

Analysis of Drug Utilization Patterns and Prescribing Practices in the Department of Obstetrics and Gynecology at a Tertiary Care Facility in North India: A Cross-Sectional Observational Study

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Abstract

Background: Rational use of medicines (RUM) is crucial for optimal patient care and efficient utilization of healthcare resources. In obstetrics and gynecology, inappropriate prescribing practices can lead to significant health hazards and resources wastage. This study analyses drug utilization patterns and prescribing practices in a tertiary care hospital's obstetrics and gynecology department to evaluate adherence to RUM principles. **Methods:** A prospective, cross-sectional observational study was conducted at the Department of Obstetrics and Gynecology in collaboration with the Department of Pharmacology at Sharda Medical School of Research and associated Sharda Hospital, North India, over six months. The prescriptions were analyzed by the WHO/International Network for Rational Use of Drugs (INRUD) core drug use prescribing indicators and complementary indices. **Results:** The study analyzed 609 prescriptions, comprising 1,595 drugs. The average number of drugs per prescription was 2.62. Generic prescribing was low (22.4%), and antibiotic encounters were high (36.5%), highlighting the need for antimicrobial stewardship. Injectable prescriptions accounted for 9.85% of encounters. Only 42% of drugs were from the National List of Essential Medicines (NLEM). Polypharmacy (>4 drugs) was observed in 11% of prescriptions, and 22.4% of prescriptions included fixed-dose combinations (FDCs). **Conclusion:** The findings emphasize the need for interventions to enhance generic prescribing, rational antimicrobial use, and adherence to essential drug lists. Continuous prescription audits and educational programs are recommended to promote RUM in obstetrics and gynecology.

Keywords: Drug utilization, rational use of medicines, antimicrobial stewardship, Obstetrics and gynecology, Fixed-dose combinations, Polypharmacy, WHO core prescribing indicators.

Introduction

Rational use of medicines (RUM) ensures that patients receive medications appropriate to their clinical needs, in doses that meet their requirements, for an adequate duration, and at the lowest cost^[1].

The World Health Organization (WHO) estimates that more than 50% of all medicines are inappropriately prescribed, dispensed, or sold, leading to wastage of resources, increased antimicrobial resistance, and adverse health outcomes^[2].

Drug utilization studies provide valuable insights into prescribing trends and adherence to treatment guidelines, helping to bridge the gap between practice and principles of RUM.

In the field of obstetrics and gynecology, a wide range of pharmacological interventions are routinely employed, including antimicrobials, hormonal therapies, and analgesics. Given the potential impact on maternal and fetal health, inappropriate prescribing can have profound consequences. Several studies have underscored suboptimal adherence to WHO prescribing indicators, such as the overuse of antibiotics, underuse of generic drugs, and limited alignment with essential medicines lists^[3,4,5].

This study seeks to evaluate prescribing practices in a tertiary care setting in North India, contributing to the growing body of literature on RUM. By identifying patterns and gaps, this research aims to inform targeted interventions to optimize drug use, reduce

costs, and improve healthcare outcomes in obstetrics and gynecology.

Objectives

Primary Objective

To investigate the general prescribing trends in the outpatient department of obstetrics and gynecology at Sharda Medical School of Research and associated Sharda Hospital.

Secondary Objectives

1. To analyze antimicrobial prescribing patterns.
2. To assess adherence to standard treatment guidelines, the extent of polypharmacy, and the use of fixed-dose combinations (FDCs).

Methodology

Study Design

A prospective, cross-sectional, observational study was conducted over six months in the outpatient department (OPD) of the obstetrics and gynecology department.

Study Duration

The study was conducted between April 2022 and September 2022.

Study Population

All patients attending the gynecology OPD during the study period were screened for eligibility. A total of 609 patients met the inclusion criteria and were included in the study.

Inclusion Criteria

1. Female patients aged ≥ 18 years visiting the gynecology OPD.
2. Newly registered patients presenting with curative (non-chronic) complaints requiring pharmacological intervention.
3. Patients voluntarily willing to participate in the study.

Exclusion Criteria

1. Patients unwilling to participate in the study.
2. Patients with follow-up visits, chronic disease management, or non-pharmacological treatment plans.

Sample Size

The sample size was determined based on the World Health Organization (WHO) guidelines, and a target of 600 patients was set. However, 609 patients were ultimately included as they met the study's inclusion criteria.

Data Collection

Prescriptions were audited using a specially designed case record form to document relevant prescribing details while maintaining patient confidentiality (only initials of names were recorded).

Data Analysis

The collected data were analyzed using the WHO Core Prescribing Indicators:(6)

1. Average number of drugs per encounter
2. Percentage of drugs prescribed by generic name
3. Percentage of encounters with an antibiotic prescribed
4. Percentage of encounters with an injection prescribed
5. Percentage of drugs prescribed from the essential drugs list (EDL)/ National list of essential medicines (NLEM).

Statistical Analysis

The collected data was systematically analyzed using Microsoft Excel 2007. Descriptive statistical methods were employed to derive meaningful insights from the dataset. The analysis included the calculation of frequencies to determine the occurrence of various prescribing trends, averages/means to assess central tendencies such as the average number of drugs per prescription, and percentages to express the proportion of different prescribing patterns relative to the total data set.

Results

The prescription were analyzed using the WHO Core Prescribing Indicators to evaluate prescribing patterns. A total of 609 prescriptions, comprising 1,595 drugs, were analyzed. The average number of drugs per prescription was 2.62. Generic prescribing was found to be low, with only 357 drugs (22.4%) prescribed by their generic names. Additionally, 60 prescriptions (9.85%) involved injectable drugs (**Table 1, Figure 1**).

Antibiotics were prescribed in 222 encounters (36.5%) (**Table 1**). Among these, 66 prescriptions (29.7%) contained more than one antimicrobial, with some cases involving excessive use, including one prescription with seven antimicrobials. The most common diagnoses associated with multiple antimicrobial use were Pelvic Inflammatory Disease (PID), Abnormal Uterine Bleeding (AUB), and Vaginitis (**Table 2, Figure 2**). The most commonly prescribed antimicrobials were Metronidazole (117 prescriptions) and Doxycycline (86 prescriptions), followed by FAS-3 (Fluconazole, Azithromycin, Secnidazole) in 42 cases. Topical Cotrimoxazole + Clindamycin was prescribed in 39 encounters, while Cefixime (11), Nitrofurantoin (4), and Ofloxacin (2) were used less frequently (**Table 3, Figure 3**).

Analysis of adherence to standard guidelines revealed that 351 prescriptions (57.6%) followed the Standard Treatment Guidelines (STG), leaving 42.4% deviating from recommended protocols. Moreover, 42% of the drugs prescribed were included in the National List of Essential Medicines (NLEM), indicating moderate adherence, though a notable percentage (58%) consisted of non-essential medications (**Table 1**).

Fixed Dose Combinations (FDCs) accounted for 22.45% (358 out of 1,595) of the total drugs prescribed. Among these, 73.18% were 2-drug combinations, 6.42% were 3-drug combinations, 5.59% were 4-drug combinations, and 14.81% involved FDCs with five or more drugs. Only 58 FDCs (16.2%) were listed in the NLEM, highlighting the need for better alignment with essential medicines (**Table 4, Figure 4**).

Polypharmacy, defined in this study as prescriptions containing more than four drugs, was observed in 67 prescriptions (11%) (**Table 5, Figure 5**).

Table 1: Prescribing Indicators

Parameter	Value	Percentage
Total Prescriptions Analyzed	609	-
Total Drugs Prescribed	1,595	-
Average Number of Drugs per Prescription	2.62	-

Drugs Prescribed by Generic Name	357	22.4% (of total drugs)
Injectable Prescribed	60	9.85% (of encounters)
Encounters with Antibiotics Prescribed	222	36.5% (of encounters)
Prescriptions Adhering to Standard Treatment Guidelines (STG)	351	57.6% (of encounters)
Drugs Prescribed from NLEM	670	42% (of total drugs)

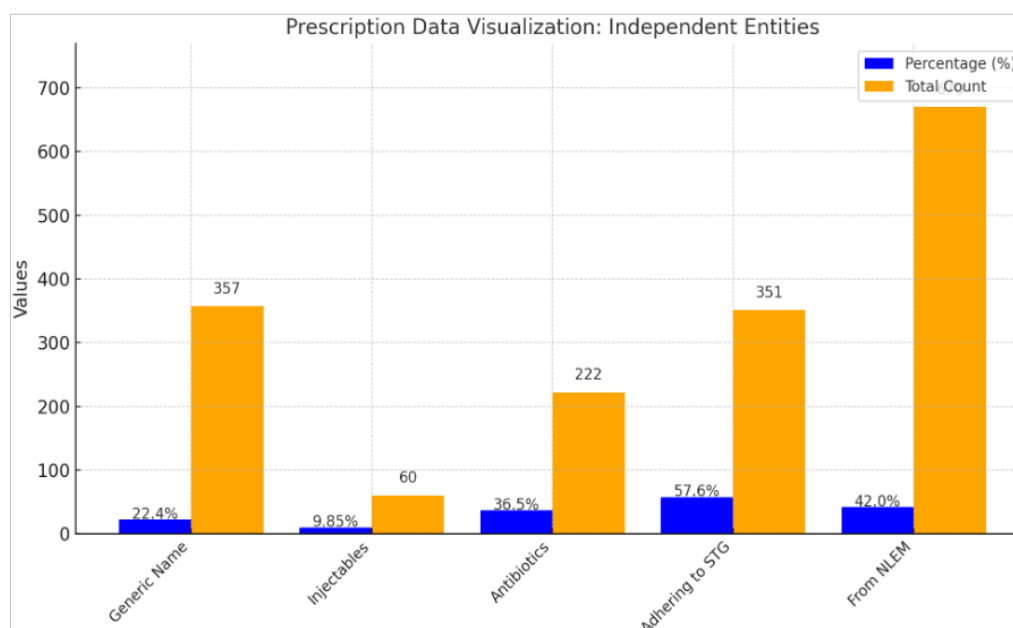


Figure 1: Prescribing indicator observation

Table 2: Antimicrobial Usage

Parameter	Value	Details
Prescriptions with More Than One Antimicrobial	66	29.73% [of total 222 Encounters with Antibiotics Prescribed]
Prescriptions with 7 Antimicrobials	1	Diagnosis: Pelvic Inflammatory Disease (PID)
Prescriptions with 6 Antimicrobials	11	Diagnosis: PID (10), AUB (1)
Prescriptions with 5 Antimicrobials	15	Diagnosis: PID (12), AUB (2), Vaginitis (1)

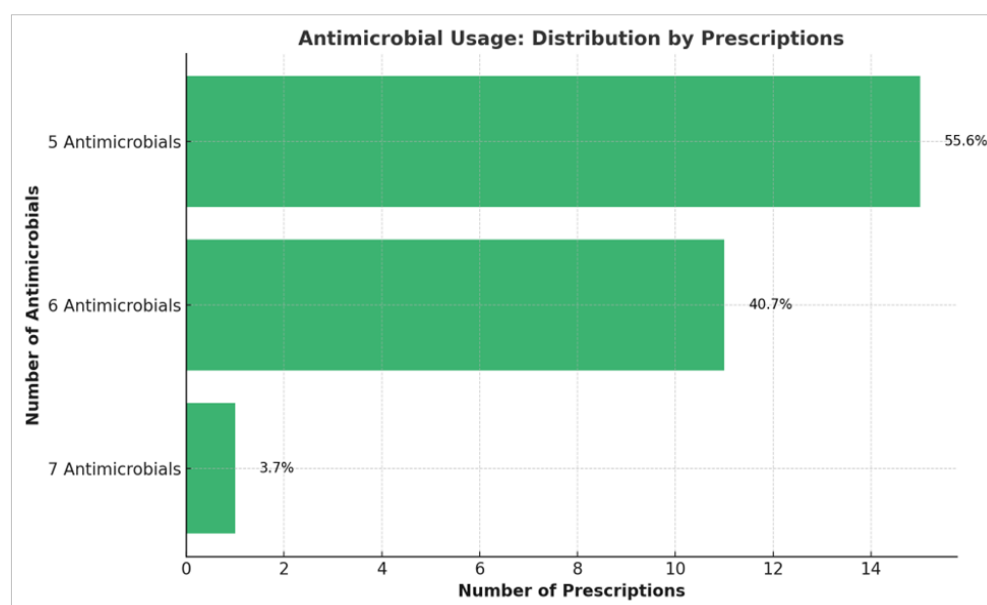


Figure 2: Distribution of antimicrobial usage

Table 3: Commonly Prescribed Antimicrobials

Antimicrobial	Number of Prescriptions
Metronidazole	117
Doxycycline	86
FAS-3 (Fluconazole, Azithromycin, Secnidazole)	42
Cotrimoxazole + Clindamycin Combination (Topical)	39

Cefixime	11
Nitrofurantoin	4
Ofloxacin	2

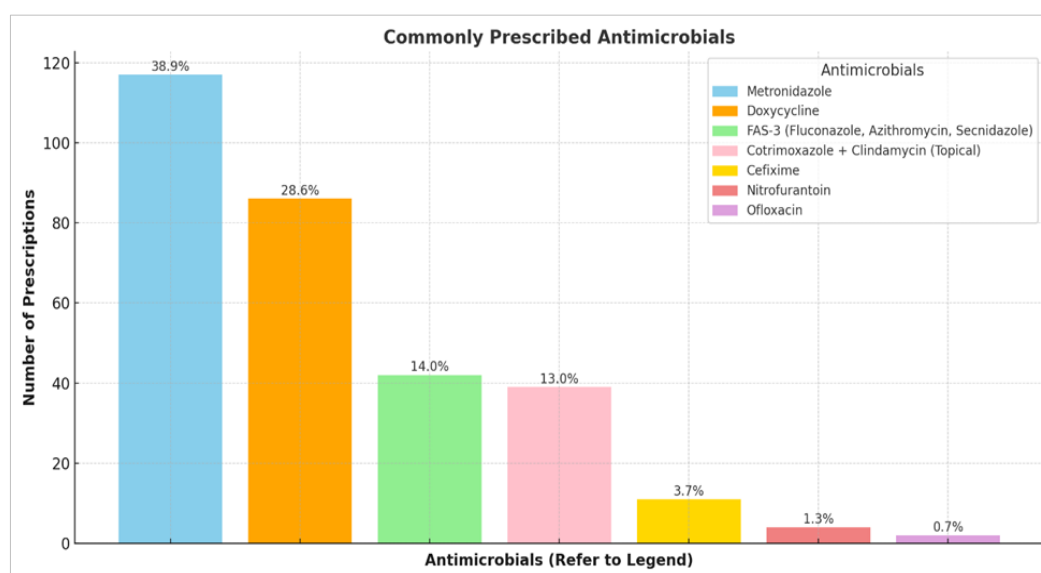


Figure 3: Commonly prescribed antimicrobials.

Table 4: Fixed Dose Combinations (FDCs)

Parameter	Value	Percentage
Total Drugs Prescribed	1,595	-
Total FDCs Prescribed	358	22.45% (of total drugs)
FDCs from NLEM	58	16.20% (of total FDCs)
FDC Composition		
2-Drug FDC	262	73.18% (of total FDCs)
3-Drug FDC	23	6.42% (of total FDCs)
4-Drug FDC	20	5.59% (of total FDCs)
≥ 5-Drugs FDC [5 (15), 6(17), 7(21)]	53	14.81% (of total FDCs)

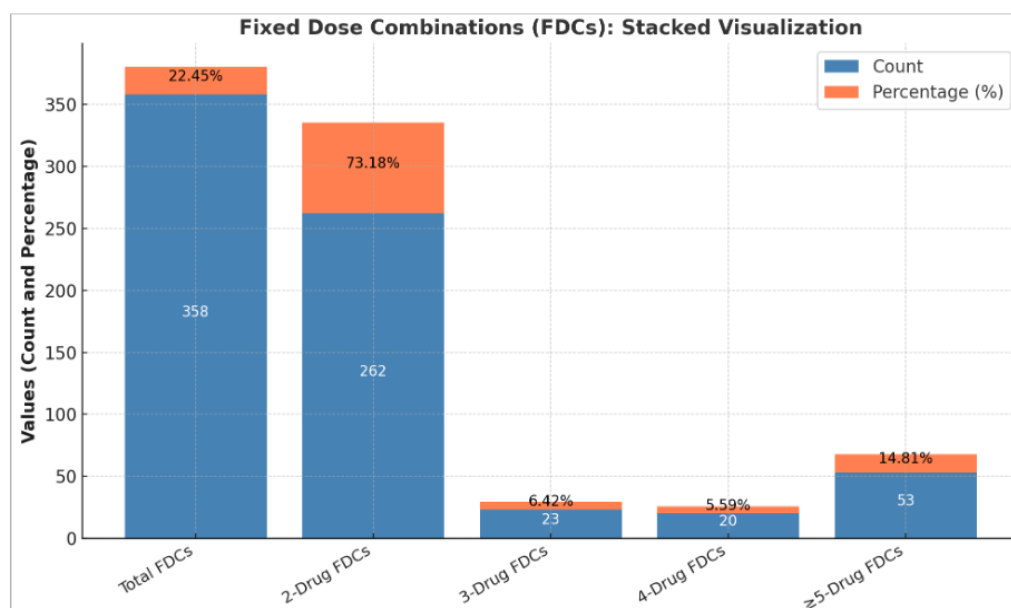


Figure 4: Fixed dose combination stacked visualization.

Table 5: Polypharmacy (>4 drugs per prescription)

Parameter	Value	Percentage
Total Prescriptions with Polypharmacy	67	11% (of total prescriptions)
Breakdown of Polypharmacy Prescriptions		
5 drugs per prescription	17	25.37% (of polypharmacy prescriptions)
6 drugs per prescription	20	29.85% (of polypharmacy prescriptions)

7 drugs per prescription	19	28.36% (of polypharmacy prescriptions)
8 drugs per prescription	10	14.93% (of polypharmacy prescriptions)
9 drugs per prescription	1	1.49% (of polypharmacy prescriptions)

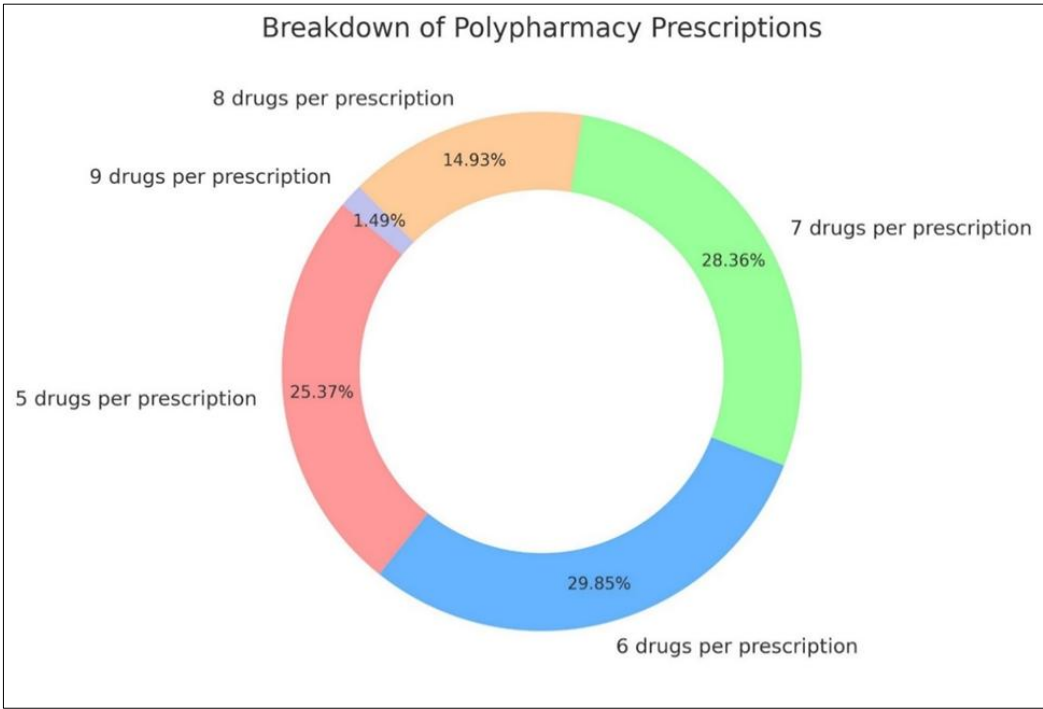


Figure 5: Polypharmacy distribution

Discussion

Drug utilization studies in any department or specialty are essential for understanding prescribing patterns, assessing adherence to standard treatment guidelines, and evaluating compliance with WHO recommendations. These studies aim to optimize patient outcomes by ensuring rational drug use, minimizing side effects, reducing costs, and enhancing patient adherence [1].

WHO has established specific recommendations for rational prescribing. In this study, we focused on analyzing the prescribing patterns of drugs in the gynecology outpatient department (OPD) of a tertiary care center in North India. The study findings were assessed in terms of their alignment with recommended guidelines, and areas for improvement were identified and suggested accordingly.

The results indicate several areas for improvement in prescribing practices. The average number of drugs prescribed per prescription was 2.62, which is slightly above the recommended WHO threshold of 1.6-1.8 drugs per prescription [6]. While this number is close to the ideal value, it suggests that the tendency toward polypharmacy may still be present, though not excessive.

Generic prescribing in this study was notably low (22.4%) compared to the WHO recommendation of 100% or at least a higher percentage [7]. Promoting the use of generics is crucial for reducing healthcare costs and improving access to essential medicines. Educational interventions and policy reinforcements may help in enhancing generic prescribing [8].

Amongst all the prescriptions, 60 prescriptions (9.85%) involved injectable drugs. While injectable are often necessary for certain conditions, their relatively high usage could indicate a preference for more aggressive treatment options or a lack of adequate oral alternatives for certain conditions. The WHO recommends limiting injectable use to conditions requiring

immediate therapeutic effects or in cases where oral formulations are insufficient [6].

Antibiotics were prescribed in 222 encounters, accounting for 36.5% of total encounters. This is slightly higher than the ideal threshold of 30% as suggested by WHO, raising concerns about the overuse of antibiotics [6]. Antibiotic over prescription is a well-known factor contributing to the growing issue of antimicrobial resistance (AMR). This data highlights the need for better stewardship and adherence to appropriate prescribing guidelines. In 1 prescription, 7 antimicrobials were prescribed, while 11 prescriptions involved 6 antimicrobials, and 15 prescriptions involved 5 antimicrobials. The most common diagnoses associated with multiple antimicrobial use were Pelvic Inflammatory Disease (PID), Abnormal Uterine Bleeding (AUB), and Vaginitis. The syndromic approach justifies the use of combination antimicrobial therapy in these conditions [9]. However, the inclusion of antimicrobials for the partner's treatment further increases the total number of prescribed antimicrobials. This suggests the need for careful evaluation before prescribing multiple antimicrobials, as excessive use can lead to significant side effects and resistance issues. These prescriptions align with common treatment regimens for infections, but the high frequency of specific combinations (such as metronidazole and doxycycline) suggests a pattern that warrants monitoring for appropriateness and potential overuse.

Adherence to Standard Treatment Guidelines (STG) was observed in 57.6% of prescriptions (351 cases), indicating a moderate level of compliance. However, 42.4% of prescriptions deviated from these guidelines. Ensuring adherence to STGs is essential for rational prescribing, as non-compliance may lead to inappropriate treatment and potentially compromise patient outcomes [10].

The study highlighted moderate adherence to the National List of Essential Medicines (NLEM), with 42% of prescribed drugs being listed. The WHO recommends 100% adherence to essential

medicines to ensure cost-effective and evidence-based treatment ^[6]. This suggests that a substantial proportion of prescribed medications were non-essential, indicating room for improvement in aligning prescriptions with essential medicine guidelines.

Although there is no universally strict definition for polypharmacy, in this study, it was considered as the prescription of more than four drugs per encounter ^[11,12]. Notably, the 11% prevalence of polypharmacy in this study was lower compared to findings from other studies, such as one conducted in a gynecology OPD reporting a prevalence of 93.33% ^[13], or a study on older populations reporting rates of 49% across India and 17.8% in North India ^[14]. Although relatively low in this study, polypharmacy should still be monitored to prevent unnecessary drug exposure.

Fixed Dose Combination (FDC) usage was lower (22.45%) compared to another study in an obstetrics and gynecology department, which reported 41.84% FDC usage ^[15]. While FDCs can be beneficial in simplifying treatment regimens, excessive use of multi-drug combinations, particularly those not included in the NLEM, can increase adverse effects and complexity in drug management. Rational selection and prescribing of FDCs should be emphasized.

Overall, this study highlights key areas requiring attention to enhance rational prescribing. Interventions such as prescription audits, clinician education, and implementation of standard guidelines can help optimize drug utilization, improve patient safety, and ensure cost-effective treatment in obstetrics and gynecology.

Conclusion

This study reveals several critical insights into prescribing patterns, including the relatively high usage of antibiotics, polypharmacy, and FDCs. The moderate adherence to Standard Treatment Guidelines (STGs) and the National List of Essential Medicines (NLEM) suggest that improvements in rational prescribing practices are needed. Addressing these areas, such as reducing polypharmacy, improving adherence to STGs, and promoting generic prescribing, will enhance patient safety and optimize healthcare resources. Comparison with other published studies indicates that these issues are common in clinical settings, underscoring the importance of continued efforts in promoting rational drug use and antimicrobial stewardship.

Declarations

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None declared.

Author contributions

All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Competing interests

The authors state no conflict of interest.

Ethical approval

This study protocol was approved by Institutional Ethics Committee, SMS&R and Sharda hospital, Sharda University, Greater Noida, UP, India. Ref. No. SU/SMS&R/76-A/2022/78

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