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SERVICES FOR SCIENCE AND EDUCATION

Assessment of Knowledge and Prevalence of Antimicrobial Use (AMU) Among Patients in a District Hospital in Abuja, Federal Capital Territory, Nigeria

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ABSTRACT

Background: Worldwide, antimicrobial use is a major contributor to the development of antimicrobial resistance (AMR), withpeople and animals serving as the primary drivers. Knowledge of antibiotic rational use includes not only providers' actions in ensuring patients receive appropriate treatment for their condition, at the right dose and duration, but also patients' actions in adhering to the treatment protocols recommended, completing the full course, and not sharing or storing medicines for future use. This study aims to determine the knowledge and prevalence of antimicrobial use among patients in a District Hospital in Abuja, Federal Capital Territory, Nigeria. Methods: This was descriptive, cross-sectional study done in September, 2022 among 400 patients attending outpatient clinic at Maitama District Hospital Abuja's. A multistage sampling technique was used in this study. The data was analyzed using the IBM SPSS 28 (Statistical Package for the Social Sciences) computer software (IBM SPSS Inc. 2021). Ethical approval was granted by Bingham University Teaching Hospital, Jos, Plateau State. Results: The prevalence of antimicrobial use in the last 1 month, 6month and last 1 year was 41.5%, 32.0% and 5.6% respectively. A majority (74.25%) of the participants had gotten a prescription for the antibiotics from a doctoror nurse, 83.75% of them had received advice from a doctor, nurse or pharmacist on how to take the antibiotics while 16.25% of them had not. The antibiotics were sourced pharmacy (70.25%), hospital (22.5%), clinic (4.25%) while 3% stated other sources. Respondents stated that the conditions that can be treated with antibiotics, bladder infection or urinary tract infection (UTI) (75.2%), followed by Skin or wound infection (70.8%), Sore throat (62.4%) and Gonorrhea (55.9%) were the most selected. While other conditions were Cold and flu (48.5%), Fever (33.7%), Malaria (34.2%), Measles (30.7%), Body aches (21.3%), Headaches (11.9%) and HIV/AIDS (11.4%). Two thirds (63.25%) of respondents had good knowledge of antimicrobial use, 17.25% fair knowledge of antimicrobial use, and 19.5% poor knowledge of antimicrobial use. Test of

association showed statistical significance for Age ($\chi^2_{(2, N=400)} = 69.56$, $p < 0.003$), Marital status ($\chi^2_{(2, N=400)} = 96.64$, $p < 0.001$) and Education ($\chi^2_{(2, N=400)} = 106.53$, $p < 0.01$). Conclusion: The prevalence of antimicrobial use in the last 1 month was 41.5%, prevalence in last 6 months was 32.0% and in last 1 year was 5.6% respectively.Two thirds of respondents had good knowledge of antimicrobial use, 17.25% fair knowledge of antimicrobial use, and 19.5% poor knowledge of antimicrobial use. Individuals and communities should develop proper health-seeking behavior, such as consulting a physician or a licensed health workers before using antimicrobials.

Keywords: Knowledge, Antimicrobial use, Antibiotic Use

INTRODUCTION

Antimicrobial use is a major contributor to the development of antimicrobial resistance (AMR), withpeople and animals serving as the primary drivers[1]. The imprudent use of Antimicrobials hastens theemergence of antimicrobial resistance (AMR), reducing treatment efficacy and putting the future of human and animal medical interventions at risk.[2] Inadequate infection prevention and control in healthcare institutions, contamination of the food supply with AMR bacteria, limited access to drinkable water, and restrictions in public health preventative programs, such as immunization, sanitation, and sexual health, all contribute to the spread of AMR. [3]

Antibiotic misuse by the general people hasbeen identified as a significant risk factor for antimicrobial resistance[4, 5] People have unfettered access to medicines, even for animals and plants, and established rules addressing this practice are rarely enforced. In food animals and plants, there is little to no adherence to adequate antibiotic use and antimicrobial withdrawal times, resulting in the accumulation of antimicrobial residues on thesefood items, which are then consumed by people, increasing the incidence of AMR. Furthermore, many communities continue to have inadequate WASH systems in their houses, abattoirs, and animalfarms, with most of them dumping effluent and feces contaminated with antimicrobials and AMR- resistant microorganisms into both the land and aquatic environments. it is also worth noting that Nigerians have a poor grasp of antimicrobial resistance and/or the safe use of antibiotics. Health professionals lack the capacity and/or resources to promote AMR awareness and antimicrobial stewardship, and there are currently no limited AMR surveillance systems in place for human, animal,or agricultural health systems, all of which contribute to AMR risk and transmission. [6,7]

To prevent further emergence and spread of antimicrobial resistance, public education, and awareness about the judicious and appropriate use of existing antimicrobials is the core approach to take. Evidence demonstrates that not only in low- and middle-income nations, but even in wealthy ones, public knowledge about antimicrobial resistance is still lacking.[7] Judicious Antibiotic use entails ensuring that the most appropriate antimicrobial is administered while treating illnesses. It demands that "patients receive medicines suited to their clinical needs, in doses that satisfy their own individual requirements, and for an adequate period to guarantee that they obtainthe benefit of the medicines.[8]

This description adds to the WHO definition of rational medicine use: "Medicine use is rational (appropriate, proper, correct) when patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost both to them and the community. Irrational (inappropriate, improper, incorrect) use of medicines is when one or more of these conditions is not met[8]."

Knowledge of antibiotic rational use includes not only providers' actions in ensuring patients receive appropriate treatment for their condition, at the right dose and duration, but also patients' actions in adhering to the treatment protocols recommended, completing the full course, and not sharing or storing medicines for future use[8]. Some advantages of rational antimicrobial use include reduced human and animal mortality and morbidity, shorter hospital length of stay for patients, improved living standards, and economically feasible low-cost health services [9].

The single most significant factor favoring the development of drug resistance in microbes, including bacteria, is excessive/ inappropriate antimicrobial usage (e.g., too wide, without clinical indication, at too low a dose, for too short a duration). AMR is a natural evolutionary reaction to antimicrobial/antibiotics use (AMU).[10] Microorganisms that are subjected to selective pressure evolve defense mechanisms to ward off predators. These mechanisms can take the form of spontaneous mutations, horizontal gene transfer from bacteria, or the acquisition of genetic elementsthat give resistance. As a result, bacteria become less susceptible to medications that they previouslyresponded to[11,12]. AMR organisms are believed to have emerged and spread recently because of a sharp increase in the use of antimicrobial agents in humans, animals, and agriculture (both appropriately and inappropriately) and/or the failure of infection control protocols to adequately stop the spread of resistant organisms[13,14]. Examples of inappropriate use include overprescribing antibiotics by doctors, patient misuse, using antibiotics to promote growth in animals, self-medicationand/or medication of family members (family medication) without prescription from health professionals, and using antibiotics in nursing homes and long-term care institutions, [15] Other examples of inappropriate use include giving a non-first-line antibiotic or an antibiotic with extremely broad-spectrum action for a sensitive infection or an infection that can be treated with a narrow- spectrum medication. The most common improper use of antibiotics in outpatient facilities occurs when antibiotics are recommended for viral respiratory diseases such as viral bronchitis, otitis, and sinusitis[16] .

Antimicrobial use (AMU) and antimicrobial resistance (AMR) awareness levels among residents must be determined in order to optimize the use of antimicrobials in order to improve patient outcomes, ensure cost-effective therapy, and reduce adverse consequences of antimicrobial use (including antimicrobial resistance) among hospitalized patients, the general public, and agricultural professionals where there is a high rate of antimicrobial misuse to combat infections brought about by AMR and delay further emergence and spread of resistance [6,7, 16]. Only a few research data on public awareness and knowledge of antimicrobials use in Nigeria are available presently, as a result, it is critical to examine public knowledge of antimicrobial use in Abuja, in order to determine what kind of intervention the public might require. This study aims to determine the knowledge and prevalence of antimicrobial use among patients in a District Hospital in Abuja, Federal Capital Territory, Nigeria.

METHODS

This study was done in the Abuja Municipal Area Council of Abuja, Nigeria. Abuja is the Federal Capital Territory with a population of 2,702,443 [17,18] The Abuja Federal Capital Territory (FCT) is located between latitudes 8° 25' and 9° 25' N and longitudes 6° 45' and 7° 45' E, with a geographical mass of approximately 8000sq km in the country's center and is bordered on all sides by four states: Niger, Nasarawa, Kogi, and Kaduna. The Federal Capital City (FCC) occupies around 250 square kilometersof the landmass, with a population count of 778,567 for the Abuja Municipal Area Council[19].

Abuja Municipal Area Council (AMAC) established in 1984, is the most populated area council, inhabited by more than half (55%) of the total population in Abuja, the other area councils being Abaji, Bwari, Gwagwalada, Kuje, and Kwali.It has five districts namely Asokoro, Garki, Karu, Maitama, and Wuse Districts and twelve Wards: City Centre, Garki, GUI, Gwagwa, Gwarimpa, Jiwa, Karshi, Kabusa, Karo, Nyanya, Orozo, and Wuse. An Elected Councilor represents each of these wards. The Area Council'sLegislative Arm is made up of Councilors. The Executive Arm is made up of an elected Chairman and Vice Chairman, as well as an appointed Secretary and other supervisory councilors and special advisers[19,20,22].

Majority of the residents in AMAC are civil servants, low-middle-income earners, primarily small traders and low-ranking civil officials which reside in remote areas. Those with a higher socioeconomic position, on the other hand, live in the urban settlement. Some work in NGOs and private sectors while others engage in commercial activities liketrading and transportation[20, 21].

Abuja was chosen for this study as it is now one of Nigeria's ten most populous cities and one of the world's fastest growing cities with an increasing number of the population with representation of all tribes living in Nigeria who have easy access to antimicrobials. According to Nigeria's legislation[21,22]antimicrobials and other antibacterial should only be dispensed with prescription Notwithstanding, a combination of factors ranging from a relative paucity of licensed prescribers, pharmacies, and accessto quality medicines to the proliferation of poorly regulated patent medicine vendors, drug markets, and hawkers means that the country faces severe access issues while also dealing with an irrational drug use crisis. The ease with which antimicrobials can be accessed and purchased over the counter flourishes in an environment characterized by a poorly regulated antimicrobial market and insufficient enforcement of prescription-only access to antibiotics when necessary. In many cases, over-the-counter access is not limited to first- or second-line antibiotics alone, but also includes the critically important class of antimicrobials, which are "peddled" all over the streets of the country, and even though certain antimicrobials are prescribed by a doctor, patients and their families frequently press healthcare personnel for antimicrobials and, in most cases, self-medicate with antimicrobials including for mild viral infections. Antimicrobials are widely utilized therapeuticallyand for livestock growth promotion in the agricultural industry, resulting in widespread drug misuse.

Maitama District Hospital, one of the largest government-owned hospitals in Abuja. Outpatient services, as well as Surgical, Medial, Pediatrics, Obstetrics, and Gynecology services, are available at the two-story, 101-bed hospital. Laboratory, X-ray services and Accident & Emergency service are also available.

Maitama District Hospital (MDH) has a high patient load (average general outpatient attendance of over 1,500/month i.e., 160 per clinic day). The GOPD is visited daily by anaverage of 160 patients presenting with all kinds of symptoms and illnesses. It also provides full- scale clinical and diagnostic services in various areas of specialties to patients from all the districts within AMAC as well as other area councils within the FCT[23].

A descriptive, cross-sectional design was done in September, 2022 among adults who reside in Abuja, that attend Maitama district Hospital Abuja's General Out-Patient Clinic for care, assistance, and treatment. Patients aged 18 andabove who fulfill the inclusion criteria and give informed consent will be enrolled in the trial.

For this study, Sample Size was determined using the Cochran's formula[24] n= $\mathbf{Z^2Pq/e^2}$ n = the desired sample size; Z = the standard normal deviate usually set at 1.96 which corresponds to a 95% confidence level.P = prevalence of residents (18 and above) = 50%. q = 1-P; E = degree of accuracy desired, set at 0.05Therefore N = 1.96^2 *(0.5) *(0.5) /0.005^2.Thus, the minimal sample size obtained for this study population was 384. Then, 10% was added to the sample size to take care of attrition for residents who refused to participate or incompletely answered the interview, thus making the sample size 423.

Respondents were selected using a multistage sampling method.

- **First stage**: Abuja Municipal Area Council (AMAC) was selected using simple random sampling technique by balloting without replacement from the list of five districts in AMAC LGA namely Asokoro, Garki, Karu, Maitama, and Wuse Districts and Maitama district was selected.
- **Second Stage**: Selection of General hospital from Maitama District. Maitama district hospital was selected as it was the only general hospital in this district.
- **Third Stage 3:** Selection of Participants. One in every two patients who came seeking care at the Maitama hospital general outpatient clinic was systematically recruited into the study from all eligible adult patients found in the waiting area of the outpatient clinic before the commencement of consultation. 800 patients were expected basedon the average weekly attendance at OPD, so 20 people were interviewed daily giving a sampling interval of 2 (i.e., formula K= N/n was used, whereby N=the total number of patients attending OPDper week and n=the estimated sample size. K = 800/423, K = 1.89 which was approximated to 2). thesystematic sampling technique was carried out as follows: Simple random sampling was done for the first two patients in the waiting room to get the startingpoint.

Thereafter, every 2nd patient was selected and recruited into the study if consent was given until the required sample size was obtained.

Inclusion Criteria:

The criteria for eligibility for the study included (1.) Adults (18 years and above) visiting the OPD as patients (2.) both males and females who were medically stable and willing to participate.

Exclusion Criteria:
Clients who were very sick and could not understand the study, mentally impaired clients, and those not willing to participate were excluded from the study.

Informed consent was obtained from all of the eligible participants. Data was collected from consenting participants using a structured, open-ended, self-administered questionnaire. The first domain consisted of the demographic details of the participant; the second domain was related to behavior related to antimicrobial use; the third domain was related to the respondent's knowledge of antimicrobial use and assessment of key areas of antimicrobials indication, identification, prescription dangers and administration.

The participant's level of knowledge was determined according to the outcome criteria highlighted below. The independent variables included in this study are the socioeconomic status of the respondent (age, location, gender, ethnicity, education, marital status, and occupation) while the dependent/outcome variables include the knowledge of antimicrobial use, and use of antimicrobials. The definition and measurement of the outcome variables was done as follows;

Knowledge of Antimicrobial Use:
Antimicrobial use i.e., Antibiotic use demonstrates the frequencyin which antibiotics are taken, and the appropriate use including how the antibiotics were gotten, when antibiotics should be taken, and what diseases they should be used for i.e., Gonorrhoea, Bladderinfection or urinary tract infection (UTI), Skin or wound infection;

***Good Knowledge**:*
Those who reported that the antibiotics or antibiotics prescription were obtained from a doctor or nurse, and that they received advice from a medical professional on how to take them. Those who use antibiotics according to the instructions on the label and those who associated AMU with the correct treatment of diseases.

***Poor Knowledge**:*
Those who believe they don't require an expert's opinion or prescription before taking antibiotics, those who do not take the complete course of antibiotics, share antibiotics, or use left-over antibiotics. And those who associated AMU with the wrong treatment of diseases.

Average Knowledge:
Those who have some ideas about the correct use for antimicrobials.

Measurement of Outcome Variables: To compute these outcome variables, respondents' responses to questions asked were scored as "correct" or "incorrect" and transformed as "1" or "0", respectively. The correct responses to questions in each category were added to give the general knowledge score for each of the outcome variables. Respondents scoring above the cut-offs in each thematic area assessed were regarded as satisfactory while those with scores below were considered to have an unsatisfactory knowledge level.

A total of eighteen (18) questionnaire items with True/False answers were used to assess knowledge of antimicrobial use i.e., antibiotics, and the respondents' knowledge was graded with a score of one for correct answer and zero for incorrect answer. As there were eighteen (18) items in this section, the total knowledge score can be between zero to eighteen points, based on this the total knowledge score was categorized into "Sufficient Knowledge i.e., ≥ 12 correct answers", "Moderate" (9-11 correct answers), and "Poor Knowledge" (< 9 correct answers) Responses of "Do not know" were counted as incorrect,and no points were given. The total knowledge score was the sum of all the correct answers providedby the respondent. Mean knowledge score (%) was calculated and divided into three categories: poor use (<50%), average use (50-70%), and good use (>70%) level.

The same criteria were applied for the knowledge of antibiotic use. Eighteen questions assessed antimicrobial i.e., antibiotic usage practices. A score of 70% and above was taken as good practice while less than 50% constituted bad usage practice.

The survey tool was pretested among clients attending clinic at University of Abuja Teaching Hospital, and was adjusted as appropriate. The pretested questionnaire was then administered to participating clients.

The data was analyzed using the IBM SPSS 28 (Statistical Package for the Social Sciences) computer software (IBM SPSS Inc. 2021). The data was summarized usingdescriptive statistics which include the percentages, frequencies. Inferential statisticsprovided an opportunity to assess differences between groups based on certain demographic variablesas well as, determine the factors that predict good antibiotic use. For bivariate analysis, the chi-square test (χ 2) was used to assess associations between independentand dependent variables at 95% Confidence Intervals (95% CIs). At this point, any p-value less than0.05 was considered statistically significant.

Ethical approval was granted by the Bingham University Teaching Hospital Ethical Research Committee and the FCT Health Research committee. Approval and Permission was grated by the Maitama D istrict hospital, Abuja and Health and Human Services Department, of the Federal Capital Territory Administration.

RESULTS

Table 1: Prevalence of Use of antimicrobials among respondents

	Frequencyn n = 400	Percent (%)
Last use of Antimicrobials		
In the last month	166	41.50
In the last 6 months	128	32.00
In the last year	23	5.75
More than a year ago	28	7.00
Never	5	1.25
Can't remember	50	12.50
Antimicrobial prescribed by a Doctor		
Yes	297	74.25

No	80	20.00
Can't remember	23	5.75
Antimicrobial dosage advised by a doctor		
Yes	335	83.75
No	65	16.25
Source of antimicrobial		
Hospital	90	22.50
Clinic	17	4.25
Pharmacy	281	70.25
Other	12	3.00

Prevalence of Use of Antimicrobials Among Respondents

From Table 1, prevalence of antimicrobial use in the last 1 month, 6month and last 1 year was 41.5%, 32.0% and 5.6% respectively. Most (41.5%) of the respondents indicated that they had taken antibiotics in the last 1 month, 32% had taken antibiotics in the last 6 months while other participants had either consumed antibiotics in the last year (5.75%) or more than a year ago (7%). 1.25% of respondents had never used antibiotics and 12.5% stated that they couldn't remember.

A majority (74.25%) of the participants had gotten a prescription for the antibiotics from a doctoror nurse, 20% of them had not, and 5.75% of them stated that they couldn't remember. 83.75% of them had received advice from a doctor, nurse or pharmacist on how to take the antibiotics while 16.25% of them had not.

In response to where the antibiotics were sourced from, 70.25% of the respondents had gotten the antibiotics from a pharmacy, 22.5% had gotten them from a hospital, 4.25% had gotten them from a clinic while 3% stated other sources. When asked about when to cease taking antibiotics, the majority (81.25%) of the participants believe they should stop taking antibiotics when they've taken all the antibiotics as directed, 14.5% believe treatment should be stopped when they feel better, while 4.25% indicated not knowing when to stop. In response to the conditions that can be treated with antibiotics, Bladder infection or urinary tract infection (UTI) (75.2%), followed by Skin or wound infection (70.8%), Sore throat (62.4%) and Gonorrhea (55.9%) were the most selected. While other conditions such as, Cold and flu (48.5%), Fever (33.7%), Malaria (34.2%), Measles (30.7%), Body aches (21.3%), Headaches (11.9%) and HIV/AIDS (11.4%) were selected less.

In response to the question about what to do if respondents' health condition doesn't improve after an antibiotic course, the Majority (91.9%) of the participants chose to 'Go back to hospital', 26.2% chose to '*Ask advice from drug sellers/ physicians*', while 18.6% indicated that they will *Change to other antibiotics*.

Table 2: Knowledge of Antimicrobial Use among Maitama general hospital out-patients, Abuja

Knowledge assessment item	Response option	Gender	Correct response *n* (%)	Incorrect response *n* (%)	Total (%) N=400
"It's okay to use antibiotics that were given to a friend or family member, as long as they were used to treat the same illness"	***False***	**Female**	***192 (48%)***	36 (9%)	228 (57%)
		Male	***116 (29%)***	56 (14%)	172 (43%)
"It's okay to buy the same antibiotics, or request these from adoctor, if you're sick and they helped you get better when you had the same symptoms before"	***False***	**Female**	***133(33.25%)***	95 (23.75%)	228 (57%)
		Male	***79 (19.75%)***	93 (23.25%)	172 (43%)
When I get cold, I will take antibiotics to help me get better Quickly	***False***	**Female**	***167(41.75%)***	61 (15.25%)	228 (57%)
		Male	***120 (30%)***	52 (13%)	172 (43%)
I normally stop taking antibioticswhen I start feeling better.	***False***	**Female**	***166 (41.5%)***	62 (15.5%)	228 (57%)
		Male	***117(29.25%)***	55 (13.75%)	172 (43%)
If my family member is sick, I usually will give him my antibiotics if his illness is similar to mine	***False***	**Female**	***166 (41.5%)***	62 (15.5%)	228 (57%)
		Male	***128 (32%)***	44 (11%)	172 (43%)
I normally keep antibiotics at home in case of Emergency	***False***	**Female**	***129(32.25%)***	99 (24.75%)	228 (57%)
		Male	***83 (20.75%)***	89 (22.25%)	172 (43%)
I will use leftover antibiotics if I am sick	***False***	**Female**	***159 39.75%)***	69 (17.25%)	228 (57%)
		Male	***117 29.25%)***	55 (13.75%)	172 (43%)
I don't need to see a doctor for a prescription if I know the antibiotic to use for my illness	***False***	**Female**	***148 (37%)***	79 (19.75%)	228 (57%)
		Male	***106 (26.5%)***	67 (16.75%)	172 (43%)
I will take antibiotics according tothe instruction on the label	***True***	**Female**	***172 (43%)***	56 (14%)	228 (57%)
		Male	***139 (34.75%)***	33 (8.25%)	172 (43%)
I Normally look at the expiry date of an antibiotic before using it	***True***	**Female**	***199 (49.75%)***	29 (7.25%)	228 (57%)
		Male	***149 (37.25%)***	23 (5.75%)	172 (43%)

Assessment on Use of Antimicrobials i.e., Antibiotics

Table 2 shows that in the antimicrobial use knowledge assessment section, 77% of participants (48% Female, and 29% Male) correctly believe that the statement *"It's okay to use antibiotics*

that were given to a friend or family member, as long as they were used to treat the same illness", is false, while 23% answered incorrectly stating true or don't know.

53% of respondents (33.25% Female and 19.75% Male) correctly believe that the statement *"It's okay to buy the same antibiotics, or request these from a doctor, if you're sick and they helped you get better when you had the same symptoms before"*, is false, while 47% answered incorrectly stating true or don't know. Only 28.25% of respondents (15% female and 13.25% Male) correctly stated that they won't use antibiotics when they get a cold, and many respondents (70.75%) do not stop taking antibiotics when they start feeling better.

73.5% of participants (41.5 % Female and 32% Male) do not give their antibiotics to sick family members with illnesses like theirs, 53% of participants (32.25% female and 20.75% male) do not keep antibiotics at home in case of emergency and 69% of participants (39.75%, 29.25% female and male) will not use leftover antibiotics.

63.5% of participants (37%, 26.5 Female and male) responded 'False' to the question *'' I don't need to see a doctor for a prescription if I know the antibiotic to use for my illness ''.*

Many respondents (77.75%) take antibiotics according to the instruction on the label, and 87% check the expiry date of an antibiotic before using it.

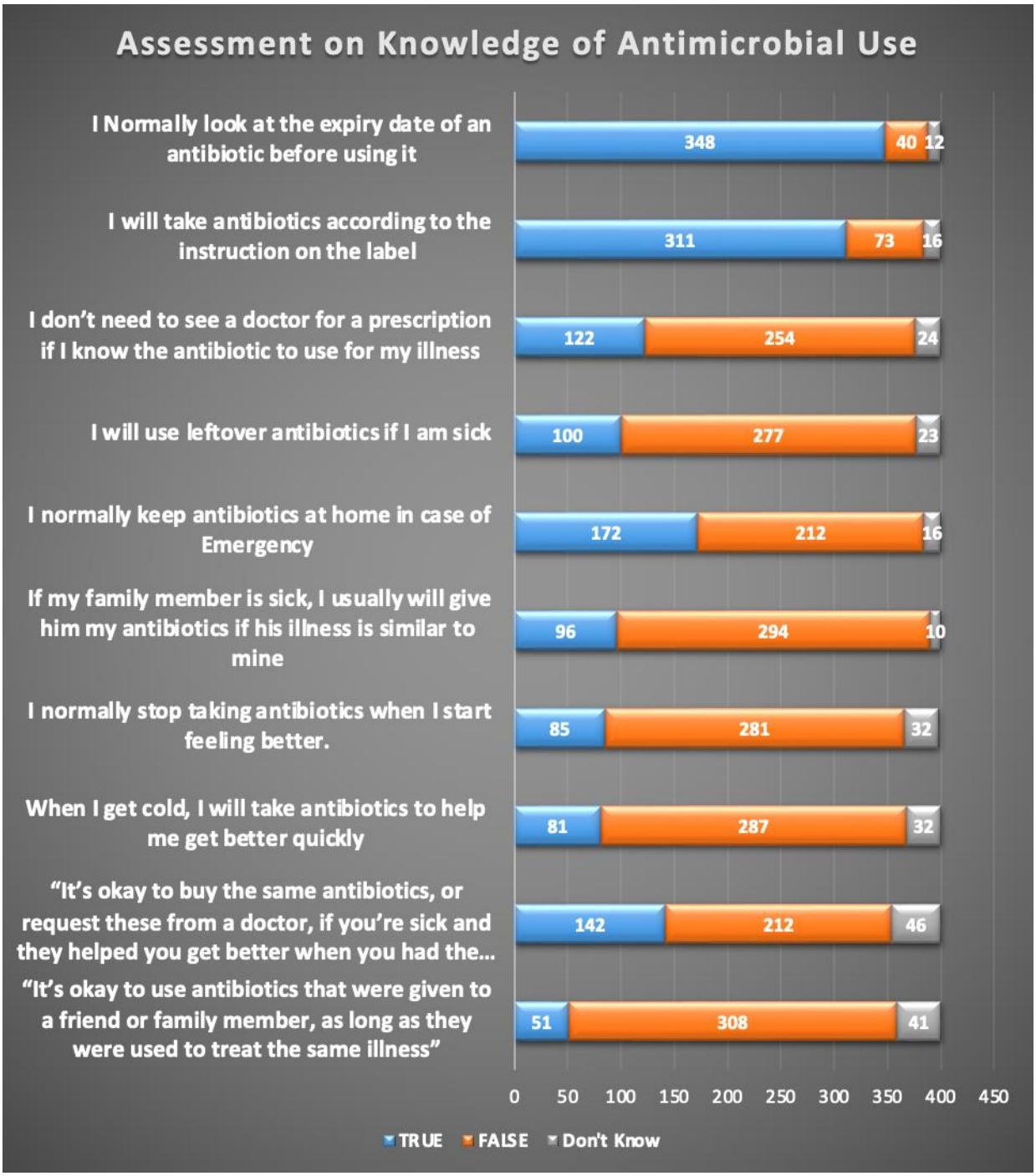

Figure 1: A Stacked-bar chart showing Proportion of participants with correct identification of true and false statements on knowledge of Antimicrobials use i.e., Antibiotics among Maitama general hospital out-patients, Abuja

Table 3: Distribution of Respondents by the level of knowledge of antimicrobial use among Maitama general hospital out-patients, Abuja

Level of Knowledge of antimicrobial use	Total score	% Score	No of respondents, (%) Male	No of respondents, (%) Female	Total N (%)
Good Knowledge	**≥ 7**	**>70%**	99 (24.75%)	154 (38.5%)	253 (63.25%)
Fair Knowledge	**5-6**	**50-69**	32 (8%)	37 (9.25%)	69 (17.25%)
Poor Knowledge	**< 5**	**<50%**	41 (10.25%)	37 (9.25%)	78 (19.5%)
Total			**137 (43%)**	**228 (57%)**	**400 (100%)**

Source: Field survey, 2022

Assessment Level of Knowledge of Antimicrobial Use Among Maitama General Hospital Out-Patients, Abuja

Information in Table 3 shows the level of knowledge of antimicrobial use between male and female respondents. 38.5% of female respondents had good knowledge, 9.25% had fair knowledge while 9.25% had Poor knowledge. From all the male respondents, 24.75% had good knowledge, 8%had fair knowledge and 10.25% had poor knowledge.

Their scores were accumulated by adding the total of correct answers (1) and wrong answers (0) to the questions in the survey. Figure. 4.5 and 4.6 below gives a visual representation on the assessment on level of knowledge of antimicrobial use.

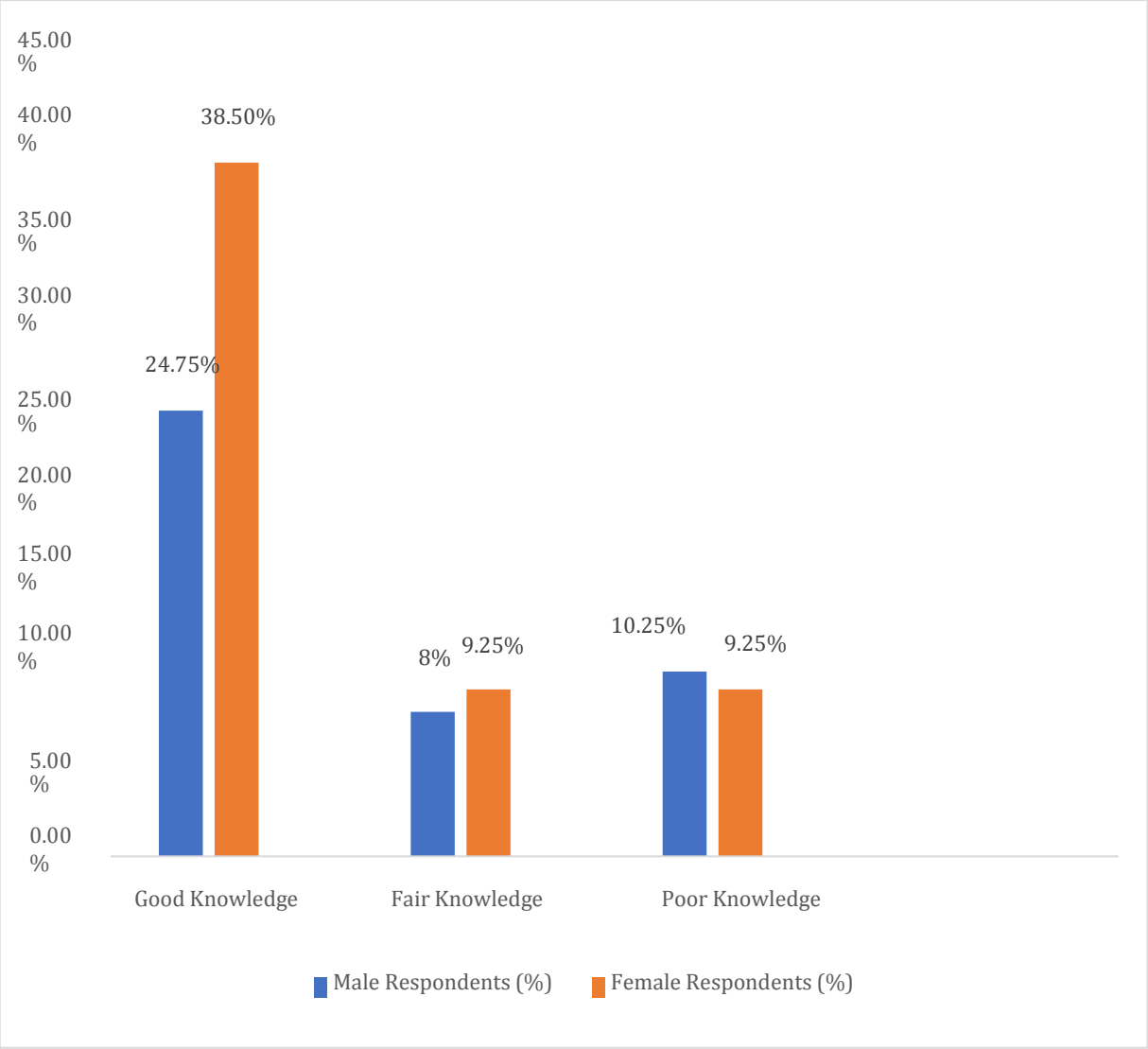

Figure 2: **Bar chart presentation of male and female respondents Knowledge levels of Antimicrobial Use among residents in Abuja Municipal Area Council**

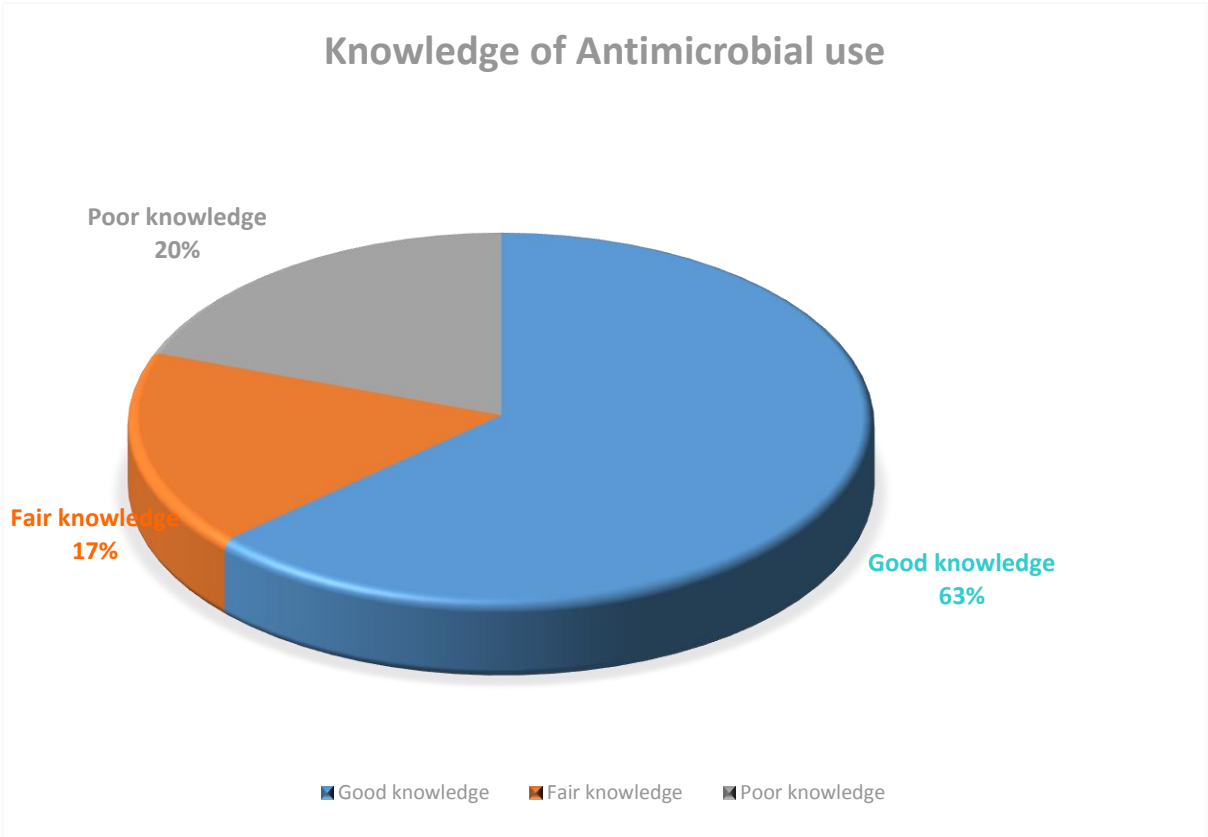

Figure 3: Pie chart presentation of Total percentage Knowledge levels AboutAntimicrobials Use among Maitama general hospital out-patients, Abuja

Table 4: Bivariate analysis between Age, Marital status, and Education and knowledge of antimicrobial use among Maitama general hospital out-patients, Abuja

Variables	Knowledge of Antimicrobial Use				χ2 Value	P-value
		Good Knowledge	Fair Knowledge	Poor Knowledge		
Age	18- 29	101(25.25%)	28 (7%)	49(12.25%)	**69.56**	**< 0.001**
	30-39	87(21.75%)	29 (7.25%)	20 (5%)		
	40-49	33 (8.25%)	5 (1.25%)	2 (0.5%)		
	50-59	22 (5.5%)	3 (0.75%)	4 (1%)		
	60 and above	10 (2.5%)	4 (1%)	3 (0.75%)		
Marital Status	Single	114 (28.5%)	38 (9.5%)	57(14.25%)	**96.64**	**< 0.001**
	Married	127(31.75%)	22 (5.5%)	17 (4.25%)		
	Divorced	9 (2.25%)	7 (1.75%)	4(1%)		
	Widowed	3 (0.75%)	2 (0.5%)	0(0%)		
Education	No schooling received	**0**	0	0	**106.53**	**< 0.001**
	Primary	**0**	**2 (0.5%)**	**0**		
	Secondary	23 (5.75%)	5 (1.25%)	24 (6%)		
	Tertiary	138 (34.5%)	33 (8.25%)	43 (10.75)		
	Postgraduate	90 (22.5%)	31 (7.75%)	11 (2.75%)		
Significant at p<0.05, Pearson Chi-square=χ						

Test of Association (Bivariate Analysis) Between Age, Marital Status, and Education and Knowledge of Antimicrobial Use Among Respondents

Table 4 shows that test of association showed statistical significance for Age ($\chi^2_{(2, N=400)} = 69.56$, $p < 0.003$), Marital status ($\chi^2_{(2, N=400)} = 96.64$, $p < 0.001$) and Education ($\chi^2_{(2, N=400)} = 106.53$, $p < 0.01$). It showed that more respondents 18 - 39 years had good knowledge of antimicrobial use than those 40 and above. A higher proportion of married respondents had good good knowledge of antimicrobial use than those who were single. Most respondents with tertiary or postgraduate education had good knowledge of antimicrobial use than those with primary education or no education at all. These were all statistically significant.

Table 5: Description of scores (outcomes) obtained by respondents (n = 400)

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Outcomes	**Maximum Obtainable Score**	**Scores Obtained by Respondents**		**Good *n(%)***	**Fair *n (%)***	**Poor *n(%)***
		Lowest	**Highest**			
Use of antimicrobials i.e., antibiotics, antifungal, antivirys, antiparasites	10	0	10	63.25%	17.25%	19.5%

Table 5 shows a summary of the outcomes obtained by respondents. 63.25% of respondents had good knowledge of antimicrobial use, (gave satisfactory answers), 17.25% fair knowledge of antimicrobial use, (gave average answers) and 19.5% poor knowledge of antimicrobial use, (gave unsatisfactory answers to questionsunder the use of antimicrobials.0

DISCUSSION

In assessing the use of antibiotics, most (41.5%) of the participants had used an antibiotic in the month preceding the survey, and 32% had taken antibiotics in the previous 6 months. Frequent use and overuse of antibiotics in a population can increase the ecological tendency for resistance[25]. This high prevalence of antibiotic use is similar to the report of previous studies[26,27] and in terms of where people acquired their antibiotics, the majority (74.25%) got prescriptions from their doctor, and 83.75% got instructions on how to take them from a doctor, nurse, or pharmacist. Also noteworthy is the fact that 70.25% obtained the antibiotics from a medical store or pharmacy, though it is important to keep in mind that because this is a self-reported survey, respondents may give the response they think is 'expected,' which can lead to bias.

Understanding when to stop taking antibiotics is a crucial component of appropriate antibiotic use, a significant number of study participants (81.25%) feel that you should stop taking antibiotics once you have taken all of the prescribed doses. WHO recommends that people always take the complete course of antibiotics recommended to them by a licensed healthcare provider because a full course of antibiotics is required to kill all bacteria; stopping early favors bacteria strains that already have some natural resistance[12, 13, 15,27].

In response to the conditions that can be treated with antibiotics, bladder infection or urinary tract infection (UTI) (75.2%), followed by Skin or wound infection (70.8%), Sore throat (62.4%) andGonorrhea (55.9%) were the most selected. While other conditions such as, Cold and flu (48.5%), Fever (33.7%), Malaria (34.2%), Measles (30.7%), Body aches (21.3%), Headaches (11.9%) and HIV/AIDS (11.4%) were selected less. More than half (62.4%) of the participants were unaware that antibiotics are ineffective for sore throat infections, which is greater than the 40% reported from an internet survey by Carter *et al.,* (2016) [28] and below the 70% stated from WHO research carried out in Barbados, China, Egypt, India, Indonesia, Mexico, Nigeria, the Russian Federation, Serbia, South Africa, Sudan, and Vietnam[29] , However, the results of this survey are lower than the 74% reported by Mongolia[30] .

The majority of sore throats are caused by viruses, with the exception of strep throat, which is caused by bacteria. As a result, it is critical that the public understands that not all throat illnesses are caused by bacteria. However, 28.25% of the respondents said they would take antibiotics for a common cold or cough, which is higher than the percentages reported from Hong Kong (17%)[31] , and the United States (27%)[32] , And lower than the proportions 57%, 70%, 83% reported in Qatar [33] , South Korea and Mongolia respectively[30,34]. This suggests that they were unaware that the common cold and cough are viral infections and that antibiotics are ineffective against viruses.

The participants' lack of knowledge could also have been influenced by the terminology employed ('viruses' or 'bacteria'). It might be vital to educate the public on the distinctions

between viruses and bacteria as well as the diseases they cause because respondents might not be able to discriminate between these groups of organisms. In a world of antibiotic resistance, the possibility of this illogical use of antibiotics being repeated is concerning[35].

Respondents were asked to indicate whether the statement It's okay to use antibiotics that were given to a friend or family member, as long as they were used to treat the same illness was true or false (Table 2). Despite the fact that this is an incorrect statement, 12.75% of respondents believe it is true, while 10.25% are unsure. Those with less education are more inclined to believe this assertion is true. Taking antibiotics prescribed for someone else can contribute to their inappropriate use because the person to whom they were prescribed did not complete their course of treatment, and also because the antibiotics may not be appropriate for the friend or family member's particular illness or taken in thecorrect dose or for the correct duration. There is a much greater indication of misunderstanding surrounding the second statement given to respondents: It's okay to buy the same antibiotics, or request these from a doctor if you're sick and they helped you get better when you had the same symptoms before. According to the survey, 35.5% of respondents believe this misleading assertion is correct. This is concerning since doctors should administer antibiotics only after testing to determine whether medicines are required and, if so, whichantibiotics.

Majority (70.75%) (41.5% female and 29.25% male) of the study population (Table 2) stated that the prescribed dose and duration of antibiotics should not be terminated when symptoms improve which is higher than reports from other surveys which reported 34%, 53%, and 58%[31,36,37] .Understanding this theory is critical since discontinuing antibiotics too soon puts people at risk of infection recurrence, colonization with antibiotic-resistant organisms, and complicated disease consequences[38,39].

More than 60% of respondents were already aware that antibiotics should not be bought without aprescription and that leftover antibiotics should not be kept at home. A very high level of positivist 77.75% was shown toward using antibiotics as directed on the label and checking the expiration date of an antibiotic before using it (87%). This is similar to a Malaysian study where 92.2% of participants said they check the expiration date of antibiotics before taking them[40] . Respondents' positive attitude may be due to the increased awareness created by the National Agency for Food, Drug Administration and Control (NAFDAC) on the need to check the expiry dates of medicines at the point of sale oradministration due to the presence of fake and expired medicines in the Nigerian market[41] .When the knowledge level of antimicrobial use was tested, 63.25% (38.5% female, 24.75% male) of respondents were found with good knowledge, 17.5% (9.25% female, 8% male)) had fair knowledge and 19.5% (9.25% female, 10.25% male) had poor knowledge (Table 3).

Limitations to the study maybe the fact that the study did not involve those attending primary health care centers, private hospitals, pharmacies and other smaller health posts. Thus, the findings may not be generalized. The knowledge of antimicrobials use and its use were self-reported, and so there are concerns about response or recall bias.

CONCLUSION

The prevalence of antimicrobial use in the last 1 month, 6month and last 1 year was 41.5%, 32.0% and 5.6% respectively. A majority (74.25%) of the participants had gotten a prescription for the antibiotics from a doctoror nurse, 83.75% of them had received advice from a doctor, nurse or pharmacist on how to take the antibiotics while 16.25% of them had not. The antibiotics were sourced pharmacy (70.25%), hospital (22.5%), clinic (4.25%) while 3% stated other sources. Respondents stated that the conditions that can be treated with antibiotics, bladder infection or urinary tract infection (UTI) (75.2%), followed by Skin or wound infection (70.8%), Sore throat (62.4%) and Gonorrhea (55.9%) were the most selected. While other conditions were Cold and flu (48.5%), Fever (33.7%), Malaria (34.2%), Measles (30.7%), Body aches (21.3%), Headaches (11.9%) and HIV/AIDS (11.4%).

Two thirds (63.25%) of respondents had good knowledge of antimicrobial use, (gave satisfactory answers), 17.25% fair knowledge of antimicrobial use, (gave average answers) and 19.5% poor knowledge of antimicrobial use. Test of association showed statistical significance for Age ($\chi^2_{(2,\ N=400)} = 69.56$, $p < 0.003$), Marital status ($\chi^2_{(2,\ N=400)} = 96.64$, $p < 0.001$) and Education ($\chi^2_{(2,\ N=400)} = 106.53$, $p < 0.01$). It showed that more respondents 18 - 39 years had good knowledge of antimicrobial use than those 40 and above. A higher proportion of married respondents had good knowledge of antimicrobial use than those who were single. Most respondents with tertiary or postgraduate education had good knowledge of antimicrobial use than those with primary education or no education at all. These were all statistically significant.

RECOMMENDATIONS

Individuals and communities should develop proper health-seeking behavior, such as consulting a physician or a licensed health workers before using antimicrobials. Similarly, medical laboratory investigation is important before using medications, discarding leftover antibiotics, and ceasing self-medicating. This will facilitate the appropriate use of antimicrobials and prevent the emergence of antimicrobial resistance (AMR).

The federal, state, and local governments, health care providers, and community health workers should focus on increasing awareness of inappropriate and indiscriminate use of antimicrobial especially antibiotics. This will help reduce AMR risk factors through health campaigns and programs.

Healthcare practitioners should increase their efforts to dispel myths and educate patients about antibiotic use, hence promoting rational antibiotic use in the Nigerian community.

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