



## Antibiotic Prescription Pattern Among The In-Patients Of A Tertiary Care Hospital

Raj shivaani M R, Preetha Selva\*

Department of Pharmacology, Saveetha Medical College and Hospital, SIMATS, Chennai, Tamil Nadu, India



### Article History:

Received on: 02 Dec 2019

Revised on: 06 Dec 2019

Accepted on: 08 Jan 2020

### Keywords:

Antibiotics,  
Prescription pattern,  
Resistance

### ABSTRACT

Antibiotics happen to be the most commonly used medicines, especially in developing countries like India, where infectious diseases are at a raise. Millions of antibiotics are prescribed by physicians all over India. The main objective of the present study is to analyze the prescription pattern of the antibiotics given to the in-patients of our hospital and to access the rationality of these prescriptions given, using the World Health Organization's core drug prescribing indicators. A total of 400 in- patients from Departments of Pediatrics, General Surgery, Obstetrics & Gynecology and Orthopedics were analyzed after screening for inclusion and exclusion criteria. The numbers of females are 248 (62%) and the males are 152 (38%) in a ratio of 1:1.63. 101 patients belonged to 40-60 years age group. The pattern of antibiotic usage in the Department of Pediatrics, Obstetrics and Gynecology, General Surgery, Orthopedics was studied. The most common antibiotics prescribed were Cefotaxime (44%), Amoxicillin(38%) and Cefazolin (38%, 24%) in Departments of Pediatrics, Obstetrics & Gynecology, Surgery and Orthopedics respectively. The total numbers of drugs prescribed were 1441 out of which 612 were antibiotics (43.09%). The number of antibiotics per prescription was 1.53. The average number of drugs prescribed per prescription was 3.6. The percentage of encounters with injections was 26.48%. The percentage of drugs prescribed by generic name is 36.2%. The percentage of drugs from the Essential Drug List was 92%. The percentage of fixed-dose combinations of antibiotics prescribed was 14.54%. Hence, in our study, though most of the drugs are given from the Essential List of Medicines, drugs given by a generic name is low. Physicians can be encouraged to prescribe more drugs by generic name. To conclude, antibiotic stewardship interventions have to be implemented to promote the judicious use of antibiotics to prevent adverse consequences.

### \*Corresponding Author

Name: Preetha Selva

Phone: 9940170371

Email: [drpreethaselva@gmail.com](mailto:drpreethaselva@gmail.com)

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL2.2155>

Production and Hosted by

IJRPS | [www.ijrps.com](http://www.ijrps.com)

© 2020 | All rights reserved.

### INTRODUCTION

India is a vast developing country, so it is the population and diseases. India has an estimated population of 1.32 million people. The common diseases in India are mostly infectious in origin due to a lack of good sanitary measures and poor awareness of the people residing here. Antibiotics are hence the commonly prescribed drugs to treat the most prevalent infectious diseases like tuberculosis, diarrhea, sexually transmitted diseases, conjunctivitis, throat and urinary tract infections, ear infections, etc. They

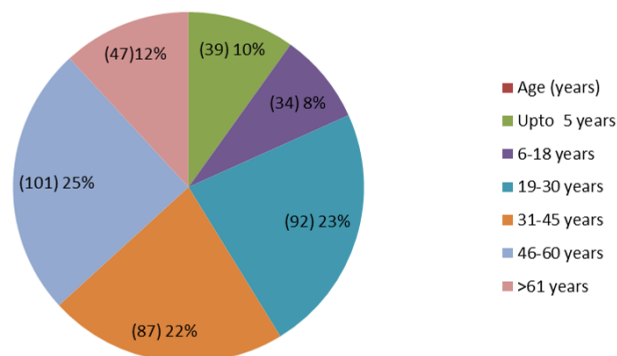
have high prescribing patterns even though they treat only bacterial infections and not viral infections. Sometimes they are prescribed under the demand of the patients. The physicians end up prescribing these antibiotics to satisfy their patients. Results indicate that they would be satisfied only when the physician explains him/her why he/she is not prescribing her any antibiotics (Badar and Navale, 2012)

But this, in turn, can cause many problems. This may lead to antibiotic overuse or antibiotic tolerance or resistance. This has become a very big concern nowadays, as bacteria resistant to antibiotics are showing up more and more in hospitals all over India. This is a major concern as it becomes difficult for physicians to treat diseases as the bacteria become resistant to antibiotics (Remesh *et al.*, 2013). The major problems faced by the resistant bacteria are

1. It becomes difficult to treat even the common infections and they may turn to be life-threatening. So there becomes a need to find newer drugs to treat even the normal conditions.
2. When the patients become resistant to the drugs, there is a need for a treatment where there is either an extended hospital stay or in need of new and many drugs. Therefore, infected patients require longer hospital stays that can be expensive (Shafiq *et al.*, 2016; Llor and Bjerrum, 2014).
3. As told before, patients showing resistance to bacteria are in need of newer drugs. So this may lead to the requirement of more toxic treatment.
4. Moreover, the spread of resistant bacteria to the family member, friends, co-workers, etc. may threaten the community (Jain *et al.*, 2015).

Misuse of antibiotics does not only indicate increased use of antibiotics or the use of antibiotics where and when not required. It may also be due to giving the correct dosage of the drug for an incorrect interval [may be for a long or a short duration]. Sometimes, the correct antibiotics given in combinations with other drugs or other antibiotics can minimize the therapeutic benefits of the drug (Harmeet *et al.*, 1998; Badar and Navale, 2012).

Though antibiotic resistance is an inevitable problem, steps should be taken at most to prevent it. More the bacteria are exposed to antibiotics, the



**Figure 1: Age of the in patients included in the study**

more resistance. So there is a need for rational use of the antibiotics.

This study was done to identify the pattern of usage of antibiotics among the patients of the tertiary care hospital and to evaluate the rationality of the prescriptions according to the WHO prescribing indicators.

### Objective

1. To evaluate the prescription pattern of antibiotics used among the inpatients of our tertiary care hospital
2. To assess the rationality of the use of antibiotics in our hospital using WHO core drug prescribing indicators.

## MATERIALS AND METHODS

### Study design

Prospective observational study

### Study duration

The study was conducted for a period of 3 months, starting from April 2019 to July 2019 (Jha *et al.*, 2019).

### Study place

The study was conducted in the male and female wards of Pediatrics, Obstetrics & Gynecology, General Surgery and Orthopedic Departments of Saveetha Medical College and Hospital.

### Sample size

The sample size was calculated using the statistical formula using the margin of error and prevalence of the study population from the previous studies.

### Study population

#### Inclusion criteria

The data of all the in-patients who were prescribed at least one antibiotic admitted in the Departments

**Table 1: Antibiotics are given in the Department of Pediatrics**

Antibiotics are given	Frequency/ number
Cefotaxime	44
Amoxicillin	21
Amoxicillin +Clavulanic acid	18
Ciprofloxacin	10
Norfloxacin	7

**Table 2: Antibiotics are given in the Obstetrics and Gynaecology department**

Antibiotics are given	Frequency
Amoxicillin	38
Metronidazole	36
Doxycycline	15
Gentamicin	11

**Table 3: Antibiotics given in Department of General Surgery**

Antibiotics are given	Frequency
Cephazolin	38
Gentamicin	24
Metronidazole	23
Amoxicillin	11
Vancomycin	4

**Table 4: Antibiotics are given in the Department of Orthopedics**

Antibiotics are given	Frequency
Cefazolin	24
Cefazolin +Gentamicin	23
Cloxacillin +Genatmicin	20
Cefuroxamine	13
Cefoperazone	6
Clindamycin	9
Vancomycin	5

**Table 5: WHO drug prescribing Indicators**

Sl.No	WHO prescribing indicators	Number	Percentage
1.	Average drugs per encounter	(1441/ 400) 3.6	-
2.	Percentage of drugs prescribed by generic name	522 out of 1441	36.2%
3.	Number of antibiotics prescribed per prescription	612 out of 400 (1.53)	-
4.	Percentage of encounters with injection prescription	626 out of 1441	26.48%
5.	Percentage of antibiotics from the Essential Drug List	556 out of 612	92%
6.	Percentage of fixed-dose combinations of antibiotics	89 out of 612	14.54%

of General Surgery, Pediatrics, Obstetrics and Gynecology, Orthopedics of our Hospital during the study period were included in the study.

#### Exclusion criteria

1. All the outpatients were excluded from the study
2. Incomplete and illegible data were excluded

#### Procedure

The study was started only after getting approval from the Institutional Ethics Committee and permission to conduct the study was obtained from the Head of the Department of the respective departments in our college.

Data of all the in-patients who met the inclusion criteria were collected from the respective case sheets of the patients. The patient's age, gender, diagnosis, antibiotic prescription, dosage, frequency, route of administration and duration of treatment were collected.

1. The generic names and the brand names of the drugs prescribed were found using the Standard Current Index of the Medical Specialties [CIMS] India 2019 edition.
2. WHO prescribing indicators were used to find the rationality of the drugs prescribed.

#### RESULTS AND DISCUSSION

In total, 400 patients were included in the study based on the inclusion and exclusion criteria.

Out of the 400 patients, 152 (38%) are males and 248 [62%] are females. The male-female ratio was 1:1.63. Out of the 400 patients, the maximum number of people using antibiotics comes under the age group of 40 years to 60 years (101 patients). The least number of patients using antibiotics come under the age group of 6 to 18 years (34 patients) (Figure 1).

The drugs prescribed for 100 patients from each Department (Pediatrics, General Surgery, OBG, and Orthopedics) were collected and analyzed. The most common antibiotics prescribed were Cefotaxime (44%), Amoxicillin (38%) and Cefazolin (38%, 24%) in Departments of Pediatrics, Obstetrics & Gynecology, Surgery and Orthopedics respectively. The antibiotics prescribed in each department are shown in (Tables 1, 2, 3 and 4).

The prescription patterns were analyzed based on the WHO drug prescribing indicators Table 5.

Most infections are serious in nature and require long and complex treatment procedures. The treatment modalities for such infections include antibiotics. They should be used rationally as there is an increase in the incidence of antibiotic resistance. They are the most commonly used and misguided drugs by patients and prescribers. Early disease recognition and early start of corrective treatment for such infections were proved to provide significant outcomes in terms of treatment effectiveness (Remesh *et al.*, 2013). Drug utilization studies have become a special tool to evaluate health care systems, especially in developing countries like India. These studies help to analyze different aspects of the use of antibiotics and on the methods of improving the quality in the standards of treatment given.

A total of 400 prescription patterns from the patients of Saveetha Medical College were taken into the study, out of which 38% were males, and 62% were females in the ratio 1:1.63 (Remesh *et al.*, 2013). This is similar to the study conducted by Ambili Ramesh, whose study also contained data from all the departments and showed more number of females included in their study. The increased number of females enrolled might be due to the inclusion of the Obstetrics and Gynecology Department in our study, which obviously includes only female patients.

Among the patients, the major number of patients come under the age group of 46 to 60 (101 patients) and the least number of patients come under the age group of 6 to 18 years (34 patients). The average drugs prescribed by the physician were found to be 3.6, which is less than the average drugs prescribed in the study done by Remesh *et al.*, which was 4.1. The average calculation of the drugs helps us to understand the pattern of prescription as well as to educate the prescribers on the consequences of either prescribing more drugs or less of them for the safety of the patients (Thapaliya *et al.*, 2015).

In our study, this is acceptable as all the participants are in-patients who are in need of more medications than our patients. There is no evidence of polypharmacy here.

Most of the antibiotics prescribed belonged to the beta-lactam group. The most commonly used among them were cefotaxime, amoxicillin, cefazolin and cefuroxime. This is similar to the study done.

The percentage of drugs prescribed by their generic names was found to be 36.3%, i.e., 522 drugs out of a total of 1441 drugs, which is greater than the study done by Remesh A, Salim's *et al.* which was 10.5%. Drugs prescribed under the generic name

are less costly than the drugs prescribed under the brand name. Confusions faced by the pharmacists can be avoided and most of the drugs prescribed by the physicians are written under their generic name (Jain *et al.*, 2015). However, this is still low in our study and physicians should be motivated and encouraged to prescribe more antibiotics under a generic name. They should be aware of the false advertisements given by pharmaceutical representatives and outweigh the benefits of using generic drugs.

The average number of antibiotics prescribed per prescription was found to be 1.53 i.e.; All the patients are being prescribed approximately 1 to 2 antibiotics at least. This is acceptable as most of the inpatient in Obstetrics & Gynecology, General Surgery, Orthopedics undergo surgery, which requires prophylactic measures requiring at least 2 drugs to cover a wide spectrum of microorganisms.

The percentage of drugs administered through injections was found to be 26.48%. This is because the in-patients who underwent surgery are given parenteral drugs during the initial stay in the hospital. The number of drugs included in the Essential Drug List is 92%. This is effectively high and the physicians should be encouraged to continue the same practice.

Patients from this study received antibiotics on a number of occasions. In many instances, patients received alternate antibiotics one by one when the first one was ineffective. The ineffectiveness was contributed to the lack of diagnosis without doing the culture sensitivity tests. So, measures have been taken to avoid the inappropriate use of antibiotics. Doctors must have a clear understanding of the therapeutic use of antibiotics; they should also be aware of the resistant patterns and the prevalence of various infections in their hospital and should have good judgment in the selection of antibiotics.

## CONCLUSION

Prescription pattern studies have become a potential tool for evaluating the health care system. In our study, it observed that the number of drugs are prescribed from the National List of Essential Medicines. The prescription of drugs by the generic name also needs improvement. Since our study is based on the prescription pattern of the inpatients of our hospital, culture and sensitivity report were available for the physicians to make the right choice on the prescription of the antibiotics. But there is a need for antibiotic stewardship programmers' in order to facilitate the rational use of the antibiotics and to prevent the resistance caused by the exces-

sive or inappropriate use of antibiotics.

## ACKNOWLEDGEMENTS

We are thankful to the Department of Pediatrics, Obstetrics and Gynecology, Surgery and Orthopedics for granting us permission and for their guidance throughout the study. We also express our heartfelt thankfulness to the patients who participated and co-operated to help us complete the study.

## REFERENCES

- Badar, V. A., Navale, S. B. 2012. Study of prescribing pattern of antimicrobial agents in medicine intensive care unit of a teaching hospital in central India. *J Assoc Physicians India*, 60(4):20-23.
- Harmeet, S. R., Nagarani, Ma, Moushumi, R. 1998. A study on the drug prescribing pattern and use of antimicrobial agents at a tertiary care teaching hospital in eastern Nepal. *Indian Journal of pharmacology*. May, 1(3):175-175.
- Jain, S., Jain, P., Moghe, V., Seth, V., Upadhyaya, P., Abhijit, K., Goyal, J. 2015. A systematic review of prescription pattern monitoring studies and their effectiveness in promoting rational use of medicines. *Perspectives in Clinical Research*, 6(2):86-86.
- Jha, A., Jha, D., Jha, J., Achappa, B., Holla, R. 2019. Quality of life among HIV-tuberculosis co-infected patients. *Perspectives in Clinical Research*, 10:125-125.
- Llor, C., Bjerrum, L. 2014. Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. *Therapeutic Advances in Drug Safety*, 5(6):229-241.
- Remesh, A., Retnavally, K. G., Salim, S., Gayathri, A. M., Nair, U. 2013. Antibiotics prescribing pattern in the in-patient departments of a tertiary care hospital. *Archives of Pharmacy Practice*, 4:71-71.
- Shafiq, N., Kumar, M. P., Gautam, V., Negi, H., Roat, R., Malhotra, S., Ray, P., Agarwal, R., Bhalla, A., Sharma, N., Singh, R., Sharma, G. D., Bahadur, L., Yadanapudi, N., Gupta, R., Singh, G. 2016. Antibiotic stewardship in a tertiary care hospital of a developing country: establishment of a system and its application in a unit—GASP Initiative. *Infection*, 44(5):651-659.
- Thapaliya, K., Shrestha, S., Bhattarai, S., Basnet, D., Chaudhary, R. K. 2015. Prescribing pattern of antibiotics in pediatric hospital in Chitwan district in Nepal. *World J Phar Pharm Sci*, 4(11):1631-1672.