

**Short Communication**

**DRUG UTILIZATION EVALUATION OF ANTIBIOTICS IN GENERAL MEDICINE DEPARTMENT  
OF A TERTIARY CARE HOSPITAL**

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**ABSTRACT**

**Objective:** Conventional need of broad spectrum antibiotics for multiple organ infections in hospital, ensue the problem of resistance. Most of the antibiotic utilization is empirical leading to their irrational prescriptions. Our present study aims in accessing the drug utilization evaluation of antibiotic usage in a tertiary care hospital which helps in accessing rationality that aid in monitoring the drug efficacy, cost constraints and other factors related to patient safety.

**Methods:** A prospective study was conducted for a period of four months from September 2015 to December 2015 in the Medicine department of Viswabarathi Hospital, Kurnool and AP.

**Results:** A total of 210 prescriptions were analyzed. Among the wide range of antibiotics, i.e., 479 antibiotics prescribed, beta-lactams were found in the maximum cases which accounts for more than half of the cases. Little more than half of the prescriptions i.e.51.90% was with two antibiotics, followed by three antibiotic prescriptions. 9.05% prescriptions were with 4-5 antibiotics.

**Conclusion:** Judgmental use of antibiotics will reduce the burden of multi-drug resistance and thereby enabling better patient management and limiting the resultant morbidity and mortality.

**Keywords:** Infections, Prescriptions, Rationality, Antibiotics

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Infections are the major reason for the poor prognosis of a condition. So proper control of infections can avoid or prevent certain situations which lead to morbidity or mortality. Control of infections can be achieved by usage of antibiotics. Just like a coin have two sides; antibiotics also have two-sided effects. One is in control of infection; the other is the resistance of an organism. For a decade, the problem of resistance is rising. This led to the usage of fixed dose combinations, usage of multiple antibiotics in order to have a good control on infection.

Various studies are already done on the drug utilization of antibiotics, but most are conducted in developed countries and adding to that very little data is available in regard of south India. Random prescription of antibiotics by physicians for multiple organ infections does not give a clear picture on the percentage of a particular class of antibiotic in the prescription which reflects irrationality. This study helps in addressing a few of these aspects. Certain guidelines are laid out for the rational use of antibiotics. Irrespective of the guidelines, many physicians prescribe antibiotics irrationally. In the present trends, antibiotics account for the majority of prescriptions. Studies conducted by many professionals shown that almost every prescription contains an antibiotic [1]. Some guidelines for the rational use of antibiotics are as follows:

- Prophylactic and empirical therapy of antibiotics should not be used unless and until in cases of emergency
- Culture sensitivity tests of antibiotics should be done in order to avoid resistance.
- Antibiotics are to be prescribed as per the spectrum of antibiotics
- The dosage of antibiotics should be as per the patient conditions. A gradual increase in the dose is to be done in case if efficacy is not seen.
- Parenteral therapy is advocated unless until it is necessary (where the patient is not able to take by oral route or in emergency conditions).

Following of the above guidelines minimizes the effects with respect to the drug. Drug utilization evaluation is a tool to improve the rationality in prescribing, i.e.; it helps in monitoring the drug efficacy, cost constraints and other factors related to patient safety [2]. It also plays a key role in minimizing the adverse drug effects [3].

Our present prospective study of antibiotic usage aims to study about the drug utilization pattern for setting appropriate interventions to identify the problems in prescribing practices and also in promoting rational use of drugs in the community. The present novelty of the study is, it specifies the usage of antibiotics in the respective hospital, and thereby caution the health care individual is prescribing which improves rationality and individual treatment regimen.

This study was conducted in the Medicine department of Viswabarathi Hospital, which is 250 bedded tertiary care teaching hospitals providing health care services. The research approach adopted in this study was a prospective study in the Medicine Department of a tertiary care teaching hospital. This study was conducted for a period of four months from September 2015 to December 2015. This study includes the hospital in patients treated for various diseases in Medicine department. A Patient, who meets the following criteria was enrolled where Inclusion criteria were patients of age<80 Y of both genders. Exclusion criteria were patients with diseases like psychiatry, cancer, pregnant and nursing mothers. The cases which had found in Medicine department, details of cases, including patient name, age, sex, past medical history and other relevant information was collected. The collected prescriptions were entered into the Microsoft Office Excel sheet according to their age, gender, therapeutic category and prescription. The study protocol was approved by the Institutional Human Ethics Committee and Informed consent from patients was taken.

A total of 210 prescriptions were analyzed. Out of the collected prescriptions, 128 (60.95%) were males and 82(39.05%) were found to be females. It was clearly shown in table 1.

Among the total prescriptions collected, age was taken into consideration by dividing into four age groups with 20yrs each.

Maximum numbers of patients were found in the age group of 21-40yrs and the least were found in the age group of 0-20yrs. The same was stated in table 2.

**Table 1: Gender wise distribution**

S. No.	No. of prescriptions	percentage
Males	128	60.95%
Females	82	39.05%
Total	210	100

Among the wide range of antibiotics i.e., 479 antibiotics prescribed, beta-lactams were found in the maximum cases which account for more than half of the cases. Amongst the beta-lactams, cephalosporin's account for the highest with includes a maximum of III generation cephalosporins. Ceftriaxone was found to be the wisest in prescriptions with the least consideration of cefotaxime. Among penicillin antibiotics, amoxicillin was in the top. Next class of drug which accounts to after beta-lactams is quinolones. Ofloxacin infusion was given in most of the cases. The least class of drug prescribed was aminoglycosides, which probably might be due to its toxicity. The same was depicted in table 3.

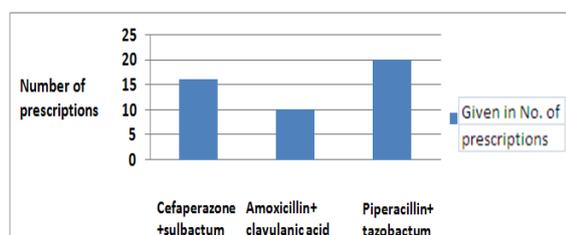
**Table 2: Age-wise distribution**

S. No.	Age (y)	No. of prescriptions	Percentage
1	0-20	36	17.14%
2	21-40	70	33.34%
3	41-60	62	29.52%
4	61-80	42	20%
		Total: 210	100

**Table 3: According to drug class: monotherapy**

Drug class	Drug	Drug given in no. of prescriptions	
Pencillins,cephalosporins, and other beta-lactams(276)	Ceftriaxone	138	
	Cefoperazone	16	
	Cefotaxime	1	
	Cefixime	1	
	Meropenem	10	
	Imipenem	1	
	Aztreonam	8	
	Amoxicillin	81	
	Piperacillin	20	
	Aminoglycosides(3)	Amikacin	3
Other anti bacterials(17)		Metronidazole	13
		Linezolid	4
Tetracycline(17)	Tetracycline	1	
	Doxycycline	16	
Quinolones(58)	Ciprofloxacin	2	
	Ofloxacin	49	
	Moxifloxacin	7	
Macrolides(25)	Clarithromycin	4	
	Clindamycin	18	
	Azithromycin	3	
Anti malarials(32)	Artesunate	29	
	Quinine	3	
Anti mycobacterials(51)	Rifampicin	11	
	Pyrazinamide	13	
	Ethambutol	14	
	Isoniazide	13	

Fixed dose combinations have been seen in some prescriptions, of which piperacillin+tazobactam (n=20) is the most common one. It was indicated in the [fig 1].



**Fig. 1: Fixed dose combinations**

In the collected prescriptions, 51.90%, i.e. a little more than half of the prescriptions were with two antibiotics, followed by three antibiotic prescriptions. 9.05% prescriptions were with 4-5 antibiotics. It was emphasized in the table 4 below.

**Table 4: No. of antibiotics in each patient**

S. No.	Category	No. of prescriptions	Percentage
1	Single antibiotic	37	17.62%
2	Two antibiotics	109	51.90%
3	3 antibiotics	45	21.43%
4	4-5 antibiotics	19	9.05%

Studies on the drug utilization pattern are increasing tremendously due to irrationality in prescriptions. Irrationality is the leading cause of resistance. Avoidance of resistance and rationality can be improved by prescribing a least possible dose of antibiotics for the shortest possible duration with lowest economic consideration [4]. Therapy or treatment duration of antibiotics should be as per the standard treatment guidelines laid. Over or under the prescription of antibiotics may result in either treatment failure or side effects. So drug utilization evaluation is a tool in accessing the rationality of prescription [1].

A research study conducted by Meher B. R and others showna majority of male patients, which was in correlation to our study [5]. Our present study has shown that antibiotic prescription was found to be major in the age group of 21-40 y. A similar study conducted by Pandiamunian J & Somasundaram G of Mahatma Gandhi Medical College & Research Institute, Puducherry has shown the prescription of antibiotics was maximum in the age group of 51-60 y [6].

Beta-lactams and quinolones were the commonly prescribed antimicrobial classes. Among beta-lactams, cephalosporins specifically III generations were on the top. This is quiet in correlation to the study conducted by Lisha Jenny John et. al in which cephalosporins and aminoglycosides are seen [7].

A study conducted by Mujtaba Hussain Naqvi Syed and others shown that more than half of the patients taken into the study were with a single antibiotic followed by two antibiotic usages. This was found contradictory with our study where two antibiotic usages were seen in major followed by three drug usage [8].

The present study analyzed the antimicrobial drug utilization of patients admitted to the medical department of the hospital setting. The purpose of inpatient based prescription audit has the advantage of minimizing the 'dropouts' as patients had to purchase and take the prescribed drugs and limitation of the study was a qualitative assessment of antimicrobial drug utilization was not performed.

Finally, we conclude that that cautious and judicious use of antibiotics will reduce the burden of multi-drug resistance and thereby enabling better patient management and limiting the resultant morbidity and mortality. This will help in rationalizing prescribing practices based on the feedback from these studies and practices between institutions, regions and countries can be compared.

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#### **CONFLICT OF INTERESTS**

No conflict of interest was seen

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