

# Drug utilization evaluation of third generation cephalosporins using core drug use indicators

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**Abstract:** To evaluate the drug utilization of third generation cephalosporins using core drug use indicators in various wards of Sri Ramachandra Hospital. Third generation cephalosporins are the most commonly prescribed broad spectrum antibiotic even before the culture sensitivity results arrives. Hence this study was undertaken to study the drug utilization evaluation of third generation cephalosporins in the inpatient department of various wards of Sri Ramachandra Hospital. A prospective study was conducted between July 2009 and February 2010. Prescriptions of 364 patients containing third generation cephalosporins admitted in inpatient department of various wards of Sri Ramachandra Hospital, Chennai were collected and using WHO basic drug indicators, the utilization pattern were analyzed. The average number of drugs per prescription was found to be 7.89 on prescription analysis. Cefixime was the most frequently prescribed (32.69%) oral third generation cephalosporins, followed by cefotaxime (31.32%). Among IV third generation cephalosporins, cefotaxime was the most frequently prescribed injections (35.4%). Only 28.02% of drugs were prescribed by generic name. The results obtained represent the over all prescribing pattern of third generation cephalosporins in the Tertiary Care Teaching Hospital, Chennai.

**Keywords:** Drug utilization evaluation, antibiotic, prescribing pattern.

## INTRODUCTION

The role of drugs in the health care delivery system is incredible. The utilization of health services can be improved by the availability of drugs (Odusanya & Bamgbala 1999). Rational use of drugs is essential since drugs are expensive and they constitute a large percentage of health care costs. Rational use of drugs is defined by the World Health Organisation as “patients receive medicines appropriate to their clinical needs, in doses that meet their own requirements for an adequate period of time, and at the lowest cost to them and their community” (World Health Organisation 1987; IOCU 1998). Polypharmacy is the most common irrational practice. Most drugs were prescribed by trade names and by abbreviations. Unnecessary antibiotics, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), injections, vitamins and expensive third generation antibiotics prescribed to most patients (Pradhan *et al.*, 1998). Irrational prescribing is still commonly practiced in spite of various programs on rational use of drugs and the Emergency Drugs List (EDL) of WHO. Mass awareness programmes must be conducted amongst physicians and consumers to promote the concept of essential medicines and advantages of generic drug prescribing.

Prescribing practices will reflect the health professionals' abilities to differentiate among the various choices of drugs and determine the drugs that will most benefit their patient (Crockett 2005). The study of prescribing pattern

is essential so that necessary modifications in the prescribing practices of the prescribers can be made and rational and cost effective medical care can be achieved (Gupta *et al.*, 1997). Third generation cephalosporins are the most commonly prescribed broad spectrum antibiotic even before the culture sensitivity results arrives. Hence this study was carried out to evaluate the drug utilization of third generation cephalosporins by physicians in the inpatient department of various wards of Sri Ramachandra Hospital. Feedback from the current study gives a review of the prescribing practices to prescribers which can be modified if necessary to facilitate better health care delivery (Bhartiy & Shinde 2006).

## MATERIALS AND METHODS

Prescriptions of patients containing third generation cephalosporins admitted in inpatient department of various wards of Sri Ramachandra Hospital, Chennai were collected prospectively between July 2009 and February 2010. Sri Ramachandra Hospital is a 1749 bedded tertiary care teaching hospital. The hospital includes all major departments and services including medical wards, neurology, oncology, pediatrics, nephrology, cardiology, general medicine, Obstetrics & Gynecology (OB&G), urology and orthopaedics. Patients receiving the study drug were identified by daily review of the patient's drug records in each of the participating departments. These were analyzed according to the following basic drug use indicators (core indicators) (World Health Organisation 1993):

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- Average number of drugs per prescription
- Percentage of drugs prescribed by generic name
- Percentage of prescriptions with an antibiotic prescribed
- Percentage of prescriptions with an injection prescribed

These indicators are highly standardized and will enable quick and reliable assessment of drug use in health care. Use of these indicators facilitates identification of particular drug use issues. Patient demographics and clinical details were recorded on a proforma. The proforma consists of patient details, social history, family history, chief complaints, investigations, diagnosis and medications prescribed. From the day of admission till the day of discharge, followup of cases were done.

#### Analysis

The completed proforma sheets were analyzed based on the age distribution, department-wise distribution, average number of drugs per prescription, commonly prescribed third generation cephalosporin and third generation cephalosporin injections commonly prescribed.

Intravenous fluids were not considered as drugs and only drugs of allopathic medicines were included.

**Table 1:** Age distribution of patients

Age	No. of males (n = 139)	Percentage	No. of females (n = 225)	Percentage
0-10	5	3.60	4	1.78
11-20	4	2.88	7	3.11
21-30	24	17.27	69	30.67
31-40	10	7.19	35	15.56
41-50	20	14.39	42	18.67
51-60	29	20.86	37	16.44
61-70	27	19.42	19	8.44
71-80	13	9.35	7	3.11
81-90	7	5.04	5	2.22

**Table 2:** Department wise categorization of prescriptions

Department	Number of males (n = 139)	Percentage	Number of females (n = 225)	Percentage
General medicine	28	20.14	7	3.11
OB&G	0	0	102	45.33
Neurology	42	30.22	19	8.44
Orthopedics	16	11.51	14	6.22
Cardiology	8	5.76	19	8.44
Urology	11	7.91	10	4.45
Nephrology	8	5.76	12	5.33
General surgery	6	4.32	15	6.67
ENT	5	3.60	10	4.45
Medical Gastro Enterology	7	5.04	7	3.11
Pediatrics	6	4.32	10	4.45
Plastic surgery	1	0.71	0	0
Dermatology	1	0.71	0	0

#### STATISTICAL ANALYSIS

Data was analyzed and presented as percentage, mean and standard deviation. Analysis was done in Excel version 7.

#### RESULTS

Totally, 364 prescriptions containing third generation cephalosporin were analyzed and the mean number of drugs was 7.89.

Gender analysis revealed that female patients prescribed with third generation cephalosporins were more in number (n=225, 61.81%) compared to males (n=139, 38.19%). With regard to age, 20.86% of males (n=29) were in 51-60 years age group while 30.67% of females (n=69) were in 21-30 years age group. Table 1 shows the details of age distribution.

In relation to various departments, 102 (28.02%) of prescriptions containing third generation cephalosporins were from OB&G department. The department-wise categorization of prescriptions among male and female was displayed in table 2.

Among the 364 prescriptions containing third generation cephalosporins, cefixime was the most frequently prescribed third generation cephalosporin (32.69%), followed by cefotaxime (31.32%). The various third generation cephalosporins prescribed were shown in table 3.

**Table 3:** Commonly prescribed third generation cephalosporins

Drugs	Number of patients (n = 364)	Percentage
Ceftriaxone	71	19.51
Cefotaxime	114	31.32
Cefoperazone	48	13.19
Cefixime	119	32.69
Cefpodoxime	2	0.54
Ceftazidime	10	2.75

Among 364 prescriptions, 322 prescriptions contain injections and cefotaxime was the most frequently prescribed injections (35.4%). Injectable third generation cephalosporins prescribed were shown in table 4.

**Table 4:** Commonly prescribed third generation cephalosporin injection

Drugs	Number of patients (n = 322)	Percentage
Cefotaxime	114	35.4
Cefixime	85	26.40
Ceftriaxone	71	22.05
Cefoperazone	48	14.91
Cefpodoxime	2	0.62
Ceftazidime	2	0.62

The prescribing indicators were shown in table 5.

**Table 5:** Prescribing indicators

Indicators	Number (n = 364)	Percentage
Drugs prescribed by generic name	102	28.02
Prescriptions with injections	322	88.46

## DISCUSSION

The study focused on the pattern of third generation cephalosporin prescription in various departments of a tertiary care teaching hospital. Prescribing practices reflects the clinical judgment of the clinicians. A majority of the prescriptions were written from drugs contained in the hospital's formulary indicating, to a large extent, that physicians in this establishment complied with the recommendations of the hospital's formulary.

In our study, majority of the patients prescribed with third generation cephalosporins were women. This may be due to the fact that women are more prone to bacterial infections, especially urinary tract infections, vaginal infections during pregnancy and after delivery also. The same reason may be applied to the prescription being more from the OB&G department.

Cefixime and cefotaxime were the commonly prescribed third generation cephalosporins and prescribed more commonly in injection form. This is because the parenteral third generation cephalosporins have excellent activity against most bacterial infections.

In our study, only 102 drugs (28.02%) were prescribed by generic names. This value is less when compared to the reports of other studies (Bosu & Ofori-Adjei 1997; Najmi et al., 1998). The low rate of generic prescribing has been linked to pressure from patients and high marketing strategy of the pharmaceutical companies. Generic prescribing helps the hospital pharmacy to have a better inventory control. Confusion among the pharmacists while dispensing can also be reduced, when prescribed by generic names. Moreover, generic drugs are more cost effective than the branded ones.

The results have some limitations. The study period was limited and hence seasonal variations in prescribing patterns were not revealed. The results were not collected from each physician, and the results obtained represent the overall prescribing pattern of third generation cephalosporins in the hospital. Some prescriptions might have been left during the study period. The drug utilization study focusing on third generation cephalosporins have not been done before. Hence it is not possible to compare the results with that of previous literatures.

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