Original Research Article

PRESCRIPTION PATTERN OF ANTIBIOTICS IN PRIVATE HEALTHCARE FACILITIES IN PORT HARCOURT METROPOLIS, RIVERS STATE.

ABSTRACT

Background: The consequences of antibiotic resistance are grave with mortality and morbidity continually on the rise. The widespread use of antibiotics plays a major role in the development and spread of antimicrobial resistance. Knowledge backed by data will help improve antimicrobial stewardship and curb the growing challenge of antimicrobial resistance locally and globally. An assessment of antibiotic prescription practices of doctors in private practice in Port Harcourt, Rivers state, Nigeria was carried out.

Method: A structured questionnaire was used to collect information on medical training and antibiotic prescription practices among 102 medical doctors. 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: Demographic characteristics showed that 32.4% of the respondents were female and 67.6% were male practitioners. About 60.8% had MBBS only, 21.6% had a postgraduate medical fellowship and 17.6% had postgraduate degrees (PGD/MSc/PhD). The data showed that 35.3% of the respondents had practiced for at least 15 years, 33.3% had practiced for 1 -5 years and 23.5% had practiced between 6 – 10 years. The results showed that 43.1% of the respondents commonly prescribed cephalosporins with cefuroxime being the most frequent. Amoxicillin prescribed by 20.6% while only 2.9% indicate prescribing the Penicillins V or G. Laboratory investigations were the basis for prescribing antibiotics in 30.4% while 69.6% prescribed on empirical basis. The cross-tabulation of basis of prescriptions with qualifications showed that prescription based on clinical judgment was mostly common among persons with postgraduate medical fellowship (86.4%) and least common among individuals with MBBS only. The prescription by empirical assessment was also mostly common among individuals with 6 – 10 years practicing experience (75%). However, there was no statistically significant association between the basis of prescriptions with academic qualifications or years of practice.

Conclusion: Findings of the study indicate a high preference for prescription of cephalosporins especially based on empirical assessment and not laboratory investigations among doctors in private medical facilities in Port Harcourt metropolis. Urgent steps are recommended to ensure adoption of antimicrobial stewardship principles in a bid to control the growing rate of antimicrobial resistance locally.

Keywords: prescription, antibiotics, doctors, hospitals, Port Harcourt.

1.0 INTRODUCTION

Antibiotics are drugs used to suppress or destroy the growth of pathogens [1]. It has been identified that antibiotics are one of the drugs most prescribed by physicians but in most cases are prescribed inappropriately. For example, studies [2,3 stated that 85% of all prescriptions generated by physicians are antibiotics. One of the main goals of medical practice is to ensure the appropriate use of antimicrobial agents [1]. It has been identified that many health facilities in developing countries are faced with the problem of irrational antibiotics prescription [4]. These inappropriate prescriptions include [but are not limited to] the unnecessary use of antibiotics to treat non-responsive conditions and the suboptimal use of antibiotics for treating responsive conditions; incorrect use of drugs, their dosing and duration; excessive use of broad agents, and poor adherence [5]. The widespread irrational use of antimicrobial agents has led to an emergence of antibiotics resistance [6]. Rational use of drugs has been defined by the world health organization (WHO) as patients receiving appropriate medication for their clinical needs at the appropriate dose designed to meet their personal needs for an appropriate period and at the lowest cost to them and their community [7]. Irrational prescribing of antimicrobial agents is a global problem that has drawn the attention of health authorities in many countries because of its adverse bearing on the development of resistance, increase in healthcare cost, morbidity, and mortality [8]. Drug utilization studies assess the appropriate use of drug therapy by evaluating drug use and comparing data obtained against predetermined criteria and standards. The main objective of drug utilization studies is to promote the rational use of drugs in populations. [1] These studies provide information on how drugs are being used thereby providing means of managing the adverse effects and economic problems emanating from inappropriate use of drugs. Studies have been carried out on drug utilization of antibiotics in different hospitals all around the world. [9,10,1,11] In developing counties, regulating drug use is not as strict as in developed countries and this has given rise to inappropriate prescription and use of antibiotics with the emergence of antibiotics resistance. [1] To reduce antimicrobial resistance in hospitals, interventions should be put in place such as monitoring the use of antibiotics, evaluating prescription patterns, developing, and implementing antimicrobial stewardship to suit the peculiar needs of the hospital amongst others. This study, therefore, evaluated the pattern of antibiotic prescription amongst private medical practitioners.

2.0 METHODS

2.1 Ethical consideration

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.

2.2 Study setting/Location

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

2.3 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.

2.4 Study procedure Data collection

Two trained research assistants and the primary researcher were involved in the data collection process. Data relevant to the objective of the study were retrieved from the study group using a pre-designed standard data collection form. These include doctor's demography, and number of the antibiotics prescribed, dosage regimen (dosage form, strength, dose, dosing frequency and duration of administration), number of days of hospitalization, patient's antimicrobial culture sensitivity test results, cost of prescribed and administered antibiotics treatment. Other information assessed includes the knowledge of antibiotic stewardship.

In-depth interview

In depth interview was conducted among randomly selected private medical practitioners. The interview addressed the pattern of antibiotic prescription in the health facility, the presence and use of standard treatment guideline and essential medicine list. A structured questionnaire was adapted and tailored to suit the objectives of the study. The feasibility of the instrument was assessed on ten healthcare professionals who were not included in the main study. The confidentiality of the participants was maintained throughout the process.

2.5 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.

3.0 RESULTS

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

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.

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

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.

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
PenicillinV &G	3	2.9
Quinolones	2	2
Total	**102**	**100**

Prescription Indicators

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

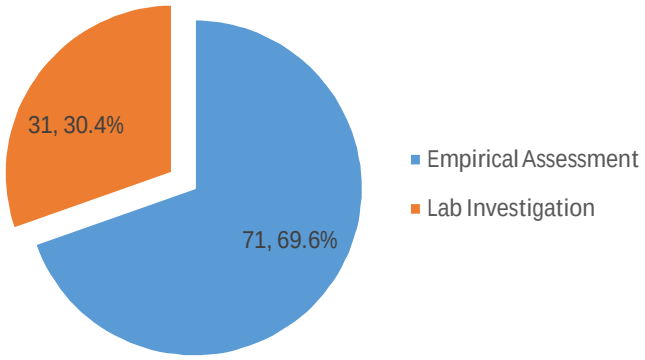

Figure 1: Basis for the choice of prescription

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 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
MBBS only	39(62.90)	23(37.10)	62(100.00)	(0.117)
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
10 - 15 years	4(50.00)	4(50.00)	8(100.00)	(0.536)
15 and above	24(66.67)	12(33.33)	36(100.00)	

4.0 Discussion

Inappropriate use of antibiotics is a global public health challenge and has been associated with antibiotic resistance. WHO reports show that efforts to promote rational antibiotic use in developing countries are poor. With the growing number of infections with antibiotic resistant bacteria, rational drug use becomes imperative and studies that promote rational drug use are highly necessary. Appropriate drug utilization contributes immensely to a global reduction in morbidity and mortality because of its medical, social and economic benefits [12]. Prescribers who participated in the study comprised 67.6% males and 32.4% females which is at variance with the study of Elvis *et al.,* who reported more female prescribers (83.9% females and 16.1% males). The most prescribed antibiotics in this study were cephaolosporins (59.8%) and Amoxicillin 20.6%, while the less commonly prescribed were quinolones (2%) and penicillin V and G (2.9%). When comparing this result with other studies, it was found out that some studies reported similar pattern with Faris *et al.,*. [13] reporting 16.9% use of ceftriaxone.

Results obtained were similar to earlier study among pediatric patients in Port Harcourt and in Ethiopia (Girma *et al.,* [14], Mgbahurike *et al.,* [15]. Most studies showed that amoxicillin was the most prescribed antibiotic [15]. Another study found that amoxicillin, azithyromycin, amoxicillin – clavunate and cefaclor were most prescribed [16]. In our study, 30.4% of the antibiotic's prescription followed laboratory investigation whereas 69.6% were prescribed

without laboratory investigation, indicating that many antibiotics were prescribed without any confirmation of bacterial infection, which can lead to increased antibiotic resistance [12,17]. Many studies have established association between overuse of antibiotics to potential increase in antibiotic resistance [18,19]

The high prevalence of cephalosporin use in this study is concerning, as it has been shown to contribute to the development of antibiotic-resistant bacteria. The 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 serious implications for public health, as 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 noteworthy, as these antibiotics are considered to be effective treatments for certain types of bacterial infections [17]. The underuse of these antibiotics may suggest a lack of awareness or understanding of their appropriate use among healthcare providers. It is important for healthcare providers to use antibiotics judiciously, based on the type of infection and the susceptibility of the bacteria to different classes of antibiotics [10,16].

5.0 Conclusion

The findings of the current study shows that the doctors in private medical facilities in Port have a strong tendency to prescribe antibiotics based on empirical assessment rather than laboratory investigations when compared to the WHO standards of antibiotics prescription pattern. It is highly recommended that urgent measures be taken to encourage the adoption of antimicrobial stewardship principles to curb the local increase in antimicrobial resistance.

References

[1] Abrha S, Assefa R, Molla F, Melkam W, Assen A, Mulugeta A, Wondimu A, MohammedJ, Masresha B. Antibiotics Utilization and their Cost in Ayder Referral Hospital, Mekelle, Ethiopia. Global Journal of medical research. 2005; 15(1)

[2] Jimoh AD, Etuk EU, Sani Z, Shuaibu HA. The pattern of antibiotic use in a family medicine department of a tertiary hospital in Sokoto, northwestern Nigeria. Journal of Clinical and Diagnostic Research, 2011; .5(3): 566-569. 3.

[3] Molslad S, Eke Dahl A, Hovellius B, Thomansson H. Antibiotics prescription in primary care: a 5- year follow-up of an educational program. Famprait. 1994; 11:282-286.

[4] Erah PO, Olumide GO and Akhamafe AO. Prescribing pattern in 2 health care facilities in Warri, southern Nigeria: A comparative study. Trop.J. Pharm. 1994; Res, 2(1):175-182.

[5] Tenover FC. Mechanism of antimicrobial resistance in bacteria. Am J Med. 2006; 119(6 suppl): S3-10. 6.

[6] Thomas DW, Satterwthwacte J, AbsiEG, Lewis MA, Shephert JP. Antibiotic prescription for the acute dental condition in the primary care setting. British Dental Journal. 1996; 181:401- 404.

[7] World Health Organization. Promoting rational use of medicine: core component: WHO policy perspective of medicine. Geneva, World Health Organization. 2002.

[8] Cosgrove SE, Carmeli Y. The impact of antimicrobial resistance on health and economic outcome. Clin Infect Dis. 2003; 36:1433-7.

[9] Kala K, Sodhi RK, Jain UK. Drug Utilization Evaluation of Antibiotics in Dh Uttarakashi. IOSR Journal of Pharmacy. 2003; 7(9): 01-05

[10] Al-Azayzih A, Al-Azzam SI, Alzoubi KH, Shawaqfeh M, Masadeh MM. Evaluation of drug-prescribing patterns based on the WHO prescribing indicators at outpatient clinics of five hospitals in Jordan: a cross-sectional study. Int. J. Clin. Pharmacol. Ther. 2017; 55(5): 425-432

[11] Zhou Q, Zhu LL, Yan XF, Pan WS, Zeng S. Drug utilization of clarithromycin for gastrointestinal disease treatment. World J Gastroenterol. 2008; 14(39): 6065-6071

[12] Teferra A, Zeruesenary D, Asfawossen GY. Prescribing pattern of drugs in medical wards of three hospitals in northwest Ethiopia. Journal of Ethiopia Medical Practices. 2002; 4:8-13.

[13] Faris El-Dahiya; Dalal Salah; Meriam Alomari, Abdullah Elfefae; Ammar Abdulrahman Jairoun. Antibiotic Prescribing Patterns for outpatient pediatrics at a Private Hospital in Abu Dhabi: a Clinical Audit study. Antibiotics 2022, 11, 1676.

[14] Girma S, Sisay M, Mengistu G, Amare F, Edessa D. Antimicrobial Utilization Pattern in Pediatric Patients in Tertiary Care Hospital, Eastern Ethiopia: The Need for Antimicrobial Stewardship. Hospital Pharmacy Journal. 2017;53(1):44–54.

[15] Mgbahurike AA., Ojiyi ID, Chijioke-Nwauche IN. Antibiotic Utilization Pattern in Pediatrics Unit South–South of Nigerian Teaching Hospital. Journal of Medical, Biomedical and Applied Sciences 2020; 8 (2): 337–342.

[16] Pottegård, A.; Broe, A.; Aabenhus, R.; Bjerrum, L.; Hallas, J.; Damkier, P. Use of Antibiotics in Children. Pediatr. Infect. Dis. J. 2015, 34, e16–e22.

[17] Mihani, J.; Këlliçi, S. Patterns of Antibiotic Prescription in Children: Tirana, Albania Region. Open Access Maced. J. Med. Sci. 2018, 6, 719–722.

[18] Chijioke-Nwauche IN, Chukwumezie CA, Udezi TW. Prescribing Indicators: A Review in the General Outpatient Clinic of a Nigerian Tertiary Hospital. Journal of Health Science Research 2018; 3(2): 1-5.

[19] Llor C, Bjerrum L. Antimicrobial resistance: Risk associated with antibiotic overuse and initiatives to reduce the problem. Ther Adv Drug Saf. 2014; 5(6):229–41.

[20] Brain o. Ogbonna; Ifeoma Umeh; ifeoma Jovit Nduka; Ugochi Amanda Adenola. Pattern of Antibiotics Prescription in a tertiary hospital in delta State, Nigeria. Afrimedic Journal. 2022, 8, 1.

[21] Majhi, B.; Panda, A.; Barma, S.K. Antibiotic prescribing pattern in paediatrics outpatient in a tertiary care hospital. J. Évid. Based Med. Health 2017, 4, 3048–3051.