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PREGNANT WOMEN'S KNOWLEDGE, ATTITUDE AND PRACTICE OF MEDICATION USE AT PRINCE ALI BIN AL-HUSSEIN MILITARY HOSPITAL (AL-KARAK CITY): A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Medication use during pregnancy is a critical concern in contemporary medical practice. Accurate knowledge of how pregnant women perceive and use drugs is necessary to ensure maternal and foetal health. **Objective:** This study aimed to assess the levels of knowledge, attitude and practice (KAP) regarding medication use during pregnancy and to determine the association between socio-demographic factors and KAP outcomes among pregnant women attending the antenatal care clinic at Prince Ali Bin Al-Hussein Military Hospital in Al-Karak, Jordan. **Methods:** A descriptive cross-sectional study was conducted among 287 pregnant women using a validated 31-item KAP questionnaire, which was self-administered. Descriptive statistics and multivariate analysis of variance, followed by Bonferroni post-hoc tests, were used to examine the associations between KAP scores and participants' socio-demographic and obstetric characteristics. **Results:** Most participants demonstrated low knowledge (70.0%) and poor practice levels (47.7%). Only 10.5% and 20.2% scored highly in knowledge and practice, respectively. Moderately favourable attitudes were observed in 46.3% of the respondents, whereas 30.3% held negative views. Education had a significant influence on knowledge ($F = 28.64$, $p < 0.001$) and attitude ($F = 6.484$, $p = 0.011$). Age and parity significantly affected the practice scores ($F = 4.512$, $p = 0.012$; $F = 6.968$, $p < 0.001$, respectively), whereas occupation had a significant impact on both knowledge and attitude scores ($p < 0.001$). **Conclusion:** Despite moderately positive attitudes, substantial knowledge gaps and inconsistent medication practices persist among pregnant women. Tailored educational interventions targeting low-education and multi-parous groups, along with enhanced antenatal counselling and pharmacist integration, are recommended to promote safe medication behaviours during pregnancy.

KEYWORDS: Self-medication, pregnancy, KAP model, healthcare, Jordan.

INTRODUCTION

Medication use during pregnancy is common and often necessary, yet unsupervised use presents significant maternal–foetal risks. Globally, over 80% of pregnant women use at least one medication, with up to 40% self-medicating without clinical oversight.[1] While some drugs are essential, others pose teratogenic or toxic risks when used without guidance.[2]

In low- and middle-income countries (LMICs), self-medication is shaped by fragmented healthcare systems, limited drug counselling and cultural misconceptions. Unsafe medication behaviours contribute to approximately 20% of preventable adverse birth outcomes in these settings.[3] In Jordan, despite free nationwide antenatal care (ANC), 33% of pregnant women report self-medicating, often without risk awareness.[4]

Socio-demographic factors, such as age, education, occupation, number of pregnancies, duration of current pregnancy and income, influence health behaviours but do not consistently predict safe practices, particularly when intersecting with cultural beliefs or systemic barriers.[5,6] Knowledge, attitude and practice (KAP) surveys are widely used in global healthcare settings to

explore such dynamics.[7] KAP assumes that knowledge informs attitudes, which in turn shape behaviours; however, this linear model may falter under structural or psychological constraints.

This study was focused on evaluating the actual KAP of pregnant women in a healthcare setting regarding medication use. Furthermore, this investigation intended to identify awareness gaps and unsafe practices via empirical data collected from a cross-sectional survey.[8]

These models are crucial in Jordan's healthcare system, where deployment-related stress, relocations and hierarchical referrals may disrupt care. Although ANC is comprehensive and free, continuity and counselling can be undermined by provider turnover and system rigidity. Research has highlighted communication barriers and fragmented access in healthcare settings[9], yet no prior study has examined medication KAP in Jordan's hospitals, especially in underserved southern regions. Research from Amman has noted moderate knowledge.[10] Regional LMIC studies have revealed how institutional design affects medication trust and behaviour.[6,11]

Self-medication during pregnancy is a global public health issue, with prevalence estimates ranging from 12% to 94%.[12] National rates include 65.5% in Ghana[13], 40% in Nigeria[14] and 20.5% for herbal use in Ethiopia.[15] Even in higher-resource countries such as India, the prevalence is 19.3%, implying that health literacy, cultural beliefs and access to ANC shape behaviours across contexts. Furthermore, the economic impact is considerable; in Ghana, self-medication contributes to an estimated $20 million annually in antibiotic resistance costs.[16]

Demographic and structural factors further drive these behaviours. Lower education, income and access to healthcare are correlated with increased self-medication.[14,15] In Jordan, many women view herbal remedies as safe owing to their perceived natural origin.[16] Cultural reliance on pharmacists and informal care remains prevalent even when ANC is free. Among families, deployment fosters self-reliance, while institutional mistrust and long waiting periods disincentivise formal care.[6,10]

Understanding these behaviours requires a robust theoretical framework. Although the KAP model is widely applied, it has limited predictive power; studies have reported that high levels of awareness do not necessarily lead to safer behavioural choices.[6,17]

Forced mobility, deployment and rigid hierarchies disrupt care continuity and weaken trust.[10,19] Centralised care may alienate patients, and partner absence may disrupt household routines and adherence.[10] These dynamics highlight the systemic foundations of self-medication.

Despite extensive global literature, pregnant women's KAP in Jordan has not been adequately investigated. This research gap is alarming, given regional self-medication rates and maternal risks such as anaemia, which affects 36.8% of women in southern Jordan.[4]

STUDY AIM AND OBJECTIVES

1. To assess pregnant women's level of knowledge regarding the safety of medication use during pregnancy
2. To explore their beliefs and attitudes toward drug use during pregnancy
3. To investigate actual practices and factors associated with medication use among pregnant women
4. To determine the association between KAP and socio-demographic factors

METHODOLOGY

Study Design and Setting

This study employed a cross-sectional descriptive design and was conducted from April 1 to May 30, 2025, at the ANC clinics of Prince Ali Bin Al-Hussein Military Hospital in Al-Karak, Jordan. As a referral centre serving both military and civilian populations.

Sampling Methods and Participants

Participants were recruited via convenience sampling, a justified approach in LMIC ANC contexts.[21] Eligible participants were pregnant women aged ≥18 years, literate in Arabic and with at least one prior ANC visit. Women with cognitive impairments, severe pregnancy complications requiring hospitalisation were excluded.

The sample size was calculated using a single-proportion formula based on a reported 36% prevalence of good knowledge about medication use in pregnancy[20], with a 95% confidence level and 5% margin of error. After applying finite population correction and a 10% buffer for non-response or incomplete data, the final target sample size was determined to be 229. Data were successfully collected from 287 participants.

Instrument and Validity

A 31-item structured, self-administered questionnaire was adapted, which captured the following information[20]:

Socio-demographic: Age, education, occupation, number of pregnancies and duration of data were gathered using a 31-item structured, self-administered questionnaire adapted from previous validated tools.[20] The instrument included the following sections:

Socio-demographic and obstetric characteristics: age, education, occupation, number of pregnancies and the trimester of the current pregnancy

Knowledge: 12 true/false/unsure statements regarding medication safety (e.g. 'tetracycline is safe in pregnancy'), scored 0–12

Attitudes: 8 items measured on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree), including both direct and reverse-coded statements

Practices: yes/no items assessing behaviour (e.g. use of over-the-counter [OTC] medications without professional consultation)

The KAP scores were classified based on Bloom's cut-off criteria, which categorise knowledge into the following levels.
High: ≥80%
Moderate: 60%–79.9%
Low: <60%

A pilot test was conducted from March 15 to 21, 2025, with 21 participants, to evaluate the instrument's clarity and reliability. Internal consistency was confirmed with Kuder–Richardson 21 (KR-21) values of 0.78 for knowledge and 0.74 for practices and Cronbach's alpha for attitudes of 0.81, indicating acceptable reliability[22,23,24,25] Content validity was confirmed by a panel of five experts, yielding item-content validity index (I-CVI) values ranging from 0.82 to 0.95.

Ethical Considerations

Institutional Review Board of the Royal Medical Services granted approval (RMS-IRB/30/05/2025). Each participant provided written informed consent before completing the questionnaire, which was obtained privately to reduce bias.

Data Analysis

Data were entered using Microsoft Excel and analysed with IBM SPSS Statistics, version 25. Descriptive statistics (means, standard deviations, frequencies and percentages) were used to summarise participants' characteristics. Associations between categorical variables were evaluated using Chi-square tests. The effects of independent variables (age, education, parity and occupation) on KAP scores were assessed using multivariate analysis of variance (MANOVA), followed by Bonferroni post-hoc tests. A significance level of $p < 0.05$ was adopted for all analyses.[25]

Tables

Table 1: Demographic and obstetric features of the study sample (N = 287).

Variables	Category	Frequency	Percentage
Age	18-25 years	53	18.5
	25-35 years	172	59.9
	above 35 years	62	21.6
Education level	Secondary and less	106	36.9
	University	181	63.1
Occupation	Business	18	6.3
	Civil servant	46	16.0
	Health worker	35	12.2
	Homemaker	188	65.5
Number of pregnancies	1	61	21.3
	2-3	124	43.2
	More than 3	102	35.5
Duration of present pregnancy	First trimester	52	18.1
	Second trimester	79	27.5
	Third trimester	156	54.4

Table 2: Knowledge of pregnant women regarding medication use and restriction in pregnancy.

Statement	Desired answer	True	False
		n (%)	n (%)
Any medication can be used at any stage of pregnancy	False	137 (47.7)	150 (52.3)
Some medications may be more suitable to be used during some stage of pregnancy	True	128 (44.6)	159 (55.4)
A non-prescribed medication can be used during pregnancy	False	140 (48.8)	147 (51.2)
Wrong drug choice can affect the formation of the foetus and health of the mother	True	233 (81.2)	54 (18.8)
The pharmacist should provide all necessary information and advice regarding the medication before using it	True	175 (61.0)	112 (39.0)
It is safe to take common medications and over-the-counter drugs without the physician or pharmacist's advice	False	128 (44.6)	159 (55.4)
Some medications should never be used in pregnancy regardless of the condition	False	171 (59.6)	116 (40.4)
Knowledge of some common medications that should be avoided		n (%)	n (%)
Misoprostol	True	185 (64.5)	102 (35.5)
Warfarin	True	116 (40.4)	171 (59.6)
Tetracycline	True	88 (30.7)	199 (69.3)

Paracetamol	False	175 (61.0)	112 (39.0)
Amoxicillin	False	172 (59.9)	115 (40.1)
Overall knowledge score	Mean 6.23 (SD=2.51) Range 0-12		
*Low level (<60.0%) *Moderate level (60-79.9%) *High level (80-100%)	201 56 30	70.0% 19.5% 10.5%	

*Bloom's cut-off point, SD: Standard Deviation

Table 3: Attitude of pregnant women regarding medication use and restriction.

Statement	Mean	SD
*Take medication without a physician's prescription	3.34	0.82
*All medications are the same and can be used in pregnant women	3.49	0.64
*There should be no restriction of drugs during pregnancy because the baby needs it	2.43	1.10
*Doctors prescribe too much medication	2.19	1.18
Avoid medications because of the risk to my baby	2.96	0.93
Avoid medications during pregnancy because drugs are harmful	2.79	1.01
It is better to take natural remedies during pregnancy	2.73	1.21
Verify the safety of medication before taking them	1.91	0.87
Overall attitude score	Mean 21.85 (SD=4.44) Range 10-31	
# Negative level (<60.0%) # Moderate level (60-79.9%) # Positive level (80-100%)	87 133 67	30.3% 46.3% 23.3%

* Reversed items (high scores indicates disagree) #Bloom's cutoff point, SD: Standard Deviation

Table 4: Practice of pregnant women regarding medication use and restriction.

Statement	Desired answer	Yes	No
		n (%)	n (%)
Took over-the-counter drugs without asking a doctor or pharmacist	No	50 (17.4)	237 (82.6)
Took routine medications without asking a doctor or pharmacist	No	128 (44.6)	159 (55.4)
Saw a doctor to obtain a prescription before taking any medication	Yes	147 (51.2)	140 (48.8)
Asked about the drug to know if pregnant women could take it	Yes	183 (63.8)	104(36.2)
Asked the pharmacist for advice regarding the safety of medications during pregnancy	Yes	162 (56.4)	125 (43.6)
Checked the leaflet of the drug to know if pregnant women could take it	Yes	122 (42.5)	165 (57.5)
Overall practice score	Mean 3.52 (SD=1.22) Range 0-6		
#Low level (<60.0%) #Moderate level (60-79.9%) #High level (80-100%)	137 92 58	47.7% 32.1% 20.2%	

SD: Standard Deviation

Table 5: Factors associated with knowledge, attitude and practice regarding medication use among pregnant women.

Variables	Category	Knowledge		Attitude		Practice	
		Mean	SD	Mean	SD	Mean	SD
Age	18-25 years	6.13	2.65	22.15	4.23	3.96[a]	0.98
	25-35 years	6.21	2.60	21.46	4.61	3.44[b]	1.17
	above 35 years	6.35	2.17	22.69	4.02	3.35[b]	1.46
	F-value (p-value)	0.122 (0.886)		1.921 (0.148)		*4.512 (0.012)*	
Education level	Secondary and less	5.24	2.26	22.72	4.56	3.57	1.24
	University	6.81	2.48	21.35	4.30	3.49	1.21

	F-value (p-value)	*28.64 (<0.001)*		*6.484 (0.011)*		0.247 (0.619)	
Occupation	Business	5.33[b]	2.28	21.61	4.17	3.67	1.03
	Civil servant	6.59[b]	1.94	21.30	4.40	3.41	1.15
	Health worker	9.34[a]	1.86	19.00[a]	3.76	3.14	1.22
	Homemaker	5.64[b]	2.32	22.54[b]	4.38	3.60	1.25
	F-value (p-value)	*28.946 (<0.001)*		*7.00 (<0.001)*		1.606 (0.188)	
Number of pregnancies	1	6.84	2.49	22.07	4.57	3.97[a]	0.91
	2-3	5.97	2.64	21.49	4.27	3.52	1.19
	More than 3	6.18	2.32	22.17	4.57	3.25[b]	1.35
	F-value (p-value)	2.498 (0.084)		0.734 (0.481)		*6.968 (<0.001)*	
Duration of present pregnancy	First trimester	5.83	2.54	22.62	4.11	3.38	1.39
	Second trimester	6.47	2.74	21.59	4.64	3.49	1.26
	Third trimester	6.24	2.38	21.73	4.44	3.58	1.14
	F-value (p-value)	1.025(0.360)		0.960(0.384)		0.507 (0.603)	

SD: Standard Deviation

RESULTS

Demographic and Obstetric Features of the Study Sample (N = 287)

A total of 287 pregnant women participated in the study. The majority were aged 25–35 years (n = 172, 59.9%). Most pregnant women had a university-level education (n = 181, 63.1%). Among the occupation variables, the largest group was homemakers (n = 188, 65.5%). Regarding obstetric history, 43.2% (n = 124) had 2–3 pregnancies, compared with 21.3% (n = 61) who were in their first pregnancy. Over half of the participants (54.4%, n = 156) were in the third trimester of pregnancy, with 27.5% (n = 79) in the second and 18.1% (n = 52) in the first trimesters. See Table 1.

Assessing KAP Regarding Medication Use Among Pregnant Women at Prince Ali Bin Al-Hussein Military Hospital (Al-Karak City).

Assessing Knowledge Regarding Medication Use and Restriction During Pregnancy.

Table 2 shows that slightly more than half of the sample correctly recognised that not all medications were safe for every stage of pregnancy (52.3%). Moreover, 44.6% knew that certain medications were more suitable, and 51.2% correctly reported that non-prescribed medicines cannot be used during pregnancy.

The vast majority (81.2%) were aware of the negative consequences of incorrect drug choices on maternal and foetal health. In addition, 61.0% thought that pharmacists should provide essential medication guidance, and 55.4% correctly described that OTC drugs require medical advice.

Knowledge of specific drugs was mixed, with 64.5% correctly recognising misoprostol as unsafe but only 40.4% identifying the risk of warfarin. Notably, only 30.7% were aware of the risks associated with tetracycline. Concerning safe medications, only 39.0% and 40.1% correctly reported that paracetamol and amoxicillin were safe during pregnancy. The overall knowledge level was low for most participants, with 70% having a low knowledge level, 60% exhibiting a moderate level and only 10.5% demonstrating a high level of knowledge.

Assessing Attitude Regarding Medication Use and Restriction During Pregnancy.

The responses revealed mixed viewpoints. Many disagreed in terms of unsafe behaviours, such as taking un-prescribed medications (mean = 3.34) or perceiving all medications as appropriate during pregnancy (mean = 3.49). In addition, avoidance of a medication as it posed a risk to the foetus scored moderately (mean 2.79–2.96). However, verifying medication safety before use reported the lowest score (mean = 1.91).

According to Bloom's cut-off criteria, 30.3% of pregnant women had a negative attitude, 46.3% had a moderate attitude and only 23.3% exhibited a positive attitude toward medication use. See Table 3.

Assessing Practices Regarding Medication Use and Restriction During Pregnancy.

Table 4 shows that although a majority of the sample (82.6%) reported not taking OTC drugs without checking with healthcare providers, a disturbing 44.6% admitted to taking routine medications without medical advice. Furthermore, 63.8% enquired about drug safety, 56.4% consulted pharmacists and only 42.5% reported reading the leaflet. Based on Bloom's classification, 47.7% reported a low level of good practice, 32.1% exhibited a moderate level and only 20.2% showed a high level of appropriate practice.

Factors Associated with KAP Regarding Medication Use Among Pregnant Women at Prince Ali Bin Al-Hussein Military Hospital (AL-Karak City)

MANOVA demonstrated that participants' age had a significant impact on practice scores; $F(2,287) = 4.512$, $P = 0.012$. A Bonferroni post-hoc test was performed, and the results revealed that women aged 18–25 years (*M*

= 3.96, *SD* = 0.98) reported significantly higher practice scores than those aged 25–35 years (*M* = 3.44, *SD* = 1.17, *P* = 0.019) and those aged >30 years (*M* = 3.35, *SD* = 1.46, *P* = 0.022). Moreover, the education level significantly affected the knowledge *F*(2,287) = 28.64, *P* < 0.001 and attitude scores; *F*(2,287) = 6.484, *P* = 0.011. Women with a university degree (*M* = 6.81, *SD* = 2.48) displayed significantly higher knowledge scores than those with secondary education and less (*M* = 5.24, *SD* = 2.26). Conversely, women with secondary education and less (*M* = 22.72, *SD* = 4.56) showed significantly higher attitude scores than their counterparts (*M* = 21.35, *SD* = 4.30).

Furthermore, occupation significantly affected the knowledge scores; *F*(2,287) = 28.964, *P* < 0.001. Following the Bonferroni test, health workers (*M* = 9.34, *SD* = 1.86) reported significantly higher scores than businesspeople, civil servants and homemakers; *P* < 0.05 for all comparisons. In the same context, homemakers (*M* = 22.54, *SD* = 4.38) demonstrated significantly higher attitude scores than health workers (*M* = 19.0, *SD* = 3.76), *F*(2.287) = 7.0, *P* < 0.001.

Regarding obstetric variables, the number of pregnancies had a significant effect on the practice domain; *F*(2,287) = 6.968, *P* < 0.001. Women experiencing their first pregnancy (*M* = 3.97, *SD* = 0.91) showed higher practice scores than those with more than three pregnancies (*M* = 3.25, *SD* = 1.35). The duration of the present pregnancy did not exert a significant impact on KAP regarding medication use; *P* > 0.05 for all.

DISCUSSION

This study examined pregnant women's KAP related to medication use in a Jordanian military hospital. Although awareness of medication-related risks was relatively high, with 81.4% of the participants recognising the potential dangers of inappropriate drug use, only 20.2% adhered to safe medication practices. This gap reflects a persistent pattern reported in previous studies from Jordan and Ethiopia[10,18], demonstrating that knowledge alone is insufficient to ensure behavioural change.

The elevated rate of self-medication (44.6%) observed in this study exceeds national figures reported in Ethiopia and India.[15] This rate falls within the broader global prevalence range of 12%–94%[12], emphasising the prevalence of this issue even in healthcare systems offering free ANC. This finding raises concerns about potential disruptions in care continuity, particularly during relocation cycles common in military environments. In such settings, the absence of stable provider relationships may impair trust, reduce adherence to medical guidance and contribute to increased reliance on OTC drug use.

Concerning knowledge, higher educational attainment and employment in the healthcare sector were significantly linked to enhanced understanding of medication safety (*F* = 28.64, *P* < 0.001). However, this association was not accompanied by more favourable attitudes. Participants with secondary education or less exhibited significantly higher attitude scores than their university-educated counterparts (*F* = 6.484, *P* = 0.011). This unexpected pattern may indicate a more cautious or deferential disposition toward medical authority among less-educated respondents. In contrast, more educated women may approach medical guidance with greater scrutiny or perceived autonomy, as observed in other structured healthcare systems.[8]

Regarding attitudes, although many participants acknowledged the importance of medication safety, a portion expressed hesitancy about drug use during pregnancy owing to perceived risks to foetal health. This finding agrees with global evidence suggesting that maternal caution, especially in the first few pregnancies, influences drug-related decisions. In our study, younger women (*P* = 0.012) and those in their first pregnancy demonstrated significantly safer practices, likely reflecting heightened vigilance and caution during initial maternal experiences. While women in the third trimester reported slightly higher mean practice scores, the difference was not statistically significant, indicating that increased exposure to antenatal counselling alone may not adequately influence medication-related behaviours in the absence of targeted interventions.

In terms of practice, while certain participants reported consulting pharmacists and healthcare professionals, a considerable number engaged in unsupervised use of OTC and traditional remedies. Notably, the use of herbal remedies was prevalent among homemakers, who comprised 65.5% of the sample. This behaviour should not be construed as a lack of awareness but rather as a response to practical constraints, such as limited access to clinics during working hours and strong adherence to cultural norms surrounding natural remedies. These observations highlight the need for healthcare delivery systems to be more responsive to women's everyday realities and time constraints.

This study has several limitations. It employed convenience sampling from a single governorate, which restricts the generalizability of the findings. Furthermore, the cross-sectional design prevents causal inference regarding the relationship between socio-demographic variables and KAP outcomes. Future studies should expand across multiple regions using probability-based sampling and consider longitudinal designs to better assess changes in KAP over time.

CONCLUSION

The findings from this study indicate a substantial disconnect between pregnant women's knowledge of medication risks and their actual practices within Jordanian military healthcare settings. Although 81.2% of the participants recognised the dangers associated with OTC medication use during pregnancy, only 20.2%

reported consistently safe practices, a disparity that exceeds reported figures in several civilian LMIC contexts.

The findings underscore that medication-related behaviours are not determined by cognitive awareness alone but are deeply influenced by structural, cultural and institutional constraints. Unsafe practices appear to stem less from knowledge deficits and more from fragmented care pathways, provider turnover and limited access to counselling. This observation is particularly applicable to military deployments and rigid healthcare hierarchies.

Targeted structural interventions are required to address these challenges. Pharmacists could be integrated into ANC teams to provide consistent medication guidance and support. Moreover, stricter regulations can be enforced on the dispensing of OTC and antibiotic medications in military pharmacies. In addition, peer-led maternal support networks can be established to strengthen community-based awareness and trust.

Future research should employ longitudinal and mixed-methods designs to examine how military organisational cycles, rank and institutional trust shape medication practices across different stages of pregnancy. These dimensions can be thematically explored to obtain a more nuanced understanding of care fragmentation in military-affiliated maternal healthcare systems. Although the findings are limited by single-site sampling, this study provides a theory-informed foundation for developing culturally sensitive system-level strategies to enhance medication safety during pregnancy.

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