

## Research Article

# Study the Prescription Pattern of Antibiotics in the Medicine Department in a Teaching Hospital: A Descriptive Study

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### ABSTRACT

Antibiotics are one of the most important discoveries in the field of medicine and are widely used in reducing the infections. Irrational antibiotic use may result in increased cost of treatment, drug-drug interactions and also cause severe adverse reactions. The purpose of the present study was to evaluate the pattern of antibiotic usage in the general medicine department of a tertiary hospital in South India. The objective of the study was to determine the average number of antibiotics prescribed per prescription, to identify the indication for which the antibiotics were commonly used and to determine the most commonly prescribed antibiotics in a tertiary care hospital. This was a prospective observational study. About 200 patients who were prescribed antibiotics were included in the study. The data on antibiotic containing prescriptions from each patient was collected from the inpatient and outpatient department. The study was carried out from January to June, 2013. The data was collected on antibiotics was subjected for descriptive statistical analysis. A total of 200 prescriptions were studied, out of which 139 (69.5%) prescriptions were mono therapy and 61 (30.5%) prescriptions had multiple antibiotics. It was observed that out of 200 patients who were prescribed antibiotics, 110 were male (55%) and 90 were female (45%). Cephalosporins were most commonly prescribed antibiotics and ceftriaxone was prescribed mostly. The most commonly prescribed antibiotics were Cephalosporins and most of the prescriptions contained mono therapy. The antibiotics treatment regimens given in most of the patients were without done culture sensitivity test before prescribing, which lead to irrational prescribing. Rational prescribing of antibiotics avoids polypharmacy and prevents antibiotic resistances.

**Keyword:** drug utilization, rational antibiotic use, Schedule H 1.

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### INTRODUCTION

Infectious diseases are a prominent cause of mortality in the developing world.<sup>[1]</sup> People residing in the developing world often develop resistance to antibiotics which is one of the causes for poor treatment outcomes and higher healthcare utilization.<sup>[2]</sup> Resistance to antibiotics can be caused by varied factors such as health facilities, medication non adherence, multiple prescribers and dispensers, use of first generation medications, inappropriate medication usage, intake of wrong dosage, incorrect usage of medications, use of counterfeit drugs, over and under usage of medications, animal husbandry, etc. <sup>[1,3,4]</sup> Several measures can be taken to prevent untoward outcomes associated with antibiotic resistance such as monitoring patient dosages and formulations, assessing patients' pharmacokinetic profile on a timely basis and monitoring and treating patients for ADRs.<sup>[5,6]</sup> Controlling antibiotic resistance can not only help healthcare professionals provide rational and cost-

effective care but can also slow down the emergence of super resistant antibiotic strains known as the 'super bug'. Due to emerging resistance to combination antibiotics, most of the developing countries are worried about the future availability of higher generation antibiotics for treating patients, especially the pediatric population, displaying resistance to a majority of existent antibiotics.<sup>7</sup> The prevalence of antibiotic use is very high in India and ranges from 24 to 67%.<sup>3</sup> A study conducted by Akram Ahmad et al (2012) showed that almost 51% antibiotics that were prescribed were in appropriate.<sup>3</sup> This calls for need for more rational use of antibiotics. Recently, schedule H1 was introduced in India under the existent D and C Act of 1945 by the regulatory agencies to control the irrational prescribing of antibiotics.<sup>8</sup> Irrational antibiotic usage can lead to increased healthcare utilization, morbidity, mortality, adverse drug events and drug resistance.<sup>9</sup> Antibiotic resistance affects the health of

Table 1: Demographic characteristics of patients taking antibiotics

Demographic factors	Categories	Total n (%)
Age in Years	Below 12 year of age	17 (8.5)
	12- 30 years	56 (28%)
	30-60 years	97 (48.5)
	More than 60 years	30 (15)
Gender	Male	110 (55)
	Female	90 (45)

Table 2: Indications for which the antibiotics were used

S. No.	Frequency	Frequency n (%)
1	Respiratory Tract Infection	56 (28)
2	Viral Infection	24 (12)
3	Urinary Tract Infection	17 (8.5)
4	Acute gastroenteritis	15 (7.5)
5	Acute Febrile Illness	15 (7.5)
6	Hernia	8 (4)
7	Diabetes	7 (3.5)
8	Appendicitis	4 (2)
9	Meningitis	3 (1.5)
10	Anemia	3 (1.5)
11	Accidents cases	3 (1.5)
12	Inflammatory Bowel Disease	2 (1)
13	Others	43 (21.5)

Table 3: Type of therapy used for the utilization of antibiotics in tertiary care hospital

Type of therapy	Number of prescription (%)
Mono-Antibiotics therapy	139 (69.5)
Poly-Antibiotics therapy	61 (30.5)

patients by reducing treatment effectiveness, and increasing treatment complexity and costs.<sup>10</sup> Regulated antibiotic prescribing through periodic prescription audits is an indicator of provision of evidence based care.<sup>11</sup> Monitoring antibiotic prescriptions can provide feedback about prescription patterns to the physicians.<sup>12</sup> Physicians can understand the reasons for prescribing antibiotics, the process of development of antibiotic resistance and the associated complications in patients. Hence, this study aims to procure information about prescribing patterns of antibiotics in the general medicine ward of tertiary care hospital in South India.

## MATERIAL AND METHODS

A cross sectional, prospective observational study was carried out in Vydehi institute of Medical Sciences and Research Centre in the city of Bangalore, situated in South India from January to June, 2013. In this study, we enrolled 200 patients who were prescribed with antibiotics, from both outpatient department (OPD) and inpatient department (IPD). A data collection form was designed and the required data were collected from the patient's chart after the study consent was procured. The data included the name, age, weight, identification number, diagnosis, antibiotic name, dose, duration, frequency, and the report of associated ADRs. The data were analyzed by performing descriptive statistics. Data were analyzed using the Microsoft Excel software.

## RESULTS

Around 200 patients were included in the study and their prescriptions containing at least one antibiotic were analyzed. Table 1 provides demographic details of the patients to whom antibiotics were prescribed. Patients in the age group of 30-60 years (48.5%) were prescribed maximum antibiotics and patients in the age group of 12 years or less (8.5%) were prescribed the least amount of antibiotics. In the study, males were 110 (55%) and females were 90 (45%).

Indications for which antibiotics were prescribed are given in the Table-2. Respiratory tract infection were the most common clinical condition in hospitals for which antibiotics were prescribed in high percentage (21.5%), followed by viral fever (12%), UTI (8.5%), and acute gastroenteritis (7.5%).

The type antibiotics therapy used in this tertiary care hospital is presented in Table-3. The therapy given to patients was categorized into monotherapy and polytherapy. Monotherapy prescriptions (69.5%) were more common compared to poly-therapy prescriptions (30.5%). Ceftriaxone was most commonly prescribed antibiotic as mono therapy and a combination of amoxicillin clavulanate and amikacin were the most commonly prescribed antibiotics in polytherapy prescriptions.

248 antibiotics were prescribed in 200 patients. The profile of antibiotics prescribed is shown in Table 4. The most common antibiotics prescribed were cephalosporins (62.5%) followed by fluoroquinolones (16.5%), penicillin (16%), Nitroimidazole (14%) and Amikacin (10%).

## DISCUSSION

Table 4: Category of antibiotics prescribed in among patients

S. No.	Antibiotics	Total n (%)
1	Cephalosporins	125 (62.5)
2	Fluroquinolones	33 (16.5)
3	Penicillins	32 (16)
4	Nitroimidazole	28 (14)
5	Aminoglycosides	23 (11.5)
6	Others	7 (3.5)

Understanding drug utilization can help physicians provide rational and cost-effective health care to their patients. A majority of infectious diseases can be treated through antibiotic treatments. In this study, antibiotic prescriptions of patients visiting the outpatient and inpatient facilities in Vydehi institute of medical sciences and research centre hospital were studied. In the present study, male patients were more compared to females. This may be because the female population was less exposed to environmental influences when compared to male so they get more infectious diseases. Similar results were found in studies involving pediatric population conducted by Ramanath et al (2013)<sup>[7]</sup> and Akram et al (2012).<sup>3</sup> In our study more number of patients belonged to the age group of 30-60 years. Gururaja et al (2013) conducted a study the departments of Medicine and Surgery and showing near about 32% patients are belong to age more than 60 years. This factor may be due to older people were more probable to be ill and to have more serious illnesses compare with other age group of patients.<sup>13</sup>

Respiratory tract infection was the most common condition for which antibiotics were prescribed in (21.5%), followed by viral fever (12%), UTI (8.5%), and acute gastroenteritis (7.5%). Similar results were found in other studies too.<sup>7</sup> The most common antibiotics prescribed were cephalosporins (62.5%) followed by fluroquinolones (16.5%), penicillin (16%), Nitroimidazole (14%) and Amikacin (10%). Ceftriaxone was the most commonly used cephalosporin antibiotic. In a study conducted by Akram et al. in South India, 30% patients had fluroquinolone prescriptions followed by cephalosporins and others antibiotics.<sup>3</sup> A substantial number of antimicrobials were prescribed for treating patients. Cephalosporins are generally widely prescribed due to their high potent action, available in various formulations in the market, their extended indications and the activity against gram negative to gram positive bacteria means broad spectrum activity from first generation to third generation of cephalosporins.

World Health Organization (WHO) cautions patients against purchase of antibiotics without a prescription as a measure to control emergence of antibiotic resistant strains.<sup>14</sup> Despite such warnings and laws in place, in India and many developing nations, it is possible to purchase antibiotics without a prescription. There are penalties in place in case of sale of antibiotics without a prescription such as closure of business where the sale takes place. There are insufficient measures to prevent irrational sale of antibiotics.<sup>15-17</sup> Interventions focusing on improving

awareness about irrational prescribing of antibiotics among physicians and patient should be conducted. Monitoring drug utilization to inform physicians about patient antibiotic usage and educating patients about the usage of different antibiotics can prevent irrational antibiotic use.<sup>12</sup> The National List of Essential Medicines and standard treatment guidelines in different states of India specifically mention that higher generation antibiotics like cephalosporins, quinalones and carbapenems, etc should be prescribed by specialty physicians.<sup>3</sup> This calls for an urgent need for effective interventions to stop this uncontrolled practice of inappropriate prescribing of higher generation of antibiotics. The implementation of schedule H1 by the Indian government will expedite the process of reduction of inappropriate use of antibiotics.<sup>8</sup>

## CONCLUSION

In our study, most of the prescriptions contained only a single antibiotic. It was observed that out of 200 prescriptions, Cephalosporin class of antibiotics were most frequently prescribed and among mostly ceftriaxone was the drug of choice. The choice of antibiotics for different infectious diseases differed at different Indian hospitals by physician choice and preference. This study reveals that there many standard treatment guidelines available from various state government agencies. Antimicrobial policies given by central government for rational use of antibiotics in the country are not adhered by physicians. Government of India might be able to ensure both rational and restricted use of antibiotics, with the implementation of Schedule H1 from March 1<sup>st</sup>, 2014. Also, nurses and pharmacists can take part in promoting the rational use of antibiotics, which can lead to their professional betterment.

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