

# A Study on Antibiotic Prescription Practices at a Tertiary Care Hospital in Punjab

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## ABSTRACT

**Purpose:** To evaluate antibiotic prescription pattern in patients at a tertiary care hospital. Our other objectives were to study the details about antibiotics (class, frequency, route, dose, duration), rectify the errors in the prescription, and evaluate the prescription according to the WHO guidelines.

**Methods:** The study was an observational prospective study having a total number of 126 patients with study duration of 6 months. The in-patient department prescription orders of the patients were studied and data was recorded in the patient profile form. The recorded data were analyzed as per the objective of the study.

**Results:** Out of 126 patients, cephalosporins (43.7%) were the maximum used class of the antibiotic. The most frequent route of administration used was Intravenous (66.7%). Dose and frequency of the drug were written on most of the prescription, but still medication errors were present in 34.9% of the prescriptions. Sensitivity testing was done on 35.7% of patients.

**Conclusion:** There is a critical role of a clinical pharmacist in a tertiary care hospital to reduce the chances of medical errors and promote rationality of the drugs administered.

**Keywords:** Antibiotic, Prescription, Prescribing pattern, Errors.

## INTRODUCTION

We all know without any doubt that the antimicrobials have executed a critical role in supporting the healthcare systems all over the world. <sup>[1]</sup> Antibiotics have saved incalculable lives since their first discovery in the 1930's. <sup>[2]</sup> According to the recent estimates, the death rate in India due to infectious causes is somewhere around 416.75 deaths per 1 Lakh individuals. <sup>[3]</sup> Evidence suggests that there is a rapid upsurge in the prevalence of multi-drug resistant microbes in the health care settings. <sup>[4]</sup> Easy access to the antibiotics, high rate of infectious diseases, and low-standard living conditions are some of the factors that lead to hike in the antibiotic resistance in India. <sup>[5]</sup> India is one of the leading nations that represent the highest rates of antibiotic consumption. <sup>[6]</sup> One of

the ideal approaches to curb with the antibiotic resistance issue is to decrease irrational prescribing of the antibiotics and this can be achieved by following the antibiotic stewardship programs introduced by the WHO. <sup>[7]</sup> Such programs are being followed by the developed countries and have shown positive results in terms of improved medical outcomes, rational use of antibiotics and combat the resistant pathogenic strains. <sup>[8]</sup>

Nowadays, health care providers bring changes in clinical behaviour through audit and feedback mechanism. This phenomenon helps in providing summaries of the clinical performance and encourages positive alternations in the health care practices. The information is generally obtained through Medical Health Records, computerized databases or direct patient

observations. Rational use of antibiotic results in a low degree of pathogen resistance and rate of mortality is ultimately reduced. In this study, we aim to investigate the prescribing and consumption pattern in patients at a tertiary care hospital, details about antibiotics (class, frequency, route, dose, and duration), rectification of the errors in the prescription and the evaluation of the prescription according to the WHO guidelines.

## MATERIAL AND METHODS

The study was conducted at Fortis Hospital, Ludhiana for duration of 3 months. It was a Prospective Observational Study with a total number of 126 recruited subjects. Patients who were between the ages of 18- 90 years and had an antibiotic course of treatment participated in our study. A duly signed inform consent, consisting of information about the study was taken from each subject and the study was approved by the Institutional Ethical Committee of Indo Soviet Friendship College of Pharmacy.

The IPD prescription orders of the patients were studied and data was recorded in the patient profile form.

## Data analyses

The recorded data were analyzed as per the objectives of the study through descriptive analysis with the help of SPSS statistical software version 20.

## RESULTS

Out of 126 patients, the majority of them fall under the age group of 41- 60 years, i.e. 57 (45.2%) patients (Figure 1). 73(57.9%) were male patient and 53(42.1%) were female patients.

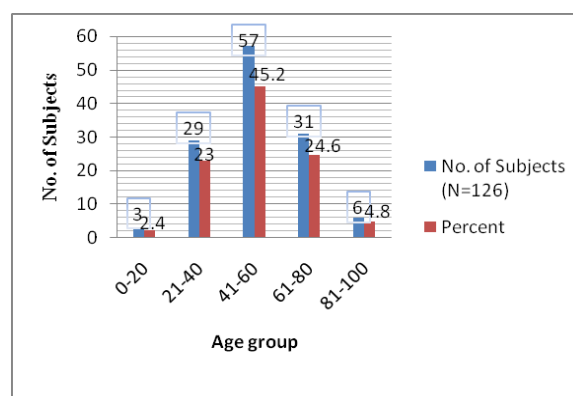


Figure 1: Age distribution of the subjects

Out of 126 patients, the maximum number of patients was of Diabetes mellitus II + Hypertension i.e. 6 (4.8%), followed by 5(4.0%) patients of Coronary artery disease as shown in Table 1.

Table 1: Disease distribution of the Patients

Diagnosis	N	%
Hepatitis	2	1.6
Febrile illness	2	1.6
Spinal cord extra modular lipoma	1	.8
CA prostate	1	.8
Psychotic illness	1	.8
CA ovary	1	.8
Quadriplegia	1	.8
Rheumatic heart disease	2	1.6
Coronary artery disease	5	4.0
Dilated cardiomyopathy	2	1.6
Cellulitis left limb	1	.8
Fall from height	1	.8
Cerebrovascular accident	1	.8
Hyperthyroidism	2	1.6
Upper uretic mass	1	.8
Chronic myeloid leukaemia	2	1.6
Carcinoma thyroid	2	1.6
Ulcerative colitis	1	.8
Glioblastoma maliform	1	.8
Prostate abscess	1	.8
Testicular carcinoma	1	.8
Acute cholecystitis	1	.8
Primigravida at 37 week 6 days	3	2.4
Post menopause	2	1.6
Soft tissue injury	2	1.6

Dystrophy injury	1	.8
CA bladder	1	.8
Breast tumour	1	.8
Nephobibhasis	1	.8
CA breast	1	.8
Emphysema	1	.8
Cholestasis	2	1.6
Post operative double valve replacement	1	.8
COPD	1	.8
Viral encephalitis	1	.8
Retrobular neuritis	1	.8
Right leg cellulitis	1	.8
Renal tubular acidosis	1	.8
Left ventricular failure	1	.8
Hairpin in abdomen	1	.8
Acute gastroenteritis	1	.8
Post-operative hysterectomy	1	.8
Fracture	1	.8
Hernia	1	.8
Acute Lvf	1	.8
Abdominal pain	1	.8
Acute coronary syndrome	3	2.4
Smv Thromboposis	1	.8
Chronic liver disease	1	.8
Systemic lucus erythromatis	1	.8
Dengue	2	1.6
Hepatic encephlopathy with chronic liver disease	1	.8
Urinary tract infection + renal stones	1	.8
COPD +coronary artery disease	1	.8
Benign prostatic hyperplasia+phimosi	1	.8
Chronic liver disease+hepatic encephalopathy	1	.8
Acute pancreatitis + sepsis	1	.8
Hypertension+prostogramy	1	.8
Ca ovary+hypertension	1	.8
Gastritis+acute colitis	1	.8
Diabetes mellitus 2+chronic kidney disease	3	2.4
Renal tubular acidosis+injury on right finger	1	.8
Diabetic foot+chronic kidney disease	1	.8
Renal tubular acidosis+head injury	1	.8
PCOD +gastric diabetes mellitus	1	.8
Ga+ Pog	1	.8
Sepsis+thrombocytopenia	1	.8
Jaundice+ ALD	2	1.6
CLD + Ascites	1	.8
Autocrine disease+urinary tract infection	1	.8
Diabetes mellitus ii + hypertension	6	4.8
Pneumonitis+diebetes mellitus 2	1	.8
Neuroendocrine tumor+ascites	1	.8
Hypertension+connective tissue disease	1	.8
Renal tubular acidosis+intraventricular hemorrhage	1	.8
Acute coronary syndrome+hypertension	3	2.4
Pheporis+hypertension	1	.8
Dilated cardiomyopathy with diabetes mellitus 2+chronic kidney disease	1	.8
Stroke+diabetes mellitus 2+hypertension	1	.8
CKD + Anaemia +CAD	1	.8
Hypertension+hypothyroidism+chronic kidney disease	1	.8
CLD +Jaundice + Ald	1	.8
Diabetes mellitus 2 +hypertension+chronic kidney disease	3	2.4
Hypertension + diabetes mellitus 2+diabetic nephropathy	2	1.6
Diabetes mellitus 2+hypertension+cerebrovascular accident	1	.8
Chronic liver disease+diabetes mellitus 2+hypertension	2	1.6
Benign prostatic hyperplasia+hypertension+ coranary artery blockage	1	.8
Cerebrovascular accident+hypertension+ coronary artery disease	1	.8
Hypertension+COPD+AV block	1	.8
Diabetes mellitus 2 +hypertension+acute kidney injury+chronic kidney disease	2	1.6
SE+Diabetes mellitus 2 +chronic kidney disease+ urinary tract infection	1	.8
Encephlopathy+Parkinsons+Coronary artery disease+Diabetes Mellitus 2	1	.8
Total	126	100.0

Out of 126 patients, the majority of the patients, i.e. 55(43.7%) were prescribed Cephalosporin class of drugs followed by Penicillin, which was prescribed to 8 (6.3%)

patients. During the course of our study, we found that the drug Inj. Magnex forte (Cefoperazone) was administered to the maximum number of patients, i.e. 28(22.2%) followed by Inj. Supacef (Cefuroxime) that was given to 10(7.9%) patients. Details of all the drugs are given in Table 2.

**Table 2: Antibiotic used during the course of treatment**

Name Of Drugs	N	%
Inj. Magnex Forte	28	22.2
Inj. Tazact	2	1.6
Tab. Martifur	1	.8
Inj. Monocef	7	5.6
Inj. Piptaz	2	1.6
Inj. Supacef	10	7.9
Inj .Augmentin	4	3.2
Ointment Suframycin	1	.8
Inj. Fortim	1	.8
Tab. MX Duo	1	.8
Tab. Niftran	2	1.6
Inj. Meropenem+ Inj. Metronidazole	1	.8
Inj. Cefroxime+Inj, Oflox	3	2.4
Inj. Monocef+ Inj, Zosyn	1	.8
Inj. Magnex Forte+Inj. Colistin	1	.8
Inj. Supacef + Tab. Pulmocef	5	4.0
Tab. Tazact + Tab. Fluconazole	1	.8
Inj. Supacef+Inj. Amikacin	5	4.0
Inj. Magnex Forte+ Inj. Amikacin	2	1.6
Inj. Altacef,+Tab. Pulmocef	2	1.6
Inj. Tazact,+Tab. Linid	1	.8
ointment Zymer+ Inj. Acyclovir	1	.8
Inj. Magnex Forte+ Tab. Clindamycin	1	.8
Inj. Tazact+Tab. Metrogyl	1	.8
Inj. Monocef+ Inj. Met RD	1	.8
Inj. Zosyn+ Inj. Supacef	1	.8
Inj. Monocef+Tab. Azithrac	1	.8
Inj. Magnex Forte+ Cap. C Mycin	1	.8
Inj. Monocef+ Cap. Doxy	1	.8
Inj. Magnex Forte+ Tab. Fluconazole	1	.8
Inj. Magnex Forte+Inj. Tazact	3	2.4
Inj. Piptaz+Tab. Clarimin	1	.8
Inj. Magnex Forte+Tab. Clarib D	1	.8
Inj. Magnex forte+Tab. Doxycycline	2	1.6
Inj. Meropenem+Tab. Fluconazole	1	.8
Inj. Metrogyl+Inj. Magnex Forte	1	.8
Inj. Augmentin+Inj. Ceftriaxone	1	.8
Inj. Magnex Forte + Tab. Rifagut	1	.8
Inj. Metrogyl+Inj. Monocef	1	.8
Inj. Clarythramycin+Tab. Tazact	1	.8
Tab. Ledispivir + Tab. Sofoslivir	1	.8
Tab. Augmentin+ Tab. Azee	1	.8
Inj. Magnex Forte+ Inj. tragocid	1	.8
Inj. Magnex Forte+Tab. Rifagut+Inj. Tragocid	1	.8
Inj. Pipracycline+ Inj. Vancomycin+ Inj. Tapenam	1	.8
Inj. Tazact+Inj. Piperacilin Tazobactum+Inj. Fluconazone	1	.8
Inj. Imipenem+ Inj. Ticloplanin+Tab. Rifagut	1	.8
Eye Drop Monogram+Tab. Mortifyr+Tab. Celil	1	.8
Inj. Magnex Forte+Inj. polymyithine B+Inj Colistine	2	1.6
Inj. Tazact+Inj. Linezolid+Tab. Rifagut	1	.8
Inj. Tazact+Tab. Bactoint+Inj. Ticloplanin	1	.8
Inj. Sipacef+ Tab. feronem+ Tab. ceftrum	1	.8
Inj. Monocef+Inj. Metrogyl+Inj. doxycycle	1	.8
Tab. Doxyxyxline+ Inj. Ceftrioxime+Tab. Metronidazole	1	.8
Inj. Vancomycin+ Tab. Acyclovir+ Tab. Monocef	1	.8
cream onset +candid powder+ Tab. Fercan	1	.8
Tab. Ticloplanin +Inj. Colistin +Inj. Tigicycline	2	1.6
Tab. Ceftrum+ Tab. Oflox +Cap. Recimix +Tab. Combutol	1	.8
Inj. Colistin+ Inj. Fluconazole+ Inj. Metronidazol+Inj. Amikacin	1	.8
Tab. Ethambutol+Tab. Rifaxim+Tab. Amikacin+ Inj. Magnex forte+Tab. Lefloxacin	1	.8
Inj. Amphotericin D+ Inj. Colestemic Sodium+Inj. Magnex Forte+Inj. Ticloplanin+Tab. Bulbrium Ds	1	.8
Total	126	100.0

35.7% of patients had their sensitivity testing done, whereas, testing was not conducted on the remaining portion of patients. Moreover, 82.5% of patients received drugs with generic names on their prescription and 17.5% of patients had brand names. The majority of the patients, i.e. 84(66.7%) were administered drugs via intravenous route followed by a combination of Intravenous + Oral in 31(24.6%) patients. The detailed information is given in Figure 2.

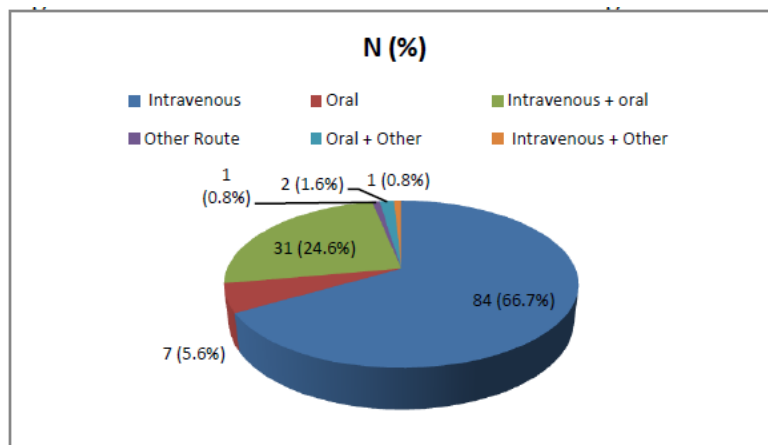


Figure 2: Route of administration followed during treatment

Out of 126 patients, 111(88.1%) patients were able to show the prescriptions with dose and frequency of the drug written on them, while 15(11.9%) patients presented with no dose and frequency. Our study also found that the minimum days of therapy given to the patients were 4 and the maximum were 30 days. This 30 days therapy was given to one patient because of severe condition and at the end of 30<sup>th</sup> day, he ended up dying. We also noticed that the medication errors were present in 34.9% of prescriptions and in 65.1%, they were absent.

Moreover, we also found that the WHO criteria for the evaluation of prescription was followed in 89(70.6%) patients and accordingly, action was taken on the errors found as illustrated in Table 3. Overall, we have described the statistical analysis of all the parameters taken in our study in Table 4.

Table 3: Distribution of action employed

Action taken for errors found	N	%
No action Taken	82	65.1
Rectification of error by pharmacist	27	21.4
Suggestion communicated to the physician for rectification of error	17	13.5
Total	126	100.0

Table 4: Descriptive statistical analysis of all the parameters

	Mean	Std. Deviation	Analysis N (p≤0.05)
Sensitivity testing Done or not	1.64	.48	126
Routes mentioned or not	1.37	.48	126
Frequency of Medication	1.12	.32	126
Generic name given or not	1.17	.38	126
Action taken for the errors found	.48	.72	126
WHO criteria used or not	1.29	.45	126
Dose of The Medication	1.12	.32	126
Medication error if any	1.73	.44	126
Route of administration	1.67	1.0	126

## DISCUSSION

The outcomes of our investigation signify a positive observational prospective

study on antibiotic prescription pattern at a tertiary care hospital in Punjab. The majority of the patients, i.e. 73(57.9%)

were men who admitted to the hospital and most of the patients fall under the age group of 41-60 years. The highest number of patients, i.e. 6 (4.8%) was presented with diabetes mellitus II along with hypertension. During the course of our study, we observed that the most frequently used class of drug was Cephalosporin with a usage of 43.7%, which was significantly more than the findings of Sharma et al. [9] On the evaluation of the drugs administered, we noticed that the Inj. Magnex forte (Cefoperazone) was administered to the majority of the patients 28(22.2%). Our results also reported that the sensitivity testing was done on 35.7% of the patients admitted, which was significantly less than that of the study conducted by (Shanker R P, et al. 2003). [10] Most of the patients, i.e. 82.5% had prescriptions with generic name mentioned and 66.7% of patients received drugs through intravenous route. Out of 126 patients, 111(88.1%) had dose and frequency of the drugs mentioned on their prescriptions. Our investigation also found that the minimum days of scheduled therapy were 4 and the maximum were 30 days as the patient was in a critical condition. We also noticed that 34.9% of the prescriptions had medication errors in them. At last, According to the WHO criteria, we evaluated the prescriptions and found that it was followed in 89 (70.6%) patients.

## CONCLUSION

Our study concluded that most of the prescriptions were having more than one antibiotic per prescription. Polypharmacy in the case of antibiotics is a major cause of resistance in antibiotic and it also increases the cost of the prescription by many folds. Sensitivity testing procedures are the critical steps that need to be followed when selecting antibiotics for the management of the infection and overall optimization of the treatment. In our study, we found that sensitivity testing was limited. In many of the prescriptions, the dose, route, frequency, and other necessary information were not included which lead to a large number of

errors in the prescription which could be life-threatening. The number of errors found was then rectified using various methods. We also noticed that the W.H.O criteria for the evaluation of the prescription were not followed in some patients. There is a major role of clinical pharmacists in order to manage the rational use of antibiotics and improving the quality of life in patients. Further, these findings are required to confirm in a large population.

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