographic predictor ( $p < 0.01$ ) of low antibiotic knowledge in the study population. The results revealed that respondents with

primary level of education were 13.2 times more likely to have low antibiotic knowledge than those with tertiary education (Table 3).

**Table 3:** Multivariate adjusted odd-ratios of low antibiotic knowledge

Variable	Prevalence of low antibiotic knowledge (%)	OR (95% CI)	P-value
<b>Gender</b>			
Male	28.4	Referent	
Female	32.4	1.215 (0.780-1.880)	0.382
<b>Age (years)</b>			
18-30	33.3	4.903 (0.899-26.751)	0.066
31-40	27.2	3.555 (0.644-19.618)	0.146
41-50	19.4	2.001 (0.307-13.038)	0.468
51-60	13.3	Referent	
<b>Educational level</b>			
Primary	76.9	13.224 (3.296-53.052)	0.000
Secondary	40.0	1.765 (1.063-2.930)	0.028
Tertiary	26.0	Referent	
<b>Occupation</b>			
Students	32.0	Referent	
Civil servants	23.9	0.862 (0.260-2.858)	0.809
Business men/women	32.7	0.811 (0.224-2.938)	0.750
Private sector employee	28.6	1.186 (0.323-4.355)	0.797
Unemployed	26.7	0.789 (0.188-3.316)	0.789
Others	35.3	0.754 (0.145-3.928)	0.737
<b>Recently took antibiotic</b>			
Yes	27.7	Referent	
No	33.9	1.447 (0.930-2.251)	0.101
<b>Got antibiotic on prescription</b>			
Yes	30.1		
No	27.1	1.237 (0.670-2.284)	0.496
<b>Overall</b>	<b>30.5</b>	Referent	

**Table 4:** Attitude of respondents towards antibiotic use

Attitude statement*	Agree n (%)	Disagree n (%)	Unsure n (%)	Demographic factor associated with statement (p-value)
When I get cold, I will take antibiotics to help me get better quickly	262 (60.9)	<b>141 (32.8)</b>	27 (6.3)	None
I expect antibiotics to be prescribed by my doctor if I suffer from common cold	285(66.3)	<b>126 (29.3)</b>	19 (4.4)	Age (0.012) Occupation (0.016)
I normally stop taking antibiotics when I start feeling better.	211 (49.1)	<b>190 (44.2)</b>	29 (6.7)	None
If my family member is sick, I usually will give him my antibiotics if his illness is similar to mine	206 (47.9)	<b>201 (46.7)</b>	23 (5.4)	None
I normally keep antibiotics at home in case of emergency	241 (56.1)	<b>173 (40.2)</b>	16 (3.7)	None
I will use leftover antibiotics if I am sick	148 (34.4)	<b>269 (62.6)</b>	13 (3.0)	None
I don't need to see a doctor for a prescription if I know the antibiotic to use for my illness	226 (52.6)	<b>169 (39.3)</b>	35 (8.1)	Age (0.003)
Will take antibiotics according to the instruction on the label	<b>362 (84.2)</b>	54 (12.6)	14 (3.3)	None
Normally will look at the expiry date of an antibiotic before it.	<b>401(93.3)</b>	18 (4.2)	11 (2.6)	Education (0.006)

\*Respondents with positive attitude indicated in bold

Most respondents in this study demonstrated negative attitude towards antibiotic use as less than 50 % positive response rate was obtained in most of the attitude statements (Table 4). The

most common negative attitudes demonstrated by respondents were their expectation to be prescribed an antibiotic when they suffer from common cold and taking an antibiotic when they have cold to help get better quickly. However, respondents demonstrated positive attitudes in looking at the expiry dates of antibiotics before using it (93.3 %); taking antibiotics according to the instructions on the label (84.2 %); and not using leftover antibiotics when they are sick (62.6 %).

## DISCUSSION

Most respondents who participated in this study were young people and students. This is because the communities where the research was carried out are located around the University and these communities have high proportions of university students. In addition, it is a tradition in Africa for elderly people to send young people on errand; hence this may have contributed to the high proportion of young people as clients of community pharmacies.

This research revealed high use of antibiotics in the study population with one in two persons reporting using an antibiotic within a month preceding the survey. The high use of antibiotics in a population can result in an increase in the ecological pressure for resistance [9]. High antibiotics self-medication rate (22.3 %) was also reported among respondents. Antibiotics are "Prescription Only Medicines" in Nigeria, which means that by policy or regulation, they are only supposed to be issued to a patient with a prescription. However, individuals self-medicate with them because they can purchase these medicines over-the-counter in Nigeria [10]. This shows that the sales of pharmaceutical products in the country are under-regulated and this has led to a high incidence of self-medication with prescription medicines; adverse drug events; treatment failures; and antimicrobial resistance in the country [11].

In the knowledge assessment, about one in three respondents had low antibiotic knowledge and the educational level of respondents was found to be a predictor of low knowledge (table 3). This finding also confirms the findings by McNulty *et al* [12], who reported that lower educational level was the greatest determinant of low antibiotic knowledge. Respondents had very low knowledge in the use of antibiotics in the treatment of viral infections and in differentiating other commonly used over-the-counter medicines from antibiotics (Table 3). The proportion of respondents in this study that incorrectly thought that antibiotics are used in the

treatment of viral infections (70.3 %) is comparable to that obtained in a survey in New Jersey (70 %) and Malaysia (67.2 %) [6,13].

Most respondents (60.9%) in this study would take antibiotics for a cold. The proportion of people reporting using antibiotics for cold is higher than that found in most studies including Malaysia (38 %) [6], Hong Kong (17 %) [7] and America (27 %) [8]. About 90% of all upper respiratory tract infections are caused by viruses, which do not respond to antibiotic treatment and this can create a selective pressure for the development of resistant strains of pathogens [13].

A high proportion of respondents expect an antibiotic to be prescribed to them when they have cold (66.3 %). Patients' expectations have been shown to contribute to inappropriate prescribing of antibiotics. Mangione-Smith *et al* [14], demonstrated that physicians' perceptions of parental expectations for antibiotics were the only significant predictor of prescribing antibiotics for conditions of presumed viral aetiology. It has also been shown that physicians would like to meet patients' expectation even though they feel antibiotics are unnecessary [15]. A study revealed that public education targeted at changing patient behaviour can contribute significantly to reducing the rate of inappropriate use of antibiotics [1]. Hence, there is need for patients to be educated on the difference between viral and bacterial infections; and advising them not to take an antibiotic for viral illness.

Antibiotic medication sharing behaviour was found to be very common among respondents as about 48% of them would give their antibiotics to their family members if they feel they have similar illness with theirs (table 4). Although this attitude was not associated with age in this study, medication sharing behaviour has been shown to be common among young people [16]. Respondents' attitude towards sharing of antibiotics in this study was unsurprising because our previous findings have demonstrated that antibiotics were among the common medications shared by students of the University community [16].

In this study, respondents demonstrated a very high positive attitude (93.3 %) towards the checking of the expiry dates of antibiotics before use and this is comparable to that obtained in a study in Malaysia where 92.2 % of respondents reported that they will look at the expiry date of antibiotics before taking it [6]. This positive attitude demonstrated by respondents may be as

a result of the increased awareness created by the National Agency for Food, Drug Administration and Control (NAFDAC) on the need to check the expiry dates of medicine at the point of sale or administration due to the presence of fake and expired medicines in the Nigerian market [17].

### Study limitations

Some limitations are associated with this study and are likely to affect the generalisation of our findings. This study excluded the non-literate members of the communities and consumers who obtain their medicines from sources other than the community pharmacy. Hence, this study might not have captured the attitude of these groups of individuals. The convenience sampling design used for this study may be associated with a selection bias as some categories of clients might have been over-selected, or under-selected or missed.

### CONCLUSION

This study shows that inadequate antibiotic knowledge exists among respondents and most respondents displayed negative attitudes towards antibiotics use. Hence, there is need for public education to promote appropriate use of antibiotics.

### ACKNOWLEDGEMENT

Authors wish to appreciate all the 4th year undergraduate pharmacy students (2010/2011 session) of the Faculty of Pharmaceutical Sciences, University of Jos, Jos, Nigeria that assisted in data collection.

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