



Research Article

RATIONAL AND EMPIRIC ANTIBIOTIC PRESCRIPTION IN GENERAL MEDICINE DEPARTMENT

Jampala Raghu Ram¹, Nandagopal Anitha, Ishrath Unnisa

Department of Pharmacology, Sultan-ul-Uloom College of Pharmacy, Mount Pleasant, 8-2-249, Road No. 3, Banjara Hills, Hyderabad-34, Telangana state.

ABSTRACT

Aim : The aim of this study is to determine the rational and empiric antibiotic prescription in General Medicine Department.

Objective : To determine the appropriate use of antibiotics and to empirical antibiotic therapy. To obtain information on the antibiotic prescribing pattern and the disease condition for which antibiotics are prescribed.

Methodology : A prospective-observational study was performed for a period of eight months from December to July in a multidisciplinary hospital. During the study 238 prescriptions were reviewed. Among them 210 prescriptions which contains antibiotics were selected. Data was collected from patient's medication orders and all the necessary treatment details were collected.

Results : The result was found that majority of the prescriptions were of male 115(54.76%) compared to female 95(45.24%). Antibiotic monotherapy was observed mostly in 162(77.14%). Majority of the prescriptions were managed with antibiotic monotherapy, thus preventing the over usage of antibiotics. Indications most commonly treated were fever 67(31.90%), urinary tract infections 27(12.8%) followed by other diseases. 47(22.3%) medication orders contain fixed dose combinations. The major route was found to be parenteral in 163 out of 210 prescriptions. The major class of drugs were cephalosporins. They were used in about 170(63.23%) prescriptions. The most common empirical therapy was given by third generation cephalosporin-ceftriaxone. Empirical therapy mostly covers broad spectrum antibiotics which are useful for the treatment of various pathogens.

Conclusion : The study concludes that by the appropriate antibiotic prescription, treatment success rate was found to be higher. Rational fixed dose combinations were prescribed. Cephalosporins were the most commonly prescribed in empirical therapy.

Keywords : Antibiotics, Rational, Empirical therapy

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INTRODUCTION

Antimicrobial is an agent that kills microorganisms and inhibit their growth. Antimicrobial medicines

Corresponding Author :

Jampala Raghuram
Associate Professor, Department of Pharmacology,
Sultan-ul-Uloom College of Pharmacy,
Mount Pleasant, 8-2-249, Road No. 3, Banjara Hills,
Hyderabad-34. Telangana State. India.
Mob: 9494238814,
E-mail: raghuram143ind@gmail.com

can be grouped according to the microorganisms they act primarily against. For example, antibiotics are used against bacteria. Antimicrobial agents are some of the most widely, and often injudiciously, used therapeutic drugs worldwide. Antimicrobials are one of the most common groups of drugs prescribed in hospitals. It has been estimated that up to a third of all patients receive at least one antimicrobial agent during hospitalization. The extraordinary therapeutic effects of antimicrobials, the problems of resistant microorganisms, irrational

prescribing, different untoward toxic-effects and high cost involved—are compelling reasons for concern about optimising and appropriate use of antimicrobials¹.

Drugs in this class differ from all others in that they are designed to inhibit/kill the infecting organism and to have no/minimal effect on the recipient. This type of therapy is generally called chemotherapy which has come to mean treatment of systemic infections with specific drugs that selectively suppress the infecting microorganism without significantly affecting the host.

Antibiotics are a group of medicines that are used to treat infections caused by germs (bacteria and certain parasites). A parasite is a type of germ that needs to live on or in another living being (host). Antibiotics are sometimes called antibacterials or antimicrobials. Antibiotics can be taken by mouth as liquids, tablets, or capsules or they can be given by injection. Usually, people who need to have an antibiotic by injection are in hospital because they have a severe infection. Antibiotics are also available as creams, ointments, or lotions to apply to the skin to treat certain skin infections².

Antibiotics, also called antibacterials are used in the treatment and prevention of bacterial infection. They may either kill or inhibit the growth of bacteria. A limited number of antibiotics also possess antiprotozoal activity³.

According to WHO the rational use of drugs is the use of the right drug, right dosage at the right cost. "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community"⁴. The empirical antibiotic therapy was defined as the initial antibiotic regimen started within 24 hours of admission. Antibiotics are generally defined as empirical if they are chosen before susceptibility results are known. Based on the microbiological findings and on an increased index of suspicion for one or the other organisms changes in prescribing of antibiotics is done. However diseases are common presentation in general medicine department. So, early diagnosis and prompt treatment are essential to protect the health of patients.

METHODOLOGY

Study Site:

A multidisciplinary hospital in Hyderabad .

Study Period:

The study was carried out for a period of eight months from January to August 2016.

Study Design:

Prospective - Observational study.

Study Material:

A specially designed data entry form was used to enter all patient data like name, age, sex, weight, inpatient number, date of admission, date of discharge, reason for admission, past medical history, food habits, known allergies, previous ADRs vital signs like temperature, Blood pressure and pulse. Provision was given in the format to enter laboratory diagnosis made, drugs prescribed along with their formulation, dose and duration.

Sources of Data:

The study includes prospective treatment chart review. It was conducted over a period of 8 months (December 2015 to July 2016). Data of the patients were collected from medical record section and General Medicine Department. A suitable data collection form was designed for the data collection. The sources of data included medical records of all patients who received antibiotic therapy for infections, laboratory test values, direct observation to the patient or family of patients treated in the General Medicine Department.

Inclusion Criteria:

- Prescriptions containing antibiotics were selected from General Medicine Department.
- Prescriptions with complete information.
- Patients with all age groups.

Exclusion Criteria:

- Prescriptions without antibiotics.
- Prescriptions with in-complete data.
- Palliative care patients.
- Terminally ill patients.

STUDY PROCEDURE

Data Collection:

A total of 238 prescriptions were collected. After evaluating the inclusion and exclusion criteria 210 prescriptions were selected for the study. Medication orders containing antibiotics of any category were

selected randomly irrespective of ailments, age or sex of the patients or the route of administration of the drug from department of general medicine, and reviewed on a daily basis. The necessary information, i.e. number of antibiotics and their name, dose, route, duration of administration, diagnosis, laboratory data and other information was collected from the medication orders on a daily basis.

Data collection sources:

- Nursing chart
- Patient admission chart
- Patients history sheet
- Doctor's orders sheet

Analysis of Data:

The data for patients receiving antibiotic therapy are presented in both tabulated and graphical forms. The collected data were analyzed and the information was tabulated as per study objectives. Appropriateness was evaluated according to the indications, the choice of antibiotic agent. The rationality of antibiotic usage was assessed by interpreting the collected data (name, dose, route, duration of administration, diagnosis and laboratory data) with standard references.

RESULTS

Table 1: Distribution of Patients Based on Gender

S.No.	Gender	Patients	Percentage
1.	Male	115	54.76%
2.	Female	95	45.24%

Among 210 prescriptions selected for the study, 115 belong to male patients and 95 belong to female patients.

Table 2: Age-Wise distribution of Prescriptions

S.No.	Age In Years	No. of Prescriptions	Percentage (%)
1.	0-20	10	4.76
2.	21-40	70	33.33
3.	41-60	85	40.47
4.	61-80	40	19.04
5.	81-100	5	2.38

Patients between the age 41-60 had more number of prescriptions 85(40.47%) and between the age 81-100 had less number of prescriptions 5(2.38%) from among 210 prescriptions selected for the study.

Table 3: Number of Prescriptions Containing Antibiotics in Male:

S.No	Characteristic	Frequency	Percentage (%)
1.	Fever	37	32.17
2.	Urinary tract infections	17	14.78
3.	Respiratory tract infections	15	13.04
4.	Soft tissue infections	12	10.43
5.	Non healing ulcer of foot	8	6.95
6.	Gastrointestinal tract infections	7	6.08
7.	Diarrhoea	6	5.21
8.	Knee Injuries	4	3.47
9.	Accidental Infections	4	3.47
10.	Edema	2	1.73
11.	Ear Infections	1	0.86
12.	Others	2	1.73
TOTAL		115	100

Table 4: Number of Prescriptions Containing Antibiotics in Female

S.No	Characteristic	Frequency	Percentage (%)
1.	Fever	30	31.57
2.	Urinary tract infections	10	10.52
3.	Soft tissue infections	9	9.47
4.	Respiratory tract infections	8	8.42
5.	Term labour	8	8.42
6.	Gastrointestinal tract infections	7	7.36
7.	Diarrhoea	7	7.36
8.	Knee Injuries	6	6.31
9.	Accidental Infections	5	5.26
10.	Ear Infections	3	3.15
11.	Others	2	2.10
TOTAL		95	100

Table 5: Type of Therapy Used for Antibiotic Utilization in General Medicine Department

S.No.	Type of Therapy	No. of Prescriptions	Percentage (%)
1.	Mono antibiotic therapy	162	77.14
2.	Two antibiotic therapy	34	16.19
3.	Poly antibiotic therapy	14	6.66

Table 6: Frequency Distribution of Type of Formulation

S.No.	Route of Administration	No. of Prescriptions
1.	Parenteral	163
2.	Oral	47

Table 7: Usage of Antibiotics among Patients

S.No.	Antibiotics	Number of Antibiotics	Percentage (%)
1.	Cephalosporins	170	63.23
2.	Fluoroquinolones	51	18.75
3.	Penicillins	23	8.45
4.	Amino glycosides	21	7.72
5.	Macrolide Antibiotics	6	2.20
6.	Others	1	0.36

Table 8: Number of Prescriptions Containing Fixed Dose Combinations

S.No	Fixed Dose Combinations	Number of Prescriptions
1.	Cefaperazone + Salbactam	25
2.	Amoxicillin + Clavulanic acid	10
3.	Piperacillin + Tazobactam	12

Table 9: Most Frequently Used Empirical Therapies

S.No.	Type of Therapy	No.of Patients
1.	Ceftriaxone	65
2.	Cefixime	23
3.	Levofloxacin	20
4.	Cefperazone+salbactam	17
5.	Cefazolin	16
6.	Amikacin	10
7.	Piperacillin+tazobactam	9
8.	Ofloxacin	8
9.	Amoxicillin	8
10.	Gentamycin	6
11.	Cefpirome	6
12.	Cefixime	6
13.	Azithromycin	4
14.	Ceftazidime	3
15.	Clarithromycin	2
16.	Ciprofloxacin	2
17.	Cefuroxime	2
18.	Ampicillin	1
19.	Norfloxacin	1
20.	Vancomycin	1

DISCUSSION

Antibiotic resistance among pathogenic micro-organisms is a matter of worldwide concern. Selective pressure by antimicrobial drugs is by far the most important driving force for the development of such resistance. Antibiotics are among the most commonly prescribed drugs in hospitals and in developed countries around 30% of the hospitalized patients are treated with these drugs. The major consideration for proper usage of antimicrobial agents, which is a main concern of modern medicine, is to select the optimal agent at the proper dosage and duration. Secondary, but still important concerns are to minimize the emergence of resistance and to provide health services at a reasonable cost⁵. Although the overall accomplishments have been outstanding, there is considerable evidence that antimicrobial agents are often abused and used excessively⁶.

In this study a total of 238 patients and their medication orders were analyzed. Among them 210 patient's prescriptions contains antibiotics. Among 210 prescriptions majority of prescriptions were of male 115(54.76%) followed by female 95 (45.24%) shown in Table 1.

Majority of the prescriptions were of adults 85(40.47%) with age group of (40-60). Male prescription orders were more than female prescriptions shown in Table 2. This indicates the male group susceptibility for infections. A study conducted by Meher et.al (2014) has also shown that male antibiotic prescriptions were more than female⁷.

Antibiotic monotherapy was observed in 77.14% of all patients, 16.19% of patients were prescribed with two antibiotics and polyantibiotic therapy was observed in 6.66% shown in Table 5. A study conducted by Mujtaba Hussain Naqvi et.al (2014) also supports that antibiotic monotherapy is sufficient for most of infections. Thus most of the patients were managed by mono antibiotic therapy⁸ 47(22.3%) medication orders contain fixed dose combinations. Antibiotics may be combined to prevent the emergence of resistant bacteria at the infection site.

In this study antibiotics were most commonly prescribed for indications such as fever, urinary tract infections, soft tissue infections, gastrointestinal and respiratory tract infections. In General Medicine Department antibiotics were prescribed for patients with fever alone were 67(31.90%), urinary tract infections 27(12.8%), respiratory tract infections 23(10.95%), soft tissue infections 21(10%), gastrointestinal infections 14 (6.66%), diarrhoea 13 (6.19%), and other indications such as ear infection, edema and various other diseases shown in Table 3 and 4.

Mainly the drugs were administered by oral and parenteral route. Parenteral antibiotic formulations were used in (163) patients, followed by oral (47) shown in Table 6.

It is observed that cephalosporin antibiotic usage was found to be more in patients 170(63.23%), followed by fluoroquinolones in 51 patients (18.75%), penicillins in 23 patients(8.45%), aminoglycosides in 21 patients (7.72%), macrolide antibiotics were used in 6 patients (2.20%) shown in Table 7. Among cephalosporins, ceftriaxone a third generation cephalosporin was most commonly prescribed drug in most patients. Ceftriaxone usage was found to be in 65 patients (30.95%) shown in Table 9. It indicates that cephalosporins were most effective in controlling infections.

In General Medicine Department empirical antibiotic therapy was of ceftriaxone followed by cefixime and levofloxacin. A Study conducted by Venugopal and et.al (2014), also shows that cephalosporins were the most commonly prescribed class of drugs⁹. The reason for prescribing cephalosporins is that it is cost effective as well as covers broad spectrum of pathogens.

CONCLUSION

Irrational prescription and irrational use of antibiotics are the main challenges in prescription of antibiotics. In this study antibiotics are prescribed rationally – monoantibiotic therapy is most commonly followed. It was found that the rate of rational use of antibiotics and treatment success rate was higher. The usage of three fixed dose combinations in the study was found to be rational according to WHO guidelines. The present study showed that when empirical therapy is needed, third generation cephalosporin – ceftriaxone was commonly prescribed. As cephalosporin is a broad spectrum antibiotic it covers majority of pathogens. The study also shows that cefixime and levofloxacin were the second and third choice of drugs respectively in empirical therapy.

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