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Study of Prescribing Pattern of Antibiotics in Obstetrics and Gynecology Department in Tertiary Care Teaching Hospital: A Prospective Study

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ABSTRACT

Antibiotics are among the most frequently prescribed medications in obstetrics and gynecology. Although gynecological medications are widely prescribed and sold in India, drug utilization studies in this area are relatively limited. Understanding prescribing patterns is essential for optimizing clinical practice. This study aims to describe the prescribing pattern of antibiotics in the obstetrics and gynecology department in a tertiary care teaching hospital. A prospective observational study was conducted over 6 months (December 2025 to May 2026). Data were collected directly from 156 patient bedside files including antibiotic prescriptions, dosages, indications, and durations. The Results shows antibiotics were prescribed in 92.3% of cases (144/156). The most commonly prescribed antibiotic classes were Cephalosporins (47.2%), Fluoroquinolones (41%), and Nitroimidazoles (38.9%). Pantoprazole (58.9%), Ceftriaxone (43.6%), and Metronidazole (35.9%) were the most frequently prescribed drugs. Combination antibiotic therapy was used in 33.3% of cases. Average prescribed duration was 7.2±3.1 days. All prescribed antibiotics (100%) were from WHO Essential Medicines List. Generic prescribing was observed in 93.2% of antibiotic prescriptions. The study documents antibiotic prescribing patterns in a tertiary care OB-GYN setting. Cephalosporins and Fluoroquinolones are the most commonly prescribed classes. Most prescriptions adhere to essential medicines principles and use generic names.

Keywords: Antibiotic prescribing, Obstetrics and Gynecology, Prescribing patterns, Tertiary care hospital, Drug utilization

INTRODUCTION

Antibiotics are among the most frequently prescribed medications in clinical practice, particularly in specialized departments managing infectious conditions.[1] In obstetrics and gynecology, antibiotics are essential for treating reproductive tract infections, pelvic inflammatory disease, urinary tract infections, and infection prophylaxis during gynecological procedures.[2]

Understanding antibiotic prescribing patterns provides valuable insights into current clinical practices and helps identify variations in prescribing behavior across different institutions and healthcare settings.[3] Drug utilization studies focusing on specific drug classes offer detailed information about which agents are preferred, for which conditions they are prescribed, and in what dosages.[4]

The obstetrics and gynecology department manages a significant burden of infectious diseases. Pelvic inflammatory disease affects approximately 10-15% of reproductive-age women globally, while reproductive tract infections remain common presentations in gynecological outpatient departments.[5],[6] The polymicrobial nature of many gynecological infections frequently necessitates empiric antibiotic therapy prior to culture results.[7]

Antibiotic selection in gynecological practice is influenced by multiple factors including the likely causative organisms, local resistance patterns, patient factors, and institutional prescribing preferences.[8] Different countries and institutions demonstrate variable preferences for specific antibiotic classes, with some favoring broader-spectrum agents and others preferring narrower spectrum options.[9]

In India, antibiotic utilization patterns in specialized departments remain relatively understudied despite the significant disease burden.[10] Previous studies examining drug utilization in gynecology departments have documented wide variation in prescribing practices, with some centers showing preference for specific agents.[11],[12] However, comprehensive prospective studies examining antibiotic prescribing patterns specifically in the Indian tertiary care setting remain limited.

The choice of antibiotic agents reflects institutional practices, clinical experience, and access to diagnostic facilities. In settings where culture facilities are available, results can guide therapy, while in resource-limited areas, empiric prescribing based on clinical presentation remains standard.[13] Documentation of current prescribing patterns serves as a baseline for understanding current practice and identifying patterns that may be amenable to optimization.[14]

Given the significance of antibiotic use in gynecological practice and the relative scarcity of detailed prescribing pattern studies from Indian tertiary care centers, the present prospective study was undertaken. The objective was to comprehensively document antibiotic prescribing patterns including drug selection, dosages, combinations, durations, and indications in the obstetrics and gynecology department of a tertiary care teaching hospital over a 6-month period.

METHODOLOGY

STUDY DESIGN AND SETTING

This was a prospective, observational study conducted in the Department of Obstetrics and Gynecology of Navodaya Medical College Hospital and Research Centre, Raichur, Karnataka, India. The hospital is an 1100-bedded tertiary care teaching hospital with high standard facilities.

STUDY PERIOD & SAMPLE SIZE

The study was prospectively conducted over 6 months from December 2025 to May 2026. Data were collected directly from patient bedside medical files during clinical consultations and ward rounds. A total of 156 patient cases with antibiotic prescriptions were analyzed during the study period.

INCLUSION CRITERIA

- Age ≥18 years
- Patients with infectious gynecological/obstetric conditions
- Prescribed at least one antibiotic
- Complete antibiotic prescription documentation
- Complete clinical information available
- Only inpatient data

EXCLUSION CRITERIA

- Non-infective conditions
- Incomplete antibiotic prescription details
- Patients <18 years
- Prophylactic antibiotics only
- Missing clinical information
- Out patients data

DATA COLLECTION

Data were collected using a structured proforma (data entry form) documenting:

ANTIBIOTIC-SPECIFIC INFORMATION:

- Antibiotic name (generic and brand)

- Antibiotic class/category

- Dosage and frequency

- Route of administration

- Duration of therapy

- Indication for prescription

- Monotherapy vs combination therapy

CLINICAL INFORMATION:

- Patient age and demographics

- Primary diagnosis

- Secondary diagnoses

- Severity of presentation

- Culture status (done/not done)

DATA ANALYSIS

Antibiotics were classified by:

1. Drug class (Penicillins, Cephalosporins, Fluoroquinolones, Macrolides, etc.)

2. Spectrum (Narrow, Intermediate, Broad, Ultra-broad)

3. Route of administration

4. Combination patterns

Statistical analysis included frequencies, percentages, and descriptive statistics. Results are presented in tables and charts.

RESULTS

ANTIBIOTIC PRESCRIPTION OVERVIEW

Out of 156 total patients, 144 patients (92.3%) received antibiotic prescriptions.

Total antibiotic items prescribed: 190 (accounting for combination therapy)

Average antibiotics per antibiotic-receiving patient: 1.32

TABLE 1: Antibiotic Classes Prescribed

Cephalosporins were the most frequently prescribed antibiotic class (47.2%), followed by fluoroquinolones (41.0%) and nitroimidazoles (38.9%), reflecting their predominant use in the study population.

TABLE 1: Antibiotic Classes Prescribed

Antibiotic Class	Cases	% of Total Cases	Prescriptions
Cephalosporins	68	47.2%	68
Fluoroquinolones	59	41.0%	63
Nitroimidazoles	56	38.9%	57
Penicillins	32	22.2%	34
Macrolides	12	8.3%	12
Aminoglycosides	8	5.6%	8
Others	17	11.8%	18

(Note: Total >100% due to combination therapy)

TABLE 2: Most Frequently Prescribed Antibiotics

Ceftriaxone was the most frequently prescribed antibiotic (47.2%), followed by metronidazole (38.9%) and ciprofloxacin (26.4%), indicating a predominance of cephalosporins and broad-spectrum antibiotics in the treatment of patients.

TABLE 2: Most Frequently Prescribed Antibiotics

Rank	Antibiotic	Class	Cases	Percentage
1	Ceftriaxone	Cephalosporin	68	47.20%
2	Metronidazole	Nitroimidazole	56	38.90%
3	Ciprofloxacin	Fluoroquinolone	38	26.40%
4	Doxycycline	Tetracycline	35	24.30%
5	Levofloxacin	Fluoroquinolone	21	14.60%
6	Amoxicillin	Penicillin	18	12.50%
7	Ampicillin	Penicillin	14	9.70%
8	Azithromycin	Macrolide	12	8.30%
9	Cefixime	Cephalosporin	11	7.60%
10	Cefotaxime	Cephalosporin	8	5.60%
11	Moxifloxacin	Fluoroquinolone	8	5.60%
12	Trimethoprim-SMX	Other	7	4.90%
13	Nitrofurantoin	Nitrofuran	6	4.20%
14	Chlorhexidine	Disinfectant	5	3.50%
15	Cefpodoxime	Cephalosporin	4	2.80%

TABLE 3: Routes of Antibiotic Administration

Route	Cases	Percentage
Oral	112	77.80%
Intravenous	18	12.50%
Intramuscular	8	5.60%
Intravaginal/Pessary	6	4.20%
TOTAL	**144**	**100%**

Oral administration was the predominant route of antibiotic delivery (77.8%), while intravenous, intramuscular, and intravaginal/pessary routes were used less frequently, accounting for 12.5%, 5.6%, and 4.2% of cases, respectively.

MONOTHERAPY VS COMBINATION THERAPY

Monotherapy (single antibiotic): 96 cases (66.7%)

Combination therapy (2+ antibiotics): 48 cases (33.3%)

COMBINATION PATTERNS:

- Penicillin + Metronidazole: 28 cases (58.3% of combinations)

- Fluoroquinolone + Aminoglycoside: 12 cases (25%)

- Cephalosporin + Metronidazole: 8 cases (16.7%)

TABLE 4: Duration of Antibiotic Therapy

A treatment duration of 6–7 days was most common (47.2%), followed by 3–5 days (23.6%) and 8–14 days (22.2%), with an overall mean antibiotic therapy duration of 7.2 ± 3.1 days.

Duration	Cases	Percentage
3-5 days	34	23.6%
6-7 days	68	47.2%
8-14 days	32	22.2%
>14 days	10	6.9%
TOTAL	**144**	**100%**

Mean duration: 7.2 ± 3.1 days

Median: 7 days

Range: 3-21 days

TABLE 5: Antibiotic Prescriptions by Diagnosis

Diagnosis (Cases)	First-line Agent	% Cases	Comments
PID (24)	Cephalosporin + Metronidazole	83%	Combination therapy
Vaginal Discharge (18)	Metronidazole Monotherapy	67%	Often prescribed as monotherapy
UTI (12)	Fluoroquinolone	75%	Mainly oral therapy
Bacterial Vaginosis (8)	Metronidazole (Vaginal Route)	100%	Local vaginal administration
Episiotomy Infection (4)	Cephalosporin	100%	Predominantly parenteral therapy

GENERIC VS BRAND NAME PRESCRIBING

Generic name prescriptions: 134 antibiotics (93.2%)

Brand name prescriptions: 10 antibiotics (6.8%)

TABLE 6: Antibiotic Dosage Forms

Dosage Form	Cases	Percentage (%)
Tablets/Capsules	116	80.6
Injections	18	12.5
Vaginal Pessaries	10	6.9
Total	**144**	**100**

Tablets and capsules were the most commonly prescribed dosage forms, accounting for 80.6% of antimicrobial prescriptions, indicating a preference for oral therapy in gynecological patients.

AGE-WISE ANTIBIOTIC PRESCRIBING

Average antibiotics per age group:

<20 years: 1.3 antibiotics

20-29 years: 1.4 antibiotics

30-39 years: 1.5 antibiotics

40-50 years: 1.4 antibiotics

TABLE 7: Antibiotic Spectrum

Spectrum of Activity	Cases	Percentage (%)
Narrow-spectrum	24	16.7
Intermediate-spectrum	42	29.2
Broad-spectrum	58	40.3
Ultra-broad Spectrum	20	13.9
Total	**144**	**100**

Broad-spectrum antimicrobials were the most frequently prescribed agents, accounting for 40.3% of cases, reflecting the need to cover a wide range of potential pathogens in gynecological infections.

ESSENTIAL MEDICINES AND STANDARDS

WHO Essential Medicines List compliance: 144/144 (100%)

NLEM 2019 compliance: 144/144 (100%)

Generic prescribing: 134/144 (93.2%)

DISCUSSION

OVERVIEW OF ANTIBIOTIC PRESCRIBIN

This prospective observational study documents comprehensive antibiotic prescribing patterns in the obstetrics and gynecology department of a tertiary care hospital over a 6-month period. The study analyzed 144 cases with antibiotic prescriptions out of 156 total cases, representing a 92.3% antibiotic prescription rate. This high rate reflects the significant burden of infectious gynecological conditions in the study population and is consistent with expectations in high-infection-burden healthcare settings.[1]

The distribution of antibiotic classes reveals specific prescribing preferences in the study institution. Cephalosporins (47.2%) and Fluoroquinolones (41%) were the most commonly prescribed classes, followed by Nitroimidazoles (38.9%). This pattern likely reflects the polymicrobial nature of gynecological infections, which often require broad-spectrum coverage to address multiple potential pathogens.[2] **(Table 1)**

Ceftriaxone was the single most frequently prescribed antibiotic, appearing in 47.2% of antibiotic prescriptions. This preference is consistent with its efficacy against common gynecological pathogens and institutional practice patterns. Metronidazole, the second most common antibiotic, is appropriately used for its anaerobic coverage, particularly important in polymicrobial infections like pelvic inflammatory disease.[3] **(Table 2)**

The high frequency of fluoroquinolone prescribing (41%) is notable and reflects their oral bioavailability and convenience for outpatient management. Ciprofloxacin and Levofloxacin together constituted 41% of fluoroquinolone prescriptions, making them significant contributors to the overall antibiotic prescribing pattern.[4]Penicillins were prescribed in only 22.2% of cases despite being recommended first-line agents for many gynecological infections.[5]

Combination antibiotic therapy was employed in 33.3% of cases, with the majority (58.3% of combinations) being penicillin-based agents plus metronidazole. This combination is appropriate for polymicrobial infections like pelvic inflammatory disease where both gram-positive organisms and anaerobes require coverage.[6]

The observation that 66.7% of antibiotic prescriptions involved monotherapy is notable and suggests that in many gynecological presentations, single-agent therapy is deemed adequate. The diagnosis-specific combinations observed primarily in PID and severe infections.

The predominance of oral antibiotic administration (77.8%) reflects the outpatient setting and the management of mostly uncomplicated or moderately severe infections responsive to oral treatment. Injectable antibiotics constituted 18.1% of prescriptions, suggesting that intravenous and intramuscular routes were reserved for more severe infections or those requiring hospitalization.[7] **(Table 3)**

The use of vaginal pessaries containing antimicrobial agents (4.2%) represents an appropriate utilization of topical therapy for conditions like bacterial vaginosis, where localized delivery provides adequate treatment.

The mean prescribed duration of 7.2 ± 3.1 days is reasonable for most gynecological infections. The observation that 47.2% of prescriptions specified 6-7 days duration suggests institutional practice patterns favoring this duration. The range of 3-21 days indicates variable prescribing based on perceived infection severity and clinical judgment.[8] **(Table 4)**

Sharma et al. (2018) in a similar gynecology study reported that metronidazole, doxycycline, and ciprofloxacin were common, consistent with the present findings.[9] Shah et al. (2004) documented high ciprofloxacin usage in obstetrics/gynecology inpatients, similar to the fluoroquinolone prevalence in this study.[10]

The pattern of cephalosporin preference aligns with international recommendations for polymicrobial infection coverage and reflects global trends toward third-generation agents for serious infections.[11]

The study demonstrates excellent adherence to WHO and NLEM standards, with 100% of prescribed antibiotics appearing on both lists. This compliance reflects appropriate drug selection and accessibility to quality medications. The 93.2% generic prescribing rate is commendable and reflects rational prescribing practices in an academic medical center.[12]

The diagnostic-specific prescribing patterns observed in this study show appropriate tailoring of antibiotics to presumed pathogens:

- PID cases predominantly received cephalosporin-metronidazole combinations, appropriate for polymicrobial coverage

- UTI cases primarily received fluoroquinolones, suitable for urinary tract pathogens

- Vaginal infection cases utilized metronidazole, appropriate for anaerobic and protozoan coverage

This pattern suggests clinical judgment-based prescribing rather than empiric broad-spectrum coverage for all conditions, which is encouraging.[13] **(Table 7)**

STUDY STRENGTHS AND LIMITATIONS

STRENGTHS:

- Prospective design with real-time data collection

- Large sample size (144 antibiotic prescriptions)

- Data collected directly from bedside patient files

- Detailed documentation of antibiotic dosages, durations, and indications

- High compliance with essential medicines principles

- Assessment of multiple antibiotic-related parameters

LIMITATIONS:

- Single-center study from a tertiary teaching hospital

- Observational design without assessment of clinical outcomes

- No analysis of resistance patterns or susceptibility data

- Limited assessment of prescriber characteristics

- Study period of 6 months may not capture seasonal variations

- No patient-level follow-up for treatment outcomes

CONCLUSIONS

This prospective observational study documents comprehensive antibiotic prescribing patterns in the obstetrics and gynecology department of a tertiary care hospital.

Key findings include:

1. High antibiotic prescription rate (92.3%) reflecting infectious disease burden

2. Cephalosporins (47.2%) and Fluoroquinolones (41%) are the most commonly prescribed classes

3. Ceftriaxone (47.2%) and Metronidazole (38.9%) are the individual most frequently prescribed agents

4. Two-thirds of antibiotic prescriptions involve monotherapy

5. Oral routes predominate (77.8%), with injectables reserved for severe cases

6. Mean duration of 7.2 days reflects institutional practice patterns

7. Excellent compliance with WHO/NLEM standards (100%)

8. High generic prescribing rate (93.2%)

9. Diagnosis-specific prescribing patterns suggest appropriate tailoring to suspected pathogens

The study establishes a comprehensive baseline of current antibiotic prescribing practices. The documented patterns reflect a mix of clinical judgment and evidence-based practice, with appropriate variation based on infection severity and diagnosis type.

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CONFLICT OF INTEREST

The author declares no conflicts of interest.

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