Original Article

Knowledge, Attitudes, And Antibiotic Use Practices for Skin Infections Among Undergraduate Students in Delta State, Nigeria: Implications for Antimicrobial Stewardship

RUNNING TITLE: Antibiotic Stewardship in Skin Infections

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ABSTRACT

Skin infections are of a significant health concern in communal student environments and are increasingly associated with irrational antibiotic use. This study investigated the knowledge, attitudes, and antibiotic use practices regarding skin infections among tertiary institution students in Delta State, Nigeria, to identify drivers of antimicrobial resistance (AMR). A descriptive cross-sectional multi-center study was conducted among 423 undergraduate students across five tertiary institutions during the 2025/2026 academic session. Participants were selected via a multistage sampling technique. Data were collected using a validated electronic structured questionnaire (Cronbach's alpha = 0.82) and analyzed using descriptive statistics and Chi-square tests at $p < 0.05$. A majority of respondents (78.5%) reported previous skin infections, primarily acne (59.0%) and boils (41.3%). Although 68.1% had used antibiotics for treatment, only 32.4% demonstrated good knowledge. Inappropriate attitudes towards rational antibiotic use were prevalent (51.1%), with 61.0% admitting to treatment cessation upon symptom resolution. Inappropriate practices were observed in 61.9% of the cohort; specifically, 65.5% engaged in self-medication and 65.2% accessed antibiotics from pharmacies without a prescription. Significant statistical associations were established between practice scores and both knowledge ($\chi^2 = 38.4$, $p < 0.001$) and attitudes ($\chi^2 = 31.2$, $p < 0.001$). Deficiencies in antimicrobial literacy and permissive attitudes toward self-medication substantially influence irrational antibiotic consumption in this population. The findings underscore an urgent need for targeted antimicrobial stewardship programmes and stricter regulatory enforcement of prescription-only medicine sales to mitigate the escalating threat of AMR.

Keywords: Skin infections, Antibiotic stewardship, Antimicrobial resistance, Self-medication

INTRODUCTION

Skin infections remain one of the most common health problems among young adults, particularly tertiary institution students, and their persistence is increasingly linked to inappropriate antibiotic use, self-medication, and poor adherence to prescribed treatment regimens.[1,2] In many low- and middle-income countries (LMICs), antibiotics are frequently used without proper medical guidance, often for conditions that do not require them or without completing the full course of therapy.[3,4] Such misuse contributes significantly to the emergence and spread of antimicrobial resistance (AMR), now recognized as a major global health threat.[5,6]

Evidence from global and regional studies shows that irrational antibiotic consumption is driven by poor knowledge, misconceptions, and ease of access, all of which accelerate resistance development.[7,8] Among university students, these behaviours are often reinforced by peer influence and self-diagnosis, leading to the perception that antibiotics are universal remedies for infections, including skin conditions.[9]

In Nigeria and similar contexts, antibiotic misuse among

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undergraduates is well documented. Studies have shown that students frequently engage in self-medication and inappropriate antibiotic use for common ailments, including skin, respiratory, and gastrointestinal infections, despite varying levels of awareness.[9] Research among Nigerian university students has revealed that moderate antibiotic knowledge does not consistently translate into appropriate practices, resulting in persistent misuse and increasing AMR risks.[9,10] Surveillance studies from hospital and community settings in Africa further demonstrate rising resistance among common bacterial pathogens due to unregulated antibiotic use and poor stewardship.[11,12]

Skin infections among tertiary institution students commonly include bacterial infections such as impetigo, folliculitis, cellulitis, and abscesses; fungal infections such as tinea corporis and candidiasis; and viral infections such as herpes simplex.[16] These are often associated with overcrowding in hostels, poor hygiene, frequent sharing of personal items, and minor skin trauma.[13] Improper management through self-medication can lead to complications including chronic infections, scarring, systemic spread, and increased AMR risk.[16,17,18]

Despite growing evidence on antibiotic misuse in Nigerian universities, there remains a paucity of data specifically examining the intersection of skin infection management and antibiotic use practices among students in Delta State. This study therefore examined the knowledge, attitudes, and antibiotic use practices regarding skin infections among tertiary institution students in Delta State, Nigeria, with implications for antimicrobial stewardship.

MATERIALS AND METHODS

Study Design and Setting

This study adopted a descriptive, cross-sectional, multi-center design conducted during the 2025/2026 academic session across selected universities, polytechnics, and colleges of education in Delta State, Nigeria. The choice of setting was informed by the high concentration of young adults in communal living environments, where skin infections and self-medication practices are commonly reported.

Study Population

The study population comprised undergraduate students (100–500 level) enrolled in tertiary institutions in Delta State who were present during data collection and provided informed consent. Students unavailable at the time of survey administration or who declined participation were excluded.

Sample Size Determination and Sampling Technique

The minimum sample size was determined using the Cochran formula for large populations: $n_0 = z^2 \times p(1-p)/e^2$. Using z = 1.96 (95% confidence level), p = 0.50 (to maximized sample size), and e = 0.05, the initial estimate was 384. Adding a 10% attrition allowance yielded a final sample size of 423 participants.

A multistage sampling technique was employed. First, five tertiary institutions were randomly selected: Delta State University (DELSU), Abraka; Federal University of Petroleum Resources (FUPRE), Effurun; Delta State Polytechnic, Otefe-Oghara; Federal Polytechnic Orogun; and College of Education (COE), Warri. Sample allocation was proportional to student population: DELSU (n=140), FUPRE (n=80), Delta State Polytechnic (n=80), Federal Polytechnic Orogun (n=60), and COE Warri (n=63). Students were stratified by faculty and department, with respondents selected using systematic random sampling.

Data Collection Instrument

Data were collected using a structured self-administered questionnaire assessing socio-demographic characteristics, knowledge of skin infections and antibiotic use (15 items; maximum score 15), attitudes toward antibiotic use (10 items; 5-point Likert scale), and antibiotic use practices (15 items; 3-point scale). Face and content validity were established by experts in public health and epidemiology. A pilot study among students outside selected institutions confirmed reliability (Cronbach's alpha = 0.82), indicating good internal consistency.

The questionnaire was distributed electronically via Google Forms through institutional platforms, student WhatsApp groups, and Telegram channels. Participation was voluntary, informed consent was obtained electronically, and anonymity was strictly maintained.

Data Analysis

Data exported from Google Forms were cleaned, coded, and analyzed using IBM SPSS version 27.0. Descriptive statistics (frequencies, percentages, means, standard deviations) summarized socio-demographic characteristics and KAP scores. Chi-square tests examined associations between knowledge, attitudes, and practice categories. Statistical significance was set at $p < 0.05$.

Knowledge scores were categorized as: poor (0–5), fair (6–10), and good (11–15). Attitude items were scored positively (agree/strongly agree with appropriate-use statements and disagree/strongly disagree with inappropriate-use statements). Practice scores used a 50% cutoff (≥15 = good practice).

Ethical Considerations

Ethical approval was obtained from the relevant institutional ethics committee. All procedures were conducted in accordance with the Declaration of Helsinki. Participation was voluntary, informed consent was obtained from all respondents, and confidentiality and anonymity were strictly maintained throughout the study.

RESULTS

A total of 423 undergraduate students from five tertiary institutions completed the survey, yielding a 100% (n=423) response rate. The mean age was 22.8 ± 3.1 years. Male respondents constituted 55.3% (n=234) of the study population. DELSU, Abraka contributed the largest proportion of participants at 33.1% (n=140). The majority of the respondents 61.5% (n=260) were in 200–300 level of study, and 47.5% (n=201) resided in school hostels (Table 1).

Regarding the prevalence of skin infections and subsequent antibiotic use, most respondents (78.5%, n=332) had previously experienced a skin infection. Among those who had experienced a skin infection (n=332), acne or pimples (59.0%, n=196) and boils (41.3%, n=137) were the most frequently reported conditions. Over two-thirds of the total sample (68.1%, n=288) reported that they had used antibiotics specifically

to treat a skin infection (Table 2).

Knowledge of skin infections and antibiotic use was assessed using 15 distinct items, with a maximum possible score of 15. The mean knowledge score achieved by the cohort was 8.9 ± 2.4. Based on the designated scoring guide, 14.9% (n=63) of the students demonstrated poor knowledge (scores 0–5), 52.7% (n=223) had fair knowledge (scores 6–10), and 32.4% (n=137) possessed good knowledge (scores 11–15). Item-level analysis revealed that while most respondents correctly identified that poor hygiene increases infection risk (85.1%, n=360) and that incomplete antibiotic courses lead to antimicrobial resistance (80.4%, n=340), key gaps remained. Only 38.8% (n=164) of the students knew that antibiotics are not effective against all types of skin infections, and 60.0% (n=254) were unaware that some skin infections can heal naturally without antibiotic intervention (Table 3).

Attitudes toward antibiotic use in skin infections were measured using a 5-point Likert scale. Overall, 48.9% (n=207) of the students demonstrated positive attitudes, while 51.1% (n=216) held negative attitudes. Notably, 61.0% (n=258) agreed or strongly agreed with the practice of stopping antibiotics immediately upon symptom improvement, and 54.6% (n=231) believed that leftover antibiotics from previous treatments could be safely reused for similar subsequent infections. Conversely, a large majority of 82.0% (n=347) agreed that antibiotic misuse actively contributes to the development of drug resistance (Table 4).

Antibiotic use practices were scored on a 3-point scale (Always = 2, Sometimes = 1, Never = 0), yielding a maximum possible score of 30. The mean practice score for the sample was 14.6 ± 4.2. Using a 50% cutoff where a score of 15 or greater indicated good practice, only 38.1% (n=161) demonstrated good antibiotic use practices, while the majority (61.9%, n=262) exhibited poor practices. Alarmingly, 65.5% (n=277) reported always or sometimes self-medicating with antibiotics for skin infections within the past six months. Additionally, over half of the cohort (54.6%, n=231) sometimes or always shared antibiotics with friends or family members, and 70.9% (n=300) stopped taking their medication as soon as their clinical symptoms disappeared (Table 5).

In terms of information sources and antibiotic access, the most common source of information regarding antibiotics was friends or peers (34.0%, n=144), followed closely by the internet and social media platforms (28.1%, n=119). Only 18.9% (n=80) of the students obtained their information directly from trained healthcare professionals like doctors or pharmacists. The majority of respondents (65.2%, n=276) accessed their antibiotics from retail pharmacies without presenting a valid prescription. Furthermore, 58.9% (n=249) of the participants had never received formal health education regarding antibiotic resistance, though a strong majority of 76.6% (n=324) expressed a willingness to support future educational campaigns targeting proper antibiotic use (Table 6).

Chi-square tests of independence revealed statistically significant associations between the students' knowledge levels and their practice categories ($\chi^2 = 38.4$, $p < 0.001$), as well as between their attitude categories and eventual practices ($\chi^2 = 31.2$, $p < 0.001$). Among the respondents who possessed good baseline knowledge (n=137), 57.7% (n=79) demonstrated good practices, compared with only 15.9% (n=10) of those classified with poor knowledge (n=63). Similarly, 55.6% (n=115) of the students holding positive attitudes (n=207) exhibited good practices, whereas only 21.3% (n=46) of those with negative attitudes (n=216) did the same (Table 7).

Table 1: Socio-demographic characteristics of respondents (N = 423)

Characteristic	Frequency (n)	Percentage (%)
Age group		
15–19 years	68	16.1
20–24 years	250	59.1
25–29 years	85	20.1
. . . . .	20	4.7
Mean age	22.8 ± 3.1 years	
Gender		
Male	234	55.3
Female	189	44.7
Institution		
DELSU, Abraka	140	33.1
FUPRE, Effurun	80	18.9
Delta State Polytechnic, Otefe-Oghara	80	18.9
Federal Polytechnic Orogun	60	14.2
College of Education, Warri	63	14.9
Level of study		
100 level	85	20.1
200 level	132	31.2
300 level	128	30.3
400 level	58	13.7
500 level	20	4.7
Place of residence		
School hostel	201	47.5
Off-campus accommodation	156	36.9
Family home	66	15.6
Ever experienced skin infection		
Yes	332	78.5
No	91	21.5
Ever used antibiotics for skin infection		
Yes	288	68.1
No	135	31.9

Table 2: Types of skin infections experienced by respondents (multiple responses; n = 332 who had experienced skin infection)

Skin infection type	Frequency (f)	Percentage (%)*
Pimples/acne	196	59.0
Boils	137	41.3
Rashes	118	35.5
Fungal infection	95	28.6
Ringworm	74	22.3
Scabies	42	12.7
Cellulitis	18	5.4

Percentage calculated among those who ever experienced skin infection

$$Percentage = \frac{frequency\ (f)}{No.of\ those\ who\ experienced\ skin\ infetion\ (n)}$$

Table 3: Knowledge of skin infections and antibiotic use (N = 423)

S/N	Statement	Correct, n (%)	Incorrect/Not sure, n (%)
1	Skin infections can be caused by bacteria, fungi, or viruses	356 (84.2)	67 (15.8)
2	Poor hygiene can increase the risk of skin infections	360 (85.1)	63 (14.9)
3*	Antibiotics are effective against all skin infections	164 (38.8)	259 (61.2)
4	Antibiotics should only be used when prescribed by a healthcare professional	162 (38.3)	261 (61.7)
5	Incomplete use of antibiotics can lead to antibiotic resistance	340 (80.4)	83 (19.6)
6	Antibiotic resistance makes infections harder to treat	335 (79.2)	88 (20.8)
7	Sharing antibiotics with friends or family is unsafe	198 (46.8)	225 (53.2)
8	Expired antibiotics should not be used for treatment	312 (73.8)	111 (26.2)
9	Skin infections can spread from one person to another	365 (86.3)	58 (13.7)
10	Self-medication with antibiotics may worsen skin infections	210 (49.6)	213 (50.4)
11	Overuse of antibiotics contributes to antimicrobial resistance	345 (81.6)	78 (18.4)
12	Some skin infections can heal without antibiotics	169 (40.0)	254 (60.0)
13	It is important to complete the full dose of prescribed antibiotics	358 (84.6)	65 (15.4)
14	Buying antibiotics without prescription increases misuse	204 (48.2)	219 (51.8)
15	Antibiotic resistance is a major public health problem	285 (67.4)	138 (32.6)

*Correct answer = No

Table 4: Attitudes toward antibiotic use in skin infections (N = 423)

S/N	Statement	SA/A, n (%)	Undecided, n (%)	D/SD, n (%)
1	**I believe antibiotics should always be used to treat skin infections**	246 (58.2)	**68 (16.1)**	109 (25.8)
2	I prefer to buy antibiotics without visiting a hospital	198 (46.8)	55 (13.0)	170 (40.2)
3*	**It is important to seek medical advice before using antibiotics**	165 (39.0)	**70 (16.5)**	188 (44.4)
4	I stop taking antibiotics once my symptoms improve	258 (61.0)	52 (12.3)	113 (26.7)
5*	**Antibiotic misuse can contribute to drug resistance**	347 (82.0)	**35 (8.3)**	41 (9.7)
6	I feel confident treating mild skin infections by myself	255 (60.3)	48 (11.3)	120 (28.4)
7*	**Healthcare professionals should regulate antibiotic use strictly**	198 (46.8)	**85 (20.1)**	140 (33.1)
8	Antibiotics from previous treatments can be reused for similar skin infections	231 (54.6)	62 (14.7)	130 (30.7)
9*	**Completing the prescribed dosage is necessary even after recovery begins**	295 (69.7)	**50 (11.8)**	78 (18.4)
10*	Public education on antibiotic use is important among students	342 (80.9)	41 (9.7)	40 (9.5)

**Positive attitude items (SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree).*

Table 5: Antibiotic use practices regarding skin infections (N = 423)

S/N	Practice Statement	Always, n (%)	Sometimes, n (%)	Never, n (%)
1*	**I use antibiotics only when prescribed by a doctor**	95 (22.5)	**112 (26.5)**	216 (51.1)
2	I buy antibiotics from pharmacies without prescription	152 (35.9)	140 (33.1)	131 (31.0)
3*	**I complete the full dosage of prescribed antibiotics**	108 (25.5)	**145 (34.3)**	170 (40.2)
4	I stop using antibiotics when symptoms disappear	178 (42.1)	122 (28.8)	123 (29.1)
5	**I share antibiotics with friends or family members**	96 (22.7)	**135 (31.9)**	192 (45.4)
6	I use leftover antibiotics for new skin infections	112 (26.5)	148 (35.0)	163 (38.5)
7*	**I check expiry dates before using antibiotics**	87 (20.6)	**98 (23.2)**	238 (56.3)
8*	I read instructions before using antibiotics	103 (24.3)	125 (29.6)	195 (46.1)
9	**I use antibiotics for pimples or acne without medical advice**	135 (31.9)	**165 (39.0)**	123 (29.1)
10*	I seek professional medical help for severe skin infections	98 (23.2)	110 (26.0)	215 (50.8)
11	**I store antibiotics for future use**	142 (33.6)	**155 (36.6)**	126 (29.8)
12	I purchase antibiotics based on recommendations from friends/social media	88 (20.8)	177 (41.8)	158 (37.4)
13	**I use herbal remedies together with antibiotics for skin infections**	72 (17.0)	**125 (29.6)**	226 (53.4)
14*	I follow the dosage instructions strictly when using antibiotics	118 (27.9)	140 (33.1)	165 (39.0)
15	**I have self-medicated with antibiotics for skin infections in the past six months**	155 (36.6)	**122 (28.8)**	146 (34.5)

**Positively framed practice items (Always = good practice; Never = poor practice).*

Table 6: Sources of antibiotic information and access (N = 423)

Variable	Frequency (f)	Percentage (%)
Major source of information about antibiotics		
Doctor/Healthcare professional	48	11.3
Pharmacist	32	7.6
Internet/Social media	119	28.1
Friends/Peers	144	34.0
Family members	52	12.3
Television/Radio	18	4.3
Others	10	2.4
Common source of antibiotics		
Pharmacy (without prescription)	276	65.2
Patent medicine store	65	15.4
Hospital/Clinic	42	9.9
Friends/Family	28	6.6
Online vendors	12	2.8
Ever received health education on antibiotic resistance		
Yes	174	41.1
No	249	58.9
Would support educational campaigns on proper antibiotic use		
Yes	324	76.6
No	56	13.2
Not sure	43	10.2

Table 7: Association between knowledge, attitudes, and antibiotic use practices (N = 423)

Variable	Good Practice (≥15), n (%)	Poor Practice (<15), n (%)	χ^2	p-value
Knowledge			**38.4**	**<0.001**
Good (score 11–15)	79 (57.7)	58 (42.3)		
Fair (score 6–10)	70 (31.4)	153 (68.6)		
Poor (score 0–5)	10 (15.9)	53 (84.1)		
Attitudes			**31.2**	**<0.001**
Positive	115 (55.6)	92 (44.4)		
Negative	46 (21.3)	170 (78.7)		

DISCUSSION

Principal Findings

This study examined the knowledge, attitudes, and antibiotic use practices (KAP) regarding skin infections among tertiary institution students in Delta State, Nigeria. The findings revealed suboptimal knowledge, widespread negative attitudes, and a high prevalence of inappropriate antibiotic use practices in this population.

Skin Infection Prevalence and Antibiotic Use

The high prevalence of skin infections (78.5%) is consistent with previous research among Nigerian adolescents and young adults, where acne and pyogenic infections are common in communal living environments.[1,16] The concentration of students in school hostels (47.5%) creates conditions favourable to bacterial and fungal pathogen transmission.[13] Furthermore, 68.1% had used antibiotics for skin infections, indicating a strong inclination toward antimicrobial therapy even for conditions such as mild acne with predominantly non-infectious aetiologies.[14,15]

Knowledge Gaps and Their Significance

Only 32.4% of students demonstrated good knowledge, with a mean score of 8.9 ± 2.4, comparable to findings by Onukansi et al.[10] among another set of Nigerian undergraduates. Critical gaps were identified: only 38.8% correctly understood that antibiotics are not effective against all skin infections, and 60.0% were unaware that some skin infections can heal without antibiotics. These findings align with international evidence from LMIC university populations, where misconceptions about antibiotic indications are widespread.[20] The finding that 61.7% of students did not know antibiotics should only be used when prescribed by a professional underscores' fundamental health literacy deficits, consistent with Popoola et al.[2] Encouragingly, most students demonstrated sound understanding of basic concepts including hygiene (85.1%) and the importance of completing prescribed courses (84.6%) suggesting that nuanced knowledge, rather than foundational awareness, is the primary deficit.[17]

Attitudes and the Knowledge–Attitude Gap

That 51.1% of students held negative attitudes toward appropriate antibiotic use is concerning. The finding that 61.0% would stop antibiotics upon symptom resolution reflects a misunderstanding of pharmacodynamic principles requiring full courses to prevent resistance selection.[3] The combination of 60.3% expressing confidence in self-treating mild infections and 46.8% preferring to purchase antibiotics without professional consultation indicates a strong culture of healthcare self-reliance documented in other African settings.[2,7] Unexpectedly, 82.0% acknowledged that antibiotic misuse contributes to drug resistance, suggesting a disconnect between general awareness and personal behavioural

change [6,17] a pattern documented in multiple LMIC settings.

Antibiotic Use Practices: The Stewardship Challenge

Practice assessments yielded the most concerning findings. The 65.5% self-medication prevalence and 65.2% non-prescription access rate are comparable to those reported by Onukansi et al.[10] and Ajagu et al.[9] reflecting weak regulatory enforcement in the Nigerian context.[4] Antibiotic sharing (54.6%), premature treatment discontinuation (70.9%), and failure to check expiry dates (56.3%) collectively represent a dangerous pattern of medication mismanagement that accelerates resistance.[6,17] The predominance of informal information sources peers (34.0%) and the internet (28.1%) over healthcare professionals (18.9%) perpetuates misconceptions and normalises non-prescription use.[2]

KAP Interrelationships

The statistically significant associations between knowledge and practice ($\chi^2 = 38.4$, $p < 0.001$) and between attitude and practice ($\chi^2 = 31.2$, $p < 0.001$) align with Onukansi et al. [10] and Akande-Sholabi et al.[7] However, a knowledge–practice gap persists: even among students with good knowledge, 42.3% still engaged in poor practices, suggesting that knowledge alone is insufficient for behaviour change.[2,12] Convenience, cost, and overconfidence in self-treatment likely override knowledge,[3,8] underscoring the need for interventions targeting beliefs and social norms.[22]

LIMITATIONS

This study has some limitations that should be considered when interpreting the findings. First, the cross-sectional design precludes causal inference between knowledge, attitudes, and practices. Second, the reliance on self-reported data may introduce social desirability bias, potentially leading to under-reporting of inappropriate practices. Third, while the sample was drawn from five institutions using a multistage sampling technique, findings may not be fully generalizable to all tertiary institutions across Nigeria. Fourth, electronic data collection via Google Forms may have excluded students without smartphone or internet access, potentially underrepresenting certain sub-populations. Fifth, the absence of microbiological data limits conclusions about actual resistance patterns in this population. Despite these limitations, the study provides valuable baseline data for antimicrobial stewardship planning in similar settings.

CONCLUSION

This study demonstrates that undergraduate students in Delta State, Nigeria, exhibit suboptimal knowledge, predominantly negative attitudes, and high rates of inappropriate antibiotic use practices related to skin infections. Self-medication, non-prescription access, and premature treatment discontinuation are pervasive. Although knowledge and positive attitudes are significantly associated with better practices, a knowledge-practice gap remains.

RECOMMENDATIONS

Urgent and coordinated responses are needed, including: integration of antimicrobial stewardship into tertiary institution curricula, peer-led educational interventions specifically addressing self-limiting nature of many skin infections, stricter enforcement of prescription-only medicine regulations, and health education campaigns targeting informal information channels. These strategies are essential to curbing the escalating threat of AMR in this vulnerable population.

WHAT IS ALREADY KNOWN ON THIS TOPIC

1. Antibiotic misuse and self-medication are prevalent among university students in sub-Saharan Africa and are recognized drivers of antimicrobial resistance.
2. Knowledge of antibiotic use does not consistently translate into appropriate practices among undergraduate students in Nigeria.
3. Skin infections are common in communal student living environments and are frequently mismanaged with antibiotics.

WHAT THIS STUDY ADDS

1. This is among the first multi-centre studies specifically examining KAP regarding antibiotic use for skin infections across multiple tertiary institution types in Delta State, Nigeria.
2. The study provides quantitative evidence of a knowledge–practice gap: even students with good knowledge demonstrate inappropriate antibiotic use practices at a substantial rate.
3. Findings highlight that peer networks and social media rather than healthcare professionals are the dominant sources of antibiotic information, with direct implications for stewardship programme design.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

OEO and UO conceived and designed the study. OEO, OAB, and OOJ developed the data collection instrument and supervised data collection. EOE and EIM performed data analysis and interpretation. UO drafted the manuscript. All authors critically revised the manuscript for important intellectual content and approved the final version for publication.

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