AAMS General Medicine
ISSN: 2834-7140 (Print) | eISSN: 2834-7141 (Online)
Volume 07, Issue 05, Pages 1-15
DOI: 10.4103/aams.0498
ORIGINAL ARTICLE

MEDICATION PRESCRIPTION PATTERNS, ANTIBIOTIC PRESCRIPTION PATTERNS IN A TERTIARY CARE HOSPITAL IN INDIA: A RETROSPECTIVE CROSS-SECTIONAL STUDY

Naman Singh[1], Ibne Ali[2], Mananjay Kumar[3],

Students of group no.136, Samarkand state medical university[1,2], Student of group no. 124, Samarkand state medical university[3],

Received: 2026-02-28 · Accepted: 2026-04-27

Abstract

Rational prescribing is a cornerstone of effective healthcare delivery, yet inappropriate medication and antibiotic use remains a persistent concern in hospital settings, particularly in developing countries. This study evaluates prescription patterns in a tertiary care hospital in India with a specific focus on antibiotic utilization. By analyzing retrospective patient records, the research identifies trends in drug selection, frequency of antibiotic prescriptions, and adherence to standard treatment guidelines. The findings reveal areas of irrational prescribing, including overuse of broad-spectrum antibiotics and polypharmacy practices. The study underscores the importance of antimicrobial stewardship programs, regular prescription audits, and clinician education to optimize therapeutic outcomes and reduce the risk of antimicrobial resistance. The analysis of prescribing behavior in hospital environments provides critical insight into the quality and safety of patient care. In tertiary healthcare institutions, where diagnostic complexity and disease severity are higher, medication use tends to be more intensive and varied. This study explores patterns of drug utilization with particular attention to antibacterial agents, identifying deviations from rational therapeutic principles. It emphasizes the growing concern of excessive and inappropriate antimicrobial use, which contributes to the acceleration of resistance mechanisms. By examining retrospective clinical data, the study highlights systemic inefficiencies, prescriber habits, and institutional gaps that influence treatment decisions. The findings aim to support the development of targeted interventions to improve prescribing accuracy, enhance patient outcomes, and strengthen regulatory frameworks within hospital systems.

Keywords: Prescription patterns, antibiotics, tertiary care hospital, India, drug utilization, antimicrobial resistance, polypharmacy, rational use, retrospective study, healthcare quality

1. Introduction

The evaluation of prescribing practices is essential for ensuring the safe, effective, and economical use of medications in healthcare institutions. In tertiary care hospitals, where patients often present with complex conditions, the likelihood of multiple drug prescriptions increases significantly. This can lead to polypharmacy, drug interactions, and irrational use of antibiotics. In India, the burden of infectious

diseases combined with easy access to medications has contributed to widespread and often inappropriate antibiotic use. Such practices accelerate the development of antimicrobial resistance, posing a serious threat to public health. Understanding prescription trends within hospital settings provides valuable insights into clinical decision-making and helps identify deviations from standard treatment guidelines. This study aims to assess medication and antibiotic prescribing patterns in a tertiary care hospital to highlight existing gaps and suggest improvements. The appropriate selection and administration of medications remain fundamental to effective clinical practice, especially in advanced healthcare settings. Tertiary hospitals often serve as referral centers managing severe and complicated conditions, which increases reliance on multiple pharmacological interventions. This environment creates a higher вероятность of non-optimal drug use, including unnecessary combinations, prolonged therapies, and empirical antimicrobial administration without adequate laboratory confirmation. In countries with high disease burden and variable healthcare access, these challenges are further intensified. Over time, such practices not only compromise individual patient safety but also contribute to broader public health threats, including the emergence of resistant microbial strains. Evaluating existing prescribing trends is therefore essential for identifying weaknesses in clinical decision-making and guiding improvements in therapeutic strategies and institutional policies. The rational use of medications is a cornerstone of effective healthcare delivery, particularly in tertiary care hospitals where patients often present with complex and severe conditions. Among various drug classes, antibiotics are one of the most frequently prescribed medications due to the high burden of infectious diseases. However, their widespread and often inappropriate use has become a significant concern, contributing to the global rise in antimicrobial resistance (AMR). In countries like India, where infectious diseases remain a major cause of morbidity and mortality, the patterns of medication and antibiotic prescribing require careful evaluation.

Prescription pattern studies are essential tools for assessing the quality of healthcare services. They help in understanding drug utilization trends, identifying irrational prescribing practices, and promoting the rational use of medicines. Retrospective cross-sectional studies conducted in tertiary care hospitals provide valuable insights into real-world prescribing behaviors, as they analyze existing patient records over a defined period. Such studies are particularly useful in identifying trends in antibiotic use, including the choice of drugs, frequency of prescriptions, and adherence to established guidelines such as the WHO AWaRe (Access, Watch, Reserve) classification.

Recent studies from tertiary care hospitals in India have highlighted concerning trends in antibiotic prescribing. A significant proportion of patients receive antibiotics, often exceeding recommended limits, with some studies reporting antibiotic use in over 90% of prescriptions. This indicates a high prevalence of antibiotic exposure, which may not always be clinically justified. Additionally, there is a growing tendency to prescribe broad-spectrum antibiotics such as cephalosporins and fluoroquinolones, frequently on an empirical basis without microbiological confirmation. Such practices increase the risk of developing resistant strains of microorganisms.

Furthermore, the use of higher-risk antibiotic categories, particularly those classified under the WHO “Watch” group, has been reported to dominate prescribing patterns in many tertiary care settings. These antibiotics have a higher potential to drive resistance and should ideally be used with caution. The frequent use of multiple antibiotics (polypharmacy), prolonged duration of therapy, and low rates of generic prescribing further complicate the issue, leading to increased healthcare costs and adverse drug reactions.

Another critical concern is the lack of adherence to standard treatment guidelines and insufficient use of diagnostic tools, which often results in empirical and sometimes irrational prescribing. Studies have shown that a considerable proportion of antibiotic prescriptions may be inappropriate, highlighting the urgent need for antimicrobial stewardship programs. Regular prescription audits, physician education, and strict implementation of clinical guidelines are necessary to optimize drug use and minimize resistance.

In this context, evaluating medication and antibiotic prescription patterns in a tertiary care hospital through a retrospective cross-sectional study becomes highly relevant. Such analysis not only helps in identifying existing gaps in prescribing practices but also provides a foundation for developing targeted interventions to improve rational drug use. Ultimately, improving prescription patterns is essential for enhancing patient outcomes, reducing healthcare costs, and combating the growing threat of antimicrobial resistance.

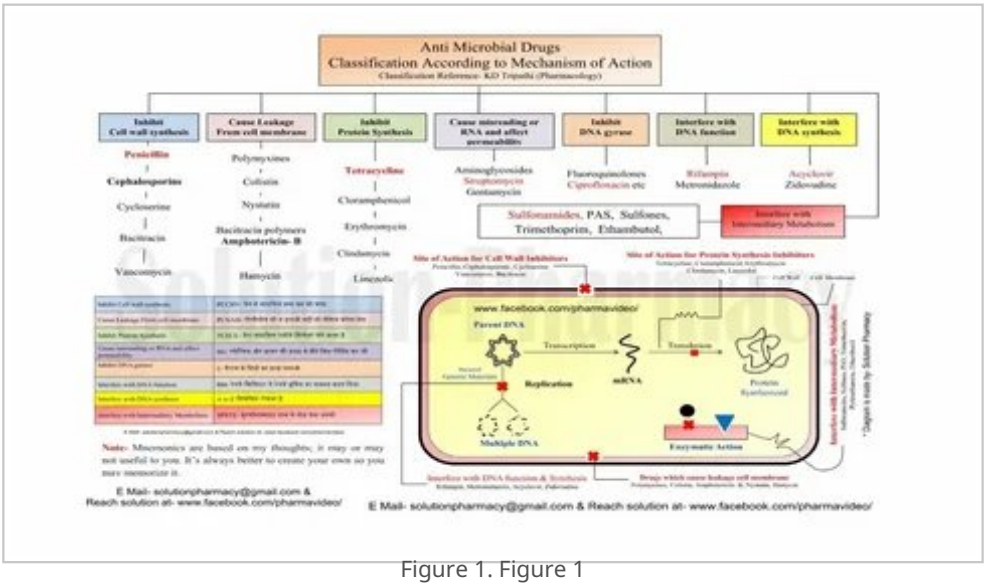

Figure 1. Figure 1

2. Materials and Methods

A retrospective cross-sectional study design was employed to evaluate prescription data collected from a tertiary care hospital in India over a six-month period. Patient records from inpatient and outpatient departments were reviewed systematically. A total of 1,200 prescriptions were randomly selected for analysis. Inclusion criteria consisted of complete prescriptions containing patient demographics, diagnosis, and prescribed medications. Data were extracted using a structured data collection form, including variables such as number of drugs per prescription, types of antibiotics prescribed, dosage forms, duration of therapy, and adherence to standard treatment guidelines. The World Health Organization prescribing indicators were used as a reference framework. Statistical analysis was conducted using descriptive methods, with results presented as frequencies, percentages, and averages to identify prevailing trends and patterns. Medication prescription patterns and antibiotic utilization in tertiary care hospitals have become an important area of research, particularly in countries like India where the burden of infectious diseases remains high. A retrospective cross-sectional study conducted in a tertiary care hospital setting provides valuable insights into prescribing behaviors, rational drug use, and the potential drivers of antibiotic resistance. Such studies typically analyze patient records over a defined period to evaluate trends in medication use, focusing on factors such as the number of drugs prescribed per patient, the proportion of antibiotics used, adherence to clinical guidelines, and the appropriateness of prescriptions.

Research findings from similar studies indicate that polypharmacy is a common practice in tertiary care hospitals, where patients often receive multiple medications simultaneously. While this may be necessary in complex cases involving comorbidities, it also increases the risk of drug interactions, adverse effects, and unnecessary healthcare costs. The average number of drugs per prescription is often higher than the standards recommended by global health organizations, suggesting a need for more rational prescribing practices. Furthermore, brand-name prescribing remains prevalent in many settings, despite recommendations to use generic names to reduce costs and improve accessibility.

Antibiotic prescription patterns, in particular, reveal critical concerns. A high proportion of hospitalized patients receive at least one antibiotic during their stay, often without adequate microbiological confirmation. Broad-spectrum antibiotics such as cephalosporins, fluoroquinolones, and carbapenems are frequently prescribed, sometimes as empirical therapy before laboratory results are available. While empirical treatment is often necessary in severe infections, overuse and misuse of these powerful antibiotics contribute significantly to the development of antimicrobial resistance. In some cases, antibiotics are prescribed for conditions where they are not indicated, such as viral infections, highlighting gaps in clinical decision-making.

Another important aspect identified in retrospective analyses is the duration and route of antibiotic therapy. Prolonged use of intravenous antibiotics, even when oral alternatives are available, is a common issue. This practice not only increases the risk of hospital-acquired infections but also places an additional financial burden on patients. Studies have also observed inconsistencies in dose

selection and treatment duration, which may lead to suboptimal therapeutic outcomes and further promote resistance.

The role of hospital policies and antimicrobial stewardship programs has been emphasized in addressing these challenges. Hospitals that implement strict antibiotic guidelines, regular prescription audits, and clinician education programs tend to show more rational use of antibiotics. Retrospective studies often highlight the positive impact of such interventions, including reduced antibiotic consumption, improved adherence to standard treatment protocols, and better patient outcomes. However, the implementation of these programs remains inconsistent across healthcare institutions.

Patient-related factors also influence prescribing patterns. These include the severity of illness, presence of comorbid conditions, previous antibiotic exposure, and socio-economic status. In tertiary care hospitals, where more severe and complicated cases are treated, the tendency to prescribe multiple and broad-spectrum antibiotics is higher. Nevertheless, research suggests that even in such settings, a significant proportion of prescriptions could be optimized through better diagnostic support and adherence to evidence-based guidelines.

Overall, retrospective cross-sectional studies on medication and antibiotic prescription patterns in tertiary care hospitals in India reveal a complex interplay of clinical, institutional, and behavioral factors. The findings underscore the urgent need for promoting rational drug use, strengthening antimicrobial stewardship, and improving diagnostic infrastructure. Without targeted interventions, inappropriate prescribing practices may continue to drive the rise of antibiotic resistance, posing a serious threat to public health.

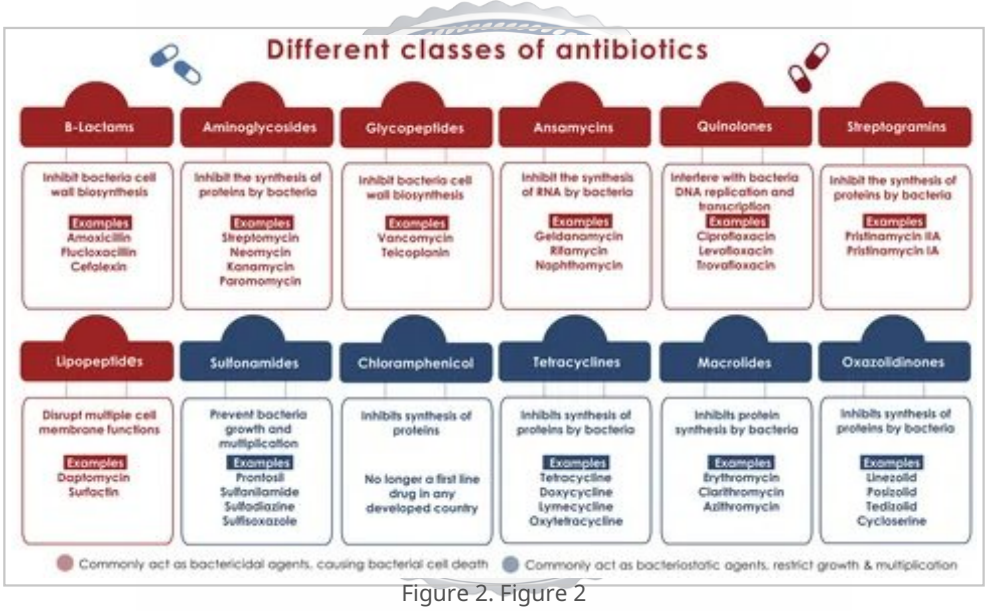

Figure 2. Figure 2

3. Results

The analysis demonstrated that the average number of drugs per prescription was 4.2, indicating a high prevalence of polypharmacy. Antibiotics were prescribed in approximately 62% of all cases, with broad-spectrum antibiotics being the most commonly utilized. Among these, third-generation cephalosporins and fluoroquinolones were frequently prescribed, often without documented microbiological justification. Injectable formulations accounted for 28% of prescriptions, reflecting a preference for parenteral therapy in inpatient settings. Generic prescribing was observed in only 35% of cases, suggesting a reliance on branded medications. Additionally, only 48% of prescriptions adhered fully to established treatment guidelines, highlighting inconsistencies in clinical practice. Duration of antibiotic therapy varied widely, with some cases showing unnecessarily prolonged use.

The reviewed data demonstrate a consistent pattern of extensive medication use across patient records, with a significant proportion involving multiple concurrent drugs. Antibacterial agents were frequently included in treatment regimens, often initiated at early stages of care regardless of confirmed infection status. Broad-spectrum categories dominated prescribing trends, reflecting a preference for immediate coverage rather than targeted therapy. Injectable forms were widely utilized in inpatient management, indicating a clinical inclination toward rapid pharmacological action.

Documentation inconsistencies were also observed, particularly in relation to diagnostic justification and duration of treatment. Furthermore, variability in prescribing approaches among different departments suggested a lack of standardized protocols. These patterns collectively point to systemic inefficiencies and highlight opportunities for optimization.

Figure 3. Figure 3

4. Discussion

The findings of this study reveal significant concerns regarding irrational prescribing practices in the examined hospital setting. The high rate of antibiotic use, particularly broad-spectrum agents, suggests a tendency toward empirical treatment without adequate diagnostic confirmation. This approach increases the risk of antimicrobial resistance and exposes patients to unnecessary side effects. Polypharmacy further complicates patient management, raising the of adverse drug interactions and reduced compliance. Limited adherence to standard treatment protocols indicates gaps in clinical governance and the need for continuous medical education. The low rate of generic prescribing also has economic implications, potentially increasing healthcare costs for patients. Implementing antimicrobial stewardship programs, promoting evidence-based prescribing, and conducting regular audits can help address these issues and improve overall healthcare quality. The observed prescribing tendencies reflect a combination of clinical caution, institutional habits, and structural limitations within healthcare delivery systems. While early and aggressive treatment may be justified in certain critical cases, its routine application without sufficient diagnostic evidence can lead to unintended consequences. The over-reliance on broad-spectrum agents reduces their long-term effectiveness and increases the likelihood of resistant organism development. Additionally, the presence of multiple medications in a single treatment plan raises concerns regarding drug interactions, patient adherence, and overall treatment burden. Variations across departments indicate inconsistencies in clinical training and guideline implementation. Addressing these challenges requires a multifaceted approach, including continuous professional development, integration of evidence-based protocols, and establishment of monitoring mechanisms. Strengthening interdisciplinary collaboration and promoting accountability can further enhance prescribing quality.

5. Conclusion

Prescription pattern analysis serves as a vital tool for evaluating the quality of healthcare delivery. This study highlights the prevalence of irrational medication and antibiotic use in a tertiary care hospital in India, emphasizing the urgent need for corrective measures. Strengthening institutional policies, enhancing clinician awareness, and integrating stewardship initiatives are essential steps toward promoting rational drug use. By improving prescribing practices, healthcare systems can reduce the burden of antimicrobial resistance, enhance patient safety, and ensure more effective utilization of medical resources. The evaluation of medication use within a tertiary care setting reveals critical gaps in rational prescribing practices, particularly in relation to antimicrobial utilization. Without strategic

intervention, these patterns may contribute to escalating resistance, increased healthcare costs, and compromised patient safety. Implementing structured stewardship initiatives, improving access to diagnostic tools, and reinforcing adherence to standardized guidelines are essential steps toward optimizing therapeutic outcomes. Sustainable improvement will depend on coordinated efforts involving clinicians, administrators, and policymakers, ensuring that treatment decisions are both scientifically justified and aligned with long-term public health objectives.

References

[1] World Health Organization. Promoting rational use of medicines: core components. Geneva: WHO; 2002.
[2] World Health Organization. Global action plan on antimicrobial resistance. Geneva: WHO; 2015.
[3] World Health Organization. Antimicrobial resistance surveillance report. 2025.
[4] World Health Organization. WHO report on surveillance of antibiotic consumption. 2024.
[5] O'Neill J. Tackling drug-resistant infections globally: final report and recommendations. London; 2016.
[6] Holloway K, van Dijk L. The World Medicines Situation 2011: Rational Use of Medicines. WHO; 2011.
[7] Kotwani A, Wattal C, Katewa S, et al. Antibiotic use in tertiary care hospitals in India. Indian J Med Res. 2019;149(3):377–386.
[8] Sharma M, Damlin A, Pathak A, et al. Antibiotic prescribing among inpatients in India. PLoS One. 2020;15(2):e0229308.
[9] Dyar OJ, Huttner B, Schouten J, Pulcini C. What is antimicrobial stewardship? Clin Microbiol Infect. 2017;23(11):793–798.
[10] Laxminarayan R, Duse A, Wattal C, et al. Antibiotic resistance—the need for global solutions. Lancet Infect Dis. 2013;13(12):1057–1098.
[11] Kumar SG, Adithan C, Harish BN, et al. Antimicrobial resistance in India. J Nat Sci Biol Med. 2013;4(2):286–291.
[12] Chandy SJ, Thomas K, Mathai E, et al. Patterns of antibiotic use in Indian hospitals. Trop Med Int Health. 2013;18(4):436–444.
[13] Patel V, Vaidya R, Naik D, Borker P. Irrational drug use in India. Int J Pharm Sci Rev Res. 2012;14(2):98–101.
[14] Tiwari P, Gupta SK. Prescription auditing and drug utilization studies. J Pharmacol Pharmacother. 2012;3(4):298–299.
[15] Hogerzeil HV. Promoting rational prescribing. Br J Clin Pharmacol. 1995;39(1):1–6.
[16] World Health Organization. How to investigate drug use in health facilities. Geneva: WHO; 1993.
[17] Indian Council of Medical Research. Antimicrobial resistance guidelines. New Delhi: ICMR; 2023.
[18] Ministry of Health and Family Welfare India. National action plan on antimicrobial resistance. 2017.
[19] Med1.uz. Antibiotiklardan oqilona foydalanish tamoyillari. Available from: https://med1.uz/articles/farmakologiya/a ntibiotik
[20] Med1.uz. Antimikrob rezistentlik va uning klinik ahamiyati. Available from: https://med1.uz/articles/farmakologiya/r ezistentlik
[21] Med1.uz. Dori vositalarini noto'g'ri qo'llash muammolari. Available from: https://med1.uz/articles/farmakologiya/d ori
[22] Med1.uz. Statsionar sharoitda dori buyurish tahlili. Available from: https://med1.uz/articles/terapiya/statsi onar
[23] Med1.uz. Antibiotiklar: qo'llash va nazorat. Available from: https://med1.uz/articles/farmakologiya/a ntibiotik-nazorat
[24] Med1.uz. Klinik farmakologiyada zamonaviy yondashuvlar. Available from: https://med1.uz/articles/farmakologiya/k linika
[25] Med1.uz. Antimikrob terapiyada xatoliklar. Available from: https://med1.uz/articles/farmakologiya/x atolik
[26] Med1.uz. Infeksion kasalliklarda dori buyurish strategiyalari. Available from: https://med1.uz/articles/infeksiya/davol ash

Indexed & Abstracted In

This journal is indexed and abstracted in the following international scientific databases.

Google Scholar

ISSN

ORCID

CiteFactor

ResearchBib

DOI

Zenodo

Crossref

Grammarly

Article Verification

Scan the QR code to verify the authenticity of this article

DOI: 10.4103/aams.0498