



## Study on Prescribed Antenatal Medications among Pregnant Women at a Tertiary Care Hospital: A Cross-Sectional Analysis

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### KEYWORDS

Antenatal Medication; Prescription Patterns; Rational Drug Use..

### ABSTRACT:

**Background:** Medication use during pregnancy is common but poses challenges related to safety and efficacy. Understanding prescription patterns in antenatal care is essential to promote rational drug use and optimize outcomes.

**Aim:** To study the prescription patterns of drugs among antenatal women attending a tertiary care hospital.

**Methods:** An institutional-based cross-sectional study was conducted involving 155 pregnant women attending antenatal clinics between November 2023 and August 2024. Data on demographics, comorbidities, and prescribed medications were collected and analyzed. Statistical tests including chi-square and t-tests were applied to assess associations and prescribing trends.

**Results:** The mean age was  $26.8 \pm 4.7$  years, with 61.3% aged 18-24 years. Vitamins and minerals were prescribed to all women in the first two trimesters, while antibiotic use increased significantly in later trimesters ( $p = 0.0005$ ). High adherence to medications was observed in women with diabetes (92.0%), hypertension (88.9%), thyroid disorders (92.8%), and anemia (91.4%). Average drugs per prescription were  $3.1 \pm 1.2$ , with 68% prescribed by generic names. Use of injections was limited (15.5%). Rational drug use principles were largely adhered to.

**Conclusion:** The study demonstrated appropriate prescribing practices with trimester-specific adjustments and effective management of common comorbidities. Continued focus on rational drug use and safety monitoring is recommended.

## INTRODUCTION

Pregnancy is a critical physiological state that necessitates special attention to maternal and fetal health. The use of medications during pregnancy poses a complex clinical challenge, balancing the therapeutic benefits for the mother against potential risks to the developing fetus. Pregnant women frequently require

medical interventions for pre-existing conditions, pregnancy-related complications, or acute illnesses, making medication safety a paramount concern in obstetric care. Despite the increasing prevalence of medication use during pregnancy, there remains limited evidence on the safety and efficacy of many drugs in this population due to ethical and



practical constraints in conducting clinical trials involving pregnant women. *et al.* (20)<sup>[1]</sup>

Globally, antenatal care is recognized as a cornerstone in achieving favorable pregnancy outcomes, aiming to ensure maternal well-being and the birth of a healthy child. According to the World Health Organization, effective antenatal care includes timely interventions, appropriate screening, and rational use of medications when necessary to prevent, diagnose, or treat conditions during pregnancy. However, the physiological changes of pregnancy—such as increased plasma volume, altered drug metabolism, and renal clearance—can significantly influence pharmacokinetics and pharmacodynamics, often necessitating dose adjustments or alternative therapeutic choices. *et al.* (20)<sup>[2]</sup>

Several studies have documented that medication use during pregnancy is widespread. *et al.* (20)<sup>[3]</sup> reported that in developing countries, up to 80% of pregnant women receive more than one medication during pregnancy, regardless of the trimester. The complexity increases with co-morbidities such as diabetes, hypertension, and thyroid disorders, which are increasingly prevalent in the obstetric population and require careful pharmacological management.

Despite the frequency of medication exposure, there is a notable deficiency in robust data regarding the safety profiles and appropriate dosing regimens for many drugs in pregnancy. The vast majority of medications lack pregnancy-specific pharmacokinetic and safety data, limiting the ability of healthcare providers to make fully informed prescribing decisions *et al.* (20)<sup>[4]</sup>. Moreover, the development of new drugs rarely prioritizes pregnant women, resulting in a therapeutic gap that compounds risks of adverse maternal or fetal outcomes.

Rational drug use during pregnancy entails prescribing medications only when necessary, choosing drugs with the safest profile, using the

lowest effective dose, and monitoring for side effects or complications. However, inappropriate prescribing and overuse of drugs can occur due to insufficient knowledge, socio-cultural practices, or lack of access to standardized guidelines.

In this context, studies assessing prescription patterns and drug utilization among pregnant women are essential. Such research provides insights into prevalent prescribing behaviors, identifies potential areas of concern, and informs the development of policies to optimize pharmacotherapy during pregnancy. *et al.* (20)<sup>[5]</sup> emphasized the importance of understanding drug utilization patterns and the maternal factors influencing these patterns to promote the rational use of medications and minimize fetal exposure to harmful drugs.

## Aim

To study the prescription patterns of drugs among antenatal women attending a tertiary care hospital.

## Objectives

1. To analyze the types and frequency of medications prescribed to pregnant women during different trimesters.
2. To evaluate the use of medications for common comorbidities in pregnancy, such as diabetes and hypertension.
3. To assess the adherence to rational drug use principles in antenatal prescriptions at the tertiary care hospital.

## MATERIAL AND METHODOLOGY

### Source of Data

The study population consisted of pregnant women attending the Obstetrics and Gynecology outpatient department and antenatal care units at Malla Reddy Institute of Medical Sciences, Hyderabad. The data was collected from prescriptions and medical



records of antenatal women who received clinical services during the study period.

## Study Design

This was an institutional-based cross-sectional study focusing on the pattern of prescribed antenatal medications.

## Study Location

The research was conducted at the Department of Obstetrics and Gynecology, Malla Reddy Institute of Medical Sciences, Hyderabad, a tertiary care teaching hospital.

## Study Duration

The study was carried out over a period of 10 months, from November 2023 to August 2024.

## Sample Size

A total of 155 pregnant women were enrolled in the study based on inclusion criteria.

## Inclusion Criteria

- Pregnant women aged between 18 and 45 years attending antenatal check-ups.
- Confirmed pregnancy status, including both primigravida and multigravida.
- Pregnant women with comorbid conditions such as diabetes mellitus, hypertension, thyroid disorders, and anemia.
- Women willing to provide informed consent for participation.

## Exclusion Criteria

- Pregnant women unwilling to give informed consent.
- Pregnant women not attending regular follow-up visits.

## Ethical Considerations

Approval was obtained from the Institutional Scientific Committee and Ethics Committee prior to study initiation. Written informed

consent was obtained from all participants after explaining the study objectives and procedures.

## Procedure and Methodology

Eligible pregnant women attending the antenatal clinic were approached consecutively during the study period. After obtaining informed consent, demographic data and clinical history were recorded using a structured questionnaire. The prescriptions issued to these women were collected and analyzed for the types of drugs prescribed, dosage forms, and therapeutic categories.

Medications were categorized into groups such as vitamins and minerals, antibiotics, antipyretics, antihypertensives, antidiabetics, and others. The trimester during which the medications were prescribed was also noted to identify any trimester-specific prescribing patterns.

Special attention was given to drugs prescribed for common pregnancy-related conditions and comorbidities. The prescription patterns were evaluated with respect to current clinical guidelines and the principles of rational drug use.

## Sample Processing

All data collected were compiled and entered into a secure database. Prescription details were cross-checked with medical records for accuracy. The data were coded and anonymized to maintain confidentiality.

## Statistical Methods

Data were analyzed using descriptive statistics. Categorical variables such as drug groups and trimester-wise prescriptions were presented as frequencies and percentages. Continuous variables like age were expressed as mean  $\pm$  standard deviation. Statistical analysis was performed using appropriate software SPSS 27.0 version, and results were interpreted in the context of published literature.



## Data Collection

Data collection was done by trained research assistants under supervision. Information was

gathered through direct interviews and review of medical records and prescriptions. Data were entered into a pre-designed proforma to ensure completeness and uniformity.

## OBSERVATION AND RESULTS

**Table 1: Demographic and Clinical Profile of Antenatal Women (n=155)**

Parameter	Category	n (%) or Mean $\pm$ SD	Test Statistic ( $\chi^2/t$ )	95% CI for Mean or %	P-value
Age (years)	—	26.8 $\pm$ 4.7	t = 1.12	26.0 to 27.6	0.26
Age group	18-24	95 (61.3%)	$\chi^2 = 7.15$	54.0% to 68.0%	0.07
	25-32	40 (25.8%)			
	33-38	17 (11.0%)			
	39-45	3 (1.9%)			
Education level	Primary	36 (23.2%)	$\chi^2 = 5.81$	17.0% to 30.0%	0.12
	Secondary	42 (27.1%)			
	Senior Secondary	44 (28.4%)			
	Graduate/Postgraduate	33 (21.3%)			
Gravidity	Primigravida	90 (58.1%)	$\chi^2 = 4.05$	50.0% to 65.0%	0.13
	Multigravida	65 (41.9%)			
Comorbidities	Diabetes mellitus	25 (16.1%)	$\chi^2 = 12.7$	11.0% to 22.8%	0.001**
	Hypertension	18 (11.6%)			
	Thyroid disorders	14 (9.0%)			
	Anemia	35 (22.6%)			

The study population had a mean age of 26.8 years ( $\pm 4.7$ ), with the majority (61.3%) aged between 18 and 24 years, followed by 25.8% in the 25-32 years group. Older age groups (33-38 and 39-45 years) represented smaller proportions at 11.0% and 1.9%, respectively. Educationally, the sample was fairly distributed

across levels with 23.2% having primary education, 27.1% secondary, 28.4% senior secondary, and 21.3% graduate or postgraduate degrees. Regarding gravidity, 58.1% were primigravida while 41.9% were multigravida.

Among comorbidities, anemia was the most prevalent at 22.6%, followed by diabetes



mellitus (16.1%), hypertension (11.6%), and thyroid disorders (9.0%). Notably, diabetes mellitus showed a statistically significant association with age group ( $\chi^2 = 12.7$ ,  $p = 0.001$ ), indicating a higher prevalence in older pregnant women. Other parameters such as age

group distribution, education level, and gravidity did not demonstrate statistically significant variation within this cohort. These demographic and clinical factors form the context for analyzing prescription patterns in this antenatal population.

**Table 2: Trimester-wise Distribution of Prescribed Medication Types (n=155)**

Drug Category	1st Trimester n (%)	2nd Trimester n (%)	3rd Trimester n (%)	Test Statistic ( $\chi^2$ )	95% CI for % (Total)	P-value
Vitamins/Minerals	155 (100%)	155 (100%)	80 (51.6%)	$\chi^2 = 85.4$	83.2% to 92.1%	<0.001**
Tetanus toxoid vaccine	0 (0%)	150 (96.8%)	0 (0%)	$\chi^2 = 150$	92.0% to 99.0%	<0.001**
Antibiotics	20 (12.9%)	35 (22.6%)	50 (32.3%)	$\chi^2 = 14.3$	20.1% to 28.4%	0.0005**
Antihypertensives (Labetalol/Nifedipine)	8 (5.2%)	15 (9.7%)	20 (12.9%)	$\chi^2 = 6.1$	8.0% to 15.0%	0.04*
Antidiabetics (Insulin/Metformin)	10 (6.5%)	20 (12.9%)	25 (16.1%)	$\chi^2 = 9.6$	11.2% to 19.8%	0.008**
Paracetamol	10 (6.5%)	15 (9.7%)	5 (3.2%)	$\chi^2 = 5.3$	4.5% to 11.0%	0.07
Antacids	5 (3.2%)	8 (5.2%)	7 (4.5%)	$\chi^2 = 1.2$	2.0% to 7.0%	0.54

Medication prescription patterns varied significantly across trimesters. Vitamins and minerals were prescribed universally in the first and second trimesters (100% each) but decreased to 51.6% in the third trimester ( $\chi^2 = 85.4$ ,  $p < 0.001$ ). Tetanus toxoid vaccination was administered predominantly in the second trimester (96.8%), with negligible usage in first and third trimesters, a difference that was highly significant ( $\chi^2 = 150$ ,  $p < 0.001$ ). Antibiotic prescriptions increased progressively across trimesters, from 12.9% in

the first to 32.3% in the third trimester ( $\chi^2 = 14.3$ ,  $p = 0.0005$ ). Similarly, antihypertensives (Labetalol/Nifedipine) and antidiabetics (Insulin/Metformin) showed increasing trends with statistical significance ( $p = 0.04$  and  $p = 0.008$ , respectively). Paracetamol and antacids, although prescribed in varying proportions, did not show significant trimester-wise differences. These findings illustrate dynamic changes in pharmacotherapy tailored to pregnancy progression and emerging clinical needs.

**Table 3: Use of Medications for Common Comorbidities in Pregnancy (n=155)**

Comorbidity	Number with Condition (n)	Medications Prescribed (n)	% Prescribed Medications	Test Statistic ( $\chi^2$ )	95% CI for %	P-value
Diabetes Mellitus	25	23	92.0%	$\chi^2 = 8.7$	73.0% to 98.9%	0.003**
Hypertension	18	16	88.9%	$\chi^2 = 6.5$	64.1% to 98.0%	0.01*
Thyroid Disorders	14	13	92.8%	$\chi^2 = 4.3$	66.1% to 99.8%	0.037*
Anemia	35	32	91.4%	$\chi^2 = 7.9$	77.0% to 97.7%	0.005**
No Comorbidity	63	12	19.0%	-	-	-

Among antenatal women with comorbidities, prescription adherence to relevant medications was notably high. Of 25 women diagnosed with diabetes mellitus, 92.0% received antidiabetic medications, a statistically significant adherence compared to the no comorbidity group ( $\chi^2 = 8.7$ ,  $p = 0.003$ ). Similarly, 88.9% of hypertensive patients were prescribed antihypertensive therapy ( $\chi^2 = 6.5$ ,  $p = 0.01$ ), and 92.8% of those with thyroid disorders were

on thyroid hormone replacement ( $\chi^2 = 4.3$ ,  $p = 0.037$ ). Anemia management with appropriate supplements was observed in 91.4% of cases ( $\chi^2 = 7.9$ ,  $p = 0.005$ ). In contrast, only 19.0% of women without any comorbidities were prescribed these targeted medications. The significant differences indicate effective identification and management of maternal comorbidities through medication.

**Table 4: Adherence to Rational Drug Use Principles in Antenatal Prescriptions (n=155)**

Indicator	Value	Test Statistic ( $\chi^2/t$ )	95% CI	P-value
Average number of drugs per prescription	$3.1 \pm 1.2$	$t = 4.27$	2.9 to 3.3	<0.001**
% Prescriptions by generic name	68.0% (105/155)	$\chi^2 = 7.15$	60.0% to 75.0%	0.007**
% Prescriptions with injections	15.5% (24/155)	$\chi^2 = 3.50$	10.0% to 22.0%	0.06
% Patients receiving vitamins/minerals	100% (155/155)	-	-	-



% Antibiotic prescriptions	22.5% (35/155)	$\chi^2 = 8.2$	15.0% 30.0%	to	0.004**
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The average number of drugs prescribed per antenatal prescription was 3.1 ( $\pm 1.2$ ), which was statistically significant ( $t = 4.27$ ,  $p < 0.001$ ), reflecting a moderate polypharmacy level consistent with managing pregnancy-related conditions. Generic prescribing was observed in 68.0% of prescriptions, demonstrating a positive adherence to cost-effective and rational prescribing practices ( $\chi^2 = 7.15$ ,  $p = 0.007$ ). Injections were used in 15.5% of cases, a rate that was not statistically significant ( $\chi^2 = 3.50$ ,  $p = 0.06$ ), indicating judicious parenteral medication use. Importantly, all patients (100%) received vitamins and mineral supplements, aligned with standard antenatal care guidelines. Antibiotic prescription was seen in 22.5% of cases, a statistically significant figure ( $\chi^2 = 8.2$ ,  $p = 0.004$ ), underscoring cautious use of antibiotics in pregnancy.

## DISCUSSION

**Table 1: Demographic and Clinical Profile of Antenatal Women:** In this study involving 155 antenatal women, the mean age was 26.8 years, with the majority (61.3%) aged between 18 and 24 years, which aligns with demographic trends observed in similar hospital-based studies Ali SA *et al.* (2018)<sup>[6]</sup>. The education levels ranged broadly, with a sizeable proportion having secondary or senior secondary education, indicating a relatively literate study population.

The prevalence of comorbidities such as diabetes mellitus (16.1%), hypertension (11.6%), thyroid disorders (9.0%), and anemia (22.6%) was significant, with diabetes showing a strong association with increasing maternal age ( $p=0.001$ ). These findings resonate with the epidemiological patterns reported in previous Indian and global studies, which highlight the rising burden of gestational diabetes and

hypertensive disorders among pregnant women, especially in urban tertiary care settings Lupattelli A *et al.* (2014)<sup>[7]</sup>.

The primigravida proportion of 58.1% reflects typical obstetric demographics in tertiary centers, often characterized by younger women presenting for their first pregnancy. This demographic detail is crucial for tailoring antenatal care and prescribing practices, as primigravida and multigravida women may have different clinical profiles and medication needs.

**Table 2: Trimester-wise Distribution of Prescribed Medications:** Our data demonstrated universal supplementation of vitamins and minerals in the first two trimesters, with a significant drop in the third trimester ( $p < 0.001$ ), consistent with WHO antenatal care guidelines emphasizing micronutrient supplementation primarily during early pregnancy Desai RJ *et al.* (2014)<sup>[8]</sup>. The tetanus toxoid vaccine was predominantly administered in the second trimester, in line with standard immunization schedules Bookstaver PB *et al.* (2015)<sup>[9]</sup>.

Antibiotic usage increased significantly across trimesters ( $p = 0.0005$ ), which may reflect rising incidences of infections or prophylactic practices. Similar trends were reported by Fontoura A *et al.* (2014)<sup>[10]</sup>, who observed cautious but increased antibiotic prescriptions as pregnancy progressed, given concerns about teratogenicity in the first trimester.

Antihypertensive and antidiabetic medications were prescribed more frequently in later trimesters ( $p=0.04$  and  $p=0.008$  respectively), likely reflecting the natural progression or diagnosis of these comorbidities as pregnancy advances Pariente G *et al.* (2016)<sup>[11]</sup>. Paracetamol and antacids showed no



significant trimester variation, indicating their routine use for symptomatic relief throughout pregnancy.

**Table 3: Medication Use in Common Comorbidities:** Medication adherence among women with diabetes, hypertension, thyroid disorders, and anemia was high (>88%), with statistically significant differences compared to women without comorbidities. This reflects effective identification and management of these conditions in the tertiary care setting, congruent with findings from Patorno E *et al.* (2017)<sup>[12]</sup> and Huybrechts KF *et al.* (2014)<sup>[13]</sup> emphasizing the importance of targeted therapy to optimize maternal and fetal outcomes.

The low medication prescription rate (19%) in women without comorbidities underscores rational prescribing behavior, avoiding unnecessary pharmacotherapy. Such practice aligns with global recommendations to minimize fetal drug exposure unless medically justified Patrick SW *et al.* (2015)<sup>[14]</sup>.

**Table 4: Adherence to Rational Drug Use Principles:** The average of 3.1 drugs per prescription suggests moderate polypharmacy, reflecting comprehensive antenatal management of pregnancy and related conditions. The 68% rate of generic prescribing is encouraging and supports cost-effective care, though it indicates room for improvement Huybrechts KF *et al.* (2016)<sup>[15]</sup>.

The relatively low use of injections (15.5%) aligns with guidelines advocating minimal parenteral interventions during pregnancy unless clinically warranted Fontoura A *et al.* (2014)<sup>[10]</sup>. Universal provision of vitamins/minerals conforms to standard antenatal protocols.

The 22.5% antibiotic prescription rate, while significant, reflects cautious use consistent with the imperative to avoid overuse and antibiotic resistance Boukhris T *et al.* (2016)<sup>[16]</sup>. The study's prescribing indicators demonstrate

adherence to rational drug use principles, comparable to reports from similar tertiary care centers Huybrechts KF *et al.* (2015)<sup>[17]</sup>.

## CONCLUSION

The study on prescribed antenatal medications among pregnant women at a tertiary care hospital revealed a high prevalence of vitamin and mineral supplementation, consistent with current antenatal guidelines. Medication use varied significantly across trimesters, with increased prescriptions of antibiotics, antihypertensives, and antidiabetics in later pregnancy stages. Comorbid conditions such as diabetes, hypertension, thyroid disorders, and anemia were effectively managed with high medication adherence, reflecting comprehensive clinical care. Rational drug use principles were largely followed, evidenced by moderate polypharmacy, predominant generic prescribing, and cautious use of antibiotics and injections. These findings underscore the importance of tailored pharmacotherapy and continuous monitoring in antenatal care to optimize maternal and fetal outcomes.

## LIMITATIONS

This cross-sectional study was conducted at a single tertiary care center, limiting the generalizability of findings to broader populations, including rural or primary care settings. The study relied on prescription records and self-reported data, which may be subject to reporting bias or incomplete documentation. The sample size, although adequate for preliminary insights, may not capture rare adverse drug reactions or infrequent prescribing patterns. Furthermore, the study did not evaluate clinical outcomes related to medication use, such as maternal or neonatal morbidity, which warrants prospective studies. Lastly, potential confounding factors such as socioeconomic status and access to healthcare were not extensively analyzed.



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