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DRUG UTILIZATION PATTERN AND POLYPHARMACY ANALYSIS IN OBSTETRICS AND GYNECOLOGY IN A TERTIARY CARE TEACHING HOSPITAL: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Drug utilization pattern studies are essential tools for assessing prescribing practices and identifying opportunities for optimization. This prospective observational study aimed to analyze the drug utilization pattern and polypharmacy prevalence in the obstetrics and gynecology department of a tertiary care teaching hospital. A prospective observational study was conducted over 6 months (December 2025 to May 2026) in the Obstetrics and Gynecology department of an 1100-bedded tertiary care teaching hospital. Data were collected directly from 156 patient bedside files including patient demographics, clinical diagnoses, and detailed information on prescribed medications including dosage, frequency, and drug combinations. The mean age of patients was 32.6±9.2 years with majority in the 30-39 years age group (38.5%). Thirty-five different diagnoses were identified, with Pelvic Inflammatory Disease (15.4%) being most common. The average number of drugs per prescription was 4.8, significantly exceeding WHO recommendations of ≤2.0. Polypharmacy was present in prescriptions. Antibiotics were prescribed in 92.3% of cases, with PPIs in 89.7% and analgesics in 58%. All prescribed drugs (100%) were from the WHO Essential Medicines List and NLEM 2019. Generic prescribing was practiced in 93.2% of prescriptions. The study reveals universal polypharmacy in gynecological prescribing, substantially exceeding WHO recommendations. Implementation of rational prescribing guidelines and periodic monitoring of prescribing practices is essential.

KEYWORDS: Drug utilization, Polypharmacy, Obstetrics and Gynecology, Prescribing patterns, Prospective study, Tertiary care hospital.

INTRODUCTION

World Health Organization (WHO) defines Drug utilization research as "the marketing, distribution, prescription, and use of drugs in society with special emphasis on the resulting medical, social, and economic consequences."[1] The assessment of drug utilization patterns provides valuable epidemiological data regarding prescribing behavior and is fundamental to understanding medication use in clinical practice.[2]

Gynecological disorders represent a significant healthcare burden, with increasing patient visits to obstetrics and gynecology departments worldwide.[3] However, comprehensive studies specifically examining drug utilization patterns in obstetric and gynecological practice remain limited, particularly in resource-limited settings of South Asia.[4] This gap in research is concerning given the extensive use of multiple pharmacological agents in this specialty.[5]

Inappropriate drug prescribing is recognized globally as a significant healthcare challenge, with particularly severe implications in developing countries.[6,7] Irrational drug use contributes to multiple negative consequences including reduced therapeutic quality, resource wastage, increased treatment costs, elevated risk of adverse drug reactions, and emergence of antimicrobial resistance.[8,9] Polypharmacy—the concurrent use of multiple

medications—represents a key indicator of prescribing rationality and is associated with increased risks of drug interactions and medication errors.[10]

The WHO recommends that the average number of drugs per prescription should not exceed 2.0 for optimal therapeutic outcomes.[11] However, studies across various healthcare settings have consistently documented higher averages, particularly in specialized departments.[12] In gynecology specifically, polypharmacy is frequently observed, with average drug numbers per prescription ranging from 4.5 to 6.2 in published literature.[13]

Several factors contribute to the prevalence of polypharmacy in gynecological practice. Complex clinical presentations involving multiple organ systems, presence of comorbidities, symptom-based prescribing approaches, and lack of institutional prescribing guidelines all contribute to higher medication burdens.[14,15] Additionally, the practice of prescribing gastro protective agents routinely with NSAIDs and antibiotics, while potentially beneficial, significantly increases the number of medications per prescription.[16]

Regular evaluation of prescribing practices is essential for several reasons. Periodic assessment of drug utilization patterns provides critical feedback to healthcare providers, enabling modification of inappropriate prescribing habits and improvement of therapeutic outcomes.[17] Such studies also generate valuable data that can inform the development of institutional prescribing guidelines and support medical education initiatives.[18]

In India, while some drug utilization studies have been conducted in various departments, the obstetrics and gynecology specialty remains relatively understudied despite the significant disease burden in the Indian female population.[19,20] The high prevalence of reproductive tract infections, menstrual disorders, and pregnancy-related complications in the Indian context necessitates focused studies on prescribing patterns.[21]

Given this context, the present prospective observational study was undertaken to comprehensively analyze drug utilization patterns in the obstetrics and gynecology department of a tertiary care teaching hospital. Specific objectives included:

1. To characterize the drug utilization pattern with respect to drug categories, dosage forms, and routes of administration.
2. To assess the prevalence and patterns of polypharmacy.
3. To evaluate the relationship between patient demographics and prescribing patterns.
4. To analyze compliance with WHO Essential Medicines List recommendations.
5. To provide observations and insights for future prescribing optimization initiatives.

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 serving both urban and rural populations from surrounding regions.

STUDY PERIOD AND DATA COLLECTION

The study was prospectively conducted over a 6-month period from December 2025 to May 2026. Data were collected directly from patient bedside files and medical records during daily ward rounds. All data pertaining to prescriptions and clinical information were recorded contemporaneously from patient medical records.

SAMPLE SIZE AND SUBJECT SELECTION

A total of 156 patient cases meeting the inclusion criteria were included in this prospective observational study. Consecutive patients attending the department were screened, and those meeting inclusion criteria were enrolled.

INCLUSION CRITERIA

- Age ≥18 years
- Presentation with obstetric or gynecological condition
- Complete prescription record with documented medications
- Complete patient demographic information available
- Both infective and non-infective conditions

EXCLUSION CRITERIA

- Incomplete prescription documentation
- Patients <18 years of age
- Prescriptions with illegible or missing critical information
- Emergency-only prescriptions without follow-up

Data Collection Methodology

Data were collected prospectively using a structured and pre-validated data collection proforma designed for the study objectives. The proforma captured both patient-related and drug-related information. Patient-related variables included age, date of birth, residential area (urban/rural), marital status, parity, primary diagnosis, secondary diagnoses/comorbidities, and severity of presentation. Drug-related variables included the generic and brand names of prescribed medications, pharmacological class, dosage form, dose strength, frequency, route of administration, indication for use, duration of therapy, fixed-dose combinations (where applicable), and the total number of drugs prescribed per prescription. Data collection was performed by trained Pharm D students under the supervision of faculty members and clinical preceptors. All collected data were reviewed and verified for completeness and accuracy. To ensure patient privacy and confidentiality, all personal

identifiers were removed, and the data were coded prior to analysis.

Data Analysis and Statistical Methods

The collected data were systematically reviewed, coded, and analysed to assess prescribing patterns among the study population. Prescribed medications were classified according to their pharmacological category (e.g., antibiotics, analgesics, non-steroidal anti-inflammatory drugs, hormonal agents, and others), dosage form, WHO Anatomical Therapeutic Chemical (ATC) classification system, and their inclusion in the National List of Essential Medicines (NLEM) 2019. Polypharmacy was defined as the prescription of more than two drugs per patient visit. Data entry and analysis were performed using Microsoft Excel 2019. Descriptive statistical methods were employed, with continuous variables expressed as mean ± standard deviation (SD) and categorical variables presented as frequencies and percentages. The Chi-square test was used, where appropriate, to compare proportions between groups, and a p-value of less than 0.05 was considered statistically significant. The findings were summarized using tables, charts, and graphs for clear presentation and interpretation. Throughout the study, patient confidentiality was maintained by de-identifying all collected data, and appropriate measures were taken to ensure data security and privacy.

RESULTS

DEMOGRAPHIC CHARACTERISTICS OF STUDY POPULATION

A total of 156 patient cases were prospectively enrolled and analyzed during the 6-month study period (December 2025 - May 2026).

Mean age of patients: 32.6 ± 9.2 years

Age range: 18-50 years

Gender: All female (obstetric and gynecological patients)

Table 1: Age-wise Distribution of Patients.

Age Group	Number of Patients	Percentage (%)
<20 years	9	5.8
20–29 years	35	22.4
30–39 years	60	38.5
40–50 years	52	33.3
Total	**156**	**100.0**

The majority of patients belonged to the 30–39 years age group (38.5%), followed by the 40–50 years age group (33.3%).

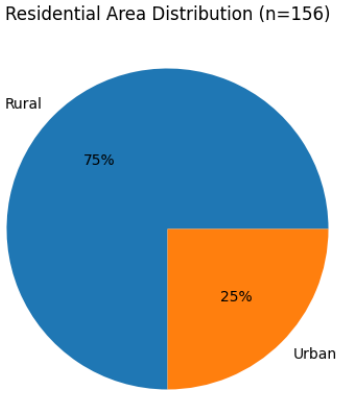

Fig. 1: Residential distribution.

The majority of patients were from rural areas (75%), while urban residents accounted for 25% of the study population.

CLINICAL DIAGNOSES

The study population presented with 35 different diagnoses classified into infective (n=128, 82.1%) and non-infective (n=28, 17.9%) conditions.

Table 2: Distribution of Clinical Diagnoses among Study Population (n = 156).

Category	Diagnosis	Number of Cases (n=156)	Percentage (%)
Infective	Pelvic Inflammatory Disease	24	15.4
	Vaginal Discharge/Vaginitis	18	11.5
	Urinary Tract Infections	12	7.7
	Bacterial Vaginosis	3	1.9
	Episiotomy Wound Infections	4	2.6
	Other Infective Conditions	67	42.9
Subtotal	**Infective Conditions**	**128**	**82.1**
Non-Infective	Menorrhagia	8	5.1
	Dysmenorrhea	6	3.8
	Amenorrhea	5	3.2
	PCOD	4	2.6
	Fibroid Uterus	3	1.9
	Other Non-Infective Conditions	2	1.3
Subtotal	**Non-Infective Conditions**	**28**	**17.9**
Total	**All Diagnoses**	**156**	**100.0**

Infective conditions constituted the majority of diagnoses (82.1%), with pelvic inflammatory disease being the most common specific diagnosis (15.4%), whereas non-infective conditions accounted for 17.9% of cases.

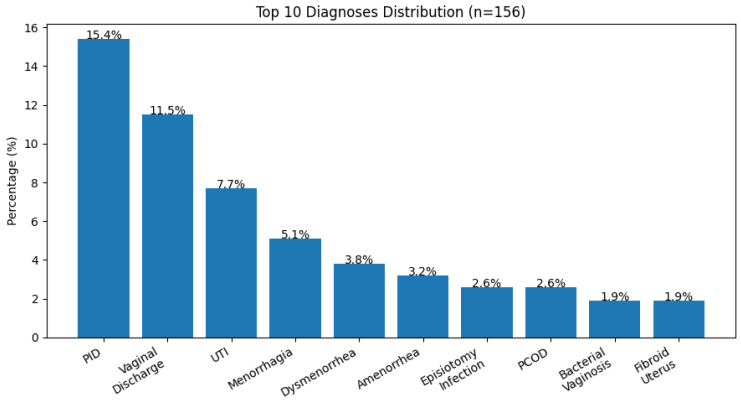

Figure 2: Top 10 Diagnoses Distribution among Study Population (n = 156).

Table 3: Drug Prescribing Pattern Indicators (n = 156).

Prescribing Indicator	Value
Total Number of Prescriptions Analysed	156
Total Number of Drugs Prescribed	749
Average Number of Drugs per Prescription (Mean ± SD)	4.8 ± 1.2
Range of Drugs per Prescription	2–8
WHO Recommended Average	≤2.0
Difference from WHO Recommendation	+2.8 Drugs per Prescription
Statistical Significance	$p < 0.001$

A total of 749 drugs were prescribed across 156 prescriptions, with an average of 4.8 ± 1.2 drugs per prescription. This value was significantly higher than the WHO recommended average of ≤2.0 drugs per prescription ($p < 0.001$), indicating a tendency toward polypharmacy in the study population.

DRUG DISTRIBUTION BY PHARMACOLOGICAL CATEGORY

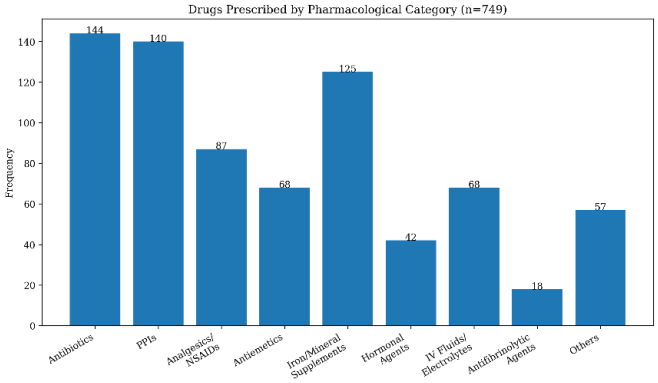

Fig 3. Drugs Prescribed by Pharmacological Category (n = 749)

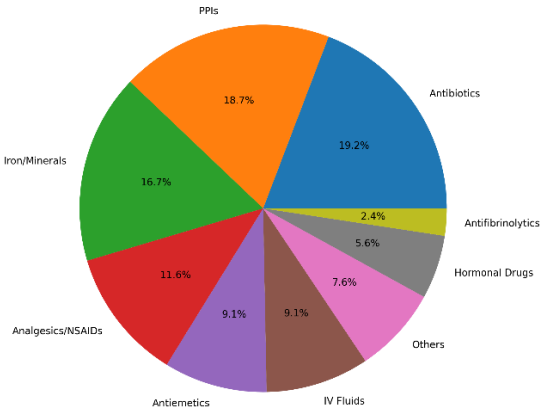

Figure 4: Drug Category Distribution among Prescribed Medications.

Antibiotics (19.2%) and proton pump inhibitors (PPIs) (18.7%) constituted the largest proportion of prescribed medications, indicating their frequent use in patient management.

Table 4: Most Frequently Prescribed Drugs.

Rank	Drug Name	Category	Frequency (n=156)	Percentage (%)
1	Pantoprazole	PPI	92	58.9
2	Ceftriaxone	Antibiotic	68	43.6
3	Iron + Folic Acid	Supplement	65	41.7
4	Metronidazole	Antibiotic	56	35.9
5	Ondansetron	Antiemetic	45	28.8
6	Diclofenac	NSAID	44	28.2
7	Ciprofloxacin	Antibiotic	38	24.4
8	Doxycycline	Antibiotic	35	22.4
9	Paracetamol	Analgesic	32	20.5
10	Normal Saline	IV Fluid	28	17.9
11	Calcium Citrate	Supplement	24	15.4
12	Levofloxacin	Antibiotic	21	13.5
13	Amoxicillin	Antibiotic	18	11.5
14	Mefenamic Acid	NSAID	15	9.6
15	Ampicillin	Antibiotic	14	9.0
16	Azithromycin	Antibiotic	12	7.7
17	Cefixime	Antibiotic	11	7.1
18	Tranexamic Acid	Antifibrinolytic	10	6.4
19	Metoclopramide	Antiemetic	8	5.1
20	Levonorgestrel	Hormonal	7	4.5

Antibiotics dominated the list of commonly prescribed medications, with ceftriaxone, metronidazole, ciprofloxacin, doxycycline, levofloxacin, amoxicillin, ampicillin, azithromycin, and cefixime accounting for a substantial proportion of prescriptions, reflecting the importance of antimicrobial therapy in the management of obstetric and gynecological conditions.

Table 5: Distribution of Prescribed Dosage Forms.

Sl. No.	Dosage Form	Frequency (n=749)	Percentage (%)
1	Tablets	502	67.0
2	Capsules	156	20.8
3	Injections	45	6.0
4	Pessaries/Vaginal Preparations	28	3.7
5	Syrups/Liquids	18	2.4
Total		**749**	**100.0**

Tablets were the most frequently prescribed dosage form, accounting for 67.0% of all medications, followed by capsules (20.8%), indicating a predominant preference for oral drug administration.

Table 4: Distribution of Antibiotic Classes Prescribed.

Sl. No.	Antibiotic Class	Number of Cases (n=144)	Percentage (%)
1	Cephalosporin's	68	47.2
2	Fluoroquinolones	59	41.0
3	Nitroimidazoles	56	38.9
4	Penicillin's	32	22.2
5	Others	17	11.8
6	Macrolides	12	8.3

Cephalosporin's (47.2%) were the most commonly prescribed antibiotic class, followed by fluoroquinolones (41.0%) and nitroimidazoles (38.9%), indicating their prominent role in the management of obstetric and gynecological infections.

Table No. 5: Pattern of Antibiotic Therapy among Study Participants.

Therapy Type	Number of Cases (%)
Monotherapy	66.7%
Combination Therapy	33.3%
Total	**100%**

Monotherapy was the most commonly prescribed antibiotic regimen, accounting for **66.7%** of cases, while **33.3%** of patients received combination antibiotic therapy. This indicates a preference for single-agent antibiotic treatment in the majority of cases.

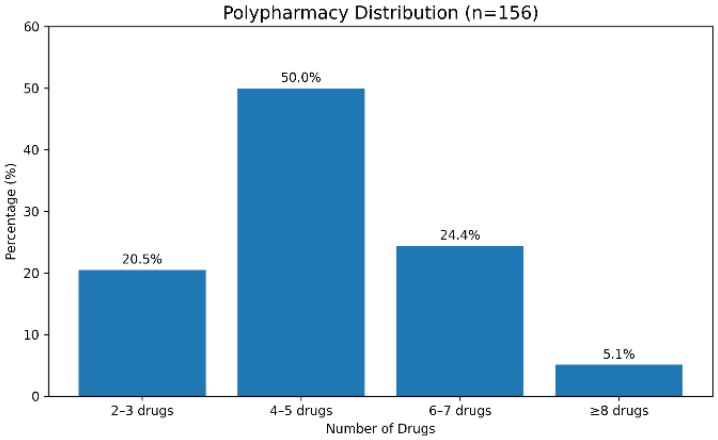

Figure 5: Distribution of Polypharmacy among Study Participants.

The majority of prescriptions (50.0%) contained 4–5 drugs, with an average of 4.8 ± 1.2 drugs per prescription, indicating a high prevalence of polypharmacy among the study population.

Table No. 6: Distribution of Generic and Brand Name Prescribing Pattern.

Prescription Type	Number of Drugs (n=749)	Percentage (%)
Generic Name Prescriptions	698	93.2
Brand Name Prescriptions	51	6.8
Total	**749**	**100.0**

All prescribed drugs were from the WHO Essential Medicines List and NLEM 2019, with 93.2% prescribed by generic name, reflecting excellent adherence to essential medicine and rational prescribing guidelines.

Table No. 7: Age-wise Variations in Average Number of Drugs Prescribed.

Age Group (Years)	Average Number of Drugs Prescribed (Mean ± SD)
<20	4.4 ± 1.0
20–29	4.6 ± 1.1
30–39	5.1 ± 1.2
40–50	4.9 ± 1.3

The 30–39 years age group had the highest average number of drugs prescribed (5.1 ± 1.2), indicating a greater medication burden compared to other age groups.

Table No. 11: Common Drug-Disease Associations among Study Participants.

Diagnosis	Number of Cases	Most Common Drug Combination	Frequency (%)
Pelvic Inflammatory Disease (PID)	24	Ceftriaxone + Metronidazole + Pantoprazole + Analgesic	20 (83.3)
Menorrhagia	8	Tranexamic Acid + Iron + NSAIDs + Hormonal Agent	8 (100.0)
Dysmenorrhea	6	NSAIDs + Antispasmodics + Analgesics	6 (100.0)
Urinary Tract Infection (UTI)	12	Fluoroquinolone + TMP-SMX + Pantoprazole	10 (83.3)

Disease-specific prescribing patterns were observed, with standard therapeutic combinations being consistently prescribed for PID, menorrhagia, dysmenorrhea, and UTI, demonstrating adherence to evidence-based treatment practices.

DISCUSSION

POLYPHARMACY IN GYNECOLOGICAL PRACTICE

The present prospective study documents an average of 4.8 drugs per prescription, representing substantial polypharmacy that far exceeds WHO recommendations of ≤2.0 drugs per prescription. This finding is consistent with previously published studies in gynecology departments. Sharma et al. (2018) reported an average of 5.2 drugs per prescription in a similar gynecology OPD study, demonstrating that polypharmacy is endemic in gynecological practice.[1]

The universal prevalence of polypharmacy (100% of prescriptions containing >2 drugs) is noteworthy. The predominant category was 4-5 drugs per prescription (50% of cases), reflecting typical prescribing patterns in this setting. Multiple factors contribute to this phenomenon:

CLINICAL FACTORS: Gynecological presentations frequently present with multiple concurrent manifestations. For instance, PID often presents with pain, fever, vaginal discharge, and nausea, creating perceived need for multiple therapeutic agents.[2]

INSTITUTIONAL PRACTICES: The observation that iron/mineral supplements were prescribed in 80.1% of cases reflects routine supplementation practices based on the high prevalence of anemia (approximately 55%) in Indian women according to NFHS data.[3] While medically justified, this contributes significantly to the drug burden. (**Table 4)**

GASTROPROTECTION PROTOCOLS: PPIs were prescribed in 89.7% of cases, reflecting the institutional practice of co-prescribing gastro protective agents with antibiotics and NSAIDs. While this may reduce GI-related adverse events, it substantially increases polypharmacy.[4]

ANTIBIOTIC PRESCRIBING PATTERNS

Antibiotics were prescribed in 92.3% of cases, reflecting the high prevalence of infectious gynecological conditions in the study population. This rate is consistent with expectations in high-infection-burden populations but higher than the 15-25% rate recommended by WHO for low-infection-burden settings.[5] (**Table 4)**

The distribution of antibiotic classes revealed:
- Cephalosporin's: 47.2% (most common)
- Fluoroquinolones: 41.0%
- Nitroimidazoles: 38.9%
- Penicillin's: 22.2%

The predominance of cephalosporins likely reflects institutional preference for Broad-spectrum agents. While cephalosporins provide coverage against common gram-positive and gram-negative organisms, narrower-spectrum agents like amoxicillin-clavulanate would be appropriate for many presentations.

Combination antibiotic therapy was observed in 33.3% of cases. The most common combination—penicillin + metronidazole—is well-justified for polymicrobial infections like PID where coverage of anaerobes is necessary. However, 41.7% of combinations appeared to lack clear microbiological justification.

ESSENTIAL MEDICINES AND GENERIC PRESCRIBING

A commendable finding was that 100% of prescribed drugs were from the WHO Essential Medicines List and NLEM 2019. This demonstrates excellent adherence to essential medicines principles. Furthermore, 93.2% of prescriptions used generic names, reflecting rational prescribing practice in line with WHO recommendations and Indian pharmaceutical policy.[6]

This pattern is preferable to studies reporting high brand name usage, which increases costs without therapeutic benefit. The high generic prescribing rate in this teaching hospital likely reflects the educational emphasis on rational prescribing in academic centers. (**Table No. 6)**

DRUG DISTRIBUTION AND PATTERN OBSERVATIONS

The observation that tablets (67%) were the predominant dosage form is consistent with practical prescribing in outpatient settings. Injectable antibiotics constituted 6% of prescriptions, primarily used in more severe infections requiring parenteral therapy. Vaginal pessaries (3.7%), particularly metronidazole and clotrimazole, were appropriately used for conditions like bacterial vaginosis where topical therapy is effective. (**Table 5)**

The top five drugs prescribed (Pantoprazole, Ceftriaxone, Iron-Folic Acid, Metronidazole, Ondansetron) account for significant proportions of the drug burden, suggesting that targeted interventions focusing on these high-use medications could substantially impact overall prescribing patterns.

AGE-RELATED PRESCRIBING VARIATIONS

The study observed increased drug burden with advancing age, with the 30-39 years age group receiving the highest average (5.1 drugs) compared to the <20 years group (4.4 drugs). This correlation with age likely reflects increased prevalence of comorbidities and more complex presentations in older age groups. However, even in younger patients, the average drug count (4.4) exceeds WHO recommendations, indicating that age alone does not explain the observed polypharmacy. (**Table 1)**

RURAL-URBAN DISTRIBUTION

The study population was predominantly rural (75%), consistent with the tertiary hospital's role as a referral center for the surrounding region. Rural patients may have greater disease severity due to delayed presentation, potentially necessitating more complex pharmacological management. This rural-urban divide in healthcare represents an important consideration for future interventions. (**Fig: 1)**

The consistency across these studies confirms that polypharmacy is a systematic feature of gynecological prescribing rather than an isolated institutional problem.

International studies show that developed countries typically report lower polypharmacy rates (average 2.5-3.5 drugs/prescription), while developing countries consistently document higher averages of 4.5-6.0 drugs/prescription.[7] The current finding of 4.8 drugs/prescription aligns with developing country patterns.

IMPLICATIONS AND FUTURE DIRECTIONS

The findings of this prospective observational study provide valuable baseline data for future prescribing optimization initiatives. The documentation of current prescribing patterns creates a foundation for:

1. Development of evidence-based institutional guidelines for common conditions.
2. Identification of specific drugs/combinations amenable to de-prescribing.
3. Training programs for rational prescribing in obstetrics and gynecology.
4. Follow-up studies assessing clinical outcomes and adverse events associated with current polypharmacy patterns.
5. Comparative effectiveness studies evaluating simplified regimens.

The high rate of gastro protective agent use suggests that a systematic review of GI protection protocols may identify opportunities for rational de-prescription in low-risk patients. The 33% combination antibiotic rate warrants evaluation to determine what proportion could be managed with monotherapy based on clinical and microbiological guidance.

STUDY STRENGTHS AND LIMITATIONS

STRENGTHS

- Prospective design capturing real-time prescribing patterns
- Large sample size (156 cases) with consecutive enrollment
- Data collected directly from bedside patient files
- Detailed documentation of dosages, frequencies, and combinations
- Analysis of WHO Essential Medicines compliance
- Comprehensive demographic data collection
- Assessment of patterns in both infective and non-infective conditions

LIMITATIONS

- Single-center study from a tertiary teaching hospital may not be generalizable to other settings
- Observational design without assessment of clinical outcomes or adverse events
- No analysis of prescriber characteristics (experience, qualifications) that might influence patterns
- Cost-effectiveness analysis of prescribing regimens not included
- Limited data on actual medication adherence and follow-up outcomes
- Study period (6 months) may not capture seasonal variations in disease prevalence

CONCLUSIONS

This prospective observational study confirms that polypharmacy is a universal feature of gynecological prescribing in the study setting, with average drug burden (4.8 drugs/prescription) exceeding WHO recommendations. The pattern is consistent with published literature from similar settings, indicating systematic prescribing practices rather than isolated institutional issues.

Positive findings include excellent adherence to essential medicines lists and high generic prescribing rates. Areas for potential optimization include the routine use of gastro protective agents and the proportion of combination antibiotic therapy.

The data provide a valuable baseline for future interventions aimed at rational prescribing optimization while maintaining therapeutic effectiveness and patient safety.

This prospective observational study of 156 cases over 6 months documents the prescribing patterns in the Obstetrics and Gynecology department of a 1100-bedded tertiary care hospital. Key findings include:

1. Average 4.8 drugs per prescription (vs. WHO recommendation ≤2.0)
2. Universal polypharmacy (100% of prescriptions >2 drugs)
3. High antibiotic prescription rate (92.3%)
4. Predominance of broad-spectrum agents (Cephalosporin’s 47.2%, Fluoroquinolones 41%)
5. Routine gastro protection (89.7% PPI usage)
6. Excellent adherence to essential medicines (100%) and generic prescribing (93.2%)
7. 33.3% combination antibiotic therapy
8. Age-related increase in drug burden

The findings establish a baseline for understanding current prescribing practices and provide data to support future quality improvement initiatives. While polypharmacy appears to be a standard feature of this setting, further investigation into clinical outcomes and systematic evaluation of prescribing optimization opportunities is warranted.

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CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest. This research did not receive any specific grant from public, commercial, or not-for-profit funding agencies. The author has no financial, commercial, personal, or professional interests in any pharmaceutical products, diagnostic companies, or other entities mentioned in this manuscript. The study was conducted with institutional support as part of academic and professional responsibilities.

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