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Determination of Antibiotic Prescription Pattern in Private Healthcare Facilities in Port Harcourt Metropolis, Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Background: The consequences of antimicrobial resistance are severe, as mortality and morbidity rates continue to increase. The extensive use of antibiotics contributes significantly to the development and spread of antimicrobial resistance. It is crucial to have knowledge supported by data to improve antimicrobial stewardship and address the growing problem of antimicrobial resistance globally and locally. Thus, an evaluation was conducted to assess the prescription practices of doctors working in private medical facilities in Port Harcourt, Rivers state, Nigeria.
Methods: A cross-sectional survey was carried out using a structured questionnaire to collect information on medical training and antibiotic prescription practices among 102 medical doctors.

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Data was analyzed at a 95% confidence interval using the SPSS v25 software and a p-value less than 0.05 was considered significant.

Results: The respondents' demographics indicated that 67.6% were male, while 32.4% were female practitioners. The majority, about 60.8%, had MBBS only, while 21.6% had a postgraduate medical fellowship and 17.6% had postgraduate degrees (PGD/MSc/PhD). The data revealed that 35.3% of the respondents had practiced for at least 15 years, while 33.3% had practiced for 1-5 years and 23.5% for 6-10 years. Cephalosporins were commonly prescribed by 43.1% of the respondents, with cefuroxime being the most frequently prescribed. Amoxicillin was prescribed by 20.6% of the respondents, while only 2.9% of them indicated prescribing Penicillins V or G. Laboratory investigations were the basis for prescribing antibiotics in 30.4%, while 69.6% prescribed on an empirical basis. The cross-tabulation of basis of prescriptions with qualifications showed that persons with postgraduate medical fellowship (86.4%) mostly prescribed based on clinical judgment, while individuals with MBBS only least commonly prescribed by clinical judgment. The prescription by empirical assessment was also mostly common among individuals with 6-10 years of practice experience (75%). However, no statistically significant association was found between the basis of prescriptions and academic qualifications or years of practice.

Conclusion: The study's results revealed that doctors in private medical facilities in Port Harcourt have a strong inclination towards prescribing cephalosporins, particularly on empirical grounds rather than laboratory investigations. It is highly recommended to take immediate measures to promote the implementation of antimicrobial stewardship principles to address the local rise in antimicrobial resistance.

Keywords: Prescription; antibiotics; doctors; hospitals; Port Harcourt.

1. INTRODUCTION

Antibiotics are a type of medication used to inhibit the growth or destroy pathogens [1]. It has been observed that physicians prescribe antibiotics more often than any other type of medication, but they are frequently prescribed inappropriately [2,3]. For instance, research indicates that antibiotics account for 85% of all prescriptions issued by physicians [2,3]. One of the primary objectives of medical practice is to ensure that antimicrobial agents are used correctly [1]. In developing nations, many healthcare facilities struggle with irrational prescriptions of antibiotics [4], which can include the unnecessary use of antibiotics to treat non-responsive conditions, suboptimal usage of antibiotics to treat responsive conditions, incorrect dosages or durations, excessive use of broad-spectrum agents, and poor adherence [5]. The irrational use of antimicrobial agents is a widespread issue that has resulted in the emergence of antibiotic resistance [6]. The World Health Organization (WHO) has defined the rational use of drugs as patients receiving appropriate medication at the proper dose, for an appropriate period, and at the lowest possible cost to them and their community [7]. In several countries, irrational prescriptions of antimicrobial agents have drawn the attention of health authorities due to their adverse effects on the development of resistance, increased healthcare expenses, morbidity, and mortality [8]. Drug utilization studies aim to promote the rational use of drugs by assessing drug use and comparing the data to predetermined standards and criteria [1]. These studies provide information on how drugs are being used, allowing for the management of adverse effects and economic problems caused by inappropriate drug use. Several studies have been conducted on the use of antibiotics in various hospitals worldwide [9,10,1,11]. In developing nations, drug use is not as closely regulated as it is in developed nations, which has resulted in the inappropriate use of antibiotics and the emergence of antibiotic resistance [1]. To reduce antimicrobial resistance in hospitals, interventions such as monitoring antibiotic use, evaluating prescription patterns, and developing and implementing antimicrobial stewardship tailored to the hospital's specific needs should be implemented. This study assessed the prescription pattern of antibiotics among private medical practitioners.

2. METHODS

2.1 Study Setting/Location

This study was carried out in Port Harcourt Rivers State, Nigeria. This study was carried out using self-administered questionnaires.

2.2 Study Design

This is a retrospective, cross-sectional (descriptive) study of the antibiotic's prescription pattern among doctors in Port Harcourt, Rivers State. A total of 102 private medical practitioners met the inclusion criteria.

2.3 Study Procedure Data Collection

The study employed an interviewer-administered structured questionnaire to collect information on the participant's demographics, the number of antibiotics prescribed, dosage regimen (including dosage form, strength, dose, dosing frequency, and duration of administration), hospitalization duration, patient antimicrobial culture sensitivity test results, and the cost of the prescribed and administered antibiotics treatment. To evaluate the questionnaire's reliability, a test-retest approach was utilized. The questionnaire was distributed to 40 individuals with similar characteristics to the study population, who were outside the study area. After a two-week period, the same individuals were asked to complete the questionnaire again. The responses from both administrations were compared and assessed for reliability using the Kuder-Richardson test, which yielded a reliability coefficient of 0.78, indicating that the questionnaire was reliable.

2.4 Data Analysis

The data obtained were coded and checked for completeness and consistency. Statistical Package for Social Sciences v25 was used for the data analysis. Data collected were summarized using a frequency (percentage), mean and standard deviation. Chi-square analysis was used to assess the association of the basis of prescription with years of experience and academic qualifications among the participants. All analysis was done at a 95% confidence interval and a p-value less than 0.05 was considered statistically significant.

3. RESULTS

3.1 Demographic Characteristics

Among the 102 private health facilities sampled, 32.4% had female doctors while 67.6% were males as shown in Table 1. Results also revealed that most (35.3%) of the respondents had at least 15 years of experience followed by 1-5 years of experience (33,3%). Most (60.8%)) of the respondents had at least MBBS qualification.

Table 1. Demographic Distribution of Respondents

Variables	Frequency (n=102)	Percent (%)
Gender		
Female	33	32.4
Male	69	67.6
Age – groups (years)		
20 – 29	13	12.7
30 – 39	36	35.3
40- 49	22	21.6
50 – 59	14	13.7
>60	17	16.7
Qualification		
Fellowship	22	21.6
MBBS only	62	60.8
PGD/MSc/PhD	18	17.6
Years of Practice		
1 - 5 years	34	33.3
6 - 10 years	24	23.5
10 - 15 years	8	7.8
15 and above	36	35.3
Location of clinic/hospital		
Semi-Urban	18	15.6
Urban	84	84.4

3.2 Characteristics of Healthcare Institutions

Results revealed that most private health institutions in Port Harcourt Rivers State had between 1- 10 medicals doctors (88.2%), 1-10 nurses (77.5%), and storage of less than 5 classes of antibiotics (65.7%) as shown in Table 2.

3.3 Drug Use Type

Table 3 shows the type, number and percentage of antibiotic prescribed during the study. Cephalosporins were the most prescribed antibiotic group (43.1%) with ceftriaxone being the most prescribed member of this group with 16.7% of all prescribed antibiotics. Amoxicillin was prescribed 20.6% of the time followed by ciprofloxacin (9.8%) while quinolones (2%) were the least prescribed.

3.4 Prescription Indicators

The basis of antibiotic prescription was investigated in this study. Fig. 1 shows that 69.6% of the antibiotic prescriptions were based on Empirical judgment while 30.4% of the prescriptions had a laboratory indication.

Results of the study as shown in Table 4 revealed private medical doctors with fellowship relied more on clinical parameters for antibiotics prescription (86.36%) as against doctors with just MBBS (62.90%). Table 4 also shows that doctors had between 6 – 10 years of experience in practice prescribed antibiotics based on clinical judgment while 50% of doctors with 10 – 15 years of experience prescribed antibiotics based on report of laboratory investigations.

Table 2. Characteristics of Healthcare institutions

Variables	Frequency	Percent
Number of Doctors		
1 -10	90	88.2
11 – 20	5	4.9
20 and above	7	6.9
Number of Nurses		
1 – 10	79	77.5
11 – 20	8	7.8
20 and above	15	14.7
Number of pharmacists		
1 – 10	96	94.1
11 – 20	4	3.9
20 and above	2	2
Bed Capacity		
10 or less	52	51
10 - 50 beds	39	38.2
50 and above	11	10.8
No of classes of antibiotics in storage		
<5	67	65.7
≥5	35	34.3

Table 3. Commonly Prescribed Antibiotics

Antibiotics	Frequency	Percent
Cephalosporins	61	43.1
Amoxicillin	21	20.6
Ceftriaxone	17	16.7
Ciprofloxacin	10	9.8
Amoxiclav	5	4.9
Penicillin V &G	3	2.9
Quinolones	2	2
Total	**102**	**100**

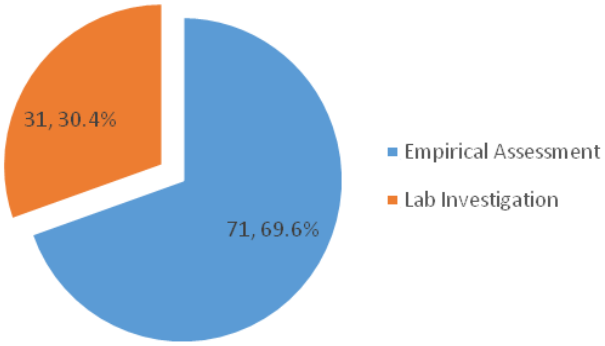

Fig. 1. Basis for the choice of prescription

Table 4. Distribution of basis of prescription by qualifications and years of practice

Variables	Empirical assessment n=71, %	Lab investigation n = 31, %	Total n =102,%	Chi-square (p-value)
Qualification				
Fellowship	19(86.36)	3(13.64)	22(100.00)	4.29 (0.117)
MBBS only	39(62.90)	23(37.10)	62(100.00)	
PGD/MSc/PhD	13(72.22)	5(27.78)	18(100.00)	
Years of Practice				
1 - 5 years	25(73.53)	9(26.47)	34(100.00)	
6 - 10 years	18(75.00)	6(25.00)	24(100.00)	2.17 (0.536)
10 - 15 years	4(50.00)	4(50.00)	8(100.00)	
15 and above	24(66.67)	12(33.33)	36(100.00)	

4. DISCUSSION

Improper use of antibiotics has become a significant public health issue worldwide due to the development of antibiotic resistance. WHO reports have revealed poor efforts to encourage rational antibiotic use in developing nations. Given the growing number of infections caused by antibiotic-resistant bacteria, there is a pressing need for rational drug use, and studies promoting it are necessary. Rational drug use has numerous medical, social, and economic benefits, which can contribute significantly to a global reduction in morbidity and mortality [12]. The study's participants included 67.6% men and 32.4% women, which differs from the study of Elvis et al., who reported more female prescribers (83.9% females and 16.1% males). This study found that cephalosporins were the most frequently prescribed antibiotics (59.8%), followed by amoxicillin (20.6%), while quinolones (2%) and penicillin V and G (2.9%) were less commonly prescribed. Some studies, such as Faris et al., reported a similar pattern with 16.9% use of ceftriaxone [13]. Results were consistent with earlier studies on pediatric patients in Port Harcourt and Ethiopia (Girma et al. [14], Mgbahurike et al. [15]), which indicated that amoxicillin was the most frequently prescribed antibiotic [15]. Another study found that amoxicillin, azithromycin, amoxicillin-clavulanate, and cefaclor were the most prescribed [16]. This study revealed that 30.4% of antibiotic prescriptions followed laboratory investigation, while 69.6% were prescribed without any laboratory investigation. This suggests that many antibiotics were prescribed without confirmation of bacterial infection, which can contribute to increased antibiotic resistance [12,17]. Numerous studies have demonstrated that overuse of antibiotics is associated with an increased risk of antibiotic resistance [18,19].

The high prevalence of cephalosporin use in this study is concerning because it has been shown to contribute to the development of antibiotic-resistant bacteria. Overuse of these antibiotics can lead to the emergence of resistant strains of bacteria, making it more difficult to treat infections with the same class of antibiotics in the future [20,21]. This can have severe implications for public health since antibiotic-resistant infections are more difficult to treat and can result in higher morbidity and mortality rates. The low

use of quinolones and penicillin V and G is also notable because these antibiotics are effective treatments for specific bacterial infections [17]. Underuse of these antibiotics may indicate a lack of awareness or understanding of their appropriate use among healthcare providers. It is crucial for healthcare providers to use antibiotics judiciously, based on the type of infection and the bacteria's susceptibility to different classes of antibiotics [10,16].

5. CONCLUSION

The study revealed that doctors in private medical facilities in Port Harcourt tend to rely on empirical assessment rather than laboratory investigations when prescribing antibiotics, which is not in line with WHO's recommended antibiotics prescription pattern. To address the local increase in antimicrobial resistance, it is recommended that urgent measures be taken to promote the adoption of antimicrobial stewardship principles.

CONSENT AND ETHICAL APPROVAL

The study protocol was approved by the research and ethical committee of Ministry of Health Rivers State. A written informed consent was obtained from the participants prior to their inclusion into the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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