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Research Article

# Study on Drug Utilization and Prescribing Patterns of Antibiotics in the Pulmonology Department of a Tertiary Care Hospital

Ranjitha Balan [1]*, Josni Jose [2], Asna [3], Dr. T. Tamil Selvan T [4], Dr. M. Shameer Babu [5]

[1] Master of Pharmacy, Department of Pharmacy Practice, Nehru College of Pharmacy, Pampady, Tiruvillamala, Thrissur, Kerala, India.

[2] Master of Pharmacy, Department of Pharmacy Practice, Nehru College of Pharmacy, Pampady, Tiruvillamala, Thrissur, Kerala, India.

[3]Master of Pharmacy, Department of Pharmacy Practice, Nehru College of Pharmacy, Pampady, Tiruvillamala, Thrissur, Kerala, India.

[4]Professor and Head, Department of Pharmacy Practice, Nehru College of Pharmacy, Pampady, Tiruvillamala, Thrissur, Kerala, India.

[5] Consultant Pulmonologist, PK Das Institute of Medical Sciences, Vaniamkulam, Palakkad, Kerala, India.

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*For Correspondence:

Mrs. Ranjitha Balan, Department of Pharmacy Practice, Nehru College of Pharmacy, Pampady, Tiruvillamala, Thrissur, Kerala, India.

## Abstract

**Background:** The study aimed to evaluate drug utilization and prescribing patterns of antibiotics in the Pulmonology Department of a tertiary care hospital, with emphasis on rationality, adherence to standard treatment guidelines (STGs), and compliance with the National List of Essential Medicines(NLEM).

**Methods:** A prospective cross-sectional study was conducted in the Pulmonology Department of PK Das Institute of Medical Sciences, Palakkad, including 300 prescriptions from patients diagnosed with respiratory tract infections (RTIs). Data were analyzed using descriptive statistics, WHO core prescribing indicators, and adherence to STGs.

**Results:** The mean age of the study population was 37.87 ± 22.05 years, with males comprising 53.3%. Cephalosporins (47%) were the most prescribed antibiotics, followed by penicillins (32.7%), macrolides (30.7%), and fluoroquinolones (26.3%). Generic prescribing was minimal (2.2%), while NLEM compliance was high (99.6%). Overall, 9.3% of prescriptions were irrational due to duplication or unnecessary broad-spectrum use.

**Conclusion:** Although adherence to guidelines was satisfactory, empirical therapy and low generic prescribing remain major issues. Continuous audit and stewardship interventions are vital to promote rational antibiotic use.

**Keywords:** Antibiotic prescribing, drug utilization, respiratory infections, pulmonology, antimicrobial resistance, stewardship.

## INTRODUCTION

Respiratory tract infections (RTIs) remain one of the leading causes of morbidity and mortality globally and account for a substantial proportion of antibiotic prescriptions across healthcare settings [1]. RTIs encompass a wide spectrum of diseases ranging from upper respiratory tract infections (URTIs) like pharyngitis and sinusitis to lower respiratory tract infections (LRTIs) such as pneumonia, bronchitis, and COPD exacerbations [2]. Although many RTIs are viral in origin, antibiotics are frequently prescribed, leading to widespread irrational use and contributing significantly to antimicrobial resistance (AMR)[3].

The World Health Organization (WHO) has highlighted AMR as one of the top ten global public health threats [4]. Misuse of antibiotics, particularly broad-spectrum agents such as cephalosporins and fluoroquinolones, accelerates the development of resistant pathogens. Inappropriate prescribing practices, including empirical therapy, polypharmacy, and lack of adherence to standard treatment guidelines (STGs), remain major contributors to this problem [5].

In India, irrational antibiotic prescribing is particularly prevalent in tertiary care settings, where physicians often manage complex respiratory conditions with overlapping bacterial and viral etiologies [6]. Pulmonology departments frequently treat patients with chronic diseases and multiple comorbidities, where empirical antibiotic use is common. Thus, evaluating prescribing trends and rationality in pulmonology settings is essential to ensure appropriate antibiotic use and to strengthen antimicrobial stewardship initiatives [7].

## MATERIALS AND METHODS

This prospective cross-sectional study was conducted in the Department of Pulmonology, after obtaining ethical approval (IEC/19/122/25). A total of 300 prescriptions of patients diagnosed with respiratory tract infections

(RTIs) were collected and analyzed. Patients of all age groups and both genders diagnosed with RTIs were included, while pregnant and lactating women and those with incomplete medical records were excluded.

Patient demographics, diagnosis, antibiotic class, route, dosage, duration, and adherence to standard treatment guidelines were recorded using a structured data form. Rationality of prescriptions was evaluated using WHO core drug use indicators and STGs. Data were analyzed using SPSS version 26, applying descriptive statistics and chi-square tests to identify associations between prescribing patterns and clinical factors.

## RESULTS

The results are presented in the following tables according to the objectives of the study.

This table represents the frequency and percentage of different antibiotic classes prescribed in the Pulmonology Department. It indicates that cephalosporins were the most commonly prescribed antibiotics, followed by penicillins, macrolides, and fluoroquinolones, showing a preference for broad-spectrum agents.

**Table 1: Drug Utilization and Prescribing Pattern of Antibiotics**

| Antibiotic Class | No. of Prescriptions (%) |
|---|---|
| Cephalosporins | 47 |
| Penicillins | 32.7 |
| Macrolides | 30.7 |
| Fluoroquinolones | 26.3 |

This table summarizes the adherence of antibiotic prescriptions to Standard Treatment Guidelines (STGs) and the National List of Essential Medicines (NLEM). The results indicate high adherence to guidelines and NLEM, though generic prescribing remains very low.

Table 2: Adherence to Standard Treatment Guidelines (STGs)

| Parameter | Value (%) |
|---|---|
| Prescriptions adhering to STGs | 96.3 |
| Generic prescribing | 2.2 |
| NLEM compliance | 99.6 |
| Irrational prescriptions | 9.3 |

This table highlights various factors influencing the prescribing behavior of physicians. The findings show that empirical therapy and preference for broad-spectrum antibiotics were major factors influencing prescribing patterns, along with patient expectations and comorbidities.

Table 3: Factors Influencing Prescribing Behavior

| Factor | Observation |
|---|---|
| Empirical therapy | Common in 45% of cases |
| Broad-spectrum preference | High use of 3rd generation cephalosporins |
| Comorbidities | Observed in 42% cases |
| Patient expectation | Influenced 30% of prescriptions |

This table illustrates the common patterns of irrational antibiotic use. It shows that unnecessary broad-spectrum use and duplication of therapy were the most frequent issues contributing to inappropriate antibiotic prescribing.

Table 4: Patterns of Irrational Antibiotic Use

| Pattern | Frequency (%) |
|---|---|
| Duplication of therapy | 3.6 |
| Unnecessary broad-spectrum use | 5.7 |
| Polypharmacy (>2 antibiotics) | 4.0 |

## DISCUSSION

The study revealed that cephalosporins and penicillins were the most commonly prescribed antibiotic classes in the pulmonology department, consistent with previous Indian studies [8,9]. Although adherence to STGs and NLEM was high, low generic prescribing and frequent empirical therapy persisted. These results suggest that prescribers prefer broad-spectrum and brand-based antibiotics to ensure rapid symptom control, possibly due to diagnostic uncertainty and patient pressure.

Similar patterns have been reported globally, where diagnostic limitations and patient expectations influence empirical prescribing [10–12]. Implementing antimicrobial stewardship programs, improving microbiological diagnostic facilities, and conducting regular prescription audits could promote rational antibiotic use. Training prescribers and encouraging evidence-based practices can significantly reduce irrational prescribing and combat antimicrobial resistance [13–15].

## CONCLUSION

The present study concludes that antibiotic prescribing practices in the pulmonology department were largely guideline-compliant, though instances of irrational and empirical prescribing remain. Despite satisfactory adherence to NLEM and STGs, overuse of broad-spectrum antibiotics and low generic prescribing rates highlight the need for stricter prescribing control and awareness among clinicians.

To improve rational antibiotic use, continuous prescriber education, establishment of antimicrobial stewardship programs, and regular monitoring are crucial. Ensuring adherence to WHO core prescribing indicators and promoting culture-based antibiotic selection will help

reduce antimicrobial resistance and enhance patient safety in tertiary care settings.

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