



A STUDY ON DRUG UTILIZATION AND PRESCRIBING PATTERN OF THIRD GENERATION CEPHALOSPORIN ANTIBIOTICS IN THE TERTIARY CARE TEACHING HOSPITAL - A PROSPECTIVE CROSS SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Cephalosporins are the commonly used group of antibiotics in hospitals and healthcare facilities around the world. The inappropriate use of antibiotics, especially broad-spectrum antibiotics in hospitals, leads to antibiotic resistance. Drug utilization pattern is a performance improvement method that focuses on evaluation and improvement of drug use processes to achieve optimal patient outcomes. Third-generation cephalosporins are the most commonly prescribed broad-spectrum antibiotics, even before culture sensitivity results are available. The objective of the current study was carried out to evaluate the drug utilization and prescribing pattern of third generation cephalosporins in the in-patient department of surgery wards of a tertiary care teaching hospital. A predesigned data collection form was used to collect the data and it was analyzed using Microsoft Excel. A total of 120 inpatients were enrolled in the study. Among 120 patients, male were predominant 92 (76.7%). More number of patients enrolled between the age group of 51-60 years [32 (26.7%)]. Patients with comorbidities were 51 (42.5%). This research study can help provide feedback to prescribers, thereby increasing awareness and improving patient care through appropriate medication use. From this study, it was clear that intravenous form of third generation cephalosporins are predominantly used. This study showed that drugs are predominantly prescribed by brand names.

KEYWORDS : Third generation cephalosporin, Drug utilization, prescribing pattern, Antibiotics

INTRODUCTION:

Drug utilization (DU) is defined by WHO as the marketing, distribution, prescription and the use of drugs in society with particular focus on medical, social and economic consequences (Ali et al., 2018). Drug prescribing analysis helps in increasing our understanding of how drugs are used to estimate the desired action in a specified period of time. Even though the advantages patients gain from pharmacological interventions are valuable, the disadvantages of drugs and the consequences of inappropriate use of drugs cannot be ignored (Samba et al., 2023).

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 (Kaliamoorthy et al., 2012). The study of prescribing pattern is essential so that necessary modifications in the prescribing practices of the prescribers can be made rational and cost effective medical care can be achieved (Kaliamoorthy et al., 2012).

Cephalosporins are the largest and the most diverse family of antibiotics available and possess an extended spectrum of activity (Dahal et al., 2017). All five generations of cephalosporins are useful in fighting skin infections, drug-resistant bacteria, meningitis, and other infections. Among the five cephalosporin generations, third-generation cephalosporins are broad-spectrum antimicrobial agents useful in a variety of clinical situations. It exists in both parenteral and oral dosage forms. Parenteral third generation cephalosporins includes Cefotaxime, Ceftizoxime, Ceftriaxone, Ceftazidime and Cefoperazone. Also, Oral third generation cephalosporins includes Cefixime, Cefpodoxime proxetil, Cefdinir and ceftibuten (Tripathi, 2019). Cefotaxime and ceftizoxime have the best Gram-positive coverage among third-generation agents. Ceftazidime and

cefoperazone are the only third generation agents with anti-pseudomonal coverage (Klein & Cunha, 1995). It has shown high efficacy in a wide range of serious infections including bacterial meningitis, Third-generation cephalosporins, with the exception of cefoperazone, penetrate into the cerebrospinal fluid and are indicated for the treatment of bacterial meningitis (Tripathi, 2019).

Because of their demonstrated clinical efficacy, favorable pharmacokinetics, and low frequency of side effects, third-generation cephalosporins are the preferred antibiotics in many clinical situations (Klein & Cunha, 1995).

Therefore, this study was carried out to evaluate the drug utilization and prescribing pattern of third generation cephalosporins in the inpatient department of surgery wards of tertiary care teaching hospital located in the rural part of south India. The outcomes of this study provide a review of the prescribing practices to prescribers which can be modified if necessary to facilitate better patient outcomes.

Objectives:

- To observe the relationship between patient demographics and prescription pattern
- To determine the frequency of use of the third generation cephalosporin antibiotics
- To assess the proportion of drugs prescribed by generic and branded third generation cephalosporin

Methodology:

A prospective cross sectional observational study was conducted for the duration of 4 months from November 2023 to February 2024 in Department of Surgery, Government Cuddalore Medical College and Hospital located in the rural part of South India. Data were collected from the patients admitted in the surgery ward, who were prescribed with third generation cephalosporin antibiotics. Selection Criteria for

this study included all the patient ≥ 13 years of age receiving any third generation cephalosporins in surgery ward.

Out-patients treated with third generation cephalosporin and pediatric patients were excluded. A predesigned data collection form was used to collect the details like basic demographics, Co-morbidities and drug related details which include Brand name and Generic name of the drugs prescribed, dosage, route of administration, frequency, and drug follow up for the few days were collected from the patient's case sheets. The collected data were analyzed and presented as percentages. Analysis was done using Spreadsheet (Excel version 10).

RESULTS:

Table – 1 Distribution of Demographic details of patients

DEMOGRAPHIC DETAILS	OBSERVED VALUE (n=120)	PERCENTAGE (%)
GENDER		
Male	92	76.7%
Female	28	23.3%
AGE		
13 – 20	11	9.2 %
21 – 30	16	13.3 %
31 – 40	19	15.8 %
41 – 50	25	20.8 %
51 – 60	32	26.7 %
61 – 70	14	11.7 %
71 – 80	2	1.7 %

Out of 120 patients, it was evident that 92 (76.7 %) were male and 28 (23.3 %) were female who were part of this drug utilization and prescription pattern study. This study implied that 11 (9.2%) falls in 13-20, 16 (13.3%) in 21-30, 19 (15.8%) in 31-40, 25 (20.8%) in 41-50, 32 (26.7%) in 51-60, 14 (11.7%) in 61-70, 2 (1.7%) in 71-80 and 1 (0.8%) in >80 years of age.

Based on the Comorbidity status, 51 (42.5 %) of the patients were with comorbidities and 69 (57.5 %) were without any comorbidities.

Among 120 patients, 72 (60 %) were prescribed based on brand names and 48 (40 %) were prescribed based on generic names of third generation cephalosporins.

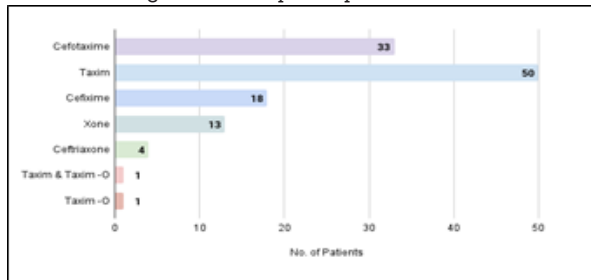


Figure – 1 Prescription patterns of third generation Cephalosporin antibiotics based on drugs utilized

Among 120 patients, it was evident that based on drug utilized, 33 with cefotaxime, 50 with Taxim, 18 with Cefixime, 13 with Xone, 4 with Ceftriaxone, 1 with Taxim-O and 1 with Taxim and Taxim-O as mentioned in the prescription.

Based on the route of administration of drugs, 100 patients were administered with intravenous form, 18 with oral form and 2 with both oral and intravenous form.

Table – 2 Distribution of duration of treatment with third generation Cephalosporins in patients

S. NO	DAYS	OBSERVED VALUE (n=120)	PERCENTAGE (%)
1.	1 – 2	16	13.4%

2.	3 – 6	79	65.8%
3.	7 – 14	22	18.4%
4.	> 14	3	2.4%

Out of 120 patients, 16 with 1-2 days, 79 with 3-6 days, 22 with 7-14 days and 3 with > 14 days duration taken treatment in the hospital.

DISCUSSION:

The principle target of the drug utilization study is to promote the rational prescribing of the drugs. Prescribing practices reflect the clinical judgment of the clinician. The majority of prescriptions were written for drugs on the hospital's drug list, which largely suggests that physicians at this facility followed recommendations (Kaliamoorthy et al., 2012). These results are consistent with results of our research.

According to the study results analyzed, the most commonly used third generation cephalosporins was Cefotaxime in injection form. This was in consistent with another study results which reveals cefotaxime was the commonly prescribed third generation cephalosporin and prescribed more commonly in injection form. This is because the parenteral third generation cephalosporins have excellent activity against most bacterial infections (Kaliamoorthy et al., 2012).

From this study, it was found that male patients were higher than the female patients. It is similar to study results of Saugath Dahal, et al., (2017) in which demographic results based on gender reveals that, out of 150 cases, 92 were male and 58 were female to use Third Generation Cephalosporins (Dahal et al., 2017). These findings are also similar to study conducted by Prakash Goudanavar et al that showed a male predominance (Goudanavar et al., 2016). Also, in another study majority of patients prescribed with third generation cephalosporins were women which was in contrast to our study (Kaliamoorthy et al., 2012).

During the study period, patients with age groups between 51-60 years are predominant with percentage of 26.7% in which patients included in the study. The findings of age groups are similar to study carried out by Samba et al that also reveals the predominant participation of 51-60 age group patients (Samba et al., 2023). As geriatric patients are more prone to infections, patients between age group of 51-60 years show predominance in age-wise distribution.

The study results show that intravenous (83.3%) route of administration as the most commonly used form of third generation cephalosporin use among in-patients. These findings are similar to study results of another study which shows intravenous route (87%) were most frequently used (Goudanavar et al., 2016).

The present study examined the prescription pattern based on nomenclature, which shows that 48 drugs (40%) were prescribed using generic names. This is consistent to the study results of Prakash Goudanavar et al were only 21 drugs (2.43%) were prescribed by generic names (Goudanavar et al., 2016).

In this study, it was identified that duration of treatment with third-generation cephalosporins in 120 in-patients was mainly found to be 3-6 days, 79 (65.8%). This was similar to the study results of Prakash Goudanavar et al, which shows predominant duration of hospital stay as 3-6 days (Kaliamoorthy et al., 2012).

CONCLUSION:

The development of medicinal use (DU) as a field of research has made it possible to study the prescribing and use of drugs scientifically and formally. This research can help provide

feedback to prescribers, thereby increasing awareness and improving patient care through appropriate medication use. From this study, it is clear that intravenous forms of third-generation cephalosporins are the most used. Current research shows that the drug is mainly prescribed as a brand name. Periodic assessment of prescribing patterns is necessary to improve prescribing standards. There is a clear need to develop standard treatment guidelines and educational initiatives to encourage rational and appropriate medication use.

Limitations:

Results are not collected from each physician. Therefore, the results obtained in the study do not represent the overall prescribing patterns of third-generation cephalosporins in the surgical departments of tertiary care university hospitals. Some prescriptions may have been missed during the study period.

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