



**Short Report:**

**Prescribing Pattern of Antimicrobials in the Department of General Medicine**

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**Abstract:** Background: Antibiotics are extensively used for the treatment of minor, moderate both life threatening and minor infections. Irrational use of antibiotics increases the risk of bacterial resistance. Hence, the present study was aimed to assess the most commonly prescribed antibiotics in the Department of General Medicine in a tertiary care hospital. Methodology: A prospective observational study was carried out at the Department of General Medicine, M.S. Ramaiah Medical Teaching hospital, Bangalore, India over a period of five months from January 2015 to May 2015. Patient's case sheets, treatment charts and laboratory investigation were used as the source of data. Results: The mean age of the study population and duration of hospitalization was  $38.54 \pm 12.27$  and  $6.15 \pm 2.56$  days respectively and the mean number of antimicrobials per prescription was  $1.44 \pm 0.74$ . The total number of antibiotics prescribed was 197. The most commonly prescribed antibiotic classes were cephalosporin (62.43%) among which ceftriaxone was the most commonly prescribed drug. Conclusions: As antibiotics are the most commonly prescribed drugs therefore development of antibiotic use policy is very essential not only to prevent antibiotic resistance but also to reduce the treatment expenditure.

**Key Words:** Antibiotics, Prescribing Pattern, Drug Resistance, Antimicrobials

**Introduction:**

The discovery of compounds with antimicrobial activity was a major development in medicine and patient care. Antibiotics are the most extensively prescribed medicines among hospitalized patients. Selection of appropriate antimicrobial agent requires knowledge of the organism's identity and its sensitivity to a particular agent, the site of infection, safety profile of the agents, patient factors and cost of therapy. A small-scale study on the pattern of antimicrobial use in a teaching hospital showed that 54% patients in medical wards, 81% in surgical wards and 96% in pediatric wards received

antimicrobial therapy. More than 90% of antimicrobials were used empirically based on clinical ground only. (1)

Antibiotic resistance is a global problem, affecting both developing and developed countries. A study conducted by the University of Washington (University of Washington, 2000) lists several factors that contribute to the increase in resistance to antibiotics such as overprescribing of antibiotics even for viral infections, over-usage and incomplete duration of antibiotics, over-the-counter availability of antibiotics, inadequate patient counseling and purchase of medicines by patients as over the counter medicines. (2) Irrational and indiscriminate use of antibiotics can result in emergence of antibiotic-resistant organisms and superinfection, increased patient morbidity, increased mortality and adverse drug reaction, which may increase treatment expenditure. (3)

Utilization of antibiotics in India has been augmented by six to seven percent annually in the past five years. (4) The prevalence of antibiotic use is very high in India and ranges from 24 to 67%. A study conducted by Ahmad et al., (2012) showed that almost 51% antibiotics that were prescribed were inappropriate. (5) In developing countries, antibiotics are prescribed for 44–97% of hospitalized patients often unnecessarily or inappropriately. (6)

The study of prescribing pattern is a component of medical audit which seeks monitoring, evaluation and modifications in the prescribing practices of the prescribers to achieve rational and cost effective medical care. (7)

Prescribing indicator has been developed by World Health Organization (WHO) in a collaborative work with International Network for Rational Use of Drugs (INRUD). Prescribing indicator is defined as the indicator used to measure the performance of health care provider in several key dimensions related to appropriate use of drugs. It is being used to detect various problems in prescribing practice such as polypharmacy, inclination for branded products, overuse of antibiotics or injections and prescribing out of formulary or essential drug list. (8)

**Materials and Methods**

It is a prospective observational study carried out at the inpatient Department of General Medicine, M.S. Ramaiah hospital, Bangalore, Karnataka, for a period of 5 months from January 2015 to May 2015. It is a 700 bedded tertiary care teaching and superspeciality hospital. A total of (n=149) patients were included in the present study. Ethical clearance was obtained from the Institutional Ethical Committee. The inpatients of Dept. of General Medicine who received antibiotic therapy were included for the study and the outpatients of general medicine department, inpatients and outpatients of other departments and patients age <20 years and >60 years were excluded from the study.

**Study procedure:**

The prescriptions were chosen based on inclusion criteria. The case files of patients admitted in the Department of General Medicine were reviewed on daily basis till discharge. Self-designed standardized Proforma was used to enter all details like patient name, age, sex, weight, inpatient number, date of admission, date of discharge, reason for admission, past medical history, food habits, known allergies, previous ADRs, list of drugs prescribed and specific issues related to antimicrobial use such as name of antimicrobials, generic name, their dosage schedule, route of administration, date of discontinuation and related laboratory value.

**Statistical analysis:**

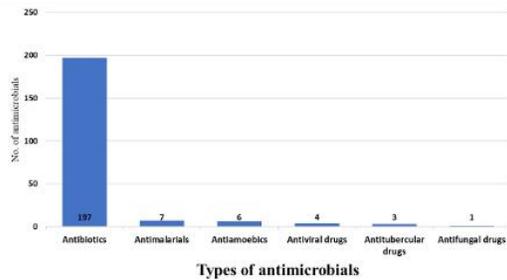
All the details which were collected from patient’s case reports were uploaded in IBM SPSS (Statistical Package for Social Sciences) statistics 20.0 version for easy accessibility, storage, retrieval and analysis of the collected data. Microsoft excel was used to generate tables, pie charts, bar diagrams and data analysis.

**Results**

The results are shown in the Tables and figures below

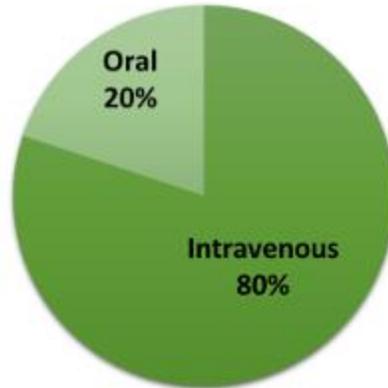
**Table 1: Prescribing pattern of antibiotics based on therapeutic class**

Therapeutic class	Number of antibiotics (n=197)	Percentage (%)
Cephalosporins	123	62.43
β-lactams	19	9.64
Macrolides	17	8.62
Fluoroquinolones	13	6.7
Tetracyclines	13	6.7
Carbapenems	6	3.04
Lincosamides	2	1.01
Glycopeptides	2	1.01
Sulphonamides	1	0.60
Aminoglycosides	1	0.60



**Figure 1: Prescribing pattern of antimicrobials**

**Route of administration**



**Figure 2: Route of administration**

**Table 2: Frequency of individual antibiotics**

S. No	Name of Antibiotics	No. of Prescription [n=197]	Percentage
1	Ceftriaxone	72	36.54
2	Cefotaxime	47	23.85
3	Cefixime	2	1.01
4	Cefpodoxime	1	0.50
5	Cefuroxime	1	0.50
6	Piperacillin/tazobactam	14	7.10
7	Amoxicillin/clavulanate	2	1.01
8	Ampicillin	3	1.52
9	Azithromycin	17	8.62
10	Ciprofloxacin	7	3.55
11	Levofloxacin	5	2.53
12	Norfloxacin	1	0.50
13	Doxycycline	13	6.5
14	Meropenem	6	3.04
15	Clindamycin	2	1.01
16	Vancomycin	2	1.01
17	Sulfamethoxazole	1	0.50
18	Amikacin	1	0.50

**Table 3: Distribution of patients based on clinical diagnosis**

Diagnosis	Number of patients [(n=149)]	Percentage
Viral fever with thrombocytopenia	37	24.84
Lower respiratory tract infection	17	11.40
Urinary tract infection	15	10.06
Pyrexia of unknown cause	14	9.39
Dengue fever with thrombocytopenia	13	8.73
Acute gastroenteritis	10	6.72
Pneumonia	9	6.04
Alcoholic liver disease	6	4.02
Meningitis	4	2.69
Miscellaneous	24	16.10

## Discussion

A total of 149 prescriptions were included as per inclusion and exclusion criteria, out of which 86 (58%) were male and 63 (42%) were female. Patients were divided into four different age groups. The age distribution of patients showed that the age group of 21-30 constituted maximum number of patients 48 (32.21%) and age group of 31-40 constituted minimum number of patients 24 (16.1%). The average length of stay of patients in the hospital was 6 days. The mean age of the present study population was a 38.54±12.27 year which was found to be similar to a study conducted by Meher, et al., (2011) in Pondicherry, India where the study population included 116 (58%) males and 84 (48%) females, the mean age of the study population was 48.8 years. (3)

The total number of antimicrobials prescribed in the study population was 218 which is shown in Figure 1, Out of which 197 (90.4%) were antibiotics, 7 (3.21%) were antimalarials, 6 (2.8%) were antiamoebics, 4 (1.83%) were antiviral drugs, 3 (1.45%) were anti-tubercular drugs and 1 (0.45%) were antifungal drugs.

Table 1 shows the prescribing frequency of different classes of antibiotics. 10 different class of antibiotics were prescribed, among which cephalosporins were the highest prescribed class of antibiotics as 123 (62.43%), among which ceftriaxone was the most commonly prescribed followed by  $\beta$ -lactams (penicillin) 19 (9.64%), macrolides 17 (8.62%), fluoroquinolones 13 (6.7%), tetracyclines 13 (6.7%), carbapenems 6 (3.04%), lincosamides 2 (1.01%), glycopeptides 2 (1.01%), sulphonamides 1 (0.60%) and aminoglycosides 1 (0.60%). A similar study was conducted by Ramya, et al., (2012) in Coimbatore, India shows that the most commonly prescribed antibiotic class was cephalosporin, fluoroquinolones, aminoglycosides, tetracyclines, macrolides, penicillin and carbapenem groups and ceftriaxone was the most commonly prescribed antibiotic of cephalosporin group. (9)

Table 2 shows individual frequency of antibiotics, a total of 18 different antibiotics were prescribed. The most frequently prescribed antibiotic was ceftriaxone followed by cefotaxime and azithromycin.

The antimicrobials prescribed per prescription were categorized based on monotherapy, dual therapy and triple therapy. One antimicrobial was prescribed to 90 (60.40%) patients, two antimicrobials were prescribed to 49 (32.9%) patients and three antimicrobials to 10 (6.71%) patients. The average number of antimicrobials prescribed per prescription was found to be 1.44±0.74. A study carried out in Gujarat, India by Prajapati, et al., (2012) has reported that the mean number of antibiotics per prescription was 1.54, (7) which is approximately similar to the current study. Indication for which antibiotics were prescribed is given in Table 3 Viral fever with thrombocytopenia 37 (24.84%) was the most common clinical condition in hospital followed by lower respiratory tract infection 17 (11.40%), urinary tract infection 15 (10.06%), pyrexia of unknown origin 14 (9.39%), dengue fever with thrombocytopenia 13 (8.73%), acute gastroenteritis 10 (6.72%), pneumonia 9 (6.04%), alcoholic liver disease 6 (4.02%), meningitis 4 (2.69%) and other miscellaneous diseases were 24 (16.10%).

A total of 218 antibiotics were prescribed in the study population, out of which 175 (80.27%) given through IV route and 43 (19.73%) given through oral route, which is represented in Figure 2 In a study carried out by Kambaralieva, et al., (2011), it was reported that 79.4% patients received antibiotics through parenteral route and 20.5% through oral route, and the results are found to be similar to the current study. (6)

A total of 218 antimicrobials were prescribed in the study population, out of which only 10 (4.62%) antimicrobials were prescribed by generic name. A study on prescribing pattern of

antibiotics conducted by Ramesh, et al., (2013) in a tertiary care hospital Kerala, India, reported that in their study, about 16 (10.5%) antibiotics were prescribed by generic name. (10)

## Conclusion

By analyzing 149 prescriptions, it was found that the most commonly prescribed class of antibiotic in the General Medicine Department was cephalosporin, majorly ceftriaxone. The most commonly diagnosed disease was viral fever with thrombocytopenia. Monotherapy was more preferred than the dual and triple therapy. Average number of antimicrobials per prescription was found to be 1.44±0.74. Development of antibiotic use policy is very essential not only to prevent antibiotic resistance but also to reduce the treatment expenditure. Clinical pharmacist should make interventions and inform the physicians and patients about the rational use of antibiotics.

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## References

1. Akter SFU, Rani MFA, Rahman JA, et al. Antimicrobial use and factors influencing prescribing in medical wards of tertiary care hospital in Malaysia. *IJSET*. 2012;1(4):274-284.
2. Ntsekhe M, Hoohlo-Khotle N, Tlali M, et al. Antibiotic prescribing patterns at Six Hospitals in Lesotho. Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program center for pharmaceutical management. 2011;1-5.
3. Meher BR, Mukherjee D, Udayshanker. A study on antibiotic utilization pattern in general medicine ward of tertiary care teaching hospital. *JCPR*. 2014;6(7):1847-1849.
4. Venu GD, Rama KT, Siva KA, et al. Prescribing pattern of antibiotics in the general medicine and pediatrics departments of a tertiary care teaching hospital. *Int J Pharm Pharm Sci*. 2014;6(2):221-224.
5. Ahmad A, Revanker M, Haqie I, et al. Study the prescription pattern of antibiotics in the Medicine Department in a Teaching Hospital. *IJTPR*. 2014;6(2):43-46.
6. Baktygul K, Marat B, Ashirali Z, et al. An assessment of antibiotics prescribed at the secondary healthcare level in the Kyrgyz republic. *Nagoya J Med Sci*. 2011;73:157-168.
7. Prajapati V, Bhatt JD, Vora MB. Study of prescribing patterns of antimicrobial agents in the medicine department at tertiary care teaching hospital in Gujarat. *NJIRM*. 2012;3(3):133-140.
8. Kumar J, Shaik MM, Kathi MC, et al. Prescribing indicator and use of antibiotics among medical outpatients in a teaching hospital of central Nepal. *Journal of College of Medical Sciences*. 2010;6(2):7-13.
9. Reddy BR, Priyasri B, Maddukuri MK, et al. A prospective study on antibiotic prescribing pattern among hospitalized patients in tertiary care hospital. *International Journal of Research in Pharmaceutical and Nano sciences*. 2012;1(2):147-158.
10. Ramesh A, Salim S, Gayathri AM, et al. Antibiotics prescribing pattern in the in-patient department of a tertiary care hospital. *Archives of Pharmacy Practice*. 2013;4(2):71-76.