

International Journal of Medical Science and Current Research (IJMSCR) Available online at: www.ijmscr.com Volume4, Issue 2, Page No: 737-743 March-April 2021



Drug Utilization and Evaluation of Antibiotics in a Private Hospital in Guntur

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Type of Publication: Original Research Paper Conflicts of Interest: Nil

ABSTRACT

Background: Drug utilization and evaluation of Antibiotics plays an important role in identifying the prescription pattern among the patients which provide useful information for improvement in the appropriate and rational use of antibiotics and developing the proper standard protocols for the use of antibiotics in hospitals.

Objective: This study was carried out at a private hospital in Guntur to assess the drug utilization and evaluation of antibiotics. The main objective is to evaluate the risk of irrational or over usage of antibiotics.

Methodology: A prospective study was conducted at Amrutha Hospitals, Guntur. Data including Patient's demographic details, antibiotic regimen, final diagnosis, dosing, route of administration, frequency and other laboratory parameters were retrieved from the hospital system.

Results: The total numbers of 1070 patient admissions were assessed in our study period. The antibiotics prescribed in male outnumbered female patients. The majority of patients who received more antibiotics were the age from 41-60 years. The most commonly prescribed antibiotics were Cephalosporins (46.61%), followed by Penicillin (11.12 %).

Conclusion: Physicians and Clinical pharmacist need to play a vital role in minimizing patient problems by evaluating and conducting awareness programs on the rational use of drugs and providing the up to date information on the prescribing guidelines in hospitals.

Keywords: Antibiotics, Antimicrobials, Drug utilization and evaluation, Prescription, Resistance.

INTRODUCTION

The World Health Organization defines Drug utilization as Marketing, distribution, prescription, and use of drugs in society with special emphasis on the resulting medical, social, and economic consequences. Drug therapy plays a crucial role in improving human health by enhancing the quality of life and extending life expectancy. Drug utilization studies helps to identify and reports an irrational prescribing, which adds on to patient morbidity and reduce the economic burden ^[1]. Many drug utilization studies have resulted in variations in prescribing patterns a high rate of polypharmacy. Sarang A

Deshmukh et al., observed that most of Antimicrobial agent receivers were age from 26 to 35 years followed by 14 to 25 years and only 10 % of the prescription was prescribed by generic name and rest 90% were prescribed by brand name ^[2]. One of the most important factors are the costs of antibiotics because it falls under the category of high cost that have specific side effects as well as the risk of development of resistant microorganisms resulted in their prolonged use ^[3].

International Journal of Medical Science and Current Research | March-April 2021 | Vol 4 | Issue 2

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Certain guidelines for the rational use of antibiotics are laid out which minimizes the effects with respect to the administered antibiotics. Drug utilization and evaluation is a tool to improve the rationality in prescribing, i.e. it helps to monitor the drug use, resistance, drug cost barriers and other factors related to patient safety ^[4]. In order to Improve the antimicrobial uses, the outcomes need to be measured. This is possible by following a proper guideline and monitoring parameters for the use of antimicrobial agents. Such practices by clinicians and clinical pharmacist contribute to ensuring of rational drug therapy ^[5]. The increasing burden of resistance to antibiotic use highlights the need for control and monitoring of antibiotic usage including prescribing, dispensing and administration ^[6]. The study Prescription guidelines contributes to determine the rationality of drug therapy and to maximize the source of utilization ^[7]. Hence by observing the prescribing pattern and antibiotic usage, the irrational use of medicines, prescribing, dispensing and patient use should be frequently monitored ^[8]. In view of this, our study was conducted to assess the drug utilization and evaluation of antibiotics in a Private hospital in Guntur.

MATERIALS AND METHODS:

This was a prospective, observational study of Drug utilization and evaluation of antibiotic at admission in an open, mixed medical- surgical, adult, ICU in a private hospital in Guntur. The study was conducted for over a period from October 2020 to March 2021. Approval was obtained from the hospital for the study inclusion criteria. The data sources needed for the study was collected from case reports, treatment charts and Laboratory parameters. The demographic data of the patient such as Name, Age, Gender, Clinical diagnosis were recorded. Other Variables such as Total number of Antibiotics prescribed, Dose of Antibiotics, and Route of Administration were also noted. The categories of Antibiotics that were mostly prescribed were recorded.

The percentage of prescription with one or more antibiotics and the number of antibiotics per

prescription was studied. This study reflects the antibiotic utilization depending on the severity and the need for the antibiotic. The determination of the quantity of the antibiotics prescribed demonstrates how many numbers of the antibiotics were used at a time.

The Age wise distribution of the antibiotics prescribed were Recorded and antibiotics prescribed to a certain age groups were measured to determine a comparative study of the antibiotics prescribed. The dosage forms of the antibiotics prescribed were measured and noted.

The average number of antibiotics prescribed per encounter was calculated by dividing the total number of drugs prescribed and multiplying per unit.

Selection criteria of patients:

Inclusion criteria: All adults In-patient and Outpatients of above 20 years were included in the study.

Exclusion criteria: Patients below 20 years of age, Pediatrics, incomplete data and treatment charts without antibiotics were excluded.

RESULTS AND DISCUSSION:

Total numbers of 1070 patient admissions were assessed during our study period in a private hospital in Guntur. Ten different classes of antibiotics drugs were administered to the patients based on the diagnosis, dosage, Frequency and Routes of administrations. The assessment in drug utilization can help minimize the irrational prescription and maximize the therapeutic effects. Our study provides an insight to the drug utilization and evaluation of antibiotics prescribed in a private hospital.

Among the total number of prescriptions in our study, the gender categorization was analyzed which included 567 numbers of males and 503 number of females. Male prominence was seen more (52.99 %) when compared with female (47.01 %). The same was observed by kirubel m. mishore et al., ^[9]. The number of patients based on the Gender categorization is depicted in **Table 1**. The percentage of gender categorization is visualized in **Figure 1**.

S.NO FREQUENCY(n=1070) **PERCENTAGE(%) GENDER CATEGORIZATION** 52.99 1 Male 567 2 47.01 Female 503

Table 1: Gender categorization of total prescription



Figure 1: Gender categorization of total prescription.

Among the total number of prescriptions that were collected, Age wise distribution was taken into consideration by categorizing them into the four age groups with 20 years of difference each.

The age wise distribution parameter is depicted in Table 2. The maximum number of antibiotic prescribed was in the age group of 41-60 years (42.15%), This finding was found to be in accordance with the results of drug utilization and evaluation of antibiotic studies conducted by kanishk kale et al., ^[10]. The least prescription of antibiotics among the four age groups in our study period was the age of above 81 years. The percentage for age wise distribution has been visualized in Figure 2.

S.NO	AGE (years)	FREQUENCY(n=1070)	PERCENTAGE(%)
1	20 - 40	342	31.96
2	41 - 60	451	42.15
3	61 - 80	260	24.30
4	>80	17	1.59

Table 2: Age wise distribution of patients





The percentage encountered with the Dosage forms was calculated and depicted in **Table 3**. The number of patients receiving the prescription in solid dosage form was more than half of the prescription given (81.86%) when compared to liquid dosage forms (18.06%) and semi solid dosage forms (0.08%). Most of the patients were above the age of 20 years to 70 years where administration by solid forms was more convenient, inexpensive and painless compared to

administration by parenteral dosage forms. Possible reason for the use of liquid dosage forms such as Injections according to our study could be due to belief and attitude of the patients and health professionals about the efficacy of injections for patient who are not tolerant to oral administrations. The percentage of patients prescribed with the different dosage forms in our study period is shown in **Figure 3**.

S.NO	DOSAGE FORM	FREQUENCY (n=1268)	PERCENTAGE(%)
1	Solid	1038	81.86
2	Semi solid	1	0.08
3	Liquids	229	18.06

Table 3: Dosage Forms prescribed by physician.





In the collected prescription of the number of antibiotics prescribed in each patient. The number of patients receiving a single antibiotic, two antibiotics, three antibiotics and four antibiotics were categorized and evaluated for the number of drug that the patient had received depending on their disease condition, susceptibility and diagnosis. The single antibiotics prescribed accounted for (83.18%), followed by two antibiotics (15.42%), three antibiotics (1.12%) and four antibiotics (0.28%). The descriptions are emphasized in **Table 4**. A study conducted by B.

Gowthami et al., ^[4] has shown that most of the antibiotics prescribed were seen majorly in two antibiotics. This was found in contrast in our study where the majority of prescriptions were in single antibiotic. Prescribing a single dose of antibiotics for the shortest duration as much as possible is encouraged to avoid resistance of the antibacterial and irrational prescription of drugs. The graphical visualization of the number of antibiotics prescribed per prescription is represented in **Figure 4**.

S. NO	NO OF ANTIBIOTICS	FREQUENCY(n=1070)	PERCENTAGE(%)
1	1 Antibiotic	890	83.18
2	2 Antibiotic	165	15.42
3	3 Antibiotic	12	1.12
4	4 Antibiotic	3	0.28







Among the total number of 1268 antibiotics drug prescribed, Cephalosporins were found to be the most prescribed drugs (46.61%). III generation Cephalosporin was the most commonly prescribed among the cephalosporin class of drugs. Cephalosporins was followed Penicillins by (11.12%), Among penicillin antibiotics, Amoxicillin was the most commonly prescribed drug. The next class of drugs which accounts to after Penicillins are Fluroquinolones (8.91%), Tetracyclines (6.31%), Macrolides (6.15%), Carbapenem (4.34%),Nitroimidazole Fluroquinolones +(4.10%),Lincomycin (4.10 %), Oxazolidonone (3.08 %), Nitroimidazole (2.76%), Amino glycosides (1.97%), Cephalosporins + Penicillins (0.55%). The frequency of the number of antibiotics prescribed is depicted in Table 5. The total number of Antibiotics prescribed was found to be 10 in our study. These differences can be correlated with hospitals and patients features. antibiotic guidelines, clinician's preferences and with the difference in the health care and educational systems which was also reported by dinesh kumar vadav et al.,^[11]. The reason for the wide number of prescription with Cephalosporins may be due to the low incidence of the Adverse drug reactions and an excellent drug absorption to the body tissues and a wide coverage to all range of bacteria. The combination antibiotics prescribed in our study were Fluroquinolones + Nitoimidazole and Cephalosporin Penicillins . The reason for prescribing +combination therapy is to broaden the spectrum of antibacterial to treat polymicrobials and to avoid the outcomes of resistance ^[12]. The percentage of patients prescribed with different class of antibiotics are shown in Figure 5.

S.NO	ANTIBIOTIC CLASSIFICATION	FREQUENCY(n=1268)	PERCENTAGE (%)
1	Cephalosporins	591	46.61
2	Pencillins	141	11.12
3	Fluroquinolones	113	8.91
4	Tetracyclins	80	6.31
5	Macrolides	78	6.15
6	Carbapenem	55	4.34
7	Fluroquinolones+ Nitroimidazoles	52	4.10
8	Lincomycin	52	4.10
9	Oxazolidinone	39	3.08
10	Nitroimidazoles	35	2.76
11	Amino glycosides	25	1.97
12	Cephalosporins + Penicillins	7	0.55





Figure 5: Percentage of Antibiotics Prescribed.

As per our study findings, many of the antibiotics were prescribed prior to the availability of the culture sensitivity reports, therefore a pre requisite of microbial investigations before the treatment is essential. The pattern of antibiotics prescriptions is widely inappropriately practiced which contributes to irrational usage of antibiotics in the health care sector. Therefore, the practitioner should be well aware of the prescription guidelines and take necessary actions to minimize the harmful effects of antibiotics.

CONCLUSION:

A Drug Utilization and Evaluation of Antibiotics was conducted in Private hospital in Guntur. The study revealed the wide ranges of antibiotic prescribed

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were the ages ranging from 41 to 60 respectively and Cephalosporins was the most commonly prescribed antibiotics in our study. The rational use of drugs should be promoted and patient should be educated about the correct dose and duration of the drug. Physicians and Clinical pharmacist should update about the rational use of antibiotics by updating the standard treatment guidelines, organizing programs, Seminars and antibiotic policy. The Proper use of antibiotics should be properly investigated by Laboratory strengthening of antimicrobial sensitivity testing.

ACKNOWLEDGEMENT:

We gratefully acknowledge the Medical Department of Amrutha hospital, Guntur for their support and their cooperation in issuing medical reports.

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