International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 9 Issue 5 ǁ 2021 ǁ PP. 24-32

Assessment of Drug Utilization of Cephalosporins in a Tertiary Care Teaching Hospital

[1]Rahul Samba*, [1]Aashritha Pattaparla, [1]B. Sateesh Kumar Naidu,[1]Fatima Tabassum, [2]Amatul Ali Sameera, [2]Nazia Lateef Amrohi

[1]Department of Pharmacy Practice, Sree Dattha Institute of Pharmacy
[2] Assistant Professor, Department of Pharmacy Practice, Sree Dattha Institute of Pharmacy, Ibrahimpatnam Hyderabad, Telangana-501510
*Corresponding Author: Rahul Samba**

ABSTRACT
AIMS AND OBJECTIVES: The present study aims to assess the drug utilization of cephalosporin's in tertiary care teaching hospital.
METHOD: A Hospital based prospective observational study was conducted at a ***"Gleneagles Global Hospital"****, in Hyderabad, T.S, and India. A total of 120 in-patients of the various departments in the Gleneagles Global Hospital, who were prescribed cephalosporins and those who fulfilled the exclusion and inclusion criteria were selected for the study, which was conducted for 6 months. All the information significant to the study was collected from the case records and discussions conducted with the patients and bystanders during ward rounds, with the support of the doctors, which was analyzed.*
RESULTS: The highest number of patients (25 out of 120) belonged to an age group of 51-60.With regards to gender, the percentage of male and female in the study was 61.6% and 31.4% respectively. Out of 120 prescriptions of cepahlosporin's 102 (85%) were administered through IV route, 13 (10.8) using oral route and 5 (4.2%) using both IV and oral route. From the result analysis, it has been analysed that among all the cephalosporin generations, most commonly prescribed were 3rd generation cephalosporin's (96.6%). About 76 (65.8%) were prescribed by generic name. From various in-patient departments 39 (32.5%) patients from general medicine and 19 (15.83%) from pulmonology department were taken into the study.
CONCLUSION:
During our study, we have also observed that modern cephalosporins are mostly used, in our case the 3rd generation cephalosporin's were prescribed in majority of 96.6%. Cephalosporin's commonly used were 3rd generation which prescribed through IV route. Thus, from our study, we have concluded that the cephalosporins as an antibiotic has more clinical values in terms of the availability and thus, they should be used rationally in order to preserve their efficacy and prevent the development of resistance.
KEY WORDS*: Cephalosporins, Drug Utilization, Antibiotics.*

Date of Submission: 27-04-2021 Date of acceptance: 11-05-2021

I. INTRODUCTION

Drug Use Evaluation (DUE) is defined as a Criteria based, ongoing, planning and systemic process for monitoring and evaluating the prophylactic, therapeutic and empiric usage of drugs too, assure that they were provided appropriately, safely, and effectively by the American Society of Health-System Pharmacists (ASHP).[1, 2] Drug therapy is supposed to be a major component of patient management in a health care setting, including primary healthcare. 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.[3] Drug utilization evaluation (DUE) considered is an ongoing, authorized, and systematic quality improvement process, which has been designed to review drug usage and/or prescribing patterns, provide feedback of the results to clinicians and other relevant groups, develop criteria and standards which describe optimal drug usage and promote appropriate use of the drug through education and other interventions. The main goal of any DUE study is to promote rational use of the drug by a reduction in drug and health-related treatment costs, improving health-related quality of life (HRQOL), improvement in quality of medical treatment, improving coordination of health care, decrease in the number of medication-related problems and medication errors and improvising prescriber's awareness and practice towards appropriate prescribing of medication.[4] Over the years, antibiotics are supposed to be used conventionally in the treatment of infectious diseases in the hospital environment, which has resulted in drastic changes in the prognostics of patients with severe infections.[5,6] Antibiotics are considered as the most common medications which are prescribed in hospital environments as well as

community-based settings.[7] The overuse of antibiotics has resulted in the emergence of drug-resistance strain which is very difficult to treat, which is a major health problem.[8]

II. AIM

The main aim of drug utilization research is to aid in the rational use of drugs in the population. For the individual patient, the rational use of the drug implies the prescription of a properly documented drug with correct information, at a reasonable price. Without knowing how the drugs being prescribed are used, it is hard to initiate discussion on rational drug use information from the past performance of prescribers is the number one priority of any auditing system.

The present study aims to document the assessment of drug utilization of cephalosporin's in a tertiary care teaching hospital

To determine the frequency of usage of cephalosporin antibiotics.

To assess the relationship between patient demographics and pattern of prescription.

To assess the percentage of drugs prescribed by generic and brand names.

To assess the average number of drugs per prescription.

III. METHODS

A prospective observational study was conducted for a period of 6 months in various in-patient departments in Gleneagles Global Hospital, LB Nagar, Hyderabad, Telangana, India. A study was carried out to assess the drug utilization of cephalosporins. All patients were monitored to know the percentage of cephalosporins used. The rationality of prescriptions was evaluated by using the WHO core drug prescribing indicators, that is, (a) an average number of drugs per encounter, (b) percentage of encounters with cephalosporins, (c) percentage of encounters with injections, (d) Percentage of drugs prescribed by generic names. Patients aged between 20 years to 80 years, Patients of either sex having a prescription of mentioned drugs (cephalosporins), Patients with and without co-morbidities, Smoking status, Alcoholic status were included. After taking informed consent, the patient is interviewed. The study excluded, Outpatients and patients with Pregnancy. Among patients meeting these criteria, a total of 120 in-patients were enrolled. The knowledge assessment questionnaire form is used which contains about 10 questions to assess the knowledge of the patient towards the medications used. A data collection form was designed and used. Data was collected with respect to Demographic details such as name, age, and sex, Condition and reasons for hospital admission were recorded, Drug data: Brand name and generic name of the drugs prescribed, dosage, route of administration, frequency, and drug follow up for the few days was recorded.

IV. RESULTS

As per the plan of work, Rationality of prescriptions is evaluated by using the WHO core drug indicators, which resulted as:

a. Average number of drugs per encounter: 12 drugs
b. Percentage of encounters with an cephalosporin's: 25.2%
c. Percentage of encounters with an injection: 30.3%
d. Percentage of drugs with generic name: 17.7%

Population Description: A total of 120 patients confirmed the use of Cephalosporins. The demographic data revealed that the number of male and female patients was 61.6% and 31.4% respectively (Table 1, Figure 1). Among them 40.84% were smokers and 59.16% were non-smokers (Table 2, Figure 2). The Distribution of Subjects based upon Age is represented in (Table 3, Figure 3). Among the study population, 40 (33.34%) patients were found to be alcoholic and 80 (66.66%) were non-alcoholic. (Table 4, Figure 4). Among the study population, 46 individuals were with co-morbidities, 74 were without co-morbidities (Table 5, Figure 5). Among the study population, the IV route was used in 102 patients, Oral for 13 and both IV and Oral for 5 patients (Table 6, Figure 6). Among the cephalosporins used 79, were prescribed by brand names and 41 using generic names (Table 7, Figure 7). Among the study population, 83 patients were prescribed individual therapy and 37 were prescribed dual therapy (Table 8, Figure 8). Among the study population, 105 patients were prescribed with only cephalosporins and 15 patients with cephalosporins and other antibiotics (Table 9, Figure 9). Based on Department wise, most cephalosporins were prescribed to 39 patients in General medicine and the least 1 in Gynecology, Hepatology, and Urology (Table 10, Figure 10). Among the study population, 116 patients were prescribed 3rd generation cephalosporins and 4 patients with 4th generation cephalosporin (Table 11, Figure 11).

Table 1: Distribution of Subjects based upon Gender

Gender	Number of Patients	Percentage%
Male	74	61.6
Female	46	31.4
Total	120	100

Figure 2: Pie Chart Distribution of Subjects based upon Gender.

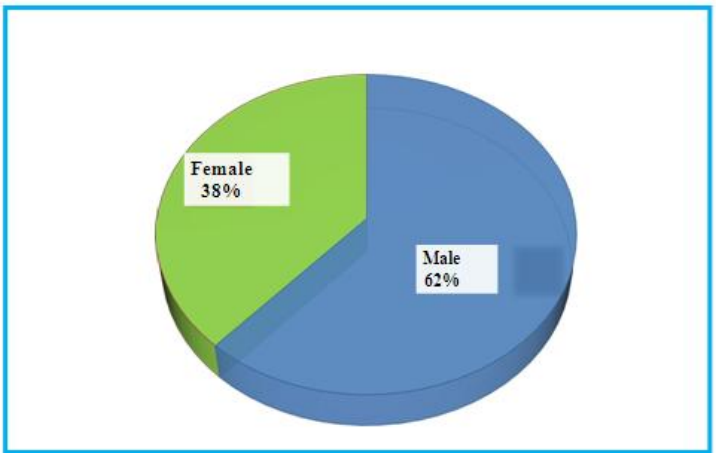


Table 2: Distribution of subjects based upon Social History (Smoking)

S.NO	Smoker	No. of patients	Percentage%
1	Yes	49	40.84
2	No	71	59.16
	Total	120	100

Figure 2: Pie Chart Distribution of subjects based upon Social History (Smoking)

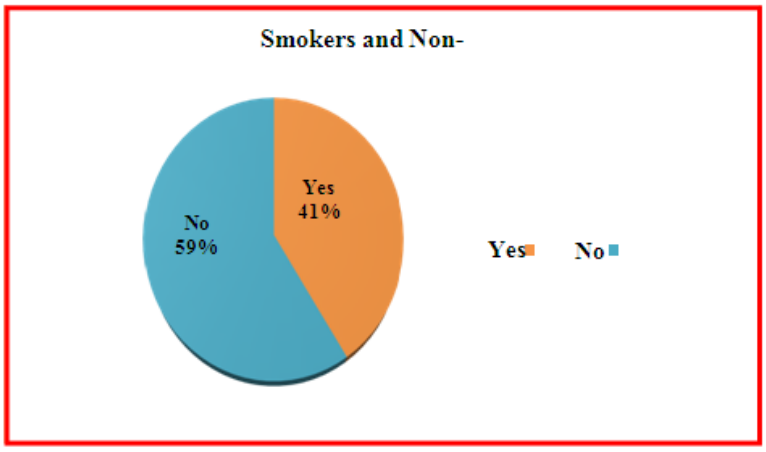


Table 3: Distribution of Subjects based upon Age

S.NO	Age in years	Number of patients	Percentage%
1	20	3	1.74
2	21-30	19	9.57
3	31-40	20	11.3
4	41-50	21	18.26
5	51-60	25	26.96

6	**60-70**	**15**	**26.09**
7	**71-80**	**17**	**5.22**
	Total	**120**	**100**

Figure 3: Column Presentation of Distribution of Subjects based upon Age.

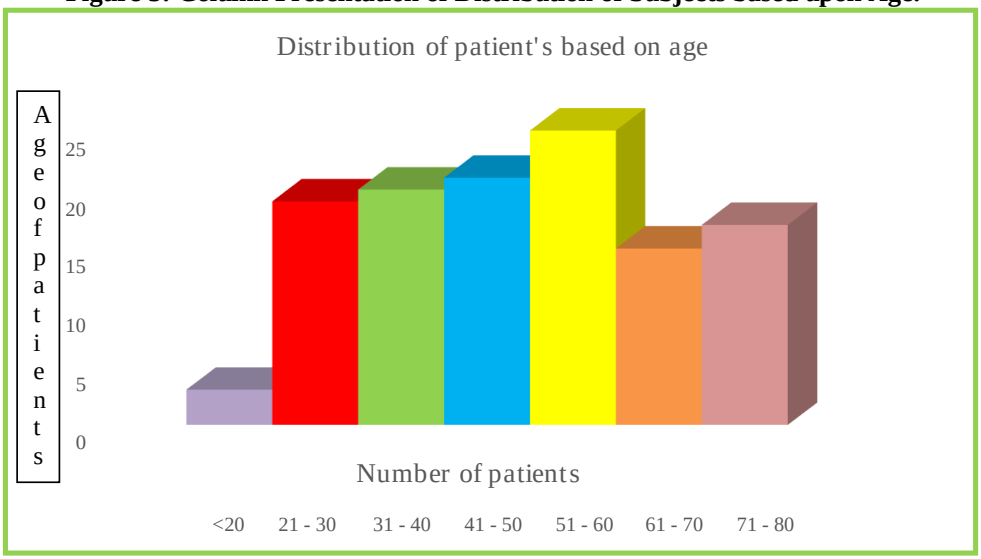


Table 4: Distribution of subjects based upon Social History (Alcohol Consumption)

S.NO	Alcoholic	No. of patients	Percentage%
1	**Yes**	**40**	**33.34**
2	**No**	**80**	**66.66**
	Total	**120**	**100**

Figure 4 : Column Presentation of Distribution of subjects based upon Social History (Alcohol Consumption).

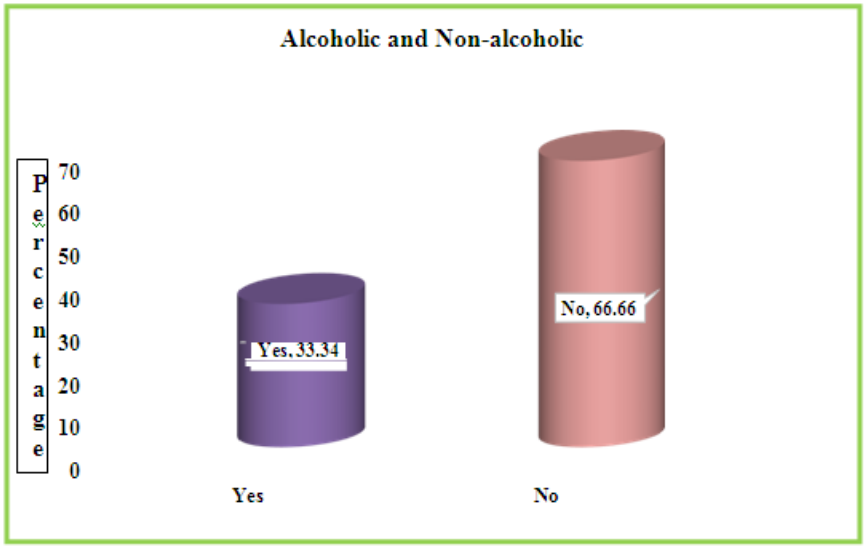


Table 5: Distribution of Subjects based upon Co-morbidities

S.NO	Co-morbid condition	Number of patients	Percentage%
1	No	74	61.6
2	Yes	46	38.4
	Total	120	100

Figure 5: Column Presentation of Distribution Of Subjects Based Upon Co-morbidities

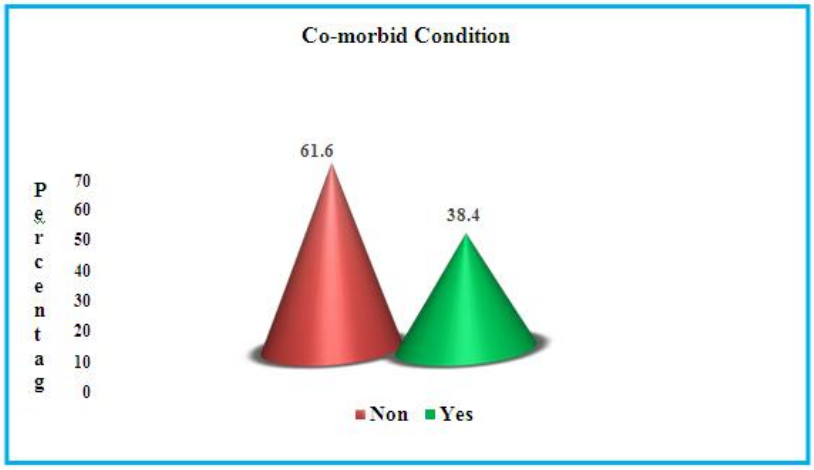


Table 6: Percentage of Cephalosporin's based upon Formulation

S.NO	Formulation	Number of drugs	Percentage%
1	IV	102	85
2	Oral	13	10.8
3	IV and Oral combination	5	4.2
	Total	120	100

Figure 6: Column Presentation of Percentage of Cephalosporin's based upon Route of Administration

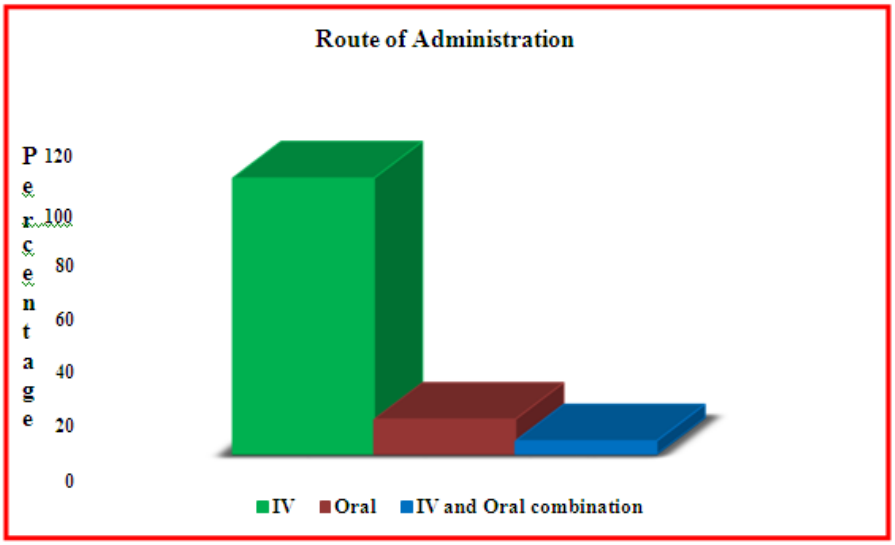


Table 7: Percentage of Cephalosporin's prescribed based on Generic name and Brand name

S.NO	Drugs	Number of drugs	Percentage%
1	Brand drugs	79	65.8
2	Generic drugs	41	34.2
	Total	120	100

Figure 7: Pie-Chart Presentation of Percentage of Cephalosporin's prescribed based on Generic name and Brand name

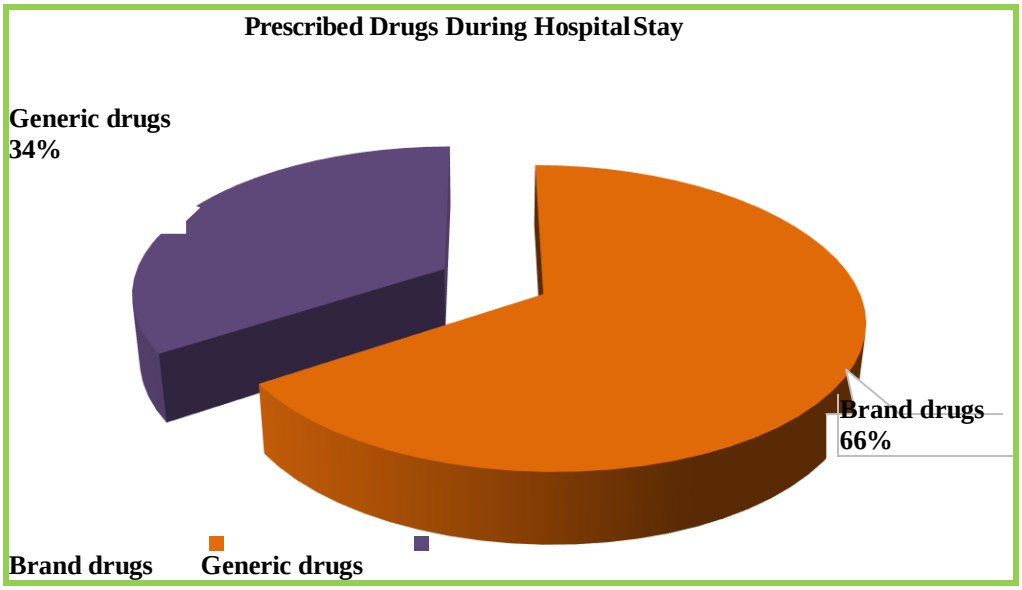


Table 8 : Percentage of Cephalosporin's prescribed as Individual therapy and Dual Therapy

S.NO	Antibiotic therapy	No. of patients	Percentage%
1	Individual	83	69.14
2	Combination	37	30.84
	Total	120	100

Figure 8: Pie Chart Presentation of Percentage of Cephalosporin's prescribed as Individual therapy and Dual Therapy

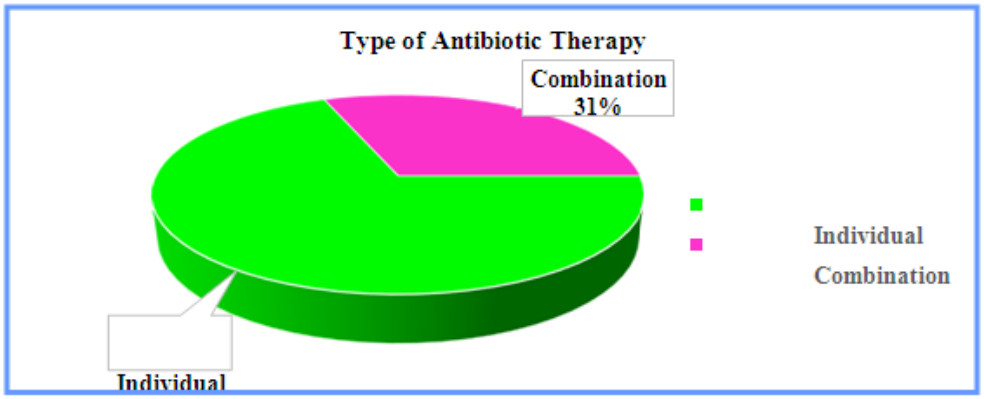


Table 9: Percentage of Cephalosporin's and other antibiotics prescribed

S.NO	Type Of Antibiotic	No. Of Patients	Percentage%
1	Cephalosporin	105	87.5
2	Other Antibiotics	15	12.5
	Total	120	100

Figure 9: Bar Presentation of Percentage of Cephalosporin's and Other Antibiotics Prescribed.

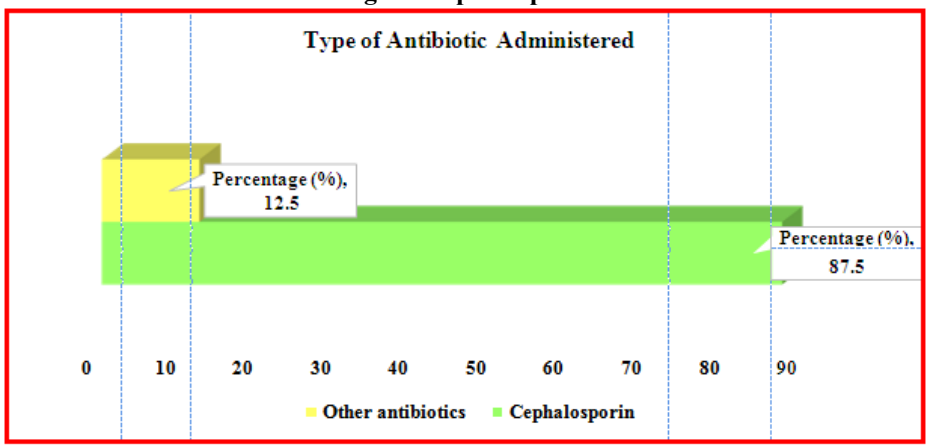


Table 10: Department wise cephalosporin's used in patients

S.NO	Department	No. of patients	Percentage%
1	Nephrology	17	14.16
2	Neurology	14	11.7
3	Cardiology	13	10.82
4	Pulmonology	19	15.83
5	Orthopaedics	9	7.5
6	General medicine	39	32.5
7	Gastroenterology	6	5
8	Gynaecology	1	0.83
9	Hepatology	1	0.83
10	Urology	1	0.83
	Total	120	100

Figure 10: Bar Graph presentation of Department wise cephalosporin's used in patients

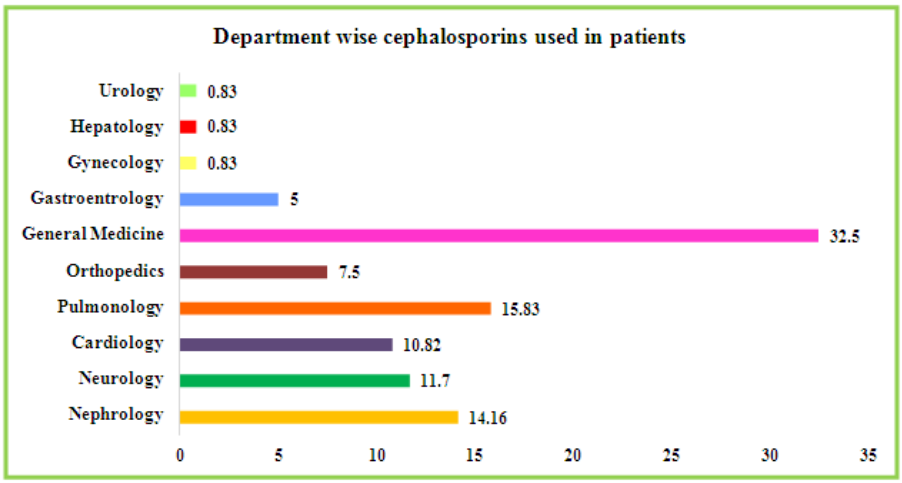
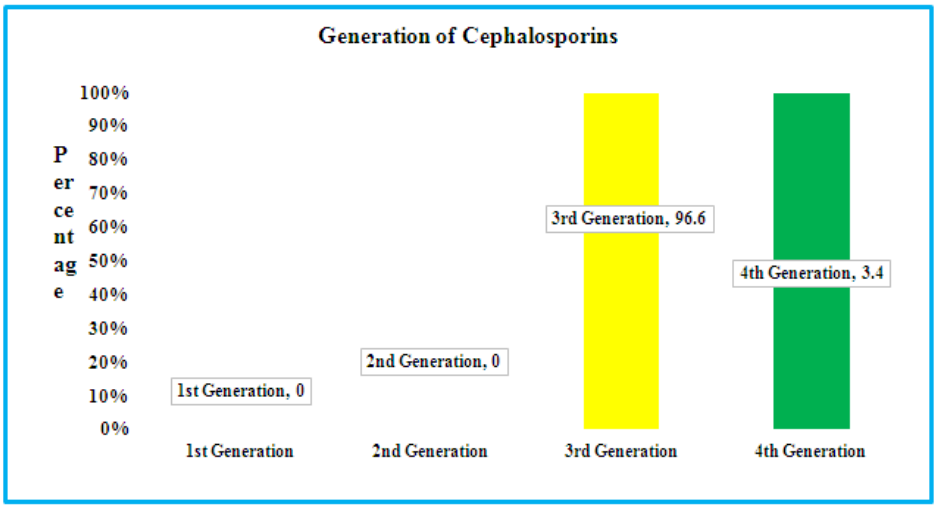


Table 11: Comparison of cephalosporin's used based on their generations

S.NO	Cephalosporin antibiotic generations	No. of patients	Percentage (%)
1	1st generation	0	0
2	2nd generation	0	0
3	3rd generation	116	96.6
4	4th generation	4	3.4
	Total	120	100

Figure 11: Bar Graph presentation of generation cephalosporin's used in patients.



V. DISCUSSION

During the study period the patients with age groups between 51-60 years, 26.9% were admitted to the hospital. According to the previous study conducted males were above 60 years of age, 73.33%, and females were 11-20 years of age, 66.66%.[9]

Based on gender-wise distribution it was analyzed that the majority of the patients in our present study were males 61.6% and females accounted for about 31.4%. From the findings of the previous study conducted the males accounted for 50.50% were as females accounted for 49.50%.[10]

As per the survey conducted in the previous study, the most prescribed route of administration was parenteral accounting for 89.33%,[11] were as in the present study, most prescribed route of administration was parenteral accounting for 85% followed by oral, 10.8%, and both parenteral and oral accounting for 4.2%.

According to the result analysis done in the present study, it has been analyzed that among all the generations of cephalosporin's, 3rd generation cephalosporin's were most commonly prescribed 96.6%, were as

in the previous study analysis 80.65% of the patients were prescribed with 3rd generation cephalosporin's.[12]
In the present study, 65.8% of the drugs were prescribed to the patients using a generic name, whereas in the previously conducted study generic names used for prescribing drugs to the patients were about 28.02%.[13]
Based on the department wise distribution of patients in the present study, 32.5% of patients were from the general medicine department and 15.83% belonged to the pulmonology department, whereas according to the previous study done 59.8% of the patients were from the medicine department and 40.2% were from the surgery department.[14]
In the present study it was identified that 105 patients were found to use cephalosporins. In the previous study conducted 101 patients were found to use cephalosporins.
In the previously conducted study, 24.88% of the patients had co-morbid conditions.[10] In the present study, 38.4% of patients had co-morbid conditions.
In the present study done the average number of drugs per prescription was found to be 12 whereas in the previous study conducted the average number of drugs per prescription was identified to be 8.62.[9]
According to the previous study done, when compared with 4th generation cephalosporin's, 3rd generation cephalosporin's were mostly used drugs.[15] In the present study conducted, in comparison to 4th generation cephalosporin's 3.4%, 3rd generation cephalosporin 96.6% drugs were used widely.

VI. CONCLUSION

In our present study, we performed a Prospective and Observational study on Assessment of Drug Utilization of cephalosporin's in Gleneagles Global Hospital to evaluate the following:

- The Observational study was conducted on 120 patients to assess the drug utilization of cephalosporins in the tertiary care teaching hospital. During the study, it was found that the highest number of patients (25 out of 120) belonged to an age group of 51-60 (26.96%).
- During the study, it was identified that with regards to gender, the percentage of males and females in the study was 61.6% and 31.4% respectively.
- Out of 120 prescriptions of cephalosporins 102 (85%) were administered through the IV route, 13 (10.8) using the oral route, and 5 (4.2%) using both the IV and oral route.
- From the result analysis, it has been analyzed that among all the cephalosporin generations, the most commonly prescribed were 3rd generation cephalosporin's (96.6%).
- During the study, it was also noticed that about 76 (65.8%) were prescribed by generic name.
- It has also been identified that from various in-patient departments 39 (32.5%) patients from general medicine and 19 (15.83%) from the Pulmonology department were taken into the study.

Thus, from our study, we have concluded that the cephalosporins as an antibiotic have more clinical values in terms of availability, and thus, they should be used rationally in order to preserve their effectiveness and prevent the outcome of resistance.

REFERENCES

[1]. Bethesda, MD. American Society of Hospital Pharmacists. Criteria for drug use evaluation Volume 1. ASHP 1990.
[2]. American Society of Hospital Pharmacists. ASHP guidelines on the pharmacist's role in drug use evaluation. Amer J Hosp Pharm 1988; 45:385-6.
[3]. Guglieo BJ. Antimicrobial therapy, Cost-benefit consideration Drugs 1989; 38:473-80.
[4]. Parthasarathi G, Hansen KN, Nahata MC. Drug Utilisation evaluation. In: Textbook of Clinical Pharmacy Practice. Hyderabad: Orient Blackswan Private Limited.; 2012; 447-465.
[5]. Thu T, Rahman M, Coffin S, Harun-Or-Rashid M, Sakamoto J, Hung N. Antibiotic use in Vietnamese hospitals: A multicenter point-prevalence study. Am J Infect Control. 2012;40(9):840-4.
[6]. Hulscher ME, Grol RP, van der Meer JW. Antibiotic prescribing in hospitals: a social and behavioral scientific approach. Lancet Infect Dis. 2010;10:167- 75.
[7]. Meer JW, Gyssens IC, Quality of antimicrobial drug prescription in hospital, ClinMicrobiol Infect., 2001,7(6), 12-5.
[8]. Reddy ES, Reza DH, Sankar B, Mubarak A, Ahamadasafnamariyam. Drug utilization evaluation of cephalosporins in the general medicine and general surgery departments in a Tertiary care teaching hospital. Am J Pharm Health Res. 2015;3(6):2321- 3647.
[9]. PraksahGoudanavar, Lovely Panavila et al. Drug use evaluation of third generation cephalosporins in a tertiary care teaching hospital.ijta.2016;32:81-85.
[10]. Jyothi.K et al. Drug utilization evaluation of cephalosporins in general medicine units of rural tertiary care hospital.Int J Curr Pharm Res.2012; 4(2):88-91.
[11]. Dr.C.H.Deepthi Reddy, ManvithaIndana et al. A study on drug utilization and evaluation of cephalosporin's in a secondary care hospital.wjpls.2017Jun; 3(5):153-167.
[12]. Sathanarayana G, Geetha P et al. A Prospective Observational Study on Assessment and Evaluation of Cephalosporin in General Medicine Department at Tertiary Care Hospital.ijor:rjpt.2016, 9(8):1039-1042
[13]. KousalyaKaliamoorthy ,RamalakshmiSankaralingam et al. Drug utilization evaluation of third generation cephalosporin's using core drug use indicators.Pak J Pharma Sci.2012,25(2):339-342.
[14]. Dr. Gururaja MP. Cephalosporin utilization evaluation in a university teaching hospital: A Prospective Study.jddt.2013, 3(2):83-87.
[15]. Naveen. V, AbuBakerSiddiq et al. A Study on Drug Utilization Pattern of Cephalosporins in General Medicine and Surgical Inpatient Department.IJCRP.2018Jan; 10(3):33-36.