

# The Pattern of Antibiotic Use in a Family Medicine Department of a Tertiary Hospital in Sokoto, North Western Nigeria

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## ABSTRACT

**Background:** Antibiotics are substances or compounds which are used to treat infections which are caused by microorganisms including fungi and protozoa. The inappropriate and indiscriminate use of antimicrobial agents can potentially cause a number of problems. The emergence of anti-microbial resistant bacteria, an increased number of patients experiencing adverse drug events and an increase in drug-related costs have been documented.

**Objective:** This research was conducted with the objective of studying the pattern of antibiotic prescription in a tertiary hospital's general out patients department.

**Methods:** A cross sectional, retrospective study was carried out in the Family Medicine Department, at the Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria from January to June 2008. The records of all the patients who had any courses of antimicrobial agents within this period were isolated and screened and relevant data were extracted by using a pre-piloted data collection form and the filled forms were analyzed.

**Results:** A total of 336 patients, consisting of 146 males (43.45%) and 190 females (56.54%) were enrolled. Among these, 139

(41.36%) were in the age group of 21–30 years and 134 (39.88%) had gastro intestinal infections as an indication of antibiotic use. 69 (20.53%) had requested for investigations. The investigations were relevant in 66 (95.65%) and in 57 (82.60%), the samples were taken before the commencement of the antibiotic therapy. Only 27 (39.13%) had got their results before the antibiotic prescription, while 42 (60.86%) had antibiotics prescribed for them without their laboratory results. Among the various antibiotics which were prescribed, 149 (35.83%) were quinolones and 109 (26.29%) were pencillins. The antibiotic combination pattern showed that 56 (44.44%) were given a combination of amoxicillin and metronidazole and that 27 (21.47%) were given a combination of amoxicillin, metronidazole and doxycycline.

**Conclusions:** Only about one fifth of the patients who were studied had any form of laboratory investigations as a guide for the antibiotic prescription and out of these, only less than half of the results were used as a guide for the antibiotic prescription. The commonest indications for antibiotic use in this study included gastro intestinal infections, genitor-urinary infections, and respiratory tract infections. Quinolones (Ciprofloxacin) were the most commonly prescribed antibiotics in this study.

**Key Words:** Antibiotic, Prescription Patterns, Laboratory investigations

## INTRODUCTION

Antibiotics are prescribed more by emergency physicians and family practitioners, and patients who are seen in the emergency room and in the family practitioner's office are more likely to receive antibiotic prescriptions [1]. Also, about 85% of all the antibiotic prescriptions are issued by general practitioners [2]. Antimicrobial agents are the most commonly used and misused of all the drugs. The inevitable consequence of the widespread use of antimicrobial agents has been the emergence of antibiotic resistant pathogens [3, 4.]. It has been reported that antimicrobials had been used in excess for decades, that only 25% of the patients with respiratory illnesses had anybacterial aetiology and that about 52% of all the antibiotic prescriptions for respiratory illnesses were not clinically indicated at all [5, 6]. As a result, antimicrobial resistance and therapeutic costs have increased significantly [7, 8].

Drug utilization includes the prescribing, dispensing and the ingesting of drugs [9]. A drug utilisation study as defined by the WHO, as a structured process which is used to assess the quality of drug therapy by engaging in the evaluation of data on drug prescribing, dispensing and patient use in a given health care environment, against predetermined, agreed upon criteria and standards, with special emphasis on the resulting medical, social,

and economic consequences. It seeks to monitor, evaluate and suggest modifications in the prescribing practices with the aim of making the medical care rationale and cost effective. The Drug Utilization 90% (DU90%) index is a simple, inexpensive and flexible method for assessing the quality of the drug prescriptions [10, 11]. Carrying out a drug utilisation study can provide valuable information to the researchers, policy makers and the drug and therapeutics committee members to determine the drug use pattern [12] but a globally accepted dose standard unit is important for the drug utilization studies particularly if the investigations are performed in different geographical areas and have to be compared [13]. The drug utilisation indicators may include prescribing, patient care, and facility indicators, while the defined daily dose is a technical unit for comparing the average recommended daily dose of a drug when it is used for its main indication [14].

Understanding the problem of antimicrobial resistance in a hospital cannot be achieved without the knowledge of the hospital's pattern of antimicrobial use and therefore, the present study was carried out to achieve the following objectives: To determine the relationship between the pattern of antibiotic usage in a tertiary institution's outpatients department; To analyze whether relevant investigations were done and used as a guide for the antibiotic

prescription: and to analyze the prescription as per the antibiotic drug combinations to document any possible drug-drug interaction or adverse drug reaction.

## METHODOLOGY

This was a cross sectional retrospective study which was conducted in the Family Medicine Department, Usmanu Danfodiyo University Teaching Hospital, Sokoto, north-western Nigeria. The hospital records of the patients who were seen during the period from January to June 2008 were collected and examined. The records of all the patients who had any course of antimicrobial agent were isolated and screened, and relevant data was extracted by using a pre-piloted data collection form.

Among the information which was considered during the data collection were : age, sex, occupation, educational level, indications for antibiotic use, comorbid conditions, whether the investigations were done or not, whether the investigations which were done were relevant for the diagnosis and whether the results were out before the commencement of the antibiotics. The information on the types of investigations and the sensitivity pattern; types, dosages, duration and the drug combinations of the antibiotics which were prescribed were also collected.

All the data were collected, recorded, tabulated and analysed with respect to the objectives of the study.

## RESULTS

A total of 336 patients were enrolled in the study.

### Demographic Details

There were 146 males (43.45%) and 190 females (56.54%). Among these, the greatest number were in the age group of 21–30 years [ 139 (41.36%) ], followed by the age groups of 10–20 years [ 67 (19.94%) ], 31–40 years [ 64 (19.09%) ], 41–50 years [ 37 (11.01%)], 51–60 years [21 (6.25%) ], 61–70 years [ 5 (1.48%) ] and 71–80 years [ 3 (0.89%) ].

### The Distribution of the Indication for Antibiotic Prescription

Among the 336 patients, 134 (39.88%) had gastro intestinal infections as an indication for the antibiotic prescription, followed by 78 (23.21%) who had genitourinary infections, 52 (15.47%) who had respiratory tract infections, 20 (5.97%) who had malaria, 14 (4.16%) who had skin infections, 4 (1.19%) who had cardio vascular diseases and 34 (10.11%) who had other infections.

### Investigations

Among the 336 patients, only 69 (20.53%) had their investigations done, while 267 (79.47%) had not done any investigations. Out of those who were investigated, the investigations of 66 (95.65%) were relevant to confirm the main diagnosis for antibiotic use while the investigations were not relevant in 3 (4.34%). 27 (39.13%) had got their results before the antibiotic prescription, while 42 (60.86%) had not got their results before the antibiotic prescription. The microscopic culture and sensitivity (MCS) results showed that 8 (38.09%) showed no growth and that 6 (28.57%) showed Staphylococcus aureus which was sensitive to gentamycin, Ofloxacin and ciprofloxacin. Among the various antibiotics which were prescribed, 149 (35.83%) were quinolones and 109 (26.29%) were penicillins. The details of the cultures and the sensitivity test results are shown in [Table/Fig-1].

## The Classes of the Antibiotics which were Prescribed

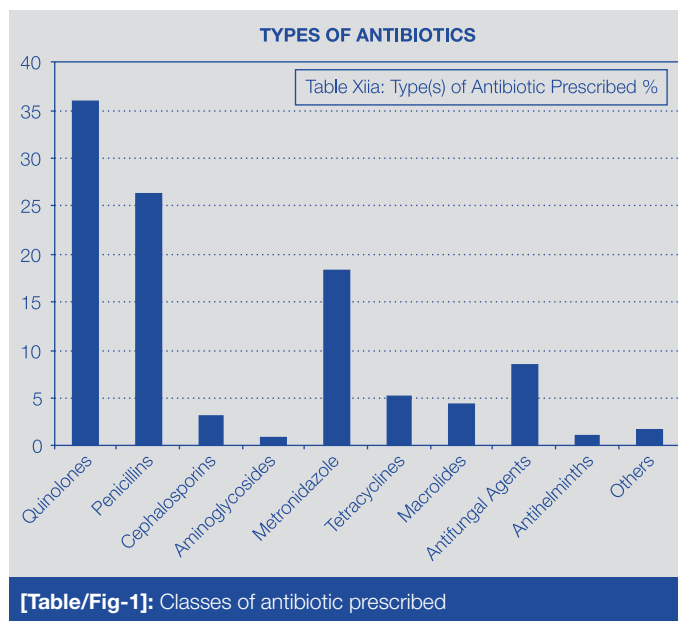
Altogether, 438 drugs were prescribed in the study population. Among the antibiotics which were prescribed, the commonest class was quinolones [149 (35.83%) of the total drugs], followed by penicillins [109 (26.20%)]. The details regarding the classes of the antibiotics which were prescribed are listed in [Table/Fig-2].

## DISCUSSION

Out of the 336 patients who were selected for this study, the highest number of patients was found to be between the age group of 21 to 30 years and the lowest number was between the age group of 71 to 80 years.

There were more females than males, with a significant number of them being not gainfully employed. Peptic ulcer disease and enteric fever were the most common diagnoses, followed closely by respiratory tract infections, urinary tract infections, and pelvic inflammatory disease. The highest co morbid condition was malaria; others included diabetes mellitus, hypertension, cardiac failure, and arthritis.

It is important to note that just about one fifth of the patients who were studied underwent any form of laboratory investigation and a majority of the investigation results were either not returned by the patients or were not recorded in the case notes, or the documented results were not relevant (an example is, when a patient presented with malaria and respiratory tract infection, an antibiotic was prescribed but the investigation which was done was the blood film for



[Table/Fig-1]: Classes of antibiotic prescribed

Organism Cultured	Frequency	%	Sensitivity
Staphylococcus Aureus	7	31.81	Gentamycin+, Levoxin++, Ofloxacin+, Siprosan+
E. Coli	5	22.72	Siprosan+++, Gentamycin+, Levoxin+, Sparfloxacin+
Streptococcus Pneumonia	1	4.54	Zinnat+
Coliforms	1	4.54	Siprosan+, Droid+, Zanozin+
No Growth	8	36.36	

[Table/Fig-2]: Sensitivity pattern

the malaria parasite). This was so concluded, because despite the fact that the data analysis revealed that over 95% of the investigations which were done were relevant for the diagnosis, there was not enough data on the sensitivity pattern of the organisms.

This study also revealed that despite the fact that the samples were taken before the commencement of the antibiotics in more than 80% of the patients who had their investigations done, only less than 40% of such results were used as a guide for the antibiotic prescription.

Ciprofloxacin was found to be the most commonly used antimicrobial agent in this study, it accounted for almost one third of the antibiotic prescriptions within the study period. Amoxicillin and metronidazole followed closely. Gentamycin and septrin were the least prescribed. This may not be unconnected with the toxicity which was associated with aminoglycosides and the emergence of resistance strains and the adverse drug reactions which were associated with septrin.

The use of trade names instead of generic names was very rampant among the prescribers; this may not be unconnected with the immense pressure which was mounted by the pharmaceutical company representatives on the prescribers and the frequent inducement or entertainment in the form of gifts.

There were no reports about drug-drug interactions or adverse drug reactions.

The international differences in the hospital use of antibiotics were not in the intensity of the use but in the prescription preferences [15]. The wards of similar medical specialties used similar total amounts of antibiotics but from different pharmacological subgroups and thus with different microbiological activities [16]. Ideally, the selection of the antibiotics should be based on the microbiological data on the bacteria sensitivity and on the prevalence of resistance in the respective hospital.

In a similar study which was done to evaluate the current practice pattern of the antibiotic prescription rate in children who were diagnosed viral respiratory tract infections among different specialty health care providers, it was reported that the unnecessary use of antibiotics not only contributed to the rising cost of the outpatient treatment of RTIs, but it was also associated with increasing adverse drug effects and the rapid spread of antibiotic-resistant organisms in the community. In another study which was done to investigate the influence of the prescription patterns in the general practice on anti-microbial resistance, it was concluded that there was a low total prescription volume of antibiotics in Norway as compared to other countries. However, there was still a great potential for reducing the unnecessary antibiotic prescribing for the most common respiratory illnesses [17]. In yet another study which was done to examine the antibiotic prescription pattern and the related cost in a tertiary hospital in Ilorin-Nigeria and Haifa-Israel, it was reported that the antibiotic prescription habits of doctors in these developing countries called for concern and that a lot of money could be saved without compromising the quality of care, if policies were formulated and promoted on the rational antibiotics prescription in developing countries like Nigeria. These should focus on promoting expenses and infectious control with the rational antibiotic prescription and utilization being aimed at minimizing the future emergence of bacterial resistance [18,19]. A poor compliance with the current treatment guidelines was observed in a study of antibiotic prescription patterns in hospitalized patients with nursing home-acquired pneumonia in the city of Buffalo, New York, contributing to the overall factors which

were responsible for antibiotic resistance [20]. A study on the pattern of antibiotic prescription in the management of endodontic infections amongst Spanish oral surgeons concluded that the use of antibiotics for minor infections or in some cases, in patients without infections, could be a major contributor to the world problem of antimicrobial resistance [21].

## CONCLUSION AND SUMMARY OF FINDINGS

This study was able to reveal the following findings:

A majority of the patients in this study were between the age group of 21 to 30 years and a high percentage of the patients were females and they were not gainfully employed. Peptic ulcer disease, typhoid fever, respiratory tract infections and genito-urinary tract infections were the most frequent indications for antibiotic use in this study. Malaria was the highest co-morbid condition. Only about one fifth of the patients who were studied had any form of laboratory investigations and only less than a half of such results were used as a guide for the antibiotic prescription. Ciprofloxacin was found to be the most commonly used antimicrobial agent in this study. Amoxicillin and Metronidazole followed closely. Gentamycin and the Sulphonamide Septrin were the least prescribed antibiotics. The incessant use of trade names instead of generic names in the prescriptions was also highlighted. The lack of proper documentation was found to be a compounding factor. Amoxicillin with Metronidazole was the most commonly used antibiotic combination. No adverse drug reaction was reported in this study.

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## APPENDIX I

Questionnaire for pattern of antibiotic use in a family medicine department of a tertiary hospital in sokoto, north western nigeria (January to June 2008)

### Section A: Demographic data

1. Serial number
2. Age
3. Sex
4. Occupation
5. Address
6. Tribe
7. Religion
8. Educational level

### Section B: Antibiotic use pattern

9. Indication for antibiotic use (diagnosis)
10. Co-morbid condition(s)
11. Were investigation(s) done?
12. Type(s) of investigations done
13. Is the investigation(s) done relevant to the indication for antibiotic use?
14. Type(s) of microorganism isolated
15. Sensitivity pattern
16. Were results out before antibiotic prescription?
17. Type(s) of antibiotic prescribed
18. Dosage and duration of antibiotic prescribed
19. Type(s) of antibiotic combination
20. Type(s) of other drug combination

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