

**The Knowledge and Attitude of Pharmacists to Patients' Antibacterial Counselling in Government-owned  
Secondary Healthcare Institutions in Ogun State Nigeria**

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**ABSTRACT**

Irrational antibacterial use with its attendant consequences has been reported worldwide. In Nigeria, evidenced-based study to ascertain pharmacists' knowledge and attitude to antibacterial counselling is scarce. This study evaluated pharmacists' knowledge of antibacterial therapy and counselling. It was a cross-sectional study among 51 pharmacists with the responsibility of patients' medication counselling at the outpatient department of government-owned healthcare institutions of Ogun State of Nigeria. Pharmacists' knowledge and attitude to antibacterial counselling was determined through structured questionnaire. The survey revealed that 18(35.3%) of the pharmacists were of the opinion that antibacterial drug(s) that may have their absorption hindered by food should be best used within a specific time frame to meal. Twenty-one (41.2%) of the pharmacists believed that antibacterial resistance may be prevented by taking antibacterial medication at regular intervals. Only 25(49.0%) accepted that patients' knowledge of counselling guide on antibacterial use can be enhanced by clearly written instruction. The pharmacists' mean knowledge scores of antibacterial therapy and counselling skill were  $3.0 \pm 1.4$  and  $5.6 \pm 2.1$  respectively while the mean attitudinal score was  $6.4 \pm 0.8$ . The pharmacists demonstrated poor antibacterial therapy knowledge but positive attitude to antibacterial counselling. Regular update of antibacterial therapy knowledge is hereby recommended.

**Key words:** Pharmacists, Antibacterials, Knowledge, Attitude, Patients Counselling

**INTRODUCTION**

Antibacterial misuse or abuse has the potentials of causing antibacterial resistance, increase morbidity and mortality with increasing cost of care, extended side effects and adverse effects (Abu-HIM *et al.*, 2015; Asogwa *et al.*, 2017; WHO, 2017). The challenge of antibacterial irrational use is global but it is more pronounced in developing countries such as Nigeria. Globally, reports had it that over 50.0% of drugs including antibacterial prescriptions, dispensing and sales are inappropriate and about 50.0% of patients are involved in irrational use (Brahma, 2012; WHO, 2014). The antibacterial era transformed the practice of medicine with great sign of relief from bacterial infections (Omole *et al.* 2012; Akinyandenu *et al.*, 2014; Choudhury *et al.*, 2018; Zahreddine *et al.*, 2018) thereby reducing morbidity and mortality from infectious diseases and making other treatments and procedures such as cancer treatment and organ transplantation achievable (Naomi *et al.* 2011; Dellinger *et al.* 2012). The challenge of antibacterial resistance has been linked to worldwide irrational use (Gualano *et al.*, 2015; WHO 2017). Antibacterial treatment failure has been on the increase (Katie *et al.*, 2012; WHO, 2017). The continual efficacy of antibacterial therapy is under a

great threat and may become extinct if concrete effort is ignored (Abdelsalam, 2010). The widespread abuse of antibacterials is perhaps due to deficient knowledge of patients on antibacterial use. Pharmacists' professional responsibility and position in health care necessitates that they ensure appropriate medication counselling (Naomi *et al.*, 2011; Ayalew *et al.*, 2014; Choudhury *et al.*, 2018). Irrational antibacterial use is implicated in different stages of antibacterial therapy including: indication, selection, dosage, treatment duration, antibacterial use and compliance with course of therapy (Gould, 2009; WHO, 2018; Zahreddine *et al.*, 2018). Appropriate knowledge of antibacterial use enhances rational usage (Asogwa *et al.*, 2017). Pharmacists' counselling has been shown to improve patients' knowledge and rational drug use. The effectiveness of counselling offered by pharmacists will depend on their knowledge and attitude to antibacterial therapy and counselling. Earlier studies tend to concentrate on the knowledge of patients on what antibacterials are meant to treat and aimed at discouraging patients from self-medication. There is the need to ensure that patients to whom antibacterials are prescribed and dispensed have adequate knowledge of correct usage. (Fleming *et al.*, 2011; Mason *et al.*, 2018).

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To ensure appropriate patients' antibacterial knowledge that will promote rational use will require a closer qualitative look that will identify pharmacists' knowledge and attitude to antibacterial therapy and counselling. In Nigeria, study to ascertain pharmacists' knowledge of antibacterial therapy and counselling skill is scarce. This study is therefore pertinent to probe into the knowledge and attitude of pharmacists to antibacterial treatment and patients' counselling.

## **METHODS**

The study was a cross sectional survey which involved pharmacists responsible for patients' medication counselling at the outpatient departments in seventeen government-owned secondary health care facilities in Ogun state of south west Nigeria. The selected health care facilities had well defined pharmacy for the outpatient department with at least one registered pharmacist responsible for dispensing and counselling of patients on medication use including antibacterials. These facilities were the major health institutions available for patients' health care in their communities. All the institutions offer medical, paediatrics, surgical, obstetrics and gynaecological services. They also serve as referral centres from primary health centres and private hospitals within and outside the state. Data collection was done on Monday to Friday within the working hours of 7.30am-3.30pm by the researchers for twelve weeks: November 2017 to January 2018. All the 51 pharmacists involved with dispensing and counselling of patients on their medication were approached consented and took part in the study. The limited number of available pharmacists made all the pharmacists including interns and coppers to be included in the study. The objectives of the study were discussed in detail with the pharmacists. They were assured of anonymity and confidentiality of their responses. The questionnaire was given to them after consent and collected back within a range of period of thirty (30) to forty-five (45) minutes. For those not ready to respond to the questionnaire immediately the questionnaire was brought back to them at a return visit when they were available for immediate response. The pharmacists' questionnaire was designed by the researchers and aimed at gathering information on the knowledge and attitude of the pharmacists on antibacterial therapy and counselling.

## **Validation and Pretest of Data Collection Instruments**

The questionnaire was pretested for face and content validity. It was discussed with two senior colleagues

(pharmacists) at the department of clinical pharmacy and pharmacy administration, university of Ibadan, who had constructed acceptable questionnaires in similar surveys. Their contributions led to editing of some questions after which the content was considered satisfactory. A pre-test of the questionnaire was carried out at Sacred Heart Hospital, Lantoro, Abeokuta, Ogun state of Nigeria which is also a secondary health care institution like those selected for the study. Two (2) pharmacists participated in the pre-test. Findings from the pre-test were used in further validation of the instruments. This led to rephrasing of some of the questions. Some ambiguous questions were reconstructed while some were removed. The result of the pre-test was not included in the final analysis

## **Reliability of Data Collection Instrument**

The reliability of the questionnaire was established by applying Cronbach's Alpha test in the SPSS software. The value of Cronbach's Alpha for the pharmacists' knowledge questions on antibacterial therapy was 0.696; approximately 0.7 on antibacterial knowledge was 0.828 and on attitude was 0.780 Cronbach's Alpha value  $\geq 0.7$  is generally acceptable by researchers as satisfactory (Mohsen *et al.*, 2011). Ethical approval for the study was granted by the joint University of Ibadan/University College Hospital (UI/UCH) Health Research and Ethics Committee with approval number UI/EC/15/038. Permission was also obtained from the pharmacy department of Ogun State Ministry of Health (approval no: SHB/2146/DPS/201), and the Head of Department of Pharmacy of each hospital.

## **The Questionnaire**

The questionnaire consisted of four sections: (a) pharmacists' demographic details which include: age, gender, marital status and year of experience as hospital pharmacist. Other characteristics considered were; highest educational attainment, field of postgraduate study and pharmacists' cadre, (b) seven questions that assessed antibacterial therapy knowledge of the pharmacists and (c) nine questions to evaluate pharmacists' antibacterial counselling skill (d) nine questions on attitude to antibacterial counselling.

## **Data Processing**

Test of knowledge was computed by allocating a score of 1 to correct response, and 0 to incorrect response. Pharmacist individual percentage knowledge score was calculated by dividing score obtained by individual pharmacist with total obtainable score multiplied by 100.

**Individual Pharmacist's Percentage knowledge score = (Score obtained/total obtainable score × 100).**

A cut off percentage score of  $\geq 75.0\%$  was set as good knowledge while percentage score  $<75.0\%$  was adjudged to be poor knowledge. Similarly, for the attitude section, correct response was allocated a score of 1 while incorrect response was considered to be 0. Individual percentage attitudinal score was computed by dividing score obtained by individual pharmacist with total obtainable score multiplied by 100.

**Individual Pharmacist's Percentage Attitudinal score = (Score obtained/total obtainable score × 100).**

A cut off percentage attitudinal score of  $\geq 75.0\%$  was set as positive attitude while percentage attitudinal score  $<75.0\%$  was adjudged to be negative attitude. (Jimmy *et al* 2013)

#### **Data Analysis**

The data obtained from the questionnaire were arranged, coded and entered into Statistical Package for Social Sciences (SPSS) version 20 for management and analysis. Descriptive statistics such as frequency, percentage and mean  $\pm$  standard deviation were used to summarize the data and evaluate distribution of responses to the study variables. Associations between pharmacists' socio-demographic characteristics and pharmacists' knowledge of antibacterial therapy, counselling of patients and attitude to antibacterial counselling were investigated using Chi square ( $X^2$ ) and Fisher's exact tests. A p-value  $< 0.05$  was considered to be statistically significant.

#### **RESULTS**

All the 51 pharmacists eligible for the study in the selected hospitals participated in the survey. There were slightly more females 26(51.0%) than males 25(49.0%). Those on the post qualification internship and National Youth service (NYSC) add up to 11 (21.6%). Thirty-three (64.7%) of the pharmacists had no post graduate experience while 21 (41.2%) had hospital pharmacy experience of  $>10$  years while the mean year of experience was  $9.2 \pm 6.4$  (Table 1).

#### **Pharmacists' Knowledge of Antibacterial Therapy**

The survey revealed that 18(35.3%) of the pharmacists were of the opinion that antibacterial drug(s) that may have their absorption hindered by food should be best used one hour before or two hours after meal. Twenty one (41.2%) of the pharmacists believed that antibacterial resistance may

be prevented by taking antibacterial medication at regular intervals. Twenty-two(43.1%) of the pharmacists had a score  $\geq 75.0\%$  indicating good knowledge (Table 2). From the response to the seven knowledge questions, average knowledge score was  $3.0 \pm 1.4$ . There was no significant association between the demographic characteristics and therapy knowledge  $p > 0.05$  (Table 5).

#### **Pharmacists' Knowledge of Antibacterial Counselling**

Forty, (78.4%) pharmacists believed that duration of therapy should be included in patients' antibacterial counselling, while 25 (49.0%) of the pharmacists had the opinion that patients' knowledge of antibacterial use can be enhanced by clearly written guides. Forty-seven,(92.2%) were of the view that patients' antibacterial counselling must necessarily include completion of course and taking at regular intervals. Thirty-seven (72.6%) of the pharmacists had good knowledge with a score  $\geq 75.0\%$  (Table 3). The mean counselling knowledge score for the total of 9 questions was  $5.6 \pm 2.1$ . There was no significant association between pharmacists' demographics and the counselling knowledge score  $p > 0.05$  (Table 5).

#### **Pharmacists' Attitude to Antibacterial Counselling**

The study revealed that 29 (56.9%) pharmacists are of the view that shortage of pharmacists in most hospitals is a justifiable reason for inadequate antibacterial counselling. Twelve (23.5%) of the pharmacist had the opinion that antibacterial identity should be disclosed to patients. Thirty-six pharmacists (70.6%) exhibited positive attitude to antibacterial counselling. Details of the pharmacists' attitude to antibacterial counselling is as in Table 4 Significant association was evident between the pharmacist's cadre and attitude to antibacterial counselling  $p = 0.02$  (Table 5).

#### **DISCUSSION**

Pharmacists have been identified to have critical roles to play in the war against antibacterial irrational use. Patients' awareness and counselling on correct usage of antibacterial agents are adjudged to be best handled by pharmacists (Naomi *et al.*, 2011; Mohamed, 2018; Mason *et al.* 2018). Many works have confirmed that proper patients' counselling on their medication improves patients' compliance and ensures better treatment outcomes (Mohamed 2018; Choudhury *et al.*, 2018). Pharmacists' good antibacterial therapy, counselling knowledge and positive attitude to antibacterial counselling is expected to enhance effective patients' counselling

### **Pharmacists' Knowledge of Antibacterial Therapy and Counselling**

From the current study, male pharmacists 49.0% almost equal the proportion of females (51.0%). This is similar to 51.5% females reported by Zahreddine *et al.*, 2018 and at variance with 69.4% males reported by Ayalew *et al.*, 2014. This study revealed that majority of the pharmacists 29 (56.9%) demonstrated poor knowledge towards antibacterial therapy. The poor antibacterial therapy knowledge demonstrated by pharmacists here is similar to pharmacists' lack of sufficient knowledge on practice of patients' medication counselling (PMC) reported by Ayalew *et al.*, 2014 in Ethiopia. More than half of the pharmacists 37 (73.3%) however demonstrated good counselling knowledge contrary to that reported by Ayalew *et al.*, 2014. The difference here may be as a result of difference in practice settings. Only a minority 18 (35.3%) of the pharmacists were of the view that antibacterial drug whose absorption may be hindered by food is best taken at a specified time space from meals. Almost all the pharmacists 41 (80.4%) were of the opinion that antibacterial-food interaction cannot be avoided by using the drug at a specified space of time to meals. The absorption of antibacterials is affected to varying degree by the presence or absence of food. Some antibacterials may have their absorption reduced, totally abolished while some are not affected if co-administered with food. Oral penicillins, co-trimoxazole and azithromycin in the capsule form are to be taken on empty stomach that is, one hour before or two hours to a meal for best absorption. Azithromycin suspension can be taken with meals; amoxicillin should be given with food to prevent gastro intestinal (GI) distress while absorption of erythromycin is not affected by food (Chris, 2017). It is therefore important that pharmacists especially those directly involved with patients' medication counselling keep themselves abreast of effects of food on antibacterial absorption and ensure that patients are counselled appropriately. It is important that patients be counselled verbally and in written form (Naomi *et al.* 2011). In the present study, only 25, (49.0%) of the pharmacists consented to the importance of written counsel as a means of enhancing patients' knowledge of antibacterial use. Patients tend to remember counselling essentials better when verbal counselling is combined with written instruction (Madden 1973). Majority, 42 (82.4%) of the pharmacists in this study believed that patients on antibacterial therapy should be counselled on likely side effects in contrast with that reported by Ayalew *et al.*, 2014 in which minority (40.8%) of the pharmacists held the view

that patients should be counselled on likely side effects. Counselling patients on likely side effects is essential as awareness is likely to produce courage to complete the course of therapy where side effects do not necessitate discontinuation of therapy. For instance, the darkening of urine by metronidazole may scare an uninformed patient (Chris, 2017). Patients should therefore be counselled on side effects of antibacterial agents. Twenty-one, (41.2%) of the pharmacists were in agreement with the effectiveness of taking antibacterials at regular dosage intervals in reducing antibacterial resistance. It is essential to maintain antimicrobial blood level within the therapeutic window. Prolonged antibacterial blood level below the minimum inhibitory concentration (MIC) may lead to multiplication of low-resistant bacteria and thus increase their tendency of being resistant. On the other hand, extended antibacterial blood level above the MIC may promote the survival of more resistant bacteria (Zahreddine *et al.*, 2018). Only ten, (19.6%) of the pharmacists attested to the importance of probing into patients' allergic history. Probing into patient allergic history is very important in antibacterial therapy to avoid hypersensitivity reactions. It has been shown that allergic reactions to penicillins occur in 1-10% of exposed individuals. Patients allergic to penicillin should not take penicillins, cephalosporins or any beta-lactam antibiotic (Chris 2017). There was no association ( $p > 0.05$ ) between socio-demographic characteristics and pharmacists' antibacterial therapy and counselling knowledge indicating that the displayed knowledge was not influenced by any of the demographic characteristics. The pharmacists demonstrated poor antibacterial therapy knowledge but good antibacterial counselling knowledge.

### **Pharmacists' Attitude towards Counselling of Patients on Antibacterial Usage**

It is the pharmacists' responsibility to ensure that patients are properly counseled on appropriate use of medication including antibacterials even though other health care providers also played vital roles. The attitude of pharmacists to antibacterial counseling is vital to ascertain rational drug therapy and improved therapeutic outcome (Naomi *et al.*, 2011; Ayalew, *et al.* 2014; Choudhury *et al.* 2018). It is therefore important for pharmacists to ensure that patients are effectively counselled on the correct use of their medications (Javadi, 2011; Yalda *et al.*, 2016). From the present study, pharmacists' attitude to antibacterial counselling was fairly good. Majority, 36 (70.6%) demonstrated positive attitude to antibacterial counseling. More than half 35 (68.6%)



had the belief that antibacterial counseling is pharmacists' responsibility. This finding differs from that reported by Ayalew *et al.*, 2014 which accounted for 46.9% of the pharmacists that believed on patients' counseling as pharmacists' responsibility. The difference may be as a result of difference in training and update opportunities. A study conducted in the state of Karnataka by Hanna *et al.* 2004 reported that most of the respondents (80.0%) believed that patient counselling is the professional obligation of pharmacists. It is possible that the situation at Karnataka favours patients counselling. For instance, patent load may be lower than in the present setting and adequate update of medication knowledge may be encouraged. The dynamic nature of drugs particularly antibacterials makes regular updates of drug information a matter of compulsion. New products and information about existing ones are being discovered. Pharmacists especially those involved with counselling of patients on medication use must keep themselves abreast of updates so as to

improve their counseling knowledge and skill (Naomi *et al.*, 2011; Choudhury *et al.*, 2018). Majority (96.1%) of the pharmacists in this study consented to the necessity of regular update of antibacterial therapy and counselling knowledge. This is at variance to the minority (42.9%) reported by Ayalew *et al.*, 2014 in support of regular updates. Sources of updates should be accessed with caution. For instance, WHO, 2002 proscribes the use of drug inserts as source of drug information as the claim may be biased? The claim by majority (72.5%) of the pharmacists to update their antibacterial knowledge from reference books is similar to 65.3% reported Ayalew *et al.*, 2014. There was significant association  $p = 0.02$  ( $p < 0.05$ ) between pharmacists' cadre and their attitude to antibacterial counselling. This might be linked with change of attitude due to experience on the job. It is likely that pharmacists on higher cadre are more experienced and concerned with patients' counselling.

**Table 1: Socio-demographic Characteristics of Pharmacists (N = 51)**

Variables	Response category	N (%)
Gender	Male	25 (49.0)
	Female	26 (51.0)
Age (years)	20 – 30	13 (25.5)
	>30 – 40	21 (41.2)
	> 40	17 (33.3)
	Mean Age $\pm$ S.D (years)	37.3 $\pm$ 8.4
Marital Status	Married	41 (80.4)
	Single	10 (19.6)
Highest education qualification	B. Pharm/Pharm. D	33 (64.7)
	M. Pharm/MSc/MPH	8 (15.7)
	FWAPGC	10 (19.6)
	No postgraduate education	33 (64.7)
Field of postgraduate study	Clinical pharmacy	13 (25.5)
	*Other fields	5 (9.8)
Pharmacists' Cadre	Intern/NYSC Pharmacist	11 (21.6)
	Pharmacist Grade I	6 (11.8)
	Senior Pharmacist	12 (23.5)
	Principal Pharmacist	8 (15.7)
	Asst. / Ch. Pharm/D.Direct.	14 (27.5)
	Experience as Hospital Pharmacists (years)	<10 (years)
	>10 (years)	21 (41.2)
Mean Experience $\pm$ SD (years)		9.2 $\pm$ 6.4

B. Pharm = Bachelor of pharmacy, M Pharm = Master of Pharmacy, MSc = Master of Science, MPH = Master in public health, FWAPC= Fellow of West African post graduate college, other fields = field of postgraduate study apart from clinical pharmacy i e pharmacology, pharmacognosy, pharmaceuticals, pharmaceutical chemistry, public health, NYSC = National Youth Service Corps, Asst = Assistant, Ch. = Chief, D. Direct – Deputy Director,

**Table 2: Pharmacists' Baseline Knowledge of Antibacterial Therapy (N = 51)**

Statements	Yes N (%)	No N (%)
Antibacterial drug whose absorption may be hindered by food is best taken at least one hour before or two hours after meal	18 (35.3)*	33 (64.7)
Antibacterial-food interaction cannot be avoided by using the drug at a specified space of time to meals	10 (19.6)	41 (80.4)*
Antibacterial resistance has the potential of ushering health care system into 'post antibacterial era'	40 (78.4)*	11 (21.6)
Antibacterial resistance may be prevented by taking antibacterial medication at regular intervals	21 (41.2)*	30 (58.8)
Antibacterial effectiveness may be improved by taking the medication at a specified time	22 (43.1)*	29 (58.9)
Prolonging antibacterial therapy unduly may not increase cost of therapy	31 (60.8)	20 (39.2)*
In antibacterial therapy, it is advisable to probe into patient's allergic history	10 (19.6)*	41 (80.4)
<b>Mean knowledge score</b>	<b>3.0 ± 1.4</b>	
<b>Cut off of pharmacists' % knowledge score on Antibacterial Therapy</b>	<b>N (%)</b>	<b>Remark</b>
< 75.0%	29 (56.9)	Poor knowledge
≥ 75.0%	22 (43.1)	Good knowledge

Maximum obtainable score = 7, % individual knowledge score = (score obtained by individual ÷ total obtainable score) × 100. \* = correct response.

**Table 3: Baseline Knowledge of Pharmacists on Antibacterial Counselling (N = 51)**

Statements	Yes N (%)	No N (%)
Patients' counselling on antibacterial usage should not include duration of therapy	40 (78.4)	11 (21.6)*
Patients' knowledge of antibacterial use can be enhanced by clearly written guides	25 (49.0)*	26 (51.0)
Counselling patients on likely side effects may not be necessary	42 (82.4)	9 (17.6)*
Pharmacists and patients are mutually active participants in antibacterial counselling	37 (72.5)*	14 (27.5)
Counselling patients on demerits of antibacterial misuse/abuse is not beneficial	44 (86.3)	7 (13.7)*
It is advisable to counsel patients on antibacterial therapy to stop the medication once perfect relief has been achieved	41 (80.4)	10 (19.6)*
Antibacterial counselling must necessarily include completion of dosage and taking the antibacterial drug at regular intervals	47 (92.2)*	4 (7.8)
For the likelihood of missed dosage, patients should be counselled to take the missed dose immediately he/she remembers	34 (66.7)*	17 (33.3)
Antibacterial capsule prescribed as i daily is best communicated to patients as: take one capsule every 24 hours	27 (52.9)*	24 (47.1)
Cut off of individual pharmacist % knowledge score on antibacterial counselling	N (%)	Remark
<b>Mean knowledge score</b>	<b>5.6 ± 2.1</b>	
< 75	14 (27.4)	Poor knowledge
≥ 75	37 (72.6)	Good knowledge

Maximum obtainable score = 9, % individual knowledge score = (score obtained by individual ÷ total obtainable score) × 100.

**Table 4: Baseline Attitude of Pharmacists to Antibacterial Counselling (N = 51)**

Statements	Yes N (%)	No N (%)
Shortage of pharmacists in most hospitals is a justifiable reason for inadequate counselling of patients	29 (56.9)	22 (43.1)*
Pharmacists should be responsible for post counselling follow up of patients on antibacterial therapy:	35 (68.6)*	16 (31.4)
Feedback may not always be necessary in antibacterial counselling	45 (88.2)	6 (11.8)*
"Sorry Madam, If you don't mind, I just want to call your attention to something about your medication" This statement may effective in approaching anon co-operating patient, who happens to be an health worker	38 (74.5)*	13 (25.5)
Effective antibacterial counselling necessitates regular update of knowledge	49 (96.1)*	2 (3.9)
I regularly make use of the internet to update my knowledge of antibacterial therapy and counselling	28 (54.9)*	23 (45.1)
Window counselling is not always appropriate in antibacterial therapy	10 (19.6)	41 (80.4)*
Antibacterial identity should not be disclosed to patients	12 (23.5)	39 (76.5)*
Most patients on antibacterial medication need no counselling	43 (84.3)	8 (15.7)*
<b>Mean knowledge score</b>	<b>6.4 ± 0.8</b>	
<b>Cut off of pharmacists % attitudinal score to counselling</b>	<b>N (%)</b>	<b>Remark</b>
< 75%	15 (29.4)	Negative Attitude
≥ 75%	36 (70.6)	Positive Attitude

Maximum obtainable score = 9; % individual attitudinal score = (score obtained by individual ÷ total obtainable score) × 100.

**Table 5: Association between Socio-demographic Characteristics and Pharmacists' Knowledge and Attitude to Antibacterial Counselling (N = 51)**

Variables		Baseline Survey		X <sup>2</sup>	P value
<b>Demographic characteristics and Pharmacists' knowledge of Antibacterial Therapy</b>					
Age (yrs)	20-40	Poor Knowledge N (%)	Good Knowledge N (%)		0.21
	>40	29 (56.9)	5 (9.8)		
Gender	Male	19 (37.3)	6 (11.8)		0.08
	Female	19 (37.3)	7 (13.7)		
Marital status	Married	27 (52.9)	14 (27.5)		0.19 *
	Single	7 (13.7)	3 (5.9)		
HEQ	B.Pharm/Pharm D	26 (51.0)	7 (13.7)		
	M Pharm & higher Q	12 (23.5)	6 (11.8)		
Pharm' Cadre	Intern/NYSC	8 (15.7)	3 (5.9)		0.24 *
	Pharmacist 1 &#above	38 (74.5)	2 (2.0)		
Experience (yrs)	< 10	29 (56.9)	1 (2.0)		0.54*
	>10	19 (37.3)	2 (3.9)		
<b>Demographic characteristics and Pharmacists' Attitude to Antibacterial Counselling</b>					
Age (yrs)	20-40	24 (47.5)	8 (15.7)		0.73
	>40	14 (27.5)	5 (9.8)		
Gender	Male	20 (39.2)	5 (9.8)		0.38
	Female	18 (35.3)	8 (15.7)		
Marital status	Married	33 (64.7)	8 (15.7)		0.15
	Single	5 (9.8)	5 (9.8)		
HEQ	B.Pharm/Pharm D	25 (49.0)	8 (15.7)		0.69
	M Pharm & higher Q	13 (25.5)	5 (9.8)		
Pharm Cadre	Intern/NYSC	9 (17.6)	2 (3.9)		0.02**
	Pharmacist 1 &#above	29 (56.9)	11 (21.6)		
Experience (yrs)	< 10	23 (45.1)	7 (13.7)		0.70
	>10	15 (2.4)	6 (11.8)		

K =Knowledge NYSC= National youth service corps, \*Fishers' Exact Test, #above =senior pharmacist Principal pharmacist, Assistant chief Pharmacist, Chief pharmacist, Deputy Director. HEQ= Highest educational qualification, Pharm=Pharmacist, \*\*significant association p < 0.05

### Limitations of study

While considering the findings of this study, attention should be drawn to the following limitations: The pharmacists that participated in the study were somewhat few and this may limit general application of the findings. This was why total sampling approach was employed. This also was a pointer to the fact that the institutions' outpatient pharmacies were understaffed. The limited number of available pharmacists makes all the pharmacists including interns and copper pharmacists to be included in the study because they were all responsible for dispensing and counselling of patients at the time of this study. The use of the dichotomous Yes or No to determine the attitude of the pharmacists instead of the Likert scale may also be considered a limitation. Despite these limitations, the findings from this study revealed current therapy knowledge and attitude of pharmacists to antibacterial counselling. The pharmacists had poor knowledge in antibacterial therapy with good antibacterial counselling knowledge. Pharmacists' attitude to antibacterial counseling was found to be positive. It is therefore

important that pharmacists ensure regular update of their knowledge on antibacterial therapy and thus improve their counselling skill.

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