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ORIGINAL RESEARCH article

Awareness and beliefs of pregnant women about medications

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Abstract: Medication use during pregnancy is concerning, especially regarding the safety of the developing fetus. The awareness and the beliefs of pregnant women about medications are strongly associated with medication adherence. This study aims to investigate pregnant women's awareness and beliefs regarding medications in Zawia City, Libya. A cross-sectional study including 209 Libyan pregnant women was conducted from January to July 2024 using a self-designed questionnaire. The gathered data were analyzed using descriptive statistics. About 75.0% of the pregnant women agreed that medications should be avoided during pregnancy. Most pregnant women did not believe that all medications are unsafe during pregnancy (80.4%). More than two-thirds of the participants are aware of the most critical stage of pregnancy. 75.0% of pregnant women lack awareness of the main drugs to be avoided during pregnancy. The primary informative source about medications was the gynecologists. Libyan pregnant women exhibit a positive belief toward medications. However, they lack the awareness of the most important medications that should not be consumed during pregnancy.

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Introduction

Physiological, endocrine, and pharmacokinetic alterations during pregnancy affect the safety and effectiveness of medications [1]. These alterations together emphasize that pregnant women constitute a specific population [2]. Although the medication treatment during pregnancy is concerning, it cannot be avoided since many pregnant women suffer from chronic diseases like asthma, epilepsy, and diabetes, which require continuous treatment. Therefore, pregnant women should seek advice from physicians and health care professionals about the benefits and potential risks of medication use [3-5]. The concern related to medication use in pregnancy should consider not the health of the pregnant woman alone, but also the fetus, because the fetus encounters potential adverse effects related to drug treatment [6]. The proportion of pregnant women administering medications has doubled in the last thirty years. Currently, according to estimates, 90% of pregnant women use one medicine during pregnancy at a minimum [7]. Drug transfer through the placenta may cause a potential risk to the fetus, creating a concern and difficulties related to the use of medications [3]. A previous to the diethylstilbestrol and thalidomide tragedies, attention to the possible teratogenicity of medications in humans increased after realizing the teratogenic effect of cortisone in 1951 in the progeny of pregnant mice. Accordingly, any medication that crosses the placenta and reaches the fetus may pose a substantial risk [8]. As a result of the teratogenic effects of diethylstilbestrol and thalidomide in humans, regulatory guidelines and legislative frameworks regarding clinical research during pregnancy have been established. These

guidelines consider only risk assessment, instead of benefit and risk assessment, resulting in pregnant women's exclusion from clinical studies and, consequently, a lack of adequate, robust, and trusted information about the safety of most medications [5, 9].

Knowledge of pregnant women on medication use and concomitant disease impacts their beliefs regarding medications. These beliefs are strongly linked to medication adherence [10, 11]. In addition, overestimation of teratogenic effects related to medications can result in non-adherence to drug treatment, which is especially significant in chronic conditions. Several studies indicate that the adherence rate is 40.0% among pregnant women suffering from chronic illnesses, which is considered a low rate resulting in inadequate treatment of chronic diseases [11]. For instance, the prescription rate of psychotropic medicines among pregnant women decreases during pregnancy and rises again following delivery [12]. To promote medicine adherence and safe medication use, supplying pregnant women with correct and proven information through open communication with health care providers is essential [13-15]. Various studies have been conducted around the world to investigate the knowledge and perception of pregnant women regarding medications during pregnancy. A study from Iraq showed knowledge gaps regarding medication safety in pregnancy, especially in rural and less educated communities [16]. In Norway, most participants considered medications safe and beneficial. On the other hand, they were more uncertain and conservative about administration during pregnancy [17]. Another study in Indonesia reported that more than half of the respondents were categorized as possessing negative beliefs regarding medications [18]. In a Sudanese study, the participants had insufficient knowledge of medications [19]. However, to the best of our knowledge, very few studies have addressed this issue in Libya, underscoring the need for more investigations. Thus, the present study aims to explore the beliefs and the awareness of pregnant women regarding medicine use during pregnancy.

Materials and methods

Study design: A cross-sectional study was conducted to investigate the knowledge, attitude, and awareness of pregnant women regarding medication use in pregnancy. It was carried out from January to July 2024 at the antenatal care units of Zawia Medical Center and Almutrud Hospital (ZMC & AH) in Zawia City, Libya.

Study approval: The approval was obtained from the ethical Review Committee of the University of Zawia (Reference No. 062-MJ-2025), and ZMC & AH (4/26/2025).

Study participants: A total of 209 Libyan pregnant women participated in this study. The participation in the study was completely voluntary. The objective of the study was clarified to the study participants.

Study tools: A self-administered questionnaire was designed according to similar published studies [4, 11]. The questionnaire was completed over a face-to-face interview. The questionnaire was generated in English and then translated into Arabic. The translation was revised by a linguistic expert to ensure the accuracy and clarity of the translation. A pilot study was conducted, with 20 participants participating, to ensure the clarity and applicability of the questionnaire. The questionnaire consisted of 17 items, which were divided into five sections. The first section contained general characteristics of participants. The second section consisted of questions related to awareness and beliefs of the pregnant women. The third section contained medications consumed by pregnant women, while the fourth section addressed the reasons for avoiding medication use in pregnancy. Finally, the fifth section dealt with the sources of drug information.

Statistical analysis: Descriptive statistics were conducted to analyze the data and evaluate the responses of study participants using SPSS V27, and a Chi-square test for analysis.

Results

This study included 209 Libyan pregnant women. 43.5% of the women were aged between 30 and 40 years, and a comparable proportion of participants were aged between 20 and 30 years (41.6%, **Figure 1**). Regarding

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academic qualifications, more than half of the respondents stated high academic qualifications (57.9%, **Figure 2**). The largest occupational group among respondents was teachers (32.1%), followed by housewives, constituting a closely similar proportion (28.7%). 43.5% of pregnant women had more than three pregnancies, while 38.8% had two to three pregnancies. Almost half of the participants were in the third period of pregnancy (45.0%). The prevalence of chronic disease among pregnant women was 12.0%, which was significantly lower than that of those not suffering from chronic diseases (88.0%). The general characteristics of the participants are outlined in **Table 1**.

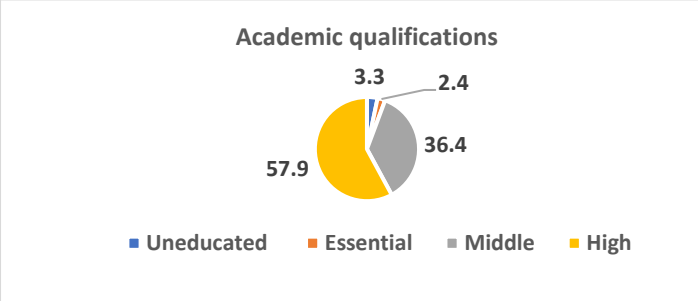

Figure 2: Academic qualifications of the participants

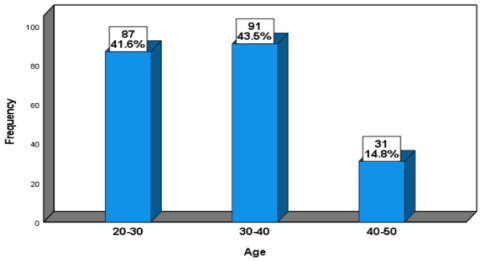

Figure 1: Age distribution of the participants

Table 1: General characteristics of the respondents

Variables	Frequency	Percentage
Age		
20 - 30	87	41.6
30 - 40	91	43.5
40 - 50	31	14.8
Academic qualifications		
Illiterate	07	3.3
Essential	05	2.4
Middle	76	36.4
High	121	57.9
Profession		
Housewife	60	28.7
Employee	34	16.3
Teacher	67	32.1
Physician	17	8.1
Engineer	10	4.8
Student	16	7.7
Others	05	2.4
Number of pregnancies		
First pregnancy	37	17.7
Two to three	81	38.8
More than 3	91	43.5
Pregnancy stage		
First stage	59	28.2
Second stage	56	26.8
Third stage	94	45
Chronic disease		
Yes	25	12
No	184	88

In **Table 2**, the majority of participants believed that medications should be avoided during pregnancy (75.1%) whereas 24.9% held the opposite view. More than half of the respondents thought that medications are more beneficial than harmful (59.8%). In addition, a significant number of participants did not believe that all medications are unsafe during pregnancy. Regarding herbal treatments, 82.8% of the participants reported that herbal remedies are not safer than drugs. The vast majority of respondents reported they do not take any drugs without advice from a physician (96.2%). About 25.0% of pregnant women reported being aware of the main

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medications to avoid in pregnancy, while 75.1% did not. A large number of pregnant women believed that medication use can protect the mother and the fetus's life. Regarding the most critical period of pregnancy, 66.0% identified the first stage, 31.1% identified the third stage, and only 3.0% identified the second stage (**Figure 3**).

Table 2: Beliefs and awareness of Libyan pregnant women about medication use in pregnancy

Statements	Yes: n (%)	No: n (%)	Chi-square	P-value
Do you believe that medications should be avoided during pregnancy?	157 (75.1)	52 (24.9)	52.751	< 0.001
Do you believe that medications are more beneficial than harmful?	125 (59.8)	84 (40.2)	8.043	< 0.005
Do you believe that all medications are detrimental during pregnancy?	41 (19.6)	168 (80.4)	77.172	< 0.001
Do you believe that herbal treatments are safer than medications during pregnancy?	36 (17.2)	173 (82.8)	89.804	< 0.001
Do you administer medications while pregnant without consulting your physician?	8 (3.8)	201 (96.2)	178.225	< 0.001
Awareness of the most crucial drugs that should not be taken in pregnancy	52 (24.9)	157 (75.1)	52.751	< 0.001
Does medication use during pregnancy protect the life of the fetus and the mother?	183 (87.6)	26 (12.4)	117.938	< 0.001
Awareness of the most critical period of pregnancy First period Second period Third period	**n (%)** 138 (66) 06 (2.9) 65 (31.1)	**Chi-square value** 125.522		**P- value** < 0.001

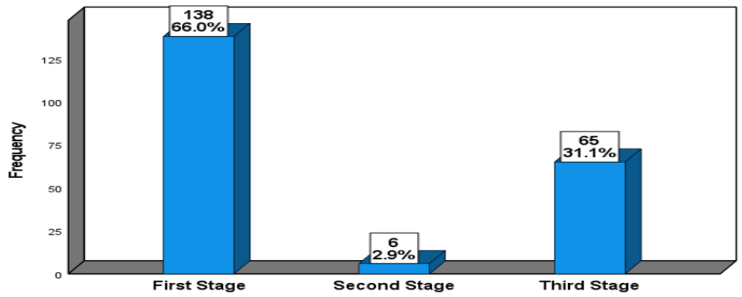

Figure 3: Critical stage of pregnancy

Table 3 demonstrates the most common types of medications taken by pregnant women. The most frequently administered medications among pregnant women were vitamins and minerals (72.7%), followed by pain relievers, accounting for 21.5%. Other medications reported lower proportions (**Figure 4**). A Chi-square test of goodness-of-fit revealed a highly significant variation in the distribution of medication use ($\chi^2 = 634.115$, $p < 0.001$).

Table 3: The most frequent medication types taken during pregnancy

Medication	Frequency	Percentage	Chi-square value	P- value
Pain relievers	45	21.5	634.115	< 0.001
Vitamins and minerals	152	72.7		
Antibiotics	5	2.4		
Hormonal medications	1	0.5		
Diabetes medications	1	0.5		
Antacids	4	1.9		
Others	1	0.5		

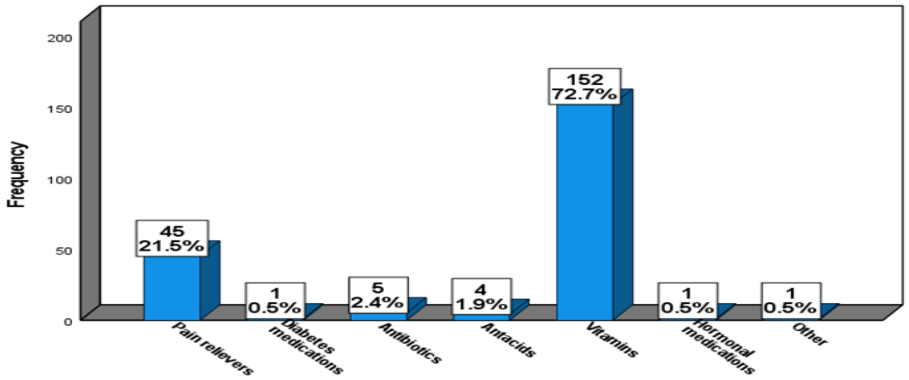

Figure 4: Medications taken during pregnancy

In **Table 4**, abortion was the predominant reason reported, accounting for 45.5%, followed by fetal malformation, with a percentage of 23.0%. Other reasons, including fetal death, mother harm, and both fetal and mother harm, accounted for 14.8%, 4.8%, and 1.9%, respectively. Among the respondents, 10.0% confirmed uncertainty by selecting " I do not know" (**Table 4**). A Chi-square test of goodness-of-fit demonstrated a statistically significant difference in the distribution of responses ($\chi^2 = 159.813$, $p < 0.001$).

Different sources of medication information are illustrated in **Table 5**. Gynecologists were identified as the primary information source by 90.4% of the Libyan pregnant women. Pharmacists and the internet were reported by 2.9% of respondents, while physicians were identified by 2.4% of respondents. Leaflets, media, and friends were identified by 0.5% of the pregnant women (**Figure 5**). A Chi-square test of goodness-of-fit showed a highly significant variation in the distribution of information sources ($\chi^2 = 990.746$, $p < 0.001$).

Table 4: Reasons for drug administration avoidance during pregnancy

Reason	n	%	Chi-square	P
Fetal death	31	14.8	159.813	0.001
Mother harm	10	4.8		
Abortion	95	45.5		
Malformation of the fetus	48	23		
Fetal and maternal harm	4	1.9		
I do not know	21	10		

Table 5: Drug information sources

Source	n	%	Chi-square	P
Physicians	5	2.4	990.746	0.001
Pharmacists	6	2.9		
Gynecologists	189	90.4		
Friends	1	0.5		
Leaflets	1	0.5		
Media	1	0.5		
Internet	6	2.9		

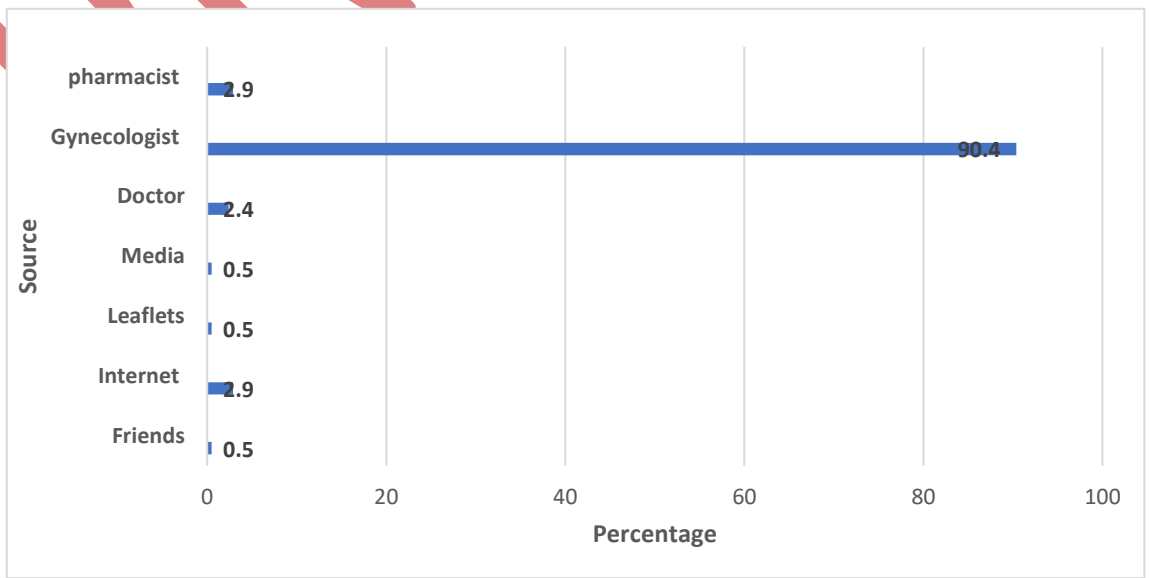

Figure 5: Sources of drug information

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Discussion

Scarcity of medicine safety information and the potential harm of medicines to the fetus create a significant concern regarding the use of medications during pregnancy [16]. 184 out of 209 were not suffering from chronic diseases, which may impact the responses of participants and the generalizability of the results. According to the study findings, most participants reject the idea that all medications are unsafe in pregnancy. In addition, the vast majority thought that medications can protect the life of the mother and the fetus. Furthermore, about 60.0% of respondents consider medications to be more beneficial than harmful. These findings collectively reveal that pregnant women exhibited positive beliefs toward medications. Nevertheless, a significant number of participants believed that drug use during pregnancy should be avoided. The caution, together with a lack of adequate knowledge about medications, may be the explanation for such a belief, which highlights the misconception among pregnant women regarding the seriousness of discontinuing drug treatment, particularly in chronic conditions, which may have a serious impact on the well-being of the mother and the fetus. This finding is in line with previous studies conducted in Libya [20] and Sweden [21]. However, a study from India stated that half of the pregnant women thought that medical treatment should be discontinued during pregnancy [22].

Regarding self-medication, an overwhelming majority of pregnant women avoid self-medication practice during pregnancy, indicating the awareness among respondents of the potential risks of self-medication and the importance of professional health care counseling [23, 24]. Regarding herbal use, 82.8% of respondents stated that herbal treatments are not safer than medications. This reflects the recognition of respondents of the potential harmful effects related to the use of herbal remedies, particularly as it lacks standardized dosing and adequate clinical evidence [25]. Comparable findings have been observed in an Ethiopian study [4]. However, the percentage reported in the current study is significantly greater than that documented in studies from the United States [26] and Saudi Arabia [11]. Experience of family members and friends, the belief that anything natural is safe, and the insufficient knowledge of the possible risks of herbal treatments may be the explanation for the proportion of participants who considered that the herbal remedies are safer than medicines.

In the present study, abortion constituted the predominant reason for stopping medicine use, followed by fetal malformation. In contrast, fetal malformation was reported as the main reason, followed by abortion, in a study from Ethiopia [4]. However, abortion and fetal malformation have been reported at the same percentage in a study in the Netherlands [27]. In the current study, a few percentages were also reported for fetal death, maternal harm, and combined fetal and maternal harm. Further, it is observed that 10.0% of pregnant women were uncertain about these reasons. These findings highlight the need for effective and evidence-based counseling of women through qualified health care providers for the provision of essential information about medications to promote medication adherence and enhance medication treatment [28, 29]. Unfortunately, a significant number of participants lack awareness of the most critical medications to be avoided in pregnancy. This finding is consistent with a study from Ethiopia [4]; it contrasts with those from India [28] and Saudi Arabia [11], in which 82.0% and 60.5% of respondents, respectively, documented that they were aware of the most critical drugs. This finding may be a consequence of a lack of structured education programs for women about the use of medications in pregnancy, the belief that all over-the-counter medicines are safe to use during pregnancy, and the fact that the majority of study participants did not complain of chronic diseases, which minimizes their urgent contact with health care professionals to seek advice regarding their medications.

In terms of drug information sources, previous published studies showed variations in the degree of reliance of pregnant women on different drug information sources. For instance, a study performed in Sweden reported that midwives and gynecologists were the primary sources of drug information [21], while pharmacists have been documented as the main source of drug information, followed by midwives in a study from Ethiopia [4]. Furthermore, a study from Saudi Arabia stated that physicians were identified as the main source of information, followed by the internet and social media [11]. In the present study, gynecologists were identified

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as the primary source of drug information for pregnant women. This finding demonstrates a high reliance of pregnant women on gynecologists and supports the vital role of gynecologists as qualified health care professionals to educate pregnant women about medications. Similar findings were reported in studies from Libya [20] and Iraq [31]. However, pharmacists were identified as a source of information by 2.9% of participants, and this proportion is lower than that reported in a previous study in Libya (23.0%) [20]. The lower reliance on pharmacists may be attributed to a lack of privacy and shortage of time in community pharmacies, and the regular visits of pregnant women to antenatal care units, and discussing with a gynecologist about their medications. Vitamins and minerals constituted the most frequently consumed medications among pregnant women, followed by analgesics. This result aligns with previous studies [32, 33]. The wide use of vitamins and minerals, which are essential for fetal development, is consistent with global standards for prenatal care. More than two-thirds of participants were aware of the most critical stage of pregnancy. Similar results were observed in studies from Sudan (66.8%) [19] and Western Uganda [34] (69.4%). However, the level of awareness in the current study is higher than that reported in a study in Ethiopia3, while lower than that documented in a Saudi Arabian study [11].

Based on study findings, no statistically significant correlations were recognized between sociodemographic characteristics and responses of participants, except that age and level of education had an impact on certain situations. The age group between 20 and 40 years was more likely to recognize the first trimester as the most critical stage. Regarding the level of education, two significant associations were reported. First, the proportion of pregnant women with middle and high levels of education who did not believe that all medications are harmful during pregnancy was more than that of those with lower levels of education. Second, pregnant women with higher levels of education identified the first stage of pregnancy as the most critical stage, more than those with middle and lower educational levels. One of the limitations of this study was the involvement of pregnant women attending antenatal units at only two hospitals in Zawia City, which may impact the generalizability of findings. Another limitation was that the questionnaire consisted of closed-ended questions, which may limit the responses of participants.

Conclusion: This study reveals that pregnant women demonstrate a positive belief toward medications. Also, pregnant women mainly depend on gynecologists as a drug information source, which reflects a great trust in health care providers. However, a lack of awareness of the most important medicines to avoid in pregnancy highlights the crucial requirement for targeted educational strategies involving trusted drug information sources such as gynecologists, pharmacists, and other health care providers to ensure medication adherence and safe medication use.

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Author's contribution: RAS, BKA & AIA conceived and designed the study. RAS, BKA, AMS & HMO collected data. RAS, BKA, AMS, AIA & SAA contributed to data analysis, and all authors contributed to data analysis and interpretation. VA & KPS drafted the manuscript. Otherwise, all authors contributed equally and approved the final version of the manuscript and agreed to be accountable for its contents.
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Data availability statement: The raw data that support the findings of this article are available from the corresponding author upon reasonable request.
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