Prescription Pattern of Antibiotics among Physicians in a Secondary Health Facility in Abuja, Nigeria

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Authors' contributions

This work was carried out in collaboration within all authors. Author A-SK was involved in the study design, literature search and writing of the first draft of the manuscript. Author JGS conceptualized the study and carried out the field works and data collection processes while Author JFL handled the statistical analysis of the data obtained from this study. All authors contributed financially to the successful completion of this work. All authors read and approved the final manuscript.

Research Article

ABSTRACT

Aim: This study was aimed at assessing the prescription pattern of antibiotics by physicians in Federal Staff Clinic, Abuja: A secondary health care facility in Nigeria.
Study Design: It was a descriptive cross sectional study
Place and Duration of Study: Federal Staff Clinic, Abuja, Nigeria between August 2012 and February 2013.
Methodology: A total number of 1022 prescription sheets containing 1648 prescribed antibiotics were obtained retrospectively and examined. Results were analysed using SPSS version 15 and presented in form of descriptive statistics.
Results: Results showed that Amoxicillin was the most prescribed antibiotic followed by Metronidazole (31.79% and 27.37% respectively). The mean number of antibiotics prescribed per prescription was 1.61 ± 0.55. The drug per prescription ranged from 1 to 9 with a mean of 3.04 ± 1.51. About Ninety five percent of the antibiotics were prescribed correctly in terms of frequency and duration of use. Only 21.2% of the antibiotic was prescribed in generic name. Almost all of the antibiotics were prescribed in oral form

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(98.3%) and were available for dispensing at the pharmacy as at the time of prescription (97.59%). All antibiotics prescribed were found in the Essential Drug List.

Conclusion: Antibiotic usage in this health facility was largely in accordance with National Drug policy which promotes rationale use of drugs. However, majority of antibiotics were not prescribed in generic form, an area where the physicians need to be educated on and monitored further.

1. INTRODUCTION

Disease prevention, management and treatment require use of different classes of medications. One of the commonest classes of medication used for such purposes are antibiotics. Antibiotics are chemical substances produced by microorganisms which have the capacity, in dilute solutions to inhibit the growth of or to kill other microorganisms [1]. Those that inhibit growth of microorganisms are said to be bacteriostatic and those that kill microorganisms are said to be bacteriocidal. Resistance to antibiotics have been identified as a common problem in world at large [2].

Resistance occurs when sub therapeutic dosage of the antibiotic is administered to cure or prevent infection thereby causing the microorganisms to develop adaptations in order to survive and resist future doses of antibiotics. Thus, subsequent administration of even therapeutic doses of the antibiotic will lead to non efficacy of the drugs towards inhibiting the growth or killing the microorganisms. Resistant isolates have been found in healthy persons and those with community acquired infection in developing countries [3]. One of the major causes of this resistance is the misuse and abuse of antibiotics. This can result from inappropriate self medication by patients [4-6]; issue of adequate compliance to prescribed medication by using the antibiotic appropriately at the right dosage and duration of use; problem of manufacturing and sales of substandard, adulterated or fake antibiotics; wrong prescription of the antibiotics for treatment of ailments by the physicians or prescribers [7,8].

Various drug prescription problems have been identified in health facilities in developing countries like Nigeria. This includes irrational use of drugs, unnecessary polypharmacy and high use of drugs with unproven efficacy. Some of these studies have shown that antibiotics are one of the most commonly prescribed drugs among physicians and have identified its overuse [9].

Antibiotic resistance can be tackled by effective auditing of production of the drugs manufacturers, sales by wholesalers and retailers and prescription by health care professionals. Standard of treatment of ailments have been found to be improved at all levels of health care system if medical audit is done. The National Drug Policy has also made recommendations for ensuring proper drug use [10]. Essential Drug Lists (EDL) and Standard treatment guidelines also serves as a guide in diagnosing, management and treatment of medical conditions among health workers in order to promote the rational use of drugs by prescribers, dispensers and consumers as stated in the National drug policy.

This study is thus aimed at assessing the prescription pattern of antibiotics by physicians in Federal Staff Clinic, Abuja: A secondary health care facility in Nigeria. This is a form of audit

which will provide information to policy maker on antibiotic usage and in the long run enhance the rationale use of antibiotics among prescribers.

2. METHODS

It was a descriptive cross sectional study conducted in Federal Staff Clinic in Abuja, Nigeria which is an arm of the Federal staff Hospital: A Secondary health centre. The Clinic has eight consulting rooms manned by eight Physicians. The Pharmacy department of the Clinic has 6 Pharmacy personnel. The average number of patients that visit this Clinic daily is about 45. All prescription sheets containing prescribed antibiotics issued to patients by physicians at the clinic were gathered retrospectively over a period of twenty four weeks spanning from August 2012 to February 2013 and those containing no prescribed antibiotics were excluded. A total number of 1022 prescription sheets containing 1648 prescribed antibiotics were obtained and examined.

Data collection form was designed and trained Pharmacists at the pharmacy department recorded the required data and information. The information extracted from the prescription sheets included names of the prescribed antibiotics, number of antibiotics prescribed per prescription, number of drugs per prescription, dosage form, frequency and duration of administration of antibiotics. In addition, the name of the antibiotics as written by the prescriber was noted to determine the level of generic drugs being prescribed, the availability of the antibiotic in the Essential Drug List (EDL) and in the pharmacy department as the time the prescription was written were also noted. Prior to this, the data collection form was pre-tested in Former Federal Staff Clinic, IIorin, Nigeria (now a clinic of the University of Ilorin Teaching Hospital, Ilorin. Ngieria): a similar secondary health facility. This ensured validity, reliability, clarity, omissions and errors in the form before usage.

Data obtained were analyzed using SPSS version 15 and presented in form of frequencies, percentage, mean and standard deviation.
The major limitation encountered in this study was denial of access to the case folders of the patients which would have helped in determining the disease conditions of patients and other relevant information about the patient which would have increase the scope of statistics carried out from the results obtained.

3. RESULTS AND DISCUSSION

3.1 Results

The result obtained was based on 1022 prescription sheets containing 1648 prescribed antibiotics. A total of 24 antibiotics were prescribed within the period of study. The most prescribed antibiotics were Amoxycillin (489; 31.79%), Metronidazole (421; 27.37%) and Amoxycillin / Clavulanic acid (216; 14.04%) (Table 1). Out of the 1022 prescriptions, 428 (41.88%) contained one antibiotic, 562 (54.99%) combined two antibiotics while only 32 (3.13%) combined three antibiotics in one prescription. The mean number of antibiotics prescribed per prescription was 1.61± 0.55.

Table 1. Frequency of antibiotics prescribed by their generic names

Name	Frequency n= 1648 (%)
Amoxicillin	524 (31.79)
Amoxicillin/ Clavulanic acid	231 (14.04)
Ampicillin	4 (0.26)
Ampicillin / Cloxacillin	68 (4.10)
Azithromycin	18 (1.09)
Cefuroxime	28 (1.69)
Cephalexin	3 (0.20)
Ciprofloxacin	138 (8.39)
Chloramphenicol	8 (0.46)
Clarithromycin	3 (0.20)
Clotrimazole	5 (0.33)
Co-trimoxazole	42 (2.54)
Doxycycline	23 (1.37)
Erythromycin	18 (1.11)
Fluconazole	3 (0.20)
Gentamicin	8 (0.46)
Ketoconazole	9 (0.55)
Levofloxacin	2 (0.13)
Lincomycin	1 (0.07)
Metronidazole	451 (27.37)
Ofloxacin	47 (2.86)
Pefloxacin	2 (0.13)
Secnidazole	4 (0.26)
Tinidazole	8 (0.46)

The drug per prescription ranged from 1 to 9 with a mean of 3.04 ± 1.51. Using the standard treatment guideline, 1560 (94.67%) of the prescribed antibiotics were correctly prescribed in term of frequency and duration of use while 88 (5.33%) of them were wrongly prescribed. Majority of the antibiotics were prescribed in branded or non-generic form as shown on Table 2. Dosage forms of antibiotics prescribed included oral, eye/ear drops and ointments as shown also on Table 2. All antibiotics prescribed were found in the EDL and 1608 (97.59%) of the prescribed antibiotics were available for dispensing to patients at the time they were prescribed while 40 (2.41%) were not available.

Table 2. Distribution of prescribed antibiotics by names and dosage forms

Name	Generic name n= 815		Dosage form n=815		
	Yes (%)	No (%)	Oral (%)	Eye/ear drop (%)	Ointment (%)
Amoxicillin	25 (4.8)	499 (95.2)	524 (100.0)	0	0
Amoxicillin/ Clavulanic acid	8 (3.6)	223 (96.4)	231 (100.0)	0	0
Ampicillin	4 (100.0)	0	4 (100.0)	0	0
Ampicillin / Cloxacillin	0	68 (100.0)	68 (100.0)	0	0
Azithromycin	9 (50.0)	9 (50.0)	18 (100.0)	0	0
Cefuroxime	12 (44.2)	16 (55.8)	28 (100.0)	0	0
Cephalexin	3 (100)	0	3 (100.0)	0	0
Ciprofloxacin	108 (78.3)	30 (21.7)	132 (95.7)	6 (4.3)	0
Chloramphenicol	8 (100.0)	0	0	0	8 (100.0)
Clarithromycin	3 (100.0)	0	3 (100.0)	0	0
Clotrimazole	5 (100.0)	0	0	0	5 (100.0)
Co-trimoxazole	16 (38.1)	26 (61.9)	42 (100.0)	0	0
Doxycycline	23 (100.0)	0	23 (100.0)	0	0
Erythromycin	16 (88.9)	2 (11.1)	18 (100.0)	0	0
Fluconazole	3 (100.0)	0	3 (100.0)	0	0
Gentamicin	1 (12.5)	7 (87.5)	0	8 (100.0)	0
Ketoconazole	9 (100.0)	0	8 (88.9)	0	1 (11.1)
Levofloxacin	2 (100.0)	0	2 (100.0)	0	0
Lincomycin	1 (100.0)	0	1 (100.0)	0	0
Metronidazole	32 (7.1)	419 (92.9)	451 (100.0)	0	0
Ofloxacin	47 (100.0)	0	47 (100.0)	0	0
Pefloxacin	2 (100.0)	0	2 (100.0)	0	0
Secnidazole	4 (100.0)	0	4 (100.0)	0	0
Tinidazole	8 (100.0)	0	8 (100.0)	0	0
Total	349 (21.2)	1299 (78.8)	1620 (98.3)	14 (0.8)	14 (0.8)

4. DISCUSSION

All prescription sheets used in this study were those from the physicians. This work shows that a total of twenty four antibiotics were prescribed within the time frame of the study. It will be observed that only three antifungal drugs (Clotrimazole, Fluconazole and Ketoconazole) were prescribed, all of which had very low frequency. This may be an indication that the prevalence of diagnosed fungal infections among patients visiting the hospital was low. Amoxicillin happened to be the most prescribed antibiotic. This may be as a result of it being readily available and cheap. In addition, Amoxicillin is a broad spectrum antibiotic that covers a very wide range of organisms. Metronidazole was next in frequency of prescribed antibiotic to amoxicillin. Metronidazole is one of the few antibiotics that is effective against anaerobic and amoebic organisms in addition to being cheap, readily available and exhibiting high efficacy against susceptible organisms. Similar study carried out in Nigeria showed that Metronidazole and Ampicillin/ Cloxacillin were the highest prescribed (19%) - drugs which were also among the most commonly prescribed in this study [11]. In addition, a study carried out in Southern Nigeria and in Egypt also revealed that the most commonly used antibiotics were the Penicillins [12,13]. This result also is in agreement with the result

obtained from this study as the Penicillins were the most prescribed antibotics. Another study carried out in Ibadan showed that Cotrimoxazole was the most commonly used- a drug which had a very low frequency in the present study [14]. The trend of prescription of antibiotics may vary from region to region depending largely on the common types of infections predominant in the area.

The result obtained from this study also showed that more than half of the prescription containing two antibiotics and close half also contained just one antibiotic. This shows very low level of unnecessary polypharmacy in antibiotic usage. The combination of two antibiotics may be to reduce the incidence of resistance to a particular antibiotic and may also be able to cover a wider range of organisms which may be necessary sometimes when commencement of treatment is done before obtaining laboratory results. For example the combination of Amoxicillin and Metronidazole to cover wide range of both gram positive and gram negative organisms.

Certain high level of polypharmacy was observed when looking at the range of drug per prescription. The maximum number of drug per prescription was very high (9 in number) although looking at the mean of 3.04± 1.51, one may deduce that the level is within acceptable range as infections may be accompanied with certain symptoms like pain and anaemia which may require supplementary drugs aside the prescribed antibiotics in the prescription sheets. Comparing with other studies, a study in Osun state showed average number of drug per encounter of 6.11 which is far higher than this study [15]. In Warri, Lagos, Ilorin and Lokoja, values of 3.4, 3.5, 3.99 and 3.68 were obtained which are closer to those obtained from this study [16-19]. The drug per encounter in a study carried out in Egypt showed a value lower than that obtained from this study (2.7) [13]. In respect to the dosages of the prescribed antibiotics, this study has revealed that the physicians in this facility highly adhere to the standard treatment guidelines as almost all of them prescribed correctly. This goes to show that the prevalence of over dosage or under dosage of these antibiotics is very minimal. In contrast, majority of antibiotics prescribed by these physicians were in branded name which does not conform to the objectives of the National Drug Policy. One of the reasons for this observed trend may be as a result of the activities of the sale representatives of various pharmaceutical companies who strive at ensuring that their brands are prescribed by the physicians. Another possible reason is that of the experience of the physician in respect to the efficacy of a particular brand for treatment of infections. Studies have shown that generic prescription has got special importance for rationale use of drug as regards to cost, safety and efficacy by permitting the identification of the products by its scientific name [20]. Table 2 also shows that the Quinolones (Ciprofloxacin, Ofloxacin and Pefloxacin) were the antibiotic prescribed mostly in generic names by the prescribers while the Penicillins (Amoxicillin, Amoxicillin/ Clavulanic acid and Ampicillin/ Cloxacillin) and Metronidazole were the least prescribed using Generic names.

Looking at the dosage form, almost all antibiotics (98.4%) prescribed was in oral form. This could be an indication that most infections treated may be systemic and not local. The low level of eye/ear drop and ointments also buttresses this point. Although it should be noted here that certain antibiotics comes in certain dosage forms. For example, Clotrimazole is usually a topical antibiotic used for skin infections although it may also come as pessaries. Antibiotics like Chloramphenicol was not prescribed in its oral form perhaps because of its serious side effects and because of availability of equally or more efficacious antibiotics which have lower daily frequency of use. Another good trend observed in this study was that all antibiotics being used in this facility were found in the Essential Drug List. This is another indication that the hospital adhered largely to the National Drug Policy. Almost all drugs were

available at the pharmacy for dispensing as at the time they were prescribed. This also goes to show that the pharmacy department were maintaining a good drug revolving fund program that promotes availability of drugs at all times. This will help the patient in obtaining required drugs promptly that can aid in prompt reduction in morbidity and mortality resulting from the various infections. A study carried out in Lokoja is in agreement with this study as it showed that almost all the drugs under study were found in the Essential drug list and in the Pharmacy department as the time the drugs were being prescribed [19].

5. CONCLUSION

Antibiotic usage for treatment of infections in this health facility was largely in accordance with National Drug policy which promotes rationale use of drugs. Generally, the awareness of the Physicians in this facility to National Drug policy and Standard treatment guideline of Nigeria could be said to be high. However, majority of antibiotics were not prescribed in generic form, an area where the physicians need to be educated on and monitored further.

CONSENT AND ETHICAL APPROVAL

This section is not applicable to this paper. Permission was however sought and granted by the Management of the Clinic prior to the commencement of this work. The information extracted from the prescription sheets excluded the names of the patients written on the prescription sheet to maintain privacy.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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