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## A STUDY OF PRESCRIBING PATTERN OF ANTIBIOTICS IN A TERTIARY CARE HOSPITAL - AN OBSERVATIONAL STUDY

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### Keywords:

Antimicrobial agents, Prescribing pattern, Tertiary care hospital

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**ABSTRACT:** The main objective was to study the prescribing pattern of antibiotic in a tertiary care hospital to assess the frequency and prescribing the practice of antibiotics. The study includes an observational study of antibiotic prescribing patterns conducted over 6 months. In this study, enrolled 300 patients who were prescribed with antibiotics from both outpatient and inpatient department. Data were collected from the patient's chart and was subjected to analyze by performing descriptive statistics. In the present study, the prescription was assessed and found the maximum number of patients belonged to the age group of 21-30 years, and the proportion of male patients was more compared to the female patients. Moreover, younger and adult patients were commonly associated with the highest prescribed antibiotics in both male and female patients. Also observed that the frequency of antibiotics were 1, 2, and 3 or > 3 prescribed to 55%, 26%, and 19% respectively. Among the all group of antibiotics cephalosporins was found to be prescribed to the largest number (22.03%) of patients, followed by Quinolone (15.57%), Antifungals (14.36%), Aminoglycosides (11.59%), Penicillin (10.76%), Antiamoebic (8.29%), Macrolides (7.31%), Antimalarial (6.44%) and others were (3.65%) Among the antibiotics cefixime, ciprofloxacin, Itraconazole, Amoxicillin, Amikacin, and Azithromycin most chosen drugs % of antibiotic prescribed to male were much higher than female patient's especially penicillins, quinolones and cephalosporins group of antibiotics whereas antifungal and macrolides group of antibiotics higher in female patients than male patients.

**INTRODUCTION:** Antibiotics are one of the most important discoveries in the field of medical science and are widely used against infectious agents<sup>1</sup>. Most of the antibiotics now in use have been discovered more or less by chance, and their mechanisms of action have only been elucidated after their discovery. Antibiotics are essential for treating bacterial infections, and antibiotic resistance stops an antibiotic from working effectively against bacterial meaning some infections may become very difficult to treat.

And the main motto of every country is to keep these essential medicines working for us, increase the health quality and decrease the health care costs. A medicinal professional prescribes the medications demonstrate his or her capacity to choose the quality of medication that is accessible in the market for that specific ailment and to decide the ones which will be most appropriate for their needs<sup>2,3</sup>. This requires a careful comprehension of different parts of both the infection and medications by the treating physicians lastly giving the patient protected<sup>4</sup>. At least 80 million antibiotic prescriptions each year are unnecessary, which makes improving antibiotic prescribing and use a national priority, according to the centers for disease control, explained the importance of the initiative in an era where antibiotic-resistant bacteria haunt an increasing number of hospitals.

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It becomes difficult to explain to patients the antibiotic probably didn't have a role in their return to health; especially they have received antibiotics multiple times for nonbacterial infections and felt better after a few days. Infectious diseases are commonest causes of morbidity and mortality in the most developing countries of the world<sup>5</sup>. The problem of overuse of antibiotic is a global phenomenon. In India, the prevalence of use of antibiotics varies from 24% to 67%. According to the recent study, the 75% of the antimicrobial prescriptions each year and is the most frequent reason for seeking medical attention<sup>6</sup>. 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>7</sup>. Various drug prescription problems have been identified in health sectors in especially developing countries. This includes unnecessary poly-pharmacy and high use of drugs with unproven efficacy<sup>8</sup>, irrational antibiotics usage can lead to increased healthcare utilization, morbidity, mortality, adverse drug events and drug resistance<sup>9</sup>.

When antibiotics are prescribed for unnecessary conditions, arise adverse problems. Antibiotics are useful when it needed, and responsible use can save the patient lives that are threatened with bacterial infections. However, a serious reduction in the use of antibiotics can help to decrease the spread of antibiotic-resistant micro-organisms and disease. To tackle with this problem, global initiatives are trying to promote the rational use of antimicrobials<sup>10</sup> but, it requires continuous education of physicians and patients, which ought to be supported by high-quality evidence linking antibiotic use to the emergence of resistance<sup>11-12</sup>.

The pattern of prescription will reflect the physician understanding of the disease and the patient's health history. The global antibiotic resistance partnership - India research estimates 190,000 neonatal deaths each year due to infections, of which over 30% is attributable to antibiotic resistance and the reason is the inappropriate use of Antibiotics. In developing countries, the antibiotics are the highly consumed medicines and the most important and irrational use of antibiotics is common practice. So, the present study was conducted to evaluate the use of antibiotics agents in a tertiary care hospital. It is an

essential component of the pharmacy service provision and clinically practices. Just as one of the measures to analyze and promote the rational use of drugs so that adequate measures can be taken to prevent the problem of multidrug resistance and health costs.

**METHODOLOGY:** Study was conducted at a tertiary hospital in Bangalore, India after permission from the IEC (298-87:88). This was an observational study of antibiotic prescribing patterns conducted over 6 months. In this study, enrolled 300 patients who were prescribed with antibiotics from both outpatient and inpatient department. A data were collected from the patient's chart and was subjected to analyze by performing descriptive statistics using the Microsoft Excel software.

**RESULTS: Patient Demographics**

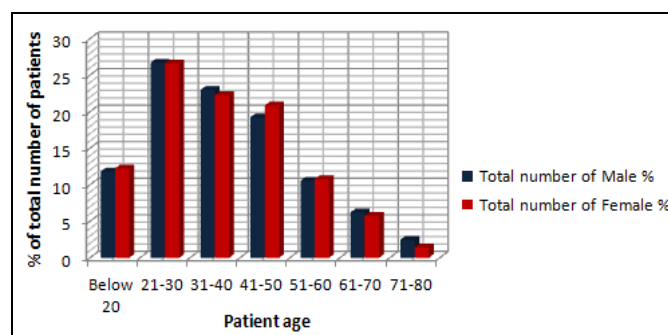


FIG. 1: PATIENT'S DEMOGRAPHIC DETAILS

In this study, a total of 300 prescriptions were analyzed. A maximum number of patients belonged to the age group of 21-30 years. Fig. 1 showed the details of patient's demographic. The proportion of male patients was more compared to female patients.

**A number of Antibiotics Prescribed Per Prescription:**

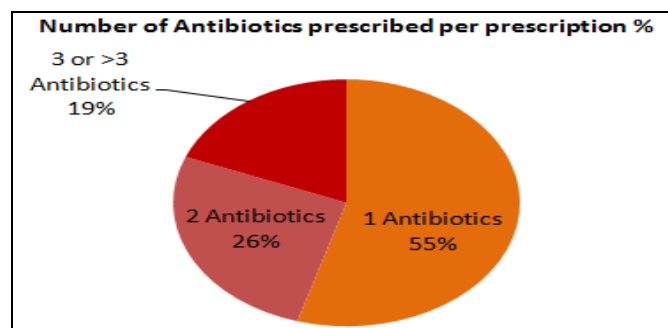


FIG. 2: NUMBER OF ANTIBIOTICS PER PRESCRIPTION IN %

A total number of prescriptions studied 300. It was observed that 1, 2, and 3 or > 3 Antibiotics were prescribed to 55%, 26% and 19% respectively **Fig. 2**.

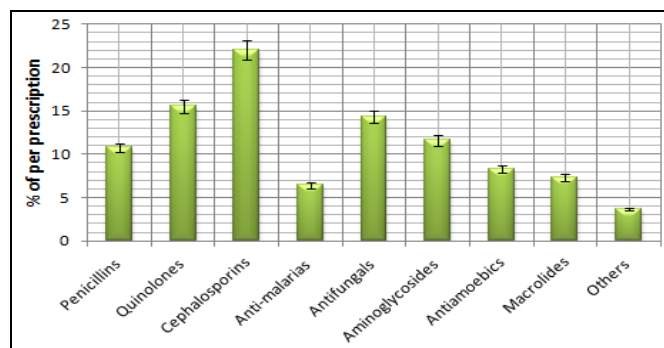
**Percentage of Most Common Prescribed Antibiotics:**

**TABLE 1: % USAGE OF DRUGS IN EACH ANTIBIOTICS GROUP**

Antimicrobial class of drugs and Percentage	Drug	(%) of prescription
Penicillins (10.76%)	Amoxicillin	6.12
	Ampicillin	3.57
	Penicillin-V	1.07
Quinolones (15.57%)	Ciprofloxacin	5.24
	Levofloxacin	3.17
	Norfloxacin	3.01
Cephalosporins (22.03%)	Ofloxacin	4.15
	Cefixime	8.09
	Cefotaxime	5.16
	Cefuroxime	4.08
Anti-malarials (6.44%)	Cefepime	2.34
	Cefoperazone	2.36
	Chloroquine	4.14
Antifungals (14.36%)	Primaquine	2.30
	Itraconazole	5.78
Aminoglycosides (11.59%)	Ketoconazole	4.22
	Fluconazole	4.36
	Streptomycin	3.47
Antiamoebics (8.29%)	Gentamycin	1.78
	Amikacin	6.34
	Metronidazole	3.68
Macrolides (7.31%)	Tinidazole	1.64
	Ornidazole	2.97
	Azithromycin	4.67
Others (3.65%)	Erythromycin	2.64
	Tetracycline	1.25
	Vancomycin	2.40

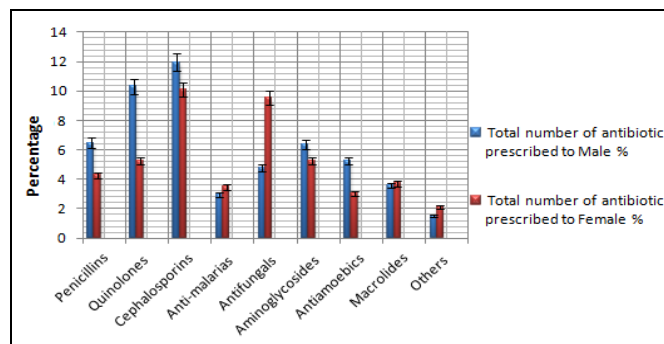
Among the all group of antibiotics cephalosporins was found to be prescribed to the largest number (22.03%) of patients, followed by Quinolone (15.57%), Antifungals (14.36%), Aminoglycosides (11.59%), Penicillin (10.76%), Antiamoebic (8.29%), Macrolides (7.31%), Antimalarial

(6.44%) **Fig. 3** and others were (3.65%). Among the antibiotics cefixime, ciprofloxacin, Itraconazole, Amoxicillin, Amikacin, and Azithromycin most chosen drugs **Table 1**.



**FIG. 3: % USAGE OF DRUGS IN EACH ANTIBIOTICS GROUP**

**Percentage of Antibiotics Prescribed for Male and Female Patients:** Among the study, the total numbers (%) of antibiotic prescribed to male were much higher than the % of antibiotics prescribed to female patient’s especially penicillins, quinolones, and cephalosporins group of antibiotics whereas antifungal and macrolides group of antibiotics higher in female patients than male patient’s **Fig. 4**.



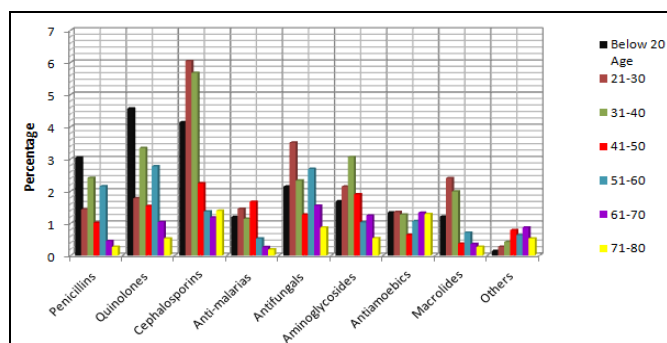
**FIG. 4: COMPARISON OF ANTIBIOTIC CONCERNING GENDER**

**Age-Wise Prescribing Frequency of Antibiotics in Male and Female Patients:**

**TABLE 2: PRESCRIBING FREQUENCY OF ANTIBIOTICS GROUP ON PATIENTS DEMOGRAPHIC**

Patients demographics / Antibiotics class	Penicillins	Quinolones	Cephalosporins	Anti-malaria	Antifungals	Aminoglycosides	Antiamoebic	Macrolides	Others
<b>Below 20</b>	3.04	4.57	4.14	1.2	2.14	1.68	1.34	1.21	0.14
<b>21-30</b>	1.43	1.78	6.04	1.45	3.51	2.14	1.35	2.4	0.27
<b>31-40</b>	2.41	3.34	5.67	1.14	2.33	3.06	1.27	1.99	0.42
<b>41-50</b>	1.01	1.54	2.24	1.67	1.27	1.9	0.64	0.37	0.79
<b>51-60</b>	2.15	2.77	1.37	0.53	2.69	1.03	1.07	0.71	0.63
<b>61-70</b>	0.45	1.04	1.18	0.26	1.55	1.24	1.33	0.36	0.87
<b>71-80</b>	0.27	0.53	1.39	0.19	0.87	0.54	1.29	0.27	0.53

Age wise prescribing frequency of antibiotics data was screened and analyzed. Among all the study, younger and adult patients were commonly associated with the highest prescribed antibiotics in both males as well as female patients **Fig. 5**.



**FIG. 5: PRESCRIBING FREQUENCY OF ANTIBIOTICS GROUP ON PATIENTS DEMOGRAPHIC**

**DISCUSSION:** Antibiotic resistance is a global threat to developing countries. Prescribing pattern of drugs reflects the attitude of the physicians. Antibiotics are supposed to be considered as the 2<sup>nd</sup> most commonly prescribed drugs in the world <sup>13</sup>. A majority of infectious diseases can be treated with antibiotic therapy. In this study, antibiotic prescriptions of patients in tertiary care hospital were studied. Total 300 numbers of prescriptions were conducted, and male patients were more compared to female patients. It was observed that 1, 2, and 3 or > 3 Antibiotics were prescribed to 55%, 26% and 19% respectively **Fig. 2**.

Similar results were found in studies conducted by Ramanath *et al.*, (2013)<sup>14</sup> and Akram *et al.*, (2012)<sup>15</sup>. In present study number of patients belonged to the age group of 21-30 years and followed by 31-40 years and so on, may be due to the lifestyle were more probable to be ill **Fig. 1** showed the detail of patient's demographic. Among all group the most common antibiotics cephalosporins was found to be prescribed to the largest percentage 22.03% of patients, followed by Quinolone 15.57%, Antifungals 14.36%, Aminoglycosides 11.59%, Penicillin 10.76%, Anti-amoebic 8.29%, Macrolides 7.31%, Antimalarial 6.44% **Fig. 3** and others were 3.65% Among the antibiotics cefixime, ciprofloxacin, Itraconazole, Amoxicillin, Amikacin, and Azithromycin most chosen drugs **Table 1**. In a study conducted by Akram *et al.* in South India, 30% of patients had quinolone prescriptions followed by cephalosporins and other

antibiotics. Cephalosporins are generally widely used medicine due to their high potent action, available in various formulations in the market, their extended indications and the activity against both the bacteria gram-negative as well as gram-positive means having broad-spectrum activity from the first generation to the third generation of cephalosporins <sup>15</sup>.

Similarly Gopalakrishnan *et al.* revealed the antibiotics prescribed, amoxicillin 49.2% and injection gentamicin 31.7% were the most commonly prescribed in both urban and as well as rural areas, and co-trimoxazole was the least prescribed antibiotic 11.5% <sup>16</sup>. In another study, ciprofloxacin, metronidazole, and penicillin G were the most common prescribed while vancomycin and chloramphenicol were least prescribed antibiotics <sup>17</sup>. Furthermore, the present study revealed that the % of antibiotic prescribed to male were much higher than the % of antibiotics prescribed to female patient's especially penicillins, quinolones, and cephalosporins group of antibiotics whereas antifungal and macrolides group of antibiotics higher in female patients than male patient's **Fig. 4**. In the current study also reflect younger and adult patients were commonly associated with highest prescribed antibiotics in both male as well as female patients **Fig. 5**. So, the measure should be taken to avoid the irrational use of antibiotics. Antimicrobial protocol and guidelines; formulary can be used to improve the rational usage of antibiotics.

**CONCLUSION:** By understanding the prescribing pattern of antibiotics and prescribing the frequency of antibiotics on patient demographics, we will be able to make the rational use of antibiotic agents is one of the main contributions to control the drugs resistance all over the worldwide. To overcome the risk of antibiotic resistance of microorganism, an antibiotics policy should be carefully instituted and implemented. Further studies are needed to explore the knowledge and skills to correct the physicians' attitudes towards prescriptions.

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**CONFLICT OF INTEREST:** Certify that we have no conflict of interest.

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