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A STUDY OF MEDICATION PATTERNS AND FACTORS INFLUENCING MEDICATION USE IN PREGNANCY AT A RURAL HEALTH BLOCK

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Abstract

Background: Pregnancy is a transformative phase for a woman's body, involving numerous significant physiological adjustments. Safely managing various health conditions that may emerge during pregnancy is paramount to ensure the well-being of both the expectant mother and the developing fetus. Understanding these prescribing patterns is essential to provide better guidance to expectant mothers and healthcare providers alike, ensuring that any medication use during pregnancy is both necessary and safe.

Objective: To assess the patterns and factors affecting medication use along with prescription pattern during antenatal periods among pregnant women.

Methods: A cross-sectional study was conducted in a rural health block spanning from July 2022 to December 2022. After securing verbal consent from antenatal women, we gathered data on patient demographics, co-existent medical conditions, medications prescribed, and recording the details in a predefined format. Descriptive statistics was used to analyze the baseline data, chi-square test was used for categorical variables and multivariate logistic regression was used for factors influencing drug prescription.

Results: Among the 322 pregnant women who participated, 49% were primigravida; with a mean age of 27.6±3.1. Approximately 30% experienced at least one disease condition during pregnancy; with anemia (11%) being the commonest. The mean number of medications was 3.3 and 33.4% of participants received medication for a particular disease condition. Multivitamins/ minerals, antimicrobials and hormones were the commonest drug classes. Maternal age over 25 [(OR (CI): 1.26 (1.03–2.16) (p = .05)] and maternal illness [OR (CI) 2.03 (1.7–3.9) (p = .05)] were identified as factors affecting drug prescription.

Conclusion: Most of our patients were multigravida over the age of 25. Vitamins and minerals were the most commonly prescribed medications, with antimicrobials being the most frequently recommended drug class for specific disease conditions. Maternal age exceeding 25 years and maternal health status were identified as influential factors in drug prescription.

Keywords: Pregnancy, Prescriptions, Factors

Introduction

Pregnancy is a unique physiological state in which multiple maternal systems adapt to support fetal development. These changes influence pharmacokinetics (absorption, distribution, metabolism, elimination) of medications, often making dosing and safety more complex. [1] Thus, the use of medications during pregnancy must carefully balance maternal benefit and fetal risk.

While iron, folic acid, and other micronutrient supplements are routinely prescribed as part of antenatal care, many pregnant women also receive additional therapeutic medications for co-morbid conditions or pregnancy complications (e.g., anemia, infections, thyroid disorders, hypertension). In India and many low- and middle-income settings, the prevalence and pattern of such prescriptions vary widely but remain under-studied, especially in rural health settings. [2]

In India, the reported proportion of pregnant women engaging in self-medication (i.e. taking drugs without a prescription) is around 19.3 % (95 % CI 7.5–41.3 %) based on meta-analysis data, reflecting both access issues and gaps in health literacy. [3] Globally, over-the-counter (OTC) drug use in pregnancy is estimated to be about 36 % (95 % CI 21–53 %) from meta-analyses of 13 studies. [4] These figures underscore that many women use medicines without formal supervision, raising concerns about safety, drug–drug interactions, and teratogenic risks.

Determinants of prescribing practices have been explored in different contexts. Maternal age, education, parity, trimester of pregnancy, and perceived severity of illness often influence whether and what medications are used. [5] In many settings, the majority of pregnant women continue existing drug therapies through pregnancy rather than discontinuing them, even if they were initiated before gestation. [6] Some specific patterns emerge globally: antiemetics, antacids, antibiotics, analgesics, antihistamines, diuretics, antidepressants, and hormones are among the more commonly used therapeutic classes during gestation. [7]

In India, a study in a tertiary hospital in Karnataka reported that the mean number of medications (excluding routine supplements) per pregnant woman was 2.68, and about 38.9 % received at least one non-routine drug. [8] In another large study from Gujarat, ferrous sulphate, calcium, and vitamins were the most commonly prescribed agents, with the average number of drugs per encounter being 3.74. [9] Similar findings were noted in a hospital-based cross-sectional study from Kolar, Karnataka, where vitamins/minerals and drugs for nausea were predominant, and most prescriptions contained two drugs per patient. [10]

However, much of the literature comes from tertiary care or urban settings; there is a paucity of data from rural obstetric outpatient clinics in India where healthcare infrastructure, prescribing behavior, and patient socioeconomic status may differ substantially. Understanding medication usage patterns and determinants in such settings is crucial for developing context-appropriate prescribing guidelines, antenatal counseling, and risk mitigation.

Therefore, the objective of our study was to assess the patterns of medication use and explore determinants of non-routine drug prescriptions among antenatal women visiting a rural health-block outpatient clinic in Kashmir, India. By identifying predictors (such as age strata, gravidity, and clinical co-morbidities), and quantifying drug class usage, this study aims to contribute evidence toward safer and more rational medication practices in resource-limited prenatal care settings.

Materials and Methods

Study design and setting

A cross-sectional observational study was conducted in the antenatal outpatient clinic of a secondary-level health facility (Sub-District Hospital, Pampore, Kashmir) from July 2022 to December 2022. The hospital caters to a largely rural population and provides both preventive and curative maternal health services.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethics Committee. Informed verbal consent was taken from each participant before data collection. Confidentiality was maintained, and patient identifiers were excluded from the study records.

Study participants
All pregnant women attending the antenatal outpatient clinic during the study period were eligible. Women with incomplete medical records or those unwilling to provide consent were excluded. A total of 322 pregnant women were enrolled.

Data collection
Data was collected using a pre-designed proforma that included:
- Socio-demographic details: age, gravidity, residence, educational status and employment status (if available).
- Clinical profile: co-existing medical conditions such as anemia, hypertension, hypothyroidism, or gestational diabetes. Number of antenatal visits was also recorded.
- Medication details: all prescribed drugs including supplements, therapeutic drugs, dose, and route of administration.

Drugs were classified into therapeutic categories (e.g., vitamins/minerals, antimicrobials, hormones, analgesics, antihypertensives). Where possible, medicines were also categorized according to the US FDA pregnancy risk classification (A, B, C, D, X).

Outcome measures
The primary outcomes were:
1. Pattern of drug use (mean number of drugs, drug classes prescribed, proportion receiving therapeutic drugs beyond supplements).
2. Determinants of prescribing (maternal age, gravidity, presence of illness).

Statistical analysis
Descriptive statistics were used to summarize demographic and prescription data. The chi-square test was applied to compare categorical variables. Univariate logistic regression was first performed to identify potential predictors of drug prescription. Factors significant at $p < 0.05$ were further tested using multivariate logistic regression to identify independent determinants. Results were expressed as odds ratios (OR) with 95% confidence intervals (CI). Analysis was carried out using SPSS version 26.

RESULTS

Socio-demographic and obstetric characteristics
A total of 322 pregnant women attending the antenatal outpatient department during the study period were enrolled. The mean age of participants was 27.6 ± 3.1 years. Age-wise distribution showed that 80 (24.8%) were aged ≤ 24 years, 155 (48.1%) were between 25–29 years, and 87 (27.0%) were ≥ 30 years.

More than half (55.27%) were primigravida, while the remainder were multigravida (44.72%). The majority were educated up to school level (56.21%), and 81.36% were unemployed, reflecting the rural population profile.

By trimester, 70 (21.73%) women were in the first, 125 (38.81%) in the second, and 127 (39.44%) in the third trimester. The mean number of antenatal visits was 3.9 ± 1.2; 201 (62.42%) had 1–4 visits, and 121 (37.57%) had > 4 visits.

A comparison between women receiving only standard supplements (Group 1, n = 198) and those receiving additional drugs (Group 2, n = 124) is presented in Table 1.

Characteristic	Group 1: Standard drugs (n=198)	Group 2: Additional drugs (n=124)
Number of participants	198	124
Mean age (years ± SD)	27.1 ± 3.2	28.3 ± 2.9
Primigravida (%)	52.02%	60.48%
Trimester distribution (1st / 2nd / 3rd	40 / 80 / 78	30 / 45 / 49
Antenatal visits (1-4 / >4)	119 / 79	82 / 42
Educational status (school or below)	108	73
Employment status (unemployed %)	173	107

Table 1. Demographic and obstetric characteristics of participants (comparison of groups)

Associated disease conditions

Almost 30% (97/322) of participants experienced at least one medical condition during pregnancy. The most frequent was anemia (10.86%), followed by hypothyroidism (5.59%), pregnancy-induced hypertension (3.72%), and gestational diabetes mellitus (2.79%). Other recorded conditions included urinary tract infections, respiratory tract infections, and miscellaneous disorders such as nausea or autoimmune illness (Table 2).

Condition	Number of participants (n)	Percentage of total participants (%)
Anemia	35	10.86
Hypothyroidism	18	5.59
Pregnancy-induced hypertension (PIH)	12	3.72
Gestational diabetes mellitus (GDM)	9	2.79
Urinary tract infection (UTI)	8	2.48
Respiratory tract infection (RTI)	7	2.17
Other disorders (vomiting, autoimmune, etc.)	8	2.48

Table 2. Distribution of associated disease conditions

Drug utilization pattern

Across all participants, approximately 1,060 drug items were prescribed, yielding a mean of 3.3 drugs per encounter.

The most commonly prescribed drug classes were multivitamins/minerals (28.9%), antimicrobials (25.5%), hormones (24.5%), PPIs/H_2-blockers (23.9%), and antiemetics (23.6%). Other groups included analgesics (18.9%), antihistamines (16.1%), amino acid supplements (8.1%), antihypertensives (2.5%), antidiabetic agents (1.9%), and antiepileptics (0.6%). (Figure 1).

The predominance of multivitamin and mineral supplements reflects routine antenatal supplementation, while antimicrobials and hormonal agents were used for specific therapeutic indications.

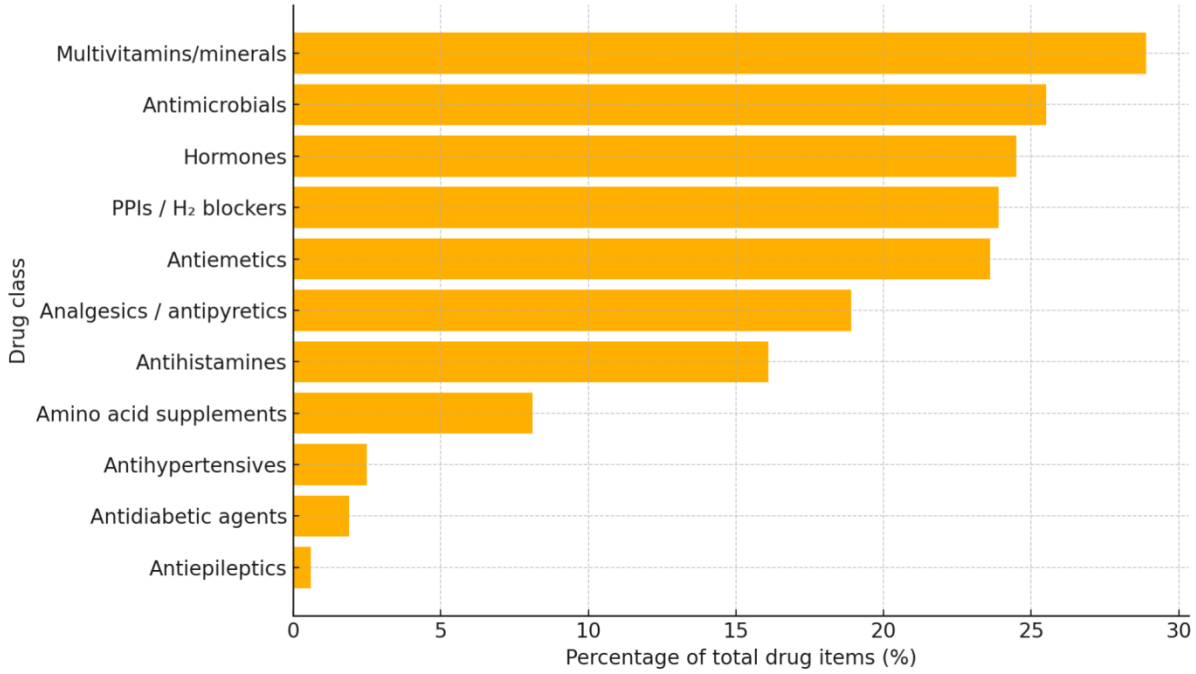

Figure 1. Bar diagram showing frequency of various drug classes prescribed during pregnancy

WHO prescribing indicators

The WHO core prescribing indicators are summarized in Table 3.

The average number of drugs per encounter was 3.3 (above the WHO optimal 1.6–1.8), explained by inclusion of routine supplements. Antibiotics were prescribed in 14% of encounters and injectables in 1%, both within acceptable WHO standards. Generic prescribing accounted for 33% of total drugs, indicating moderate preference for branded formulations, while 84% of prescribed drugs were included in the National List of Essential Medicines (NLEM 2022), denoting satisfactory adherence to essential-medicine policy.

Indicator	Value observed	WHO recommended range / comment
Average number of drugs per encounter	3.3	1.6-1.8 (higher due to supplementation)
% of encounters with antibiotics	14%	≤20% (acceptable)
% of encounters with injectables	1%	≤10% (acceptable)
% of drugs prescribed by generic name	33%	≥80% (low; preference for branded drugs)
% of drugs from essential drug list (NLEM 2022)	84%	≥80% (satisfactory adherence)

Table 4. WHO core prescribing indicators

FDA pregnancy-risk classification

When classified according to U.S. FDA pregnancy-risk categories, the majority of drugs belonged to Category A (44%) and Category B (41%), together comprising 85% of all items. Category C (13%) included PPIs, antiemetics, antihistamines, and certain hormonal agents. A small fraction (2%) were Category D (e.g., methyldopa, labetalol) used when benefits outweighed potential risks. No Category X drugs were prescribed (Figure 2). The predominance of Category A and B drugs demonstrates adherence to pregnancy-safe pharmacotherapy and avoidance of contraindicated medications.

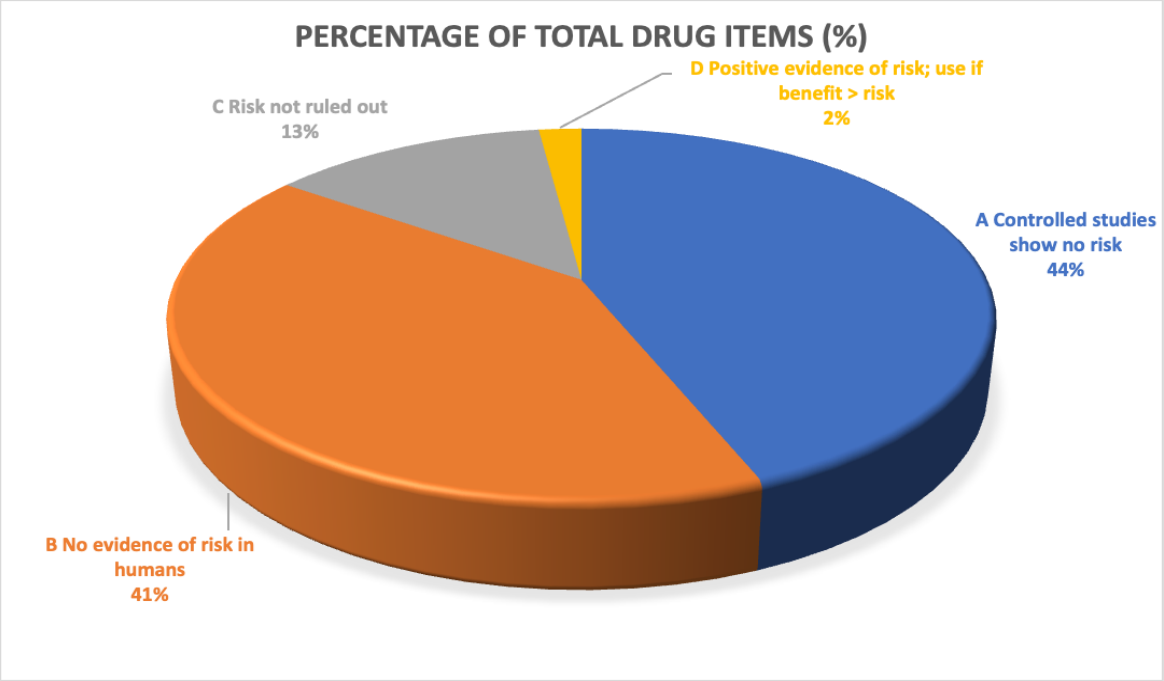

Figure 2. Distribution of prescribed drugs by FDA pregnancy-risk category

Determinants of drug prescriptions

Univariate analysis (Table 5,6) revealed that maternal age > 25 years and presence of maternal illness were significantly associated with receiving additional drugs ($p < 0.05$). Educational level, employment status, gravidity, and number of antenatal visits were not statistically significant.

In multivariate logistic regression (Table 7), only maternal age > 25 years remained an independent predictor of additional drug use (aOR 1.39, 95% CI 1.03–1.51, $p < 0.05$). Neither gravidity (aOR 0.74, $p > 0.05$) nor maternal disease (aOR 1.74, $p > 0.05$) retained significance after adjustment.

Maternal age emerged as the sole independent determinant of higher drug utilization during pregnancy.

S. No.	Baseline Characteristics	Group 1 (N = 198)	Group 2 (N = 124)	p -value
1.	Age (years)			
	≤25 >25	136 62	68 56	.005
2.	Educational Status			
	School University Degree	108 90	73 51	.420
3.	Employment Status			
	Unemployed Employed	159 39	103 21	.909
4.	Gravidity			
	Primigravida Multigravida	103 95	75 49	.162
5.	Antenatal Visits			
	1 - 4 > 4	119 79	82 42	.66
6.	Maternal Disease			
	Yes No	44 154	53 71	.00

Table 5: Comparison of the characteristics of Pregnant Women who received additional drugs during the antenatal period (Group 2, n = 124) as compared to those who received only standard drugs (Group 1, n = 198)

S. No.	Baseline Characteristics	OR (CI)	p-value
1.	Age (years) (>25)	1.41 (1.14–2.37)	<0.05
2.	Educational Status (Degree and above)	0.72 (0.44–1.01)	>0.05
3.	Employment status (Unemployed)	0.71 (0.34–0.92)	>0.05
4.	Gravidity (Primigravida)	1.03 (0.47–1.17)	>0.05
5.	Antenatal visits (>4)	0.76 (0.41–1.05)	>0.05
6.	Maternal Illness	1.41 (1.02–1.79)	<0.05

Table 6: Determinants of Drug Prescriptions During the Antenatal Period (Univariate analysis)

S. No	Characteristics	OR (CI)	p-value
1.	Age (years) (>25)	1.39 (1.03–1.51)	<0.05
2.	Gravida (primigravida)	0.74 (0.63–1.04)	>0.05
3.	Maternal Disease	1.74 (0.27–2.31)	>0.05

Table 7: Determinants of Drug Prescriptions During the Antenatal Period (Multivariate analysis)

DISCUSSION

The present cross-sectional study evaluated the pattern of medication use and factors influencing prescription during pregnancy among antenatal women attending a rural health block in Kashmir. Our findings reveal a mean maternal age of 27.6 years, with nearly half the participants being multigravida, which is consistent with previous Indian data showing that most women seeking antenatal care belong to the 25–30-year age group, the peak reproductive period in India. [8,9]

Medication use and prescribing pattern

The average number of drugs per prescription was 3.3, higher than the WHO reference range (1.6–1.8), but comparable to other Indian studies on antenatal drug utilization. [8,10] This elevation is expected, as most women routinely receive iron, folic acid, and calcium supplements, often combined with therapeutic medications for intercurrent illnesses. A similar average (3.7) was reported by Chaudhari et al. [9] in Gujarat, while Rajan et al. [8] reported a mean of 2.7 drugs per encounter in a tertiary hospital setting.

The predominance of multivitamins, minerals, and hematinics in prescriptions aligns with both Indian and global evidence underscoring widespread use of supplementation during pregnancy. [4,9] Antimicrobials (25.5%) and hormones (24.5%) were the next most frequently used drug groups, comparable to the figures of 24–27% in the Kolar study by Asha et al. [10] The high proportion of gastrointestinal and antiemetic medications (PPIs/H_2 blockers 23.9%, antiemetics 23.6%) reflects frequent management of gastritis, reflux, and hyperemesis during pregnancy, all common reasons for polypharmacy in this population.

WHO prescribing indicators

The WHO prescribing indicators in this study suggest a largely rational but improvement-worthy prescribing trend. The percentage of encounters with antibiotics (14%) and injectables (1%) fall within WHO-recommended limits, [2] indicating prudent use of these agents. However, generic prescribing (33%) was low, revealing a dependence on branded formulations, likely due to limited generic availability or prescriber preference. In contrast, tertiary-centre studies such as that by Chaudhari et al. [9] reported 90% generic prescribing, highlighting institutional differences between rural and urban setups. Encouragingly, 84% of prescribed drugs were from the National List of Essential Medicines (NLEM 2022), which is in agreement with the WHO target of ≥80%. [2]

Safety profile of drug use

Classification of drugs according to FDA pregnancy risk categories showed that 85% of prescribed items were Category A or B, representing medications with well-established safety in pregnancy. This proportion is consistent with findings from the Kolar [10] and Bangalore [8] studies, where 80–90% of prescriptions fell under A/B categories.

The small representation of Category C (13%) and D (2%) drugs was limited to necessary therapeutic use — PPIs, antiemetics, and antihypertensives — and no Category X drugs were prescribed, underscoring adherence to safe prescribing practices in the rural antenatal population.

Determinants of drug prescription

Maternal age >25 years was identified as the sole independent determinant of receiving additional drugs. This association likely reflects greater prevalence of comorbidities such as hypothyroidism, gestational hypertension, and diabetes among older pregnant women. [8,9] Although maternal illness showed significance in univariate analysis, it lost statistical strength on adjustment, possibly due to confounding between age and disease prevalence. Gravidity and number of antenatal visits did not significantly influence prescription pattern, a trend similarly reported by Rajan et al. [8] and Sharma et al.[11]

The slightly higher proportion of participants receiving additional drugs (40%) compared to those with documented illness (30%) can be explained by inclusion of prophylactic or symptom-based therapy (e.g., PPIs, antiemetics) in otherwise uncomplicated pregnancies.

This highlights the need for periodic prescription audits to ensure that adjunctive medications are used judiciously and only when clinically justified.

Comparison with previous studies

The present findings resonate with those of several Indian and international studies. Globally, Daw et al. [4] reported that vitamins, minerals, and hematinics remain the most common drug classes used in pregnancy, followed by antimicrobials and analgesics. Similar prescription patterns were noted in Ethiopia, [12] Nigeria, [13] and Nepal, [14] though the proportion of Category C/D drugs was higher in those regions, suggesting relatively greater risk exposure. The low rate of injectable and antibiotic use in our study supports safe prescribing consistent with WHO guidance. [2]

Public health implications

The predominance of safe, supplement-based prescriptions suggests that primary healthcare physicians in this rural block largely adhere to standard antenatal care practices. However, the low percentage of generic prescriptions highlights an important area for improvement. Improving the availability of quality-assured generics through government supply chains and sensitizing prescribers toward rational brand substitution could enhance cost-effectiveness and patient access to essential drugs. Additionally, maintaining a centralized prescription monitoring system would help detect irrational or duplicate prescribing, especially as the number of antenatal visits increases.

Strengths and limitations

The study provides valuable insight into real-world medication use in a rural Indian antenatal setting, a domain under-represented in literature.

Its strengths include adequate sample size, standardized data collection, and inclusion of both supplementation and therapeutic medications.

However, limitations include reliance on self-reported drug use and prescriptions recorded at a single time point, without assessment of adherence. OTC or traditional medicine use, which may contribute to total drug exposure, was not captured. Furthermore, the cross-sectional design precludes causal inference between prescribing determinants and health outcomes.

Conclusion

To summarize, medication use during pregnancy in this rural block predominantly involved essential, pregnancy-safe drugs, with limited use of potentially risky agents. Prescriptions were rational overall, though generic prescribing remained suboptimal. Maternal age >25 years was the only independent determinant of additional drug use. Ongoing monitoring, education, and reinforcement of rational prescribing principles can further improve the safety and cost-effectiveness of antenatal pharmacotherapy.

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