

# Medication use during pregnancy and drug information resources utilized by pregnant women in Jordan

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## Summary

**Purpose:** This study was designed to investigate medication use among Jordanian pregnant women, and to evaluate their level of awareness about safety of medication use during pregnancy. **Materials and Methods:** Pregnant women who attended the Obstetrics and Gynecology Clinics at the largest hospital in North of Jordan area were interviewed using a questionnaire. The questionnaire included questions about demographics, medication use during pregnancy, and resources of information regarding medication use in pregnancy. **Results:** Two hundred and forty pregnant women agreed to participate in the study and were interviewed with a response rate of 94.5%. Folic acid (93.8%) was the most frequently used medication during pregnancy followed by multivitamins (57.9%), iron supplements (55.8%), and paracetamol (41.7%). The majority (82.1%) considered first trimester to be the most critical period in which drugs ingestion can cause harm to the fetus. The great majority relied on physicians (90.4%) to be their main source of information followed by pharmacists (15.4%). **Conclusions:** Folic acid was the most frequently used medication during pregnancy and the majority of participants took medications based on physician's recommendations. However, there were also cases of self-medication.

**Key words:** Medication; Information resources; Jordan; Pregnancy; Folic acid.

## Introduction

Knowledge of safety and risks of drugs use during pregnancy is vital; it can eliminate the risks of unnecessary exposure and subsequently reduce mother's anxiety during pregnancy. On the other hand, it can decrease invasive diagnostic measures such as amniocentesis and eliminate feeling of guilt if a child with malformation is born [1, 2]. The majority of administered drugs, during pregnancy, will reach the fetal circulation through the placenta. However, the extent to which drugs cross the placenta differ widely depending on many factors including passive transfer, facilitated diffusion, active transfer, and drugs metabolism [3].

Pregnant women utilize medicine due to pregnancy-influenced issues, acute care issues, or chronic illnesses while unaware that they are pregnant. As such it is possible for exposure to drugs to occur before the diagnosis of pregnancy is made. There is insufficient human data regarding the safety and risks of drugs used during pregnancy; the main source of information is observational data [4].

In Middle Eastern countries, few studies were conducted to investigate drug use during pregnancy. In Oman a total of 139 pregnant women were interviewed using a structured questionnaire assessing their medication use including prescription, over-the-counter (OTC), and herbal products. The study found insignificant reduction in prescription medications use during pregnancy compared to three-months prior to pregnancy. However, there was an in-

crease in the use of vitamins and supplements and herbal products in all trimesters compared to three-months prior to pregnancy [5].

In a study conducted in Iran, awareness of pregnant women about safety of medication use during pregnancy was assessed. A self-completion questionnaire was distributed to 400 pregnant women attending postnatal and antenatal wards. The results showed that 19.0% of the study sample used medications other than vitamins and supplements during pregnancy and 60.8% stated that the first trimester is the most critical period in which medications can cause harmful effects for the fetus [6].

In developed countries, several studies were conducted to investigate medication use during pregnancy. A population-based cohort study investigated prescription drug use among Norwegian mothers before and during pregnancy during 2004-2006. The study found that among the 106 000 pregnancies, 83% of mothers were prescribed drugs three months prior to conception, through pregnancy, and three months after delivery [7]. In the United States of America, a retrospective study evaluating the prevalence of prescription drugs use during pregnancy was conducted. The results showed that 64% of deliveries studied were prescribed a medication other than vitamin or mineral supplement in the 270 days prior to delivery [8].

Based on the previously discussed studies [5-8], the use of prescription medications is higher in developed countries compared to Middle Eastern countries. On the other

hand, anti-infective medications are most commonly prescribed medications during pregnancy in developed countries compared to analgesics in Middle Eastern countries.

The objectives of this study were to investigate medication use among Jordanian pregnant women and to evaluate their level of awareness about safety of medication use during pregnancy. Another objective was to investigate drug information resources utilized by Jordanian pregnant women regarding medication use in pregnancy.

## Materials and Methods

The study was conducted at King Abdulla University Hospital, the largest hospital in the North of Jordan. Pregnant women at different trimesters who attended the Obstetrics and Gynecology Clinics were approached by a research assistant and asked to participate in this study. Those who agreed to participate had the research goals and methods explained to them.

A questionnaire was adapted from Al-Riyami *et al.* [5] and Mashayekhi *et al.* [6] and then checked by specialists (obstetrician and pharmacists). The questionnaire included demographic questions in addition to questions about other clinical characteristics, current medication use, and history of medication use during pregnancy. The questionnaire also contained questions about information resources regarding medication use in pregnancy as well as questions regarding safety of medication use during pregnancy. The questionnaire was written and conducted in Arabic, which is the native language in Jordan.

A research assistant, who was trained to conduct interviews and administer questionnaires, interviewed the pregnant women who gave their consent. In an attempt to improve clarity and limit response bias, the questionnaire was piloted before the study in a small sample; necessary modifications were made. The study methodology was approved by the institutional Review Board at Jordan University of Science and Technology (research number 24/2013) on June 6, 2013.

Statistical Package for Social Sciences (SPSS, version 16.0) software was used to analyze the data. Data is described using frequency distribution. A Pearson Chi-Square test was used to examine possible relationships between different categorical factors. A *p* value 0.05 (two-sided) was considered as statistically significant.

## Results

Data collection was conducted from September to December 2013. A total of 254 pregnant women were approached, 240 pregnant women agreed to participate in the study and were interviewed, with a response rate of 94.5%. Respondents' characteristics, demographics, and gestational history are shown in Table 1.

The majority of the interviewed women 197 (82.1%) believed that using medications during first trimester of pregnancy possess the highest risk for fetal congenital anomalies. Furthermore, six women (2.5%) believed that using medications during second trimester have the highest risk while 12 women (5.0%) believed that using medications during third trimester pose the highest risk. Four of the participants (1.7%) believed that risk is the same throughout pregnancy and 21 (8.8%) of the respondents did not know the answer.

Table 1. — Respondents' characteristics, demographics, and gestational history.

Variable	N (%)
Age	
Mean (29.6 years $\pm$ 4.9)	
Median (29 years) Interquartile range (7 years)	
Educational status	
No schooling	0 (0.0)
Primary	7 (2.9)
Secondary	55 (22.9)
College	149 (62.1)
Higher education	29 (12.1)
Family total income/month, Jordanian Dinar (JD)	
> 500 JD	96 (40.0)
< 500 JD	142 (59.2)
Missing answers	2 (8.0)
Medical insurance status	
Insured	221 (92.1)
Uninsured	19 (7.9)
Employment state	
Employed	109 (45.4)
Unemployed	131 (54.6)
Trimester stage at time of interview	
First trimester	24 (10.0)
Second trimester	86 (35.8)
Third trimester	130 (54.2)
Number of children	
0	61 (25.4)
1-3	160 (66.7)
4-7	17 (7.1)
8-11	8 (0.8)
Presence of health problems in children	
Yes	10 (4.2)
No	168 (70.0)
No children	62 (25.8)
Type of delivery of previous pregnancies	
Normal delivery	105 (43.8)
C-section	53 (22.1)
Both normal and C-section	21 (8.8)
No previous pregnancies	61 (25.4)
Miscarriage	93 (38.8)
Smoking status	
Cigarette smoking	
- At least one cigarette daily	3 (1.2)
- Occasionally but not daily	1 (0.4)
- Ex-smoker	2 (0.8)
- None-smoker	234 (97.5)
Water pipe	
- Daily	1 (0.4)
- Occasionally	9 (3.8)
- Ex-smoker	4 (1.7)
- None-smoker	226 (94.2)

Regarding drug information resources utilized by the studied population to answer inquires about safety of medication use during pregnancy and how to manage side effects, the great majority relied on physicians (90.4%) to be their main source of information followed by pharmacists

Table 2. — Medication use during pregnancy.

Pharmacological class/ therapeutic use	Subgroup	Participants using medications N (%)	Period of use			More than one trimester	As needed
			1 <sup>st</sup> trimester	2 <sup>nd</sup> trimester	3 <sup>rd</sup> trimester		
Antimicrobial	Antibacterials	60 (25.0)	15 (25.0)	21 (35.0)	16 (26.6)	8 (13.3)	0 (0)
	Antifungals	9 (3.8)	1 (11.1)	7 (77.8)	1 (11.1)	0 (0)	0 (0)
	Others*	16 (6.7)	4 (25.0)	8 (50.0)	4 (25.00)	0 (0)	0 (0)
Analgesic	Paracetamol	100 (41.7)	32 (32.0)	22 (22.0)	14 (14.0)	2 (2.0)	30 (30.0)
	NSAIDs**	4 (1.7)	3 (75.0)	0 (0)	0 (0)	1 (25.0)	0 (0)
Respiratory	Antihistamine	4 (1.7)	1 (25.0)	2 (50.0)	0 (0)	1 (25.0)	0 (0)
	Decongestants	5 (2.1)	1 (20.0)	2 (40.0)	1 (20.0)	1 (20.0)	0 (0)
	Expectorants	9 (3.8)	3 (33.3)	3 (33.3)	3 (33.3)	0 (0)	0 (0)
Gastrointestinal	H2-Antagonists	21 (8.8)	2 (9.5)	6 (28.6)	9 (42.9)	3 (14.3)	1 (4.8)
	Proton pump inhibitors	4 (1.7)	2 (50.0)	1 (25.0)	1 (25.0)	0 (0)	0 (0)
	Other medications for heartburn	30 (12.5)	1 (3.3)	13 (43.3)	14 (46.6)	2 (6.7)	0 (0)
	Anti-emetics	57 (23.8)	51 (89.5)	3 (5.3)	0 (0)	3 (5.3)	0 (0)
	Laxatives	2 (0.8)	2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)
Corticosteroids		7 (2.9)	2 (28.6)	1 (14.2)	1 (14.2)	3 (42.9)	0 (0)
Hypoglycemic agents		2 (0.8)	0 (0)	0 (0)	0 (0)	2 (100.0)	0 (0)
Antihypertensives		2 (0.8)	0 (0)	1 (50.0)	0 (0)	1 (50.0)	0 (0)
Herbal		21 (8.8)	6 (28.6)	4 (19.0)	1 (4.80)	0 (0)	9 (42.8)
Vitamin/supplement	Folic acid	225 (93.8)	199 (88.5)	5 (2.2)	0 (0)	20 (8.9)	0 (0)
	Calcium supplement	86 (35.8)	6 (6.9)	56 (65.1)	13 (15.1)	11 (12.8)	0 (0)
	Multivitamin	139 (57.9)	17 (12.2)	91 (65.5)	7 (5.0)	23 (16.6)	0 (0)
	Iron supplement	134 (55.8)	17 (12.7)	79 (58.9)	17 (12.7)	19 (14.2)	0 (0)
	B-complex	2 (0.8)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0)	0 (0)
	Vitamin D	6 (2.5)	11 (5.0)	1 (15.0)	1 (15.0)	3 (50)	0 (0)
	Magnesium	2 (0.8)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0)	0 (0)
Antiplatelet/Anticoagulant	Aspirin	42 (17.5)	19 (45.2)	1 (2.4)	0 (0)	19 (45.2)	0 (0)
	Enoxaparin	7 (2.9)	2 (28.6)	0 (0)	0 (0)	5 (71.4)	0 (0)
	Tinzaparin	2 (0.8)	0 (0)	0 (0)	0 (0)	2 (100.0)	0 (0)
	Unfractionated Heparin	4 (1.7)	1 (25.0)	0 (0)	0 (0)	3 (75.0)	0 (0)
Progestin	Dydrogesterone***	26 (10.8)	23 (88.5)	0 (0)	0 (0)	2 (7.7)	0 (0)
	Progesterone	2 (0.8)	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)
	Others*	3 (1.2)	1 (33.3)	2 (66.6)	0 (0)	0 (0)	0 (0)
Thyroid hormone	Thyroxin	5 (2.1)	0 (0)	0 (0)	0 (0)	5 (100.0)	0 (0)
Others		36 (15)	10 (27.8)	16 (44.4)	2 (5.6)	8 (22.2)	0 (0)

\* Others: when participants could not recall the subgroup. \*\*NSAID: Non-steroidal anti-inflammatory drug. \*\*\* Dydrogesterone: progestin available outside the USA.

(15.4%), internet (15.0), relatives (8.3%), books and magazines (3.3%), nurses (3.3%), nobody (2.1%), friends and neighbors (1.7%), TV and radio (0.8%). and others (0.4%). On the other hand, the results showed significant correlation ( $p < 0.05$ ) between educational level and relying on relatives as a drug information resource to answer inquiries about safety of medication use during pregnancy and how to manage side effects. On the other hand, significant correlation ( $p < 0.05$ ) was found between family income and relying on neighbors as a drug information resource to answer inquiries about safety of medication use during pregnancy and how to manage side effects.

Regarding factors influencing awareness of participants to which trimester is the most critical period in which medication ingestion can cause harm to the fetus, educational and employment status made a statistically significant difference in participants' responses ( $p < 0.05$ ). Conversely, family income, medical insurance, number of children, and type of delivery of previous pregnancies did not affect par-

ticipants' responses.

Data concerning overall medication use during the three trimesters of pregnancy are summarized in Table 2. Medications were classified according to pharmacological class or their intended therapeutic use. Folic acid (93.8%) was the most frequently used during pregnancy followed by multivitamins (57.9%), iron supplements (55.8%) and paracetamol (41.7%). The results showed significant correlation ( $p < 0.05$ ) between educational level and the use of calcium supplement and thyroxin during pregnancy. Furthermore, the results demonstrated significant correlation ( $p < 0.05$ ) between family income and the use of paracetamol and calcium supplement during pregnancy.

Table 3 states percentages of medications used based on physicians' prescription and reports pregnant women's recognition if these medications need a prescription or not. Eighty percent of women who used antibacterial used it based on physicians' prescription, while 11.7% of them believed they did not need a prescription.

Table 3. — *Percentage of participants purchasing medications with prescription and whether they recognize the need for prescription.*

Pharmacological class/therapeutic use	Subgroup	Participants purchasing drugs with prescription N (%)	Participants' responses in regards to the question "does this drug need a prescription?"			
			Yes N (%)	No N (%)	I don't know N (%)	Missing N (%)
Antimicrobial	Antibacterials	48 (80.0)	50 (83.3)	7 (11.7)	0 (0)	3 (5.0)
	Antifungals	9 (100.0)	8 (88.9)	1 (11.1)	0 (0)	0 (0)
	Others*	14 (87.5)	13 (81.3)	2 (12.5)	0 (0)	1 (6.3)
Analgesic	Paracetamol	38 (38.0)	45 (45.0)	48 (48.0)	2 (2.0)	5 (5.0)
	NSAIDs**	3 (1.2)	3 (1.2)	0 (0)	1 (0.4)	0 (0)
Respiratory	Antihistamine	3 (75.0)	2 (50.0)	2 (50.0)	0 (0)	0 (0)
	Decongestants	4 (80.0)	4 (80.0)	0 (0)	1 (20.0)	0 (0)
	Expectorants	4 (44.4)	6 (66.7)	2 (22.2)	0 (0)	1 (11.1)
Gastrointestinal	H2 antagonist for heartburn	18 (85.7)	16 (76.2)	2 (9.5)	0 (0)	3 (14.3)
	Proton pump inhibitor for heartburn	3 (75.0)	4 (100.0)	0 (0)	0 (0)	0 (0)
	Other medications for heartburn	20 (66.7)	15 (50.0)	15 (50.0)	0 (0)	0 (0)
	Anti-emetics	44 (77.2)	36 (63.2)	17 (29.8)	2 (3.5)	2 (3.5)
	Laxatives	2 (100.0)	1 (50.0)	1 (50.0)	0 (0)	0 (0)
Corticosteroid		7 (100.0)	7 (100.0)	0 (0)	0 (0)	0 (0)
Hypoglycemic agent		2 (100.0)	2 (100.0)	0 (0)	0 (0)	0 (0)
Antihypertensive		2 (100.0)	2 (100.0)	0 (0)	0 (0)	0 (0)
Herbal		1 (4.8)	1 (4.8)	0 (0)	0 (0)	20 (95.2)
Vitamin/supplement	Folic acid	212 (94.2)	155 (68.9)	57 (25.3)	2 (0.88)	11 (4.9)
	Calcium supplement	82 (95.3)	66 (76.7)	15 (17.5)	2 (2.3)	3 (3.5)
	Multivitamin	131 (94.2)	96 (69.0)	37 (26.6)	1 (0.72)	6 (4.3)
	Iron supplement	128 (95.5)	98 (73.1)	26 (19.4)	2 (1.5)	8 (5.9)
	B-complex	2 (100.0)	1 (50.0)	1 (50.0)	0 (0)	0 (0)
	Vitamin D	6 (100.0)	6 (100.0)	0 (0)	0 (0)	0 (0)
	Magnesium	2 (100.0)	2 (100.0)	0 (0)	0 (0)	0 (0)
Antiplatelet/anticoagulant	Aspirin	40 (95.2)	37 (88.1)	5 (11.9)	0 (0)	0 (0)
	Enoxaparin	7 (100.0)	7 (100.0)	0 (0)	0 (0)	0 (0)
	Tinzaparin	2 (100.0)	2 (100.0)	0 (0)	0 (0)	0 (0)
	Unfractionated heparin	4 (100.0)	4 (100.0)	0 (0)	0 (0)	0 (0)
Progestin	Dydrogesterone***	23 (88.5)	25 (96.2)	0 (0)	0 (0)	1 (3.8)
	Progesterone	2 (100.0)	2 (100.0)	0 (0)	0 (0)	0 (0)
	Others*	1 (33.3)	1 (33.3)	2 (66.6)	0 (0)	0 (0)
Thyroid hormone	Thyroxin	5 (100.0)	4 (80.0)	0 (0)	0 (0)	1 (20.0)
Others		34 (94.4)	31 (91.7)	2 (5.6)	1 (2.8)	0 (0)

\*Others when participants could not recall the subgroup. \*\* NSAID: non-steroidal anti-inflammatory drug. \*\*\* Dydrogesterone progestin available outside the USA.

Table 4 lists responses of participants in regards to advisors of medications use during pregnancy. The majority of participants took medications based on physician's recommendations. However, there had been cases of self-medication that included both prescription and OTC medications.

## Discussion

This study aimed at investigating medication use among Jordanian pregnant women and evaluating their level of awareness about safety of medication use during pregnancy. The results showed that medication use including prescription and OTC products is common among Jordanian pregnant women. Regarding the awareness among Jordanian pregnant women about safety of medication use

during pregnancy, the majority of the studied population indicated that the use of medications in the first trimester of pregnancy increases the risk for congenital anomalies; as expected participants with higher educational level were more aware of this fact. The majority of respondents stated that physicians followed by pharmacists and the internet are their main resources of information regarding medications' safety and how to manage side effects. These findings can be related by the educational status of the participants; more than two-thirds of women have college or higher education degrees. The results of this study were in agreement with the results of a study conducted in another Middle Eastern country, Iran; most of the interviewed pregnant women obtained their information regarding medications' safety in pregnancy from physicians and considered the

Table 4. — Response of participants in regards to advisors of medications use during pregnancy.

Pharmacological class/ therapeutic use	Subgroup	Participants' responses in regards to the question "who advised you to use this medication?" N (%)						
		Physician	Pharmacist	Friend/Relative	Internet	Nobody	Nurse	Missing
Antimicrobial	Antibacterials	52 (86.7)	4 (6.7)	0 (0)	0 (0)	2 (3.30)	2 (3.3)	0 (0)
	Antifungals	9 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Others*	15 (93.8)	1 (6.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Analgesic	Paracetamol	69 (69.0)	5 (5.0)	3 (3.0)	1 (1.0)	20 (20.0)	2 (2.0)	0 (0)
	NSAIDs**	3 (75.0)	0 (0)	0 (0)	0 (0)	1 (25.0)	0 (0)	0 (0)
Respiratory	Antihistamines	3 (75.0)	0 (0)	0 (0)	1 (25.0)	0 (0)	0 (0)	0 (0)
Decongestants	4 (80.0)	0 (0)	0 (0)	0 (0)	1 (20.0)	0 (0)	0 (0)	
	Expectorants	4 (44.4)	4 (44.4)	0 (0)	0 (0)	0 (0)	1 (11.1)	0 (0)
Gastrointestinal	H2 antagonists	18 (85.7)	3 (14.3)	0 (0)	0 (0)	1 (4.8)	0 (0)	0 (0)
	Proton pump inhibitors	3 (75.0)	1 (20.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Other medications for heartburn	22 (73.3)	4 (13.3)	0 (0)	0 (0)	3 (10.0)	1 (3.3)	0 (0)
	Anti-emetics	49 (85.9)	4 (7.0)	1 (1.8)	0 (0)	2 (3.5)	1 (1.8)	0 (0)
	Laxatives	2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Corticosteroids		7 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hypoglycemic agents		2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Antihypertensives		2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Herbals		3 (14.3)	0 (0)	4 (19.1)	1 (4.8)	11 (52.4)	0 (0)	2 (9.5)
Vitamin/supplements	Folic acid	218 (96.9)	0 (0)	0 (0)	1 (0.44)	5 (2.1)	0 (0)	1 (0.44)
	Calcium supplement	84 (97.7)	0 (0)	0 (0)	0 (0)	2 (2.3)	0 (0)	0 (0)
	Multivitamin	134 (55.8)	0 (0)	0 (0)	0 (0)	4 (1.7)	0 (0)	1 (0.4)
	Iron supplement	129 (96.3)	0 (0)	0 (0)	0 (0)	3 (2.2)	0 (0)	2 (1.5)
	B-complex	2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Vitamin D	6 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Magnesium	2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Antiplatelet/	Aspirin	41 (97.6)	0 (0)	0 (0)	0 (0)	1 (2.4)	0 (0)	0 (0)
Anti-coagulants	Enoxaparin	7 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Tinzaparin	2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Unfractionated heparin	4 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Progestin	Dydrogesterone ***	25 (96.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (3.8)
	Progesterone	2 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Others*	3 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Thyroid hormone	Thyroxin	5 (100.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Others		34 (94.4)	0 (0)	0 (0)	0 (0)	2 (5.6)	0 (0)	0 (0)

\* Others when participants could not recall the subgroup. \*\* NSAID: non-steroidal anti-inflammatory drug. \*\*\*Dydrogesterone progestin available outside the USA.

first trimester of pregnancy as the most critical period in which medications ingestion might cause harm to the fetus [6]. In this study there was a greater percentage of pregnant women who considered physicians their main source of information (90.4% vs. 59.5%) and considered first trimester to be the most critical period in which medications ingestion can cause harm to the fetus (82.1% vs. 60.8%). One of the possible reasons is less university education among the studied population in the Iranian study compared to this study. In Turkey, a descriptive study investigated women's opinion towards the risk factors for congenital anomalies. The study found that of the 200 women interviewed, 88.5% (177 women) agreed that using medications in the first trimester of pregnancy increases the risk for congenital anomalies; these results are similar to the present results [9].

On the other hand, in the United Kingdom a study eval-

uated 45 antenatal patients in a hospital setting and found that 35.6% of respondents acquired pregnancy information from hospital staff while 66.7% of respondents used the internet [10]. The present authors expect an increase in reliance on the internet to acquire information regarding the safety of medication use during pregnancy due to ease of access and economic reasons. Amoah and Appiah-Sakyi (2013) recommended playing educational DVD materials to pregnant women in waiting areas in clinics; this is applicable in Jordan and may be used to educate pregnant women about various health issues [10].

The results of the present study showed that the most commonly prescribed medications during pregnancy were folic acid, multivitamins, iron, and paracetamol. These findings were in accordance with other previously published studies [5,11]. Similarly, Al-Riyami *et al.* found that folate, iron, and multivitamins were the most com-



monly prescribed medications during pregnancy [5]. In 2007, an analysis of maternity records was conducted to investigate prescribing patterns of pregnant women in Scotland. The results showed that 21,093 prescriptions were dispensed to 3,356 women (85.2%). The most frequently prescribed medications were antacids, antibacterials, oral iron, folic acid preparations, and analgesics [11]. However, in a retrospective study conducted to evaluate prevalence of prescription medication use among pregnant women in the United States during the period of 1996 through 2000 showed that amoxicillin (antibacterial) was the most common medication that was dispensed during the 270 days before delivery. In the previous study, vitamins and mineral supplements were excluded [8].

Interestingly, 20% of antibacterial drugs in the present study were used without a prescription, although only 11.7% of the studied population believed they do not need a prescription for antibacterial drugs. This finding is not exclusive to antibacterials; responses to other medications showed a recurring pattern. For example, 11.5% of pregnant women used dydrogesterone without prescription, although none of the studied population believed it can be taken without a prescription; this finding is alarming, particularly since most of the women in this study were insured (92.1%), the present authors expect the number of pregnant women purchasing medications without a prescription to increase in the absence of medical insurance coverage. Although drug authorizing bodies in Jordan including Jordan Ministry of Health, Jordan Food and Drug Administration, and Jordan Pharmaceutical Association stated laws and regulations regarding dispensing medications, these laws are not strictly enforced which enabled pregnant women to have access to prescription medications without a prescription. In a study conducted to investigate public perception of OTC drugs in Jordan, over 1,000 subjects were interviewed and completed a questionnaire. The results showed that antimicrobials and sedatives are considered as OTC drugs and can be purchased without a prescription by 61.5% and 15.9% of participants, respectively. The study concluded that there is uncontrolled dispensing of prescription medications as OTC drugs and drug authorizing bodies need to be more assertive towards law-violations to decrease drug misuse and abuse [12]. The fact that Jordanian public can purchase prescription medications without a prescription is a major concern. This major concern will be more pronounced and poses higher risks in case of pregnant women purchasing prescription medications as OTC drugs. Health authorities should inspect of violations and take appropriate actions accordingly in order to enforce drug regulations.

Pregnancy influenced health issues such as heartburn, nausea and vomiting were managed by medications recommended mainly by physicians followed to a lesser extent by pharmacists. The results showed cases of self-medication for both prescription and OTC drugs, this is alarming

as it may predispose the fetus to harmful consequences. In many instances OTC drugs can be used to manage pregnancy influenced health issues. Encouraging active participation of pharmacists in choosing optimal therapeutic plan can help eliminate self-medication in pregnant women and ensure safe and effective treatment, especially in cases of those who do not have medical insurance coverage.

Regarding herbal treatments, more than half of the participants who ingested herbals, took them based on their own recommendations. A number of studies investigated the use of complementary and alternative medicine during pregnancy emphasized the need for further research in this area [13-18]. A study conducted in three public hospitals in northern Italy investigated the use of herbal products among pregnant women. The study found that among the 700 pregnant women interviewed, 189 women used herbal products daily for at least three months during their pregnancy [16]. A literature review evaluated relevant literature that investigated the prevalence and the motivation for use of herbal products among pregnant women found that many pregnant women use complementary and alternative medicine. The researchers concluded that healthcare professional should ask women about complementary and alternative medicine use and provide them with relevant information [14]. The present authors recommend that healthcare providers including physicians and pharmacists investigate complementary and alternative medicine use among pregnant women and provide information about their safety in pregnancy, drug-herbal interactions and other relevant information. Pregnant women on the other hand should be offered educational sessions that cover various pregnancy related issues such as safety of medication and herbal use during pregnancy.

This study was the first of its kind in Jordan to investigate medication use among Jordanian pregnant women and to evaluate their level of awareness about safety of medication use during pregnancy. Moreover, this study was the first in Jordan to investigate drug information resources utilized by Jordanian pregnant women regarding medication use in pregnancy. The results of this study should be considered within the context of its limitations. The study was conducted in a single teaching hospital in North of Jordan, thus results might not be generalized to other settings; such as one with lower percentage of medical insurance coverage and lower educational status. The questionnaire did not ask participants about their medication use three months prior to conception. A research assistant interviewed and administered the questionnaire which may have affected respondents' answers; however, other methods of data collection using mailing or emailing systems are not feasible in Jordan. Finally, the use of a diary in a prospective manner would have resulted in more accurate answers since some participants did not remember the names of their medications. Future studies investigating medication use among Jordanian nursing mothers and evaluating their level

of awareness about safety of medication use during lactation will give a more comprehensive view.

## Conclusion

Folic acid followed by multivitamins, iron supplements, and paracetamol are the most commonly prescribed drugs and supplements during pregnancy. Pregnant women relay mostly on physicians to gain knowledge about safety of medications usage and management of side effects. Self-medication among pregnant women is a major concern which may jeopardize fetus health. Health authorities, physicians, as well as other healthcare providers should work collaboratively to ensure appropriate self-medication and prevent dispensing prescription medications without a prescription. National educational programs about safety of medication use during pregnancy are warranted.

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