



# FUTURE JOURNAL OF PHARMACEUTICALS AND HEALTH SCIENCES

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## Prescribing Pattern of Antibiotics in Infectious Diseases at a South Indian Super Specialty Hospital

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### ABSTRACT

The irrational use of antibiotics mainly leads to the development of antibiotic resistance and adverse drug reactions. To eradicate these conditions in infectious disease patients by using prescribing patterns and following the rational use of antibiotics OBJECTIVE The infectious disease patients are at increased risk of cellulitis, hemorrhagic fever, dengue fever, meningococcal meningitis & worsening their condition. The therapeutic management of the contagious disease mainly depends upon prescribing antibiotics. A prospective observational study was conducted in a South Indian super specialty hospital for six months in 110 patients. The current prescribing trends are (35%) ceftriaxone, (16%) metronidazole, (8%) cefotaxime, (8%) doxycycline, (7%) cefoperazone and sulbactam, (3%) piperacillin and tazobactam, (3%) azithromycin, (3%) doripenem, (3%) amoxiclav, (2%) colistin and imipenem, (2%) rifampicin, (2%) amikacin, (2%) fluoroquinolones, (2%) levofloxacin, (1%) cefpodoxime proxetil, the prescribing patterns of antibiotics should be based on severity and specificity of infection to facilitate rational use of antibiotics providing optimal care. Pharmacists are in a critical position to provide pharmaceutical care to affected patients and initiate or recommended appropriate pharmacotherapy where indicated. Integration of a pharmacist's role in managing infectious diseases and improving patient outcomes.

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### INTRODUCTION

An antimicrobial agent that's also given orally, peripherally, as well as an intravenous infusion to

cure but rather avoid infection through abolishing but rather constraining the development of bacteria within or on the body, which is either isolated from cultural contexts of various microorganisms (like fungi) or contains semi-synthetic or synthetic origin<sup>1</sup>. Antibacterial agents usually involve amoxicillin and cephalosporin, but also ciprofloxacin. Around 2,500 years ago, the Chinese made its first reported usage. It was discovered during this period that healing illnesses with molded soybeans yogurt would have some beneficial properties [1]. It was such efficient that it soon became the norm during therapy. As earlier, about 350 A.D., the early Sudanese Nubian civilization used tetracycline antimicrobial drugs. In the European Middle Ages, fresh leaf extract and cheese curds were exploited

as infection-fighting substances.

In 1877, Louis Pasteur and an associate discovered anthrax bacteria. In 1928, Alexander Fleming found that a strain of green *Penicillium* mold inhibited the growth of bacteria on an agar plate to develop penicillin. When Howard Florey and colleagues discovered a novel stretch in *Penicillium*, which generated vast quantities of amoxicillin in the 1940s, such advancements occurred [2].

In 1939, isolates soil bacteria *Streptomyces*. Selman Waxman 1944 saw the development of penicillin. Actinomycin, doxycycline, as well as vancomycin all were identified further through investigation also to be produced from *Streptomyces*. Bacitracin, polymyxin, viomycin, cephalosporins, and oxytetracycline are other antibacterial. The most significant percentage of recently developed antimicrobials ever since the 1970s have also been synthesized modifications in antibacterial agents, which happen naturally [3].

### Infectious Diseases

Pathogenic organisms induce viral infections, including bacteria, viruses, parasites, and even fungi. Certain dangerous conditions can be transmitted from one person to another through insects or even other rodents, swallowing defective drinks or food, or being exposed to environmental microorganisms [4].

### The Following are General Warning Symptoms and Signs of Bacterial Infections

1. Wheezing, Weakness, Muscle Pain, Fever, Diarrhoea Causes
2. Bacteria, Viruses, Fungi, Parasites, Direct contact, Insect bites, Food contamination [5-7].

### Risk Factors

1. Even corticosteroids or other immune-suppressing treatments, such as anti-rejection medications, for a heart transplant.
2. If having HIV or AIDS.
3. If having certain types of cancer or other disorders that affect the immune system.

### Complications

A transiently increased cancer risk has now been attributed to many infectious agents. Most majority of contagious illnesses have only moderate adverse effects. Furthermore, certain infections, including such meningitis, AIDS, as well as pneumonia, could be severe [8].

1. Cervical cancer, as well as the human papillomavirus (HPV) have been associated).
2. Peptic ulcers but also stomach cancer also are correlated to *H. pylori*.
3. Hepatitis B and C have been linked to liver cancer.

### Prevention

#### Diagnosis

A physician may order laboratory tests and image scans to help detect what's triggering a patient's condition.

#### Laboratory Tests

Symptoms typically, but also indicators were found in so many contagious diseases. Bodily fluids specimens might infrequently contain small amounts of a specific microbe that's also producing an illness. Which allows a physician to personalize treatment [9-11].

Blood tests, Urine tests, Throat swabs, Stool samples, Spinal tap (lumbar puncture).

#### Imaging Scans

Magnetic resonance, computerized tomography, or other imaging technology may help narrow down diagnoses and rule out other conditions that may be causing difficulties.

#### Biopsies

A biopsy includes a tiny tissue sample for examination from such an internal organ. For instance, a lung tissue biopsy may be used to look for various fungi that can develop in a specific kind of pneumonia.

#### Pharmacological Treatment

It is simpler for a doctor to select the right treatment course when they know the sort of germ causing the ailment [12, 13].

#### Antibiotics

Antibiotics frequently treat bacteria, while infections can sometimes be healed with all these types of medication. Several bacteria have developed resistance between one or more kinds of antibiotics like an outcome of such antibiotic overuse. For instance, a bacterial, a virus, a fungus, or even a parasitic may be the cause of pneumonia.

#### Antivirals

Drugs have been developed to treat some, but not all, viruses. Examples include the viruses that cause:

1. HIV/AIDS, Herpes, Hepatitis B, Hepatitis C, Influenza.

### Antifungals

Topical antifungal medications can treat skin or nail infections caused by fungi. Some fungal infections, such as those affecting the lungs or the mucous membranes, can be treated with an oral antifungal. More-severe internal organ fungal infections, especially in people with weakened immune systems, may require intravenous antifungal medications.

### Anti-Parasitic

Some diseases, including malaria, are caused by tiny parasites. While these drugs treat diseases, some parasites have resisted their drugs.

### Non-Pharmacological Treatment

1. Drink plenty of fluids and get lots of rest.
2. Eat healthy & fresh foods [14].

### Prescribing Pattern

Information through market analysis, research of general practitioners, and management of prescribing within hospitals are the three primary sources of data concerning the overall prescribing of medications doctors. Those resources illustrate how doctors' defined patterns vary dramatically based on the practice engaged within, positioned, and the neighborhood where they practice.

### Highlights

1. A new probabilistic graphical model to extract patterns from extensive prescription data.
2. Examined the prescription patterns with over six million prescriptions.
3. Patterns show diverse treatment options for the same disease symptoms.
4. Patterns show diverse disease cases sharing the same prescription options.
5. Subject matter experts validated the extracted prescription patterns.

### Aim and Objectives

To evaluate the prescribing pattern of drugs in infectious diseases in inpatients at a South Indian super specialty hospital.

1. To study co-morbidities like GITI, UTI, and RTI among inpatient of infectious patients.
2. To observe the distribution pattern of infectious drug therapy.

## METHODOLOGY

### Materials

1. Patient documentation form
2. Plan on primary consultant
3. Medication chart
4. Discharge summary

### Methods

#### Study Design and Study Period

It is a prospective observational study conducted for six months.

#### Study Site

The study was conducted at the South Indian super specialty hospital, Kurnool.

#### Sample Size

A total of 110 patients were recruited from the department of general medicine in the South Indian super specialty hospital, Kurnool.

#### Study Criteria

##### Inclusive Criteria

All hospital patients with both genders have infectious diseases and co-morbid conditions.

##### Exclusive Criteria

Case records without antibiotics and papers from the outpatient department were excluded [15].

##### Ethical Clearance

The study was conducted after obtaining permission from the institutional ethics committee.

## RESULTS

A total of 110 patients were recruited under inclusion criteria upon receiving ICF (informed consent form) from each patient.

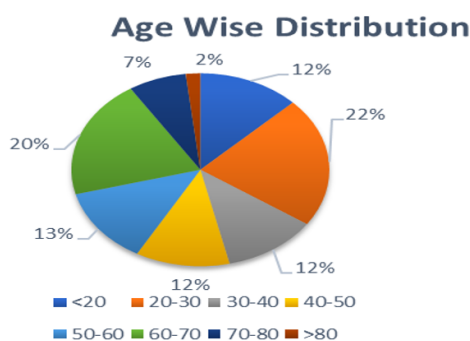


Figure 1: Age-Wise Distribution

**Table 1: Age-Wise Distribution**

Age	No of Patients	Percentage %
<20	14	12%
20-30	24	24%
30-40	13	13%
40-50	13	13%
50-60	14	14%
60-70	22	13%
70-80	8	8%
>80	2	2%

**Table 2: Gender-Wise Distribution**

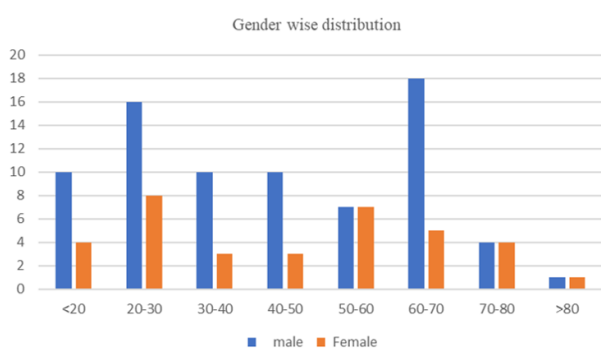
Age	Male	Female
<20	10	4
20-30	16	8
30-40	10	3
40-50	10	3
50-60	7	7
60-70	18	5
70-80	4	4
>80	1	1

**Table 3: Types of Diseases**

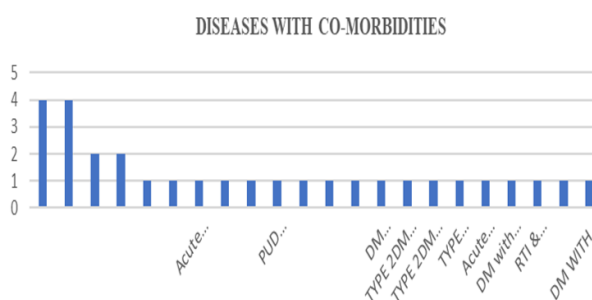
Type of Diseases	No of Patients
Dengue fever	15
VHF	9
Cellulitis	5
Malaria	4
Meningo encephalitis	4
Acute gastritis	3
Appendicitis	3
Typhoid fever	3
Acute pancreatitis	2
Hepatitis	2
Bronchiolitis	2
PUD	2
Ischemic stroke	2
Acute bronchial asthma	2
Microcytic hypochromic anemia	2
Pneumonitis	1
Ascites	1
Cirrhosis of liver	1
Carron poisoning	1
Amoebic dysentery	2
Abdominal T.B.	1
Hernia	1

**Table 4: Diseases with Co-Morbidities**

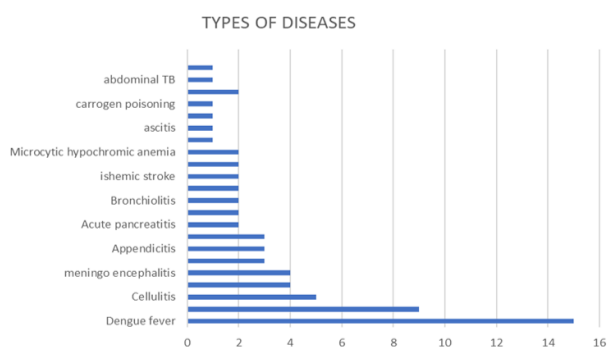
Co-Morbidities	No. of Patients
Type 2DM with HTN	4
VHF with thrombocytopenia	4
acute gastritis with UTI	2
Dengue fever with PUD	2
seizure and hypo tension	1
PUD, Hepatitis UTI	1
Acute Gastritis & AKI	1
Parkinsonism & CVA	1
Pneumonitis with COPD	1
PUD & UTI	1
Cystitis & UTI	1
Pharyngo tonsilitis & GERD	1
Acute sinusitis	1
D.M. with UTI	1
TYPE 2DM with Diabetic foot	1
TYPE 2DM with Enteric fever	1
TYPE 2DM, HTN, Hypothyroidism	1
Acute Gastritis, AKI, TYPE2 DM	1
D.M. with HTN, Ischemic cardiomyopathy	1
RTI & Rheumatoid fever	1
CKD, HTN, Acute pedal edema	1
DM with Diabetic ketoacidosis	1



**Figure 2: Gender-Wise Distribution**



**Figure 4: Diseases with Co-Morbidities**



**Figure 3: Types of Diseases**

**Age-Wise Distribution**

In the study maximum number of patients was found to be below 30 years of age – 38 patients (36%), followed by 50-60 years of age -14 patients (14%), 60-70 years of age-22 patients (13%), 40-50 years of age – 13 patients (13%), 30-40 years of age – 13 patients (13%), 70-80 years of age – 10 patients (10%) [Table 1 and Figure 1].

**Gender-Wise Distribution**

In this study, the maximum number of patients was found to be males as compared to 60-70 years of age 18 male patients & 5 female patients, 20-30 years

**Table 5: Commonly Prescribed Drugs**

Medication	Number of Drugs
Antibiotics	32
Antacids	9
Analgesics & Anti Pyretics	9
Vitamin Supplements	8
Anti-Hypertensives	6
Nutritional Supplements	4
Hypoglycemic	4
Diuretics	4
Hepatoprotective Agents	4
Anti-Allergic	4
Anti-Parasitic	4
Anti-Epileptics	3
Anti-Diarrhoea	3
Anti-Cholinergic	3
Anti-Depressants	3
Anti-Histamines	3
Enzymes	3
Osmotic Agents	3
Mucolytics	3
Anti-Emetics	2
Steroids	2
Anti-Spasmodic	2
Anti-Psychotic	2
Antivirals	2
Ppi & Anti Diarrheal Agents	2
Analgesics & Anti Diarrheal Agents	1
Analgesics & Protective Enzymes	1
Nootropic Agents	1
Nerve Protective Agents	1
Alkalyzers	1
Anti-Hyperlipidemic	1
Anti-Anemic Agents	1
Bronchodilators	1
Leukotriene Blocker	1
Anti-Coagulant	1
Anti-Platelet	1

of age 16 male patients & 8 female patients, 60-70 years of age 18 male patients & 5 female patients, 40-50 years of age ten male patients & 3 female patients, below 20 years of age ten male patients & 4 female patients [Table 2 and Figure 2].

#### Disease-Wise Categorization

Of the total 110 patients 13 patients (13%) were affected with dengue fever, 9 patients (9%) were involved with viral hemorrhagic fever, 5 patients (5%) were concerned with cellulitis, 3 patients (3%)

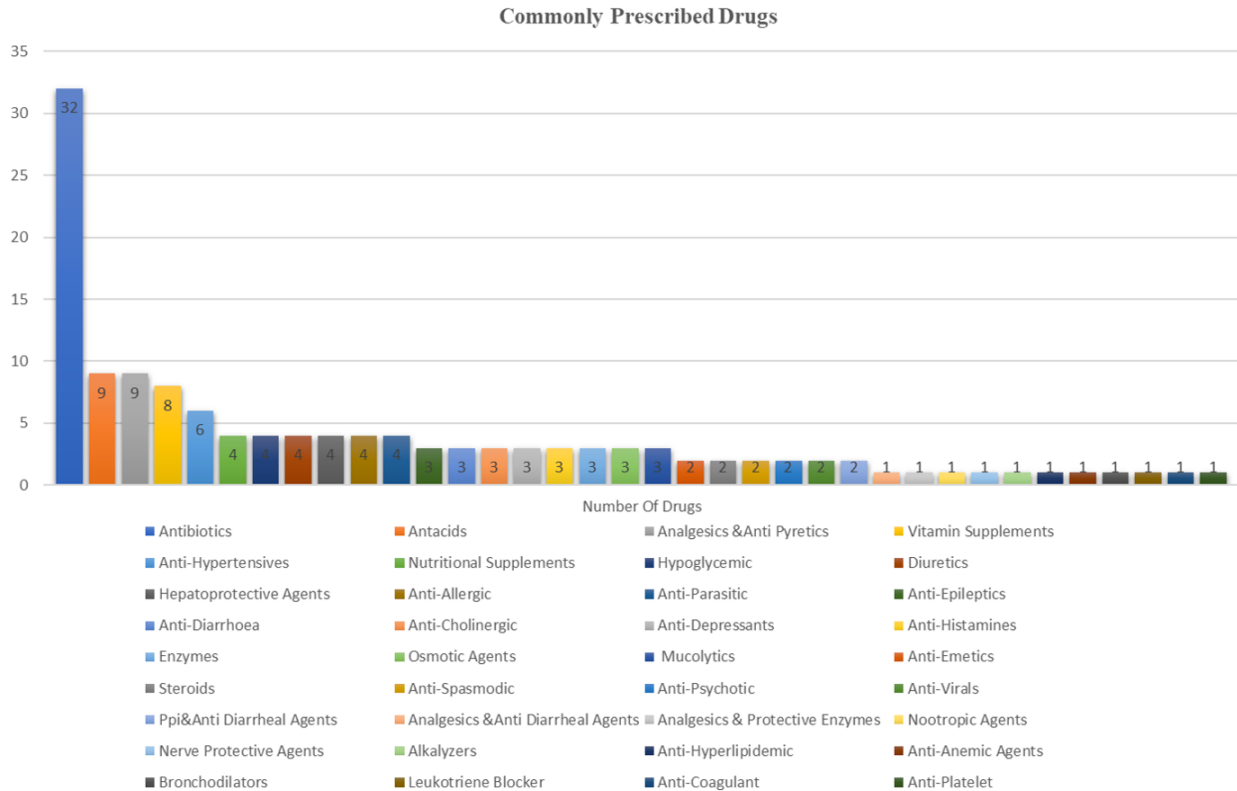
were affected with appendicitis, 4 patients (4%) were involved with malaria, 3 patients (3%) were concerned with gastritis, 4 patients (4 %) were affected with Meningo Encephalitis, 3 patients (3%) were involved with typhoid fever, 2 patients (2 %) were concerned with Hepatitis, , 2 patients (2 %) were affected with pancreatitis, 2 patients (2 %) were involved with bronchiolitis, , 2 patients (2 %) were concerned with PUD, 2 patients (2 %) were affected with ischemic stroke, 2 patients (2 %) were involved with bronchial asthma, 2 patients (2 %)

**Table 6: List of Commonly Prescribed Antibiotics**

Antibiotics	Male	Female	Total
Linezolid	10	1	11
Metronidazole	13	5	18
Piperacillin & Tazobactam	3	0	3
Colistin & Imipenem	1	1	2
Ceftriaxone	25	14	39
Clarithromycin	1	0	1
Rifampicin	2	0	2
Ciprofloxacin	-	1	1
Azithromycin	2	1	3
Amoxicillin & Clavulanic Acid	2	1	3
Cefoperazone & Sulbactam	7	0	7
Cefotaxime	4	4	8
Doxycyclin	8	0	8
Amikacin	2	0	2
Cefixime	1	0	1
Clindamycin	1	0	1
Cefpodoxime	1	0	1
Fluroquinolone & Levofloxacin	1	1	2
Meropenem	2	0	2
Ofloxacin	1	0	1
Cefpodoxime Proxetil	1	0	1
Gentamycin	1	0	1
Doripenem	2	1	3
Total	91	27	118

**Table 7: Prescribed Antibiotics**

Drugs	No. of Patients
<b>Cephalosporin 3rd Generation</b>	
Ceftriaxone	25
Cefotaxime	3
Cefpodoxime & proxetil	1
Cefpodoxime	1
Penicillin & cephalosporin	
Cefoperazone & sulbactam	1
<b>Tetracycline</b>	
Doxycyclin	5
<b>Nitro furan Derivatives</b>	
Metronidazole	8
<b>Oxazolidinone Derivatives</b>	
Linezolid	1



**Figure 5: Commonly Prescribed Drugs**

were concerned with microcytic hypochromic anemia, 1 patient (1 %) was affected with pneumonitis, 1 patient (1 %) was involved with hernia, 1 patient (1 %) was concerned with cervical spondylitis, 1 patient (1 %) was affected with amoebic dysentery [Table 3 and Figure 3].

**Diseases with Co-Morbidities**

We observed various co-morbidities in this study, among which VHF with thrombocytopenia is seen in 4 patients, followed by 4patients affected with type 2DM with HTN, two patients were affected with fever with gastritis, two patients affected with dengue fever with PUD, one patient was affected with seizures with hypotension, one patient was concerned with acute gastritis with AKI and other rarely affected diseases [Table 4 and Figure 4].

**Commonly Prescribed Drugs**

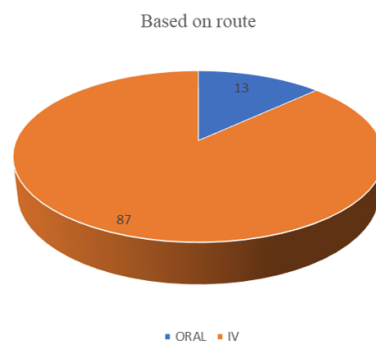
In this present study majority of the prescribed drugs were (32%) antibiotics followed by (9%) antacids, (9%) analgesics, (8%) vitamin supplements, (8%) anti-hypertensives, (4%) nutritional supplements, (4%) hypoglycemic drugs, (4%) diuretics, (4%) hepatoprotective agents, (4%) antiallergics, (4%) anti-parasitic, (3%) anti-epileptics, (3%) anti-diarrheal, (3%) anti-depressants, (2%) anti-emetics, (2%) steroids [Table 5 and Figure 5].

**List of Commonly Prescribed Antibiotics**

In our study, ceftriaxone (39%) was most commonly prescribed, followed by metronidazole, linezolid, cefotaxime, doxycycline, cefoperazone, and sulbactam, azithromycin, amikacin, rifampicin, rarely prescribed clarithromycin, cefixime, clindamycin, cefpodoxime, ofloxacin, meropenem [Table 6].

**Based on Route**

87% of prescribed antibiotics are prescribed intravenously because inpatients were selected as inclusion criteria of our study. Very fewer antibiotics were prescribed orally (13%) in this inpatient [Table 7 and Figure 6].



**Figure 6: Based on Route**



## DISCUSSION

Societies all over the universe continue to suffer significant negative consequences from bacterial infections. In 2014, in eastern U.S. seemed to have the greatest rates of infectious illness mortality, while regions inside the Southeastern having experienced the greatest rates of death per 100,000. Consequently, throughout order to reduce such effect, this is essential to focus on infectious preventative care via public health policies as according to research. Through order to boost health conditions as well as increase vaccination rates of illnesses such Hepatitis as well as meningitis that may be avoided through vaccinations, there is also need to improve access as well as the standard of healthcare throughout U. S. A prospective cohort research within primary care which lasting six months department of South Indian super specialty hospital, Kurnool. A total of 110 patients were included in the study. In the present study 66. 66% of patients were male, and females were 33.33%. Males were more prone to infectious diseases than females; this may be due to social habits. These results correlate with the study conducted by jangrasarita et al. In the present study, most antibiotics prescribed through parental than oral may be due to patient compliance. These findings correlate with the survey conducted by cube et al. In the present study, most patients were prescribed third-generation cephalosporins, followed by macrolides, quinolones, and others.

## CONCLUSION

According to our study, more antibiotics were prescribed. Cephalosporins are the most prescribed, followed by fluoroquinolones,  $\beta$ -lactamase, tetracyclines, and others. In our research, most antibiotics were prescribed through parents because of the inclusion of the inpatients. Clinical pharmacists and health care professionals should actively implement the rational use of antibiotics by making the patients aware of antibiotic resistance, hypersensitivity reaction, and their advanced consequences to humanity May save the entire world from the attack of various infectious diseases.

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## Conflict of Interest

The authors declare no conflict of interest in this study.

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