

## **Study of prescription patterns of antibiotics in tertiary care hospital**

**P. Sneha Pallavi\***, B. Teja Sree and P.V. Krishnakanth

*Department of Pharm-D and Pharmacy Practice, Malla Reddy Institute of Pharmaceutical Sciences, Hyderabad, Telangana, India*

### **\*Correspondence Info:**

P. Sneha Pallavi

Department of Pharm-D and Pharmacy Practice,  
Malla Reddy Institute of Pharmaceutical Sciences,  
Hyderabad, Telangana, India

E-mail: [snehapallavi1111@gmail.com](mailto:snehapallavi1111@gmail.com)

### **Abstract**

**Background:** In order to improve the prescription quality and promoting rational prescription pattern, there is an unavoidable need to investigate the factors that affect doctors' prescription patterns. Antibiotics are most commonly used drugs and are used as both prophylactically and to treat an ongoing infection. Irrational use of antibiotics can lead to poly-pharmacy and over use and miss-use of antibiotics can lead to antibiotic resistance.

**Objective:** A study was carried out to evaluate the (drug utilization) prescription pattern of antibiotic drugs in different medical facilities like ICU, General Medicine, Surgery, Pediatrics, and Orthopedics in a tertiary care hospital.

**Methods:** An "observational, descriptive & prospective study" was carried out for studying the prescription pattern of Antibiotics in tertiary care hospital.

**Results:** A total of "218 patients" who were prescribed antibiotic were included in the study. Commonly prescribed antibiotic were Cephalosporin's (174drugs, 51%). Extensive poly-pharmacy (100%), that is more than three drugs were prescribed in all the patients (Average drugs encountered per patient =7). The data was analyzed using WHO 'prescribing indicators'. Broad spectrums of antibiotics were commonly prescribed for majority of the diseases.

**Conclusion:** The study was undertaken to give feedback to the prescribers, so as to create awareness about the over-use of drugs. Patient counseling should be done for proper use of antibiotics, culture sensitivity tests should be conducted before prescribing antibiotics.

**Keywords:** Prescription pattern, Inpatients, Rational drug use, Poly-pharmacy, Over-use of antibiotics, Drug resistance.

### **1. Introduction**

Prescription pattern monitoring studies (PPMS) are a tool for assessing the prescribing, dispensing and distribution of medicines. Prescription pattern monitoring studies (PPMS) are drug utilization studies with the main focus on prescribing, dispensing and administering of drugs. They promote appropriate use of monitored drugs and reduction of abuse or misuse of monitored drugs. [3]

Drug Utilization Evaluation (DUE) studies are designed to assess drug usage appropriateness. Drug utilization studies have the potential to make objective evaluation and analysis of health professionals work and provide them with feedback to stimulate thinking about their practice and looking for ways to improve their own performance. To improve the overall drug use, especially in developing countries, international agencies like the (WHO) World health organization and International network for the rational use of drugs (INRUD) have applied themselves to evolve standard drug use indicators. An audit of antibiotic prescribing patterns is an important indicator of the quality and standard of clinical practice. A systematic review

of prescription pattern monitoring studies and their effectiveness in promoting rational use of medicines need to be carried out. [2]

The main aim of PPMS is to facilitate rational use of medicines (RUM); and avoid over prescription of antibiotics or misuse of antibiotics, as it may lead to antibiotic drug resistances. The objectives of this study are to check whether the drugs were prescribed according to WHO prescribing indicators and were from Essential drug list (EDL). [2]

### **2. Materials and Methods**

#### **2.1 Study design, Setting and Study population**

The present study was observational, prospective and descriptive and was carried out in five inpatients departments of (ICU, General medicine, Pediatric, Surgery and Orthopedics) 300 bedded tertiary care hospital in Hyderabad, India between November 2015 and April 2016.

Two hundred and eighteen prescriptions (n=218) were analyzed and were randomly collected who were on antibiotics treatment or prophylaxis, were enrolled.

## 2.2 Data collection

Medical case sheets, drug charts and there laboratory investigations were recorded in self-designed standardized Performa and were analyzed. Demographics (Age, Sex), Chief complaints, Current diagnosis, medical history, medication prescribed (dose, route of administration, frequency, indication, therapy duration, marketing categories [generic/branded]) were collected.

The data was then analyzed to find out the prescribing patterns in the hospital using EDL and WHO indicators.

## 2.3 Rationality of antibiotics

The drug utilization was assessed by the World health organization (WHO) core drug indicators such as prescribing indicators [6]. The total number of drugs prescribed, total number of antibiotics prescribed, Number of antibiotics used as Monotherapy & in combination, and drugs prescribed by generic/ branded names. The adherences of antibiotics prescription were checked with the WHO essential drug list (EDL) [5]. The prescribing physicians were not told

about the prescription audits in order to prevent Hawthorne effects [7].

## 2.4 Ethical considerations

The study was done using WHO guidelines only after obtaining approval from institutional research and ethics committee.

## 2.5 Statistical analysis

Observational study was done to view and record the data, prospective study was done to check the outcome and descriptive statistics were applied on the study to collect the data using Microsoft excel software; and the results were applied in percentage.

## 3. Result

The number of drugs received by patients in the present study out of 218 prescriptions included for the study, 118(54%) prescriptions had antibiotic Monotherapy, 75 (34%) prescriptions had two antibiotic drugs, 21 (10 %) prescriptions had three antibiotic drugs, 4 (2%) prescriptions were more than three antibiotic drug was observed.

**Table 1: Prescribing indicators used [9]**

Prescribing indicators	Number of drugs/Percentage
Total number of prescription analyzed	218 cases
Average drug encountered per patient	7 drugs
Total number of drugs prescribed	1550 drugs
Number of antibiotics given as Monotherapy	54%
More than one antibiotic prescribed	46%
Total number of antibiotics encountered in the study	344 Antibiotics
Drugs prescribed by Essential drug list	1550(100%)
Number of drugs prescribed by generic names	0(0%)
Number of drugs prescribed with an injection (Parenteral)	258(75%)

## 3.1 Representing the Age Distribution of Study Population

Out of 218 patients included in the study, 28 patients had an age of below 18 years, 59 patients had an age of 18-30years, 95 patients had an age of 31-60years, and 36 patients had an age of above 60 years.

## 3.2 Distribution of Antibiotics According To Class

Out of 344 antibiotics prescribed in the study, 174 (51%) were of cephalosporins, 34 (10%) were of Aminoglycosides, 42 (12%) were of Quinolones, 16 (5%) were of Macrolides, 8 (2%) were of Pencillins, 32 (9%) were of Beta lactamase inhibitors, 33 (10%) were of Nitroimidazoles, 4 (1%) Tetracycline's, 1(0.2%) were of Glycopeptides antibiotics.

## 3.3 Pattern of use of antibiotics in study population

Out of 218 prescriptions included in the study, 118 (54%) prescriptions had antibiotic monotherapy, 75 (34%) prescriptions had two drug therapies, 21 (10%) prescriptions had three drug therapies, and 4 (2%) prescriptions had more than three antibiotic combinations.

## 3.4 Route of antibiotics administered in the study

Out of 344 antibiotics prescribed in the study, n=258 (75%) were administered parenteral, followed by oral n=82 (24%) and topical n=4 (1%).

## 4. Discussion

A prescription based survey is considered to be one of the most effective methods to assess and evaluate the prescribing attitude of physician and dispensing practice of pharmacists [13]. An essential drug offers a 'cost-effective' solution to many health problems in a developing country. Prescribers can only treat patients in a rational way if they have access to an Essential Drug List (EDL) and essential drugs are available in a regular basis. Poly-pharmacy is defined as concomitant use of five or more drugs and it could enhance drug interactions and drug related problems. It is difficult to treat patients in the hospital with multiple co-morbidities with less number of drugs as they require drugs for treatment of specific condition as well as for prophylaxis, but it is also essential to keep a balance between the number of drugs and effective pharmacotherapy [14].

## 5. Conclusion

Antibiotic use was found to be reasonable and rational in most of the cases, all the antibiotics were prescribed from inside the Essential Drug list (EDL). Broad spectrum antibiotics were highly used for wide range of diseases.

Cephalosporin classes of antibiotics were commonly prescribed and parenteral route was highly used in our study population. Average drug encountered per patient were high (n=7) which may increase the risk of drug interactions and leads to poly-pharmacy. Over use of antibiotics were found which could lead to antibiotic resistance.

Prescribers should be suggested to prescribe the drugs by their generic names. Prescribing the drugs by its generic names can reduce prescribing & dispensing errors; and also benefit inventory control. There is a need to emphasize the switch over to other routes of administration as soon as possible and also to be investigated if the practice of switching from parenteral to oral drug administration when the clinical condition permits would reduce the cost associated with the drug therapy. Prescribers should be advised not to administer antibiotics with the test results.

## Reference

- [1] WHO. The Selection and Use of Essential Medicines. Technical Report Series No 946. Geneva: WHO Press; 2007.
- [2] Promoting Rational Use of Medicines: Core Components-WHO Policy perspectives on medicine, No. 005, September 2002. Essential medicines and Health Products Information Portal. A World Health Organization Resource.
- [3] Strom BL, Stephan EK, editors. Pharmacoepidemiology. 4<sup>th</sup> ed. Wiley-Blackwell: John Wiley and Sons, English; 2005.
- [4] Remesh A, Salim S, Gayathri AM, Nair U, Retnavally KG. Antibiotics prescribing pattern in the in-patient departments of a tertiary care hospital. *Arch Pharma Pract.* 2013; 4:71-6.
- [5] WHO Model Lists of Essential Medicines 19<sup>th</sup> edn. Geneva: World Health Organization; 2015.
- [6] Bapna JS, Tekur U, Gitanjali B, Shashindran CH, Pradhan SC, Thulasimani M, et al. Drug Utilization at primary health care level in Southern India. *Eur J Clin Pharmacol* 1992; 43:413-5.
- [7] Mangione-Smith R, Elliott MN, McDonald L, McGlynn EA. An observational study of antibiotic prescribing behavior and the Hawthorne effect. *Health Serv Res* 2002; 37:1603-23.
- [8] Ehijie F.O. Enato and Ifeanyi E. Chima, Evaluation of drug utilization patterns and patient care practices. *West African Journal of Pharmacy*, 2011; 22 (1): 36-41.
- [9] World Health Organization. How to investigate drug use in health facilities. Selected drug use indicators.1.WHO/DAP/93.1. WHO, Geneva, 1993.
- [10] Kigera JWM, Turyakira C. "Audit of prophylactic antibiotic use in orthopedic surgery in Mulago Hospital" *Ann African Surg* 2012; 9: 16-18.
- [11] Rogues AM, Placet-Thomazeau B, Parneix P, et al. "Use of antibiotics in hospitals in south-western France." *J Hosp Infect* 2004; 58: 187-92.
- [12] Bhavesh K. Lalan, et al., drug prescription pattern of outpatients in a tertiary care, teaching hospital in Maharashtra, 2012 July; 3(3): P 225 - 229
- [13] Vlahovic-Palcevski V, Morovic M, Palcevski G. "Antibiotic utilization at the university hospital after introducing an antibiotic policy". *Eur J Clin Pharmacology* 2000; 56:97-101.
- [14] Singh N, Yu VL. "Rational empiric antibiotic prescription in the ICU". *Chest* 2000; 117(5):1496-9.