ORIGINAL ARTICLE

MEDICATION USE AND PATIENT COUNSELING AMONG PREGNANT WOMEN IN KHYBER PAKHTUNKHWA, PAKISTAN: A CROSS-SECTIONAL HOSPITAL-BASED STUDY

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ABSTRACT

Objective: This study aimed to assess the medication patterns and its associated factors among pregnant women attending a tertiary care hospital in Dera Ismail Khan.

Methods: A hospital-based cross-sectional study was conducted at the Gynecology and Obstetrics outpatient department of DHQ Hospital, Dera Ismail Khan, from December 2025 to January 2026. A total of 194 pregnant women were enrolled using consecutive sampling. Data were collected through face-to-face interviews using a structured questionnaire covering socio-demographics, obstetric history, and details of medication use. Medications were classified according to the FDA pregnancy risk categories. Data were analyzed using statistical packages for social sciences (SPSS) version 27. Descriptive statistics and chi-square tests were used. A p-value <0.05 was considered statistically significant.

Results: The mean age of participants was 25.4 ± 5.2 years. Overall, 61.9% (n=120) participants reported a use of at least one medication. Multivitamins (35.1%), folic acid (18.6%), and calcium (13.4%) were most frequently used medications. Notably, 22.7% practiced self-medication, and only 38.1% received adequate medication information from healthcare providers. No FDA Category D or X drugs were reported. A significant association was found between medication use and trimester (p=0.033), with highest use in the third trimester (68.9%), and with education level (p=0.042), being highest among graduates (75.0%). The use of Iron sucrose was significantly higher in the third trimester (p=0.026).

Conclusion: Medication use was reported by 61.9% of pregnant women, with 22.7% practicing self medication and 56.7% receiving inadequate counseling. Medication use was significantly higher in the third trimester and among graduate women. No FDA Category D or X drugs were used. While prescribing practices are generally safe, high rates of self medication and poor patient counseling remain significant public health concerns. Targeted interventions to improve healthcare provider communication and promote rational drug use are urgently needed.

Keywords: Medication use; Pregnancy; Drug utilization; Self-medication; FDA pregnancy categories; Pakistan; Patient counseling

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INTRODUCTION

Pregnancy is a dynamic physiological period characterized by the rapid growth and development of a fertilized egg into a fetus within a uterus [1]. The use of medications during this period has been a significant concern since the thalidomide cases of the 1960s and the discovery of the teratogenic effects of diethylstilbestrol in 1971 [2]. Balancing therapeutic benefits and potential fetal risk for the mother is a significant challenge for clinicians, as many prescription and over-the-counter drugs, along with herbal remedies and dietary supplements, can cross the placental barrier and enter the fetal bloodstream [3]. Globally, medication use during pregnancy ranges from 60-90%, with substantial variation across regions and healthcare settings [4,5].

According to the World Health Organization, drug utilization refers to the use, distribution, prescription, and marketing of medications, with a focus on their medical, social, and economic impacts on society [6]. The primary goal of such research is to ensure and promote the rational use of medications among patients to optimize healthcare outcomes, a concept that is particularly important in pregnancy, where the benefit-risk balance is complex. To guide prescribing decisions, the United States Food and Drug Administration (US FDA) classify medication into A, B, C, D, or X, based on their risk to fetus, with category X drugs being the most dangerous and are strictly contraindicated during pregnancy [7]. However, because of ethical concerns pregnant women are routinely excluded from clinical trials, therefore safety data of new drugs during pregnancy remain limited, and clinicians must rely on post-marketing surveillance and observational studies to guide prescribing practices [8].

In Pakistan, several studies have documented these prescribing trends. A recent cross-sectional study conducted in Lahore reported that among 175 pregnant women, 62 different medications were prescribed, among which 54.9% used over-the-counter medications, 58.3% used dietary supplements and 21.4% reported using herbal products [7]. Another large-scale multi-center cross-sectional study conducted at five tertiary care hospitals in Karachi, Nawabshah, Larkana, and Quetta analyzed 3,769 prescriptions. The results showed that iron and vitamin/mineral supplements were the most frequently prescribed (79.4%), followed by analgesics in 6.2% and antibiotics in 2.2%. Among all prescribed medications 2.3% were classified as potentially teratogenic, exposing 0.8% of the women in the study to such drugs [8].

Despite these valuable insights, research on medication patterns during pregnancy in Pakistan, specifically in Khyber Pakhtunkhwa remains limited. To our knowledge, no published data are available on this aspect from Khyber Pakhtunkhwa, a province characterized by unique cultural practices, healthcare access challenges, and socioeconomic determinants that may affect medication utilization patterns. This study aims to address this gap by examining the current medication utilization trends in this population. The primary objective of our research is to assess medication utilization patterns among pregnant women in Dera Ismail Khan, including the prevalence of medication use, the types and frequencies of specific medications, and their classification according to US FDA pregnancy risk categories. Secondary objectives are to evaluate medication sourcing behaviors (including the extent of self-medication); to assess the adequacy of patient counseling regarding medications; to identify factors associated with medication use (including trimester, education, and parity); to analyze trimester-specific patterns for key medications such as iron sucrose and folic acid; and to generate evidence-based recommendations for improving rational drug use and patient counseling in this setting [9-11].

By addressing these objectives, this study aims to provide actionable evidence for clinicians, policymakers, and public health practitioners working to improve maternal and fetal safety in the region.

METHODOLOGY

This cross-sectional study was conducted at the DHQ Hospital, Dera Ismail Khan, Pakistan, to assess medication use patterns among pregnant women. DHQ Hospital Dera Ismail Khan is a tertiary care teaching hospital affiliated with Gomal University. It serves as a major referral center for the surrounding districts of Khyber Pakhtunkhwa, including Tank, Lakki Marwat, and South Waziristan. The Gynecology and Obstetrics OPD sees approximately 150–200 pregnant women per week. The study is reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines for cross-sectional studies. Data were collected over a one-month period from December 11, 2025, to January 11, 2026.

Ethical approval was obtained from the Institutional Review Board of Gomal University Dera Ismail Khan and also data collection approval was taken from the Medical Superintendent of DHQ Hospital, Dera Ismail Khan. Participants data were strictly maintained confidential and anonymous throughout the study.

The study population comprised of pregnant women visiting the Gynecology and Obstetrics OPD of DHQ hospital. A consecutive sampling technique was used to recruit participants. All pregnant women presenting to the OPD during the study period who met the inclusion criteria and were willing to participate in the study were included until the desired sample size was achieved.

WHO sample size calculator for cross-sectional studies was used to calculate sample size. By assuming a 61.9% prevalence of medication use during pregnancy (derived from the initial phase of data collection), a 95% confidence interval and keeping a 7% margin of error, we required minimum sample size of 185 participants. To compensate for potential incomplete or missing data additional 5% were taken which yield a final sample size of 194 participants.

Participants included in the study were pregnant women of any gestational age (first, second, or third trimester) who attended the hospital OPD during the study period, were between 16 and 37 years of age, and provided informed consent to participate. Pregnant women with severe medical or obstetric complications, those who were hospitalized due to complex medication regimens, and individuals unwilling to provide study data were excluded from the study.

Data were collected through structured face-to-face interviews using a purpose-built questionnaire developed specifically for this study. The questionnaire was constructed following a systematic review of published literature on medication use during pregnancy in similar low- and middle-income country (LMIC) settings. The questionnaire covered the following domains: (i) socio-demographic characteristics, including age, educational attainment, and pregnancy planning status; (ii) obstetric history, including number of previous pregnancies and current trimester of pregnancy; (iii) medication use details, encompassing prescription drugs, over-the-counter (OTC) medications, nutritional supplements, and herbal products; (iv) source of medication or prescribing advice, including physician, pharmacist, self-medication, or other informal sources; (v) patient knowledge and health literacy regarding medication safety during pregnancy; and (vi) counseling adequacy, assessed by asking participants whether they had received sufficient information from a healthcare provider regarding the medications prescribed to them, their indications, potential side effects, and instructions for use.

To ensure content validity, the initial draft of the questionnaire was reviewed by a panel of three subject matter experts, comprising two senior consultant obstetricians and one public health specialist with experience in maternal health research. The panel independently assessed each item for relevance, clarity, and comprehensiveness in relation to the study objectives. Based on their

consolidated feedback, minor modifications were made to the wording and sequencing of certain items to improve clarity and clinical relevance. No items were removed or added at this stage.

Pilot Testing: Following expert review, the revised questionnaire was pilot-tested on 10 pregnant women attending the same OPD who were not included in the final study sample. The pilot was conducted to assess item comprehension, cultural appropriateness, and estimated interview duration. No substantial ambiguities or comprehension difficulties were identified, and no further modifications to the instrument were deemed necessary. All interviews were conducted in Urdu, Saraiki, or Pashto, as appropriate to the participant's preferred language, to minimize language barriers and enhance the accuracy of self-reported responses.

Ethical approval was obtained from the Institutional Review Board of Gomal University, Dera Ismail Khan. Also, data collection approval was obtained from the Medical Superintendent of DHQ Hospital, Dera Ismail Khan. The study was conducted according to the ethical standards of the responsible institution and also with the Helsinki Declaration.

Statistical Analysis

The data were entered and analyzed through statistical packages for social sciences (SPSS) version 27. Descriptive statistics were calculated for all variables. For categorical variables such as age groups, trimesters, education levels, and medication use patterns frequencies and percentages were reported. In order to explore factors associated with medication use, further statistics were applied. A chi-square test of independence was used to examine association between categorical independent variables (e.g. trimester, education level, number of previous pregnancies) and the dependent variables (any medication use: yes/no). Fisher's exact test was used where chi-square was not applicable. A p-value of less than 0.05 was considered statistically significant for all tests.

RESULTS

This study was conducted on 194 pregnant women having mean age of 25.4 ± 5.2 years. The largest proportion of participants (40.4%, n=78) were aged between 21-25 years, followed by those aged 26-30 years (21.8%, n=42), 16-20 years (18.1%, n=35), and 31-37 years (16.6%, n=32). Age data was missing for one participant (0.5%). Educational status of participants varied considerably. Among all participants, (37.1%, n=72) were illiterate with no formal education, while 28.9% (n=56) had achieved higher education (graduate level), 16.5% (n=32) had secondary education, and 15.5% (n=30) had primary education. Most pregnancies were planned (76.3%, n=148), with only 2.1% (n=4) of participants reported an unplanned pregnancy; for 21.6% (n=42) of participants data on pregnancy planning was missing. A detailed summary of socio-demographics characteristics of participants is presented in table 1.

Majority of participants were in their third trimester (62.9%, n=122), while 20.6% (n=40) were in the second trimester and 16.5% (n=32) were in the first trimester. In terms of parity, 30.9% (n=60) of women were primigravida (no previous pregnancies). Among multigravida women, the proportion of those with one previous pregnancy (22.7%, n=44) was similar to those with two previous pregnancies (22.7%, n=44), while 23.7% (n=46) had three or more previous pregnancies. Only 6.2% (n=12) of the study population was reported having chronic illness, while the vast majority (93.8%, n=182) had no chronic medical conditions. A summary of obstetric and clinical characteristics of all participants is presented in table 1.

Table 1: Socio-demographics and Obstetric Characteristics of Pregnant Women (N=194)

Characteristic	Category	N	Percentage (%)
Age Groups	16-20 years	35	18.1
	21-25 years	78	40.4
	26-30 years	42	21.8
	31-37 years	32	16.6
	Missing	1	0.5
Education Level	No formal education	72	37.1
	Primary education	30	15.5
	Secondary education	32	16.5
	Higher education	56	28.9
Pregnancy Planning	Yes	148	76.3
	No	46	23.7
Trimester	First trimester	32	16.5
	Second trimester	40	20.6
	Third trimester	122	62.9
Previous Pregnancies	No	60	30.9
	One	44	22.7
	Two	44	22.7
	Three or more	46	23.7
Chronic Illness	Yes	12	6.2
	No	182	93.8

Education categories: no formal education = never attended school; primary = 1-5; secondary = grades 6-10 (including Middle and Metric); higher =grades 11 and above (including Intermediate and Graduate).

Among all participants, 61.9% (n=120) reported using at least one medication during their current pregnancy, while 38.1% (n=74) reported no medication use. Antibiotic use was reported by 10.3% (n=20) of women. The study participants have used a total of 11 different medications. Among which, multivitamins were the most commonly used medication, reported by 35.1% (n=68) of all women (n=194). This was followed by folic acid (18.6%, n=36/194), calcium supplements (13.4%, n=26/194), and iron preparations (6.2%, n=12/194). Vitamin D and Vitamin B12 were each used by 5.2% (n=10/194) of participants.

Regarding non-supplement medications, paracetamol and esomeprazole were each used by 4.1% (n=8) of participants. Labetalol and methyldopa (both antihypertensives) were each used by 2.1% (n=4) of women. Aspirin was used by 1.0% (n=2) of participants.

When classified according to FDA pregnancy risk categories, the majority of medications used fell under Category A (safe in pregnancy). Category B medications (no evidence of human risk) included paracetamol, esomeprazole, and methyldopa. Category C medications (risk cannot be ruled out) included labetalol and aspirin. Notably, no Category D or X medications were reported in this study. A complete list of frequently used medications is presented in table 2.

Table 2: Frequently Used Medications Among Pregnant Women (n=194)

Name of medicine	Frequency (n)	Percentage (%)	FDA Category
Multivitamins	68	35.05	A
Folic acid	36	18.6	A
Calcium supplements	26	13.4	A
Iron	12	6.2	A
Vitamin D	10	5.2	A
Vitamin B12	10	5.2	A
Paracetamol	8	4.1	B
Esomeprazole	8	4.1	B
Labetalol	4	2.1	C
Methyldopa	4	2.1	B
Aspirin	2	1.0	C

Iron sucrose use was reported by 48 participants (24.7%). A statistically significant association was found between iron sucrose use and trimester of pregnancy ($\chi^2 = 7.288$, df = 2, p = 0.026). The majority of iron sucrose use occurred in the third trimester (79.2%, n=38/48), followed by the second trimester (12.5%, n=6/48) and first trimester (8.3%, n=4/48). This indicates that iron sucrose was significantly more likely to be used in the third trimester compared to earlier trimesters. These findings are presented in table 3.

Table 3: Iron Sucrose Use Across Trimesters of Pregnancy (N=194)

Trimester	Iron Sucrose Use - Yes (n)	Iron Sucrose Use - No (n)	p-value	Total (n)
First Trimester	4	28	0.026	32 (8,3)
Second Trimester	6	34		40 (12.5)
Third Trimester	38	84		122 (79.2)

Analysis of other medications across trimesters and parity revealed no statistically significant associations. The use of multivitamin (p=0.454) and folic acid (p=0.279) did not differ significantly across trimesters. Similarly, no significant associations were found between medication use and number of previous pregnancies for any of the medications studied ($p > 0.05$ for all).

Regarding the source of medication or prescribing advice, physicians were the primary prescribers for the majority of participants (67.0%, n=130). However, self-medication was also reported in a substantial proportion of women (22.7%, n=44). Recommendations from Pharmacist and other sources (e.g., family, friends) each accounted for 5.2% (n=10) of medication sources.

When participants were asked about their awareness of the medications they were taking, an overwhelming majority that's 97.9% (n=190) of participants reported being aware and only 2.1% (n=4) were unaware. Regarding medication safety behavior, only 11.3% (n=22) of participants reported that they stopped medication taking at some point of pregnancy due to fear of harming the fetus, whereas 88.7% (n=172) did not discontinue any medication. Concerning the sufficiency of information received, only 38.1% (n=74) of women felt that they have received sufficient information from a healthcare provider about medication use during pregnancy. More than half participants (56.7%, n=110) reported that they didn't receive adequate information, and 5.2% (n=10) were unsure. These findings are summarized in Table 4.

Table 4: Medication Use Patterns and Related Behaviors (N=194)

Characteristic	Category	N	Percentage (%)
Any Medication Use	Yes	120	61.9
	No	74	38.1
Antibiotic Use	Yes	20	10.3
	No	174	89.7
Medication Prescriber	Physician	130	67.0
	Self-decided	44	22.7
	Pharmacist	10	5.2

Characteristic	Category	N	Percentage (%)
	Other	10	5.2
HCP Awareness about medicine use	Yes	190	97.9
	No	4	2.1
Stopped medicines due to fear of harm	Yes	22	11.3
	No	172	88.7
Information Received about medicines	Yes	74	38.1
	No	110	56.7
	Unsure	10	5.2

To examine the association between medication, use and trimester of pregnancy, a chi-square test of independence was applied. A statistically significant association was found ($\chi^2 = 6.821$, df = 2, p = 0.033) between these two variables. Medication use was highest among women in the third trimester (68.9%, n=84/122), compared to those in the first (50.0%, n=16/32) and second trimesters (50.0%, n=20/40). This association is shown in figure 1.

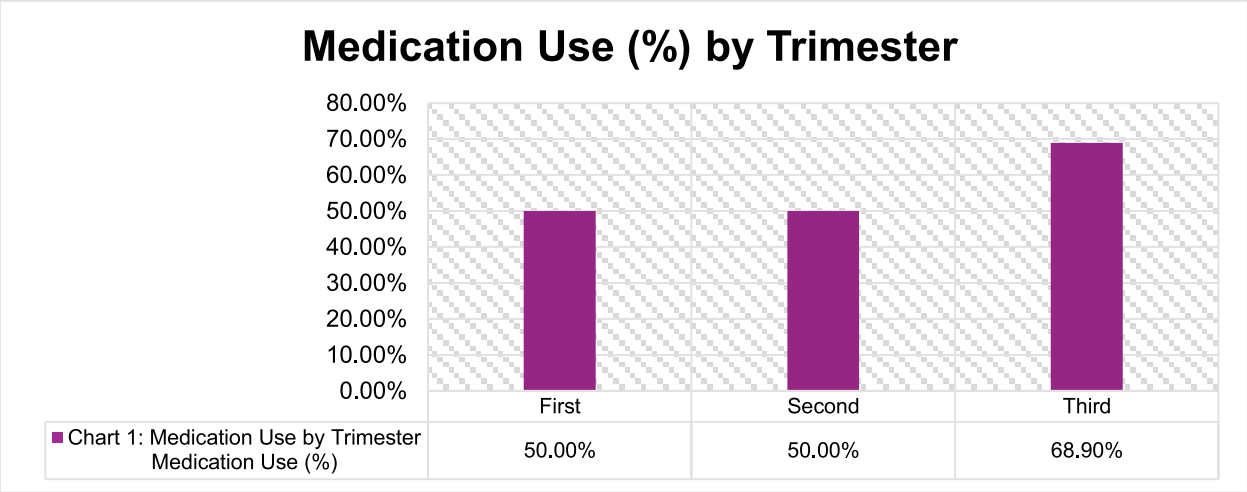

Figure 1. Medication Use by Trimester of Pregnancy

A chi-square test of independence revealed a statistically significant association between education level and medication use ($\chi^2 = 13.084$, df = 6, p = 0.042). The highest frequency of medication use was observed among women with graduate-level education (75.0%, n=18/24), followed by those with primary education (73.3%, n=22/30) and intermediate education (68.8%, n=22/32). The lowest medication use was observed among women with matriculation education (37.5%, n=6/16). It is important to note that this result should be interpreted with caution, as 2 cells (14.3%) had an expected count of less than 5, with a minimum expected count of 1.53. The details are presented in figure 2.

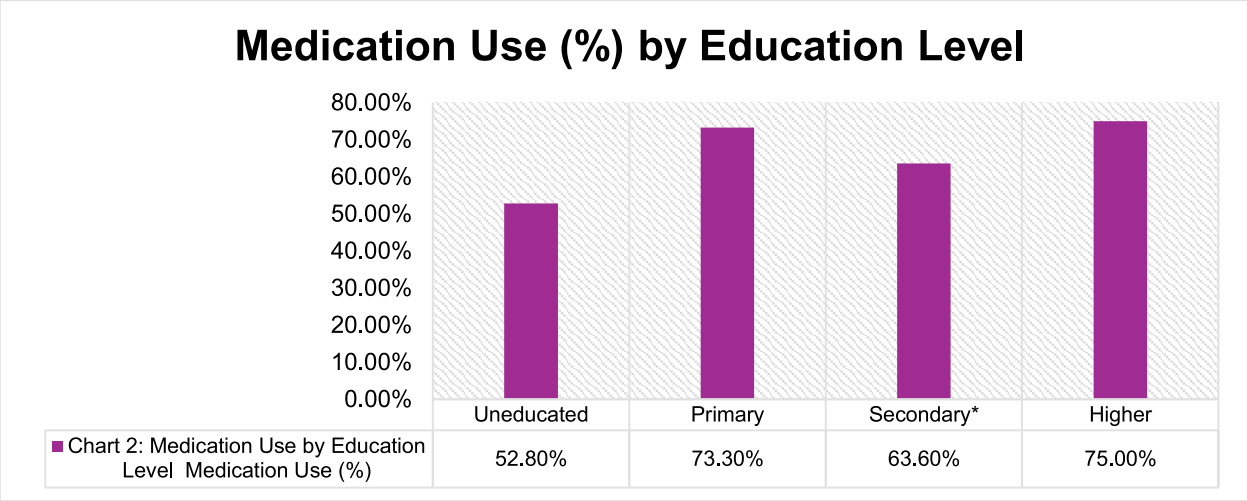

Figure 2. Medication Use by Educational Level

A chi-square test of independence was conducted to examine the relationship between medication use and the number of previous pregnancies. No statistically significant association was found (χ^2 = 3.297, df = 3, p = 0.348). Although medication use was highest among primigravida women (70.0%, n=42/60) and lowest among women with two previous pregnancies (54.5%, n=24/44), these differences were not statistically significant. All expected cell counts were greater than 5, confirming the validity of the test. These findings are presented in figure 3.

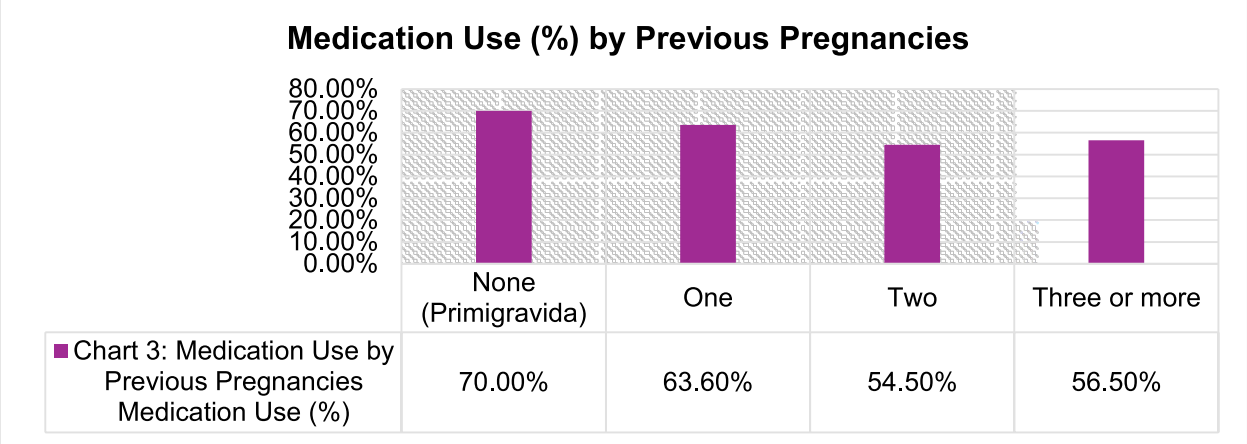

Figure 3. Medication Use by Number of Previous Pregnancies

DISCUSSION

This study provides the first empirical evidence of medication utilization pattern among pregnant women in Dera Ismail Khan, Pakistan. It focuses on both revealing the adherence to recommended practices and significant gaps in patient care. The key findings are 61.9% medication use prevalence, 22.7% self-medication rate, and 56.7% reporting inadequate counseling.

The finding that 61.9% of participants used at least one medication during pregnancy is consistent with previous Pakistani research. A study conducted in Lahore in 2024 reported that 58.3% of pregnant women were using dietary supplements, while another study from multiple tertiary care hospitals in Pakistan documented that iron and vitamin/mineral supplements accounted for 79.4% of all prescriptions [7,8]. The predominance of nutritional supplements (multivitamins, folic acid,

calcium, and iron) in the present study aligns with global antenatal care recommendations. It reflects appropriate prescribing practices for meeting increased physiological demands during pregnancy.

However, the relatively low use of folic acid (18.6%) is concerning, given its critical role in preventing neural tube defects during the first trimester [12]. This may indicate inadequate early antenatal care attendance or missed opportunities for supplementation counseling [13]. Similar patterns have been observed in a study from Ethiopia, where iron-folate supplementation rates remain suboptimal despite national policies promoting their use [14-16].

The 22.7% prevalence of self-medication identified in this study represents a significant patient safety concern because self-medication during pregnancy can lead to inappropriate drug selection, incorrect dosing, drug-drug interactions, and delayed treatment of underlying conditions [9]. While this rate is substantially lower than the 80-90% reported in some low- and middle-income countries [11], but still, it remains unacceptable due to the potential teratogenic consequences of certain medications.

The information gap identified that, 56.7% of women report insufficient medication information from healthcare providers which may directly contribute to self-medication practices. When pregnant women lack adequate counseling, they may turn to family, friends, or previous experiences for guidance. This finding underscores a critical failure in healthcare delivery: the mere prescription of medications without accompanying education undermines rational drug use [15]. As the WHO emphasizes, that optimizing healthcare outcomes not only requires appropriate prescribing but also requires comprehensive patient education [6].

A reassuring finding was the absence of FDA Category D or X medications among study participants. This is in contrast with earlier Pakistani research reporting 2.3% teratogenic medication use [8]. This improvement may reflect enhanced prescriber awareness of pregnancy-specific risks or stricter formularies in the study setting. The predominance of Category A and B medications suggests that women generally receive appropriate prescriptions.

A very small subset of women was using Category C medications (labetalol and aspirin), which highlights the clinical reality that some medical conditions such as hypertension or thromboprophylaxis requires medications where human safety data are limited. In such cases, the risk-benefit ratio must be carefully documented and discussed with patients.

Trimester of pregnancy emerged as a significant predictor of medication use ($p=0.033$), with highest use in the third trimester (68.9%). This pattern is clinically plausible, as later pregnancy involves increased physiological demands, management of pregnancy-related complications (anemia, hypertension, gastroesophageal reflux), and treatment of pre-existing conditions. The significant association between iron sucrose use and third trimester ($p=0.026$) specifically reflects the increase in prevalence of iron deficiency anemia because as the pregnancy progresses, the fetus takes more iron from the mother [14].

The association between educational attainment and medication use ($p=0.042$) warrants careful interpretation. While medication use was highest among graduate women (75.0%), this likely reflects multiple factors, such as greater health literacy, more regular antenatal care attendance, better ability to recall and report medication use, and potentially higher socioeconomic status enabling healthcare access. The lower medication use among women with matriculation education (37.5%) raises important equity concerns, like less-educated women being undersupplied with essential supplements, or are they more likely to obtain medications outside the formal healthcare system? This question requires further investigation through qualitative research and community-based studies.

The absence of a significant association between

previous pregnancies and medication use (p=0.348) suggests that parity alone does not determine medication-taking behavior in this population. However, the non-significant trend toward higher use among primigravida women (70.0%) may represent that healthcare engagement is greater during first pregnancies, a phenomenon documented in other settings.

These findings have several important implications for practice and policy in this region:

Healthcare provider must prioritize patients counselling. The finding that 56.7% of women received insufficient medication information represents a modifiable risk factor. Physicians, pharmacists, and nurses should be trained to provide clear, structured counseling on medication indications, dosing, potential side effects, and reasons for continuation. Simple interventions, such as take-home information leaflets or counseling checklists can significantly improve patient knowledge. Self-medication requires targeted intervention. Public awareness campaigns should emphasize the dangers of medication use without professional consultation during pregnancy. Given that 22.7% of women self-medicated, community-based education through lady health workers, mosques, and women's groups may be effective. Also, early antenatal care engagement must be encouraged. The low folic acid use during first trimester suggests that many women present late for care. Strategies to promote first-trimester registration and supplementation could reduce neural tube defect risk. Prescriber education on FDA categories should continue. While no Category D/X drugs were prescribed, ongoing continuing medical education can maintain this safety standard.

This study possesses several methodological and contextual strengths that enhance the validity and applicability of its findings. First, to our knowledge, this is the first study which comprehensively document medication utilization patterns among pregnant women in this region, therefore, it addresses a significant evidence gap in the Pakistani literature. Second, the study captured a comprehensive range of medication exposures including prescription drugs, over-the-counter medications, nutritional supplements, and herbal products, which provides a holistic assessment of the pharmacological burden during pregnancy. Beyond documenting prescribing patterns, the study also assessed patient-centered outcomes such as self-medication practices and the adequacy of information received from healthcare providers, which give us actionable insights for clinical practice improvement. The data collection through face-to-face interviews and in local languages (Urdu, Saraiki, and Pashto) minimized language barriers and enhanced the accuracy and completeness of self-reported data. Finally, the identification of statistically significant associations between medication uses and both trimester of pregnancy and maternal educational level provides valuable guidance for targeting future interventions to specific subgroups at risk [16].

This study also has several limitations that should be acknowledged. First, the cross-sectional design captures medication uses at a single time point, without allowing analysis of how regimens change throughout pregnancy. A prospective cohort design would provide more comprehensive data on medication patterns over time [3]. Second, the single-center setting at a tertiary care hospital limits generalizability of this study. Women of remote areas who do not have access to such facilities or attending primary care centers may have different medication use patterns [10]. Third, reliance on self-reported medication use may introduce recall bias, though structured face-to-face interviews mitigated this risk. Fourth, the one-month study period could not capture seasonal variations in medication use. Finally, the high rate of missing data for pregnancy planning (21.6%) limits interpretation of this variable.

CONCLUSION

The findings of this study highlight several important avenues for future investigation. Prospective cohort studies are needed to track medication use across gestation and assess associated maternal and fetal outcomes. Also, multi-center studies across diverse healthcare settings in Khyber Pakhtunkhwa would enhance generalizability. Qualitative research exploring the drivers of self-medication and barriers to effective patient-provider communication would provide essential context for designing culturally appropriate interventions. Furthermore, intervention studies evaluating enhanced counseling protocols, patient education materials in local languages, and healthcare provider training programs are urgently needed to address the information gap identified in this study. Finally, future research should oversample women from lower educational backgrounds and rural areas to investigate potential health inequities in access to essential medications during pregnancy.

Conflict of Interest: The authors declare that they have no financial or non-financial conflict of interests to disclose.

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Author Contributions

SSZ: Conceptualization, data collection, writing – original draft, and responsible for data integrity

HK: Data collection, writing, review & editing

WUK: Conceptualization, supervision, writing, review & editing,

KB: Data analysis, writing, original draft

RW: Data collection, writing, original draft

MA: Data analysis, writing, review & editing

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