



## Original article

# Knowledge of community pharmacists about the risks of medication use during pregnancy in central region of Saudi Arabia



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## ABSTRACT

**Background:** Community pharmacists (CPs) are the most accessible health care provider to the public, and they have huge duties to improve medication use especially among the pregnant women in their community. The objective of this study was to evaluate knowledge of CPs about the medication safety during pregnancy.

**Methods:** A prospective cross-sectional survey was carried out over practicing community pharmacists in a capital of Saudi Arabia (SA). Pharmacists were asked about the safety of each medicine during pregnancy. It involved both prescription-only medications (POM) and over-the-counter (OTC) medications. Both descriptive and analytic statistics were utilized. For descriptive analysis, results were expressed as numbers, percentages and mean ( $\pm$ SD and 95% CI).

**Results:** The response rate was (71.1%). Most of the respondents (69.6%) believed that alprazolam is not safe while 22% of respondents believed that it is used on basis of risk-benefit assessment. Also, most of CPs (65.2%) said that amoxicillin is safe, but a very few of CPs (11.7%) knew that tetracycline should be used only if potential benefits may outweigh the risk. Among non-prescribed analgesics, majority of CPs (92.6%) knew that acetaminophen is safe. About dietary supplements, 48.4% of CPs reported that Vitamin A supplements are not safe. There was significant difference observed between age groups of CPs in scores of knowledge test ( $P = 0.001$ ).

**Conclusion:** Community Pharmacists are the most accessible health care providers who can help pregnant women with their medications use there are still gaps in knowledge where educational interventions are needed.

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## 1. Introduction

Drug therapy in pregnant women cannot be completely avoided because some pregnant women may have acute or chronic diseases such as nausea, vomiting, diabetes, asthma and hypertension in which short or long-term therapy are needed (Zaki and Albarraq, 2014). In Saudi Arabia (SA), it is reported that 40% of pregnant women take either prescribed or over-the-counter (OTC)

medications (Zaki and Albarraq, 2014). Moreover, it is estimated that herbal medicine use in pregnant women range between 7% and 55% in different geographical areas of Middle East (John and Shantakumari, 2015). Frequently used medications, herbs, and complements can result in adverse outcomes for both the mother and her fetus (Arah, 2012; Bercaw et al., 2010).

To avoid such adverse events, pregnant women should be educated from health care professionals including physicians and pharmacists. A study carried out in Saudi Arabia reported that pregnant women received drug information from pamphlet than either physicians or pharmacists (Zaki and Albarraq, 2014). Another study was conducted in Riyadh city, SA to evaluate the knowledge, attitudes, beliefs, and factors associated with the uptake of the influenza vaccination in pregnant women. The study revealed that the knowledge of the influenza vaccine amongst Saudi pregnant women was low and very few of pregnant women (13%) thought that the flu vaccine is safe during pregnancy and

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seldom, health care professionals advise their patients to take flu vaccine (Mayet et al., 2017).

Community pharmacists (CPs) are the most accessible health care providers to the general public. In addition to their traditional role of dispensing medications and treating minor illnesses, CPs are considered a direct source of drug information for the public. They play important role in monitoring drug use in pregnant women. Therefore, CPs should have enough medication knowledge to improve therapy for the patients. Also, they should provide medication counseling, drug information, medication assessments and medication adherence (George, 2011). In Saudi Arabia, many studies have published related to community pharmacy practice. A study was carried out by Garcia-Bournissen et al. to assess the counseling practice of CPs in Riyadh city, SA. This study revealed that the most current CPs don't provide appropriate medication counseling (Garcia-Bournissen et al., 2008). Another cross-sectional study was carried among 100 CPs to explore the competence of CPs in monitoring drug-drug interactions, the degree of adherence to pharmacy regulations and the extent to which community pharmacists engage in patients counseling. This study reported that about 95% pharmacists don't adhere to the profession regulation act related to antibiotic dispensing and a few of CPs provide patient counseling (Al-Hassan, 2011).

A cross-sectional study was conducted in Tanzania among CPs to evaluate their knowledge towards drug use in pregnancy. It focused on four commonly used drugs that are teratogenic or cause undesirable effects to the fetus. This study reported that CPs had insufficient knowledge regarding these medications (Kamuhabwa and Jalal, 2011). A similar study was done in Brazil to assess pharmacists' knowledge and attitude towards dispensing drugs to pregnant women. It suggested that pharmacists who dispense these drugs were not able to interpret information on the use of drugs in pregnant women (Baldon et al., 2006).

To the best of our knowledge, no studies were published to assess community pharmacists' (CPs') knowledge towards medication safety during pregnancy. Such study is necessary since CP are the most accessible health care provider to the public, and they have huge duties to improve medication use especially among the pregnant women in their community. The objective of this study was to evaluate knowledge of CPs about the medication safety during pregnancy.

## 2. Methods

### 2.1. Study design

A prospective cross-sectional survey was carried out in Riyadh city, SA. The questionnaire was confirmed for its face and content validity by experts in the field of clinical pharmacy and adjusted after a pilot study conducted on 10 CPs. The reliability of questionnaire was determined to be 0.865 using the Cronbach's Alpha. Ethical approval was obtained from The King Saud University's institutional review board before data collection. The questions used in the tool had been established based on similar previously published studies (Morgan et al., 2010).

### 2.2. Questionnaire design

The questionnaire composed of two main parts. The first part is the demographic survey to collect background information regarding the age, number of working years' experience in the field of pharmacy, graduation country, and practice asking female patients about the pregnancy status. The second part comprised of a list of 22 prescription drugs, nonprescription drugs, dietary complements, and herbal medicine when they are taken in the first

trimester. Pharmacists were asked about the safety of each medicine during pregnancy. It involved both prescription-only medications (POM) and over-the-counter (OTC) medications. Each question in both section would only have one of the following answers: safe in the first trimester, must weight risks and benefits for individual patients, not safe in the first trimester, and I don't know. The selected medications in the survey included: (1) drugs which have known risks to the fetus including isotretinoin, phenobarbital, tetracycline, valproic acid; (2) drugs that are commonly used for gynecological health issues including ciprofloxacin, amoxicillin, oral contraceptives; (3) drugs that are used to treat other health issues that can be present during pregnancy such as paroxetine for depression; budesonide for asthma; lamotrigine for epilepsy and bipolar disorder; (4) OTC medications that are most commonly used during pregnancy involving acetaminophen, aspirin, dextromethorphan, guaifenesin, ibuprofen, and pseudoephedrine. All the correct answer for both prescription only medications (POM) and over the counter medications (OTC). The overall knowledge scores was calculated by adding all the correct answer for knowledge questionnaire and the maximum score was 22.

### 2.3. Study population

The study was targeted all practicing community pharmacists in Riyadh city, SA. It was estimated that about 2000 pharmacists registered with the health affairs directorate in Riyadh city. To calculate the sample size, we assumed 50% of the pharmacists have good knowledge about drug safety during pregnant women, and a total of 350 pharmacies would provide a representative sample size with 5% margin of errors and 95% confidence level.

### 2.4. Data analysis

The data was entered into the SPSS version 22 for Windows (SPSS) for analysis. Both descriptive and analytic statistics were utilized. For descriptive analysis, results were expressed as numbers, percentages and mean ( $\pm$ SD and 95% CI). The Mann-Whitney *U* test and the Kruskal-Wallis test were used to assess intergroup differences. *P*-value of less than 0.05 was consider as statistically significant.

## 3. Results

Responses were returned from 350 CPs given a response rate of 71.1%. Demographic characteristics of the participants are showed in Table 1. The age of approximately 71.5% of the study sample ranges from 25 to 35 years. About 94.9% of the participants have less than 10 years working experience in the field of pharmacy.

**Table 1**  
Demographic characteristics of the participants (N = 256).

Age	Frequency	Percentage (%)
From 25 to 35	183	71.5
From 36 to 45	70	27.3
From 46 to 55	3	1.2
<i>Years of working experience</i>		
Less than 10 years	243	94.9
From 20 to 30 years	11	4.3
From 31 to 40	–	–
<i>Asking for pregnancy status</i>		
Always	140	54.7
Often	98	38.3
If she looks pregnant	17	6.6
Never	1	0.4

**Table 2**

Response of CPs to use of prescribed medications during pregnancy.

Medication	Not Safe in the first trimester N (%)	Must weigh risks and benefits for individual patients N (%)	Safe in the first trimester N (%)	I don't know N (%)
Alprazolam	178 (69.6)	57 (22.3)	6 (2.3)	14 (5.5)
Amoxicillin	15 (5.9)	61 (23.8)	167 (65.2)	12 (4.7)
Budesonide, inhaled	17 (6.6)	190 (74.2)	29 (11.3)	17 (6.6)
Ciprofloxacin	221 (68.3)	22 (8.6)	2 (0.8)	8 (3.1)
Isotretinoin	234 (91.4)	11 (4.3)	1 (0.4)	10 (3.9)
Lamotrigine	22 (8.6)	153 (59.8)	23 (9)	57 (22.3)
Contraceptive	172 (67.2)	58 (22.7)	5 (2)	16 (6.3)
Paroxetine	83 (32.4)	160 (62.5)	3 (1.2)	7 (2.7)
Phenobarbital	129 (50.4)	113 (44.1)	2 (0.8)	9 (3.5)
Statins	204 (79.9)	28 (10.9)	13 (5.1)	10 (3.9)
Tetracycline	190 (74.2)	30 (11.7)	27 (10.5)	9 (3.5)
Valproic Acid	125 (48.8)	118 (46.1)	3 (1.2)	10 (3.9)

**Table 3**

Response of CPs to use of over-the-counter (OTC) medications during pregnancy.

Medication	Not Safe in the first trimester N (%)	Must weigh risks and benefits for individual patients N (%)	Safe in the first trimester N (%)	I don't know N (%)
Acetaminophen	2 (0.8)	9 (3.5)	237 (92.6)	8 (3.1)
Aspirin	7 (2.7)	141 (55.1)	94 (36.7)	14 (5.5)
Bismuth subsalicylate	120 (46.9)	71 (27.7)	53 (20.7)	12 (4.7)
Caffeine	16 (6.3)	63 (24.6)	170 (66.4)	7 (3.0)
Dextromethorphan hydro bromide	11 (4.3)	66 (25.8)	137 (53.5)	39 (15.2)
Guaifenesin	42 (16.4)	33 (12.9)	164 (64.1)	17 (6.6)
St. John's Wort	202 (78.9)	24 (9.4)	10 (3.9)	19 (7.4)
Ibuprofen	145 (56.6)	47 (18.4)	23 (9.0)	40 (15.6)
Pseudoephedrine hydrochloride	32 (12.5)	87 (34)	101 (39.5)	35 (13.7)
Supplement Vitamin A	124 (48.4)	46 (18)	15 (5.9)	67 (26.2)

**Table 4**

Variables influencing pharmacist' knowledge.

Variables	Mean	Median	SD	P value
<i>Age</i>				
25–35 years	10.5	11	2.7	0.001 <sup>a</sup>
36–45 years	9.6	9	2.6	
46–55 years	13	12	1.7	
<i>Country of graduation</i>				
Egypt	10.4	11	2.04	0.015 <sup>b</sup>
Others	7.8	7	3.8	
<i>Experience in years</i>				
Less than 10 years	10.2	11	2.7	0.299 <sup>b</sup>
10–20 years	11.3	10.5	2.1	

<sup>a</sup> Kruskal-Wallis.<sup>b</sup> Mann-Whitney U test.

Of all included participants, 54.7% are asking their female patients about the pregnancy status.

Table 2 presents the CPs' response of drug safety during pregnancy. Most of respondents (69.6%) believed that alprazolam is not safe while 22% of respondents believed that it is used on basis of risk-benefit assessment. Also, most of CPs (65.2%) said that amoxicillin is safe, but a very few of CPs (11.7%) knew that tetracycline should be used only if potential benefits may outweigh the risk. A majority of CPs (91.0%) knew that isotretinoin is unsafe to be used by pregnant. For central nerves system drugs, about 49% of CPs identified valproic acid is not safe, and approximately one-third of CPs correctly identified that lamotrigine should be used only if the potential benefit justifies the potential risk. For more details see Table 2.

Table 3 shows the CPs' response to the use of OTC drugs during pregnancy. Among non-prescribed analgesics, majority of CPs (92.6%) knew that acetaminophen is safe; however they were in doubt about aspirin usage during pregnancy while ibuprofen may be used if the potential benefit justifies the potential risk. A

very few of CPs knew that guaifenesin is used only if the potential benefit justifies the potential risk. About dietary supplements, 48.4% of CPs reported that Vitamin A supplements are not safe. Most of CPs (78.9%) said that St. John's wort is not safe for use in the first trimester.

In addition, there was significant difference observed between age groups and country of graduation of CPs in scores of knowledge test ( $P = 0.001$ ,  $p = 0.015$ , respectively) but no significant differences found with other variables included years of experiences ( $p = 0.299$ ) see Table 4.

#### 4. Discussion

Studies on CPs' knowledge concerning drug safety during pregnancy are limited. To our knowledge, this is the first study was conducted to evaluate the CPs' knowledge about drug use in pregnant women. One of the most important roles of CPs as health care professionals is to ensure the safety of medications prescribed or

used during pregnancy. This role can be achieved by CPs through providing medication counseling, and drug information to pregnant women (George, 2011).

Some medications are teratogenic in their natures (Garcia-Bournissen et al., 2008). Numerous medications have proven to associate with increased risks of birth defects. To protect pregnant and fetus from teratogenic events from using some drugs, the US Food and Drug Administration (FDA) has established five categories (A, B, C, D, and X) to indicate drugs' potential for causing teratogenicity. Generally, category D or X drugs are considered potentially teratogenic drugs. Many medications used to treat diseases such as hypertension and seizures are categorized as class D or X (Kamuhabwa and Jalal, 2011). In addition, there are numerous drugs with other ratings that, depending on the timing of drug use and dose of the exposure, can also cause fetal damage (Kamuhabwa and Jalal, 2011).

This study revealed that CPs have inadequate knowledge in providing information about safety of medications used during pregnancy. It has documented that CPs do not always offer correct advice to pregnant women (Damase-Michel et al., 2008; Lapeyre-Mestre, 2004). The lack of well-designed focused didactic or training and the scarce availability of continuing education programs about drugs usage in pregnancy may contribute to the inadequate knowledge of CPs towards medications safety during pregnancy.

The knowledge of CPs about the risks of different medications use during pregnancy varies according to the medication type. The majority of CPs in this study identified drugs with potentially teratogenic effects such as isotretinoin and statins that are unsafe for use in the first trimester. They also correctly identified drugs that are the most prescribed during pregnancy (i.e. amoxicillin, acetaminophen) as being safe for use in pregnant women. These results are consistent with a study conducted in Palestine which found about 82% of CPs correctly identified that isotretinoin is contraindicated during pregnancy (Arah, 2012). Another study conducted among health care professionals included gynecologists found same finding (Morgan et al., 2010). However, Morgan et al. reported that only 6% of gynecologist correctly identified that tetracycline can be used in pregnant women on basis of benefit-risk assessment. Less than half of CPs in our study correctly identified that Paroxetine and valproic acid are contraindicated in pregnancy. Our findings are similar to previous study found that 35% and 38.9% of community pharmacists correctly identified that paroxetine and valproic acid are contraindication drugs to use during pregnancy (Arah, 2012). Another study was conducted among health care professionals included general practitioner (GPs) and CPs found that 19% of GPs and 33% of CPs stated that there are no teratogenic risk for valproic acid (Damase-Michel et al., 2008).

Pharmacists can play an important role in selecting and providing information or medication counseling regarding the safety of OTC drugs, dietary supplements and herbal products to use in pregnancy. Most of OTC drugs have been linked with adverse effects during pregnancy (Verstappen, Smolders, Munster, Aarnoudse, & Hak, 2013). Although CPs showed lack of sufficient knowledge in providing information about safety of OTC drugs and herbal medications to use in pregnancy, pregnant women in SA take consume good amount of OTC drugs and herbal products (Zaki and Albarraq, 2014). In this study, a few of CPs correctly identified the safety use of OTC drugs during pregnancy including guaifenesin (12.9%), ibuprofen (18.4%). These findings are similar to the results of previous studies (Arah, 2012) & (Morgan et al., 2010).

## 5. Recommendation

Improving CPs' knowledge about drug safety during pregnancy is essential especially in this era of health care where community

pharmacies play important role in providing integrated patient care. Therefore, several means can be established to improve CPs' knowledge about drug safety during pregnancy such as installing a pharmacy network system in community pharmacies to offer immediate information to pharmacists regarding medications, adding necessary subjects regarding drug safety into the pharmacy curriculum, and developing free pharmacy continuing education programs.

## 6. Conclusion

Community Pharmacists are the most accessible health care providers who can help pregnant women with their medications use. Although there are some areas where pharmacists are knowledgeable about drug safety during pregnancy, there are still gaps in knowledge where educational interventions are needed.

## 7. Limitations

This study has some limitations. Firstly, the study was restricted to Riyadh city, therefore results may not represent the knowledge of community pharmacist practicing in other regions of Saudi Arabia. Secondly, the study used self-administrated questionnaire this could lead to desirability bias. However, a nation study involving is recommend in order to confirm some of the results of this study.

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## References

- Al-Hassan, M., 2011. Community pharmacy practice in Saudi Arabia: an overview. *Internet J. Pharmacol.* 9 (1).
- Arah, E.M.A.A.A., 2012. Community Pharmacists' Medication Knowledge: A Nation-wide Study in Palestine. Faculty of Graduate Studies Community Pharmacists' Medication Knowledge: A Nation-wide Study in Palestine By Enass Majed Abd Alrahman Abu Arah Supervisor Prof. Waleed Sweileh Co-supervisor Dr. Adham Abu-Taha This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Clinical Pharmacy, Faculty of Graduate Studies, An-Najah National University.
- Baldon, J.P., Correr, C.J., Melchior, A.C., Rossignoli, P., Fernandez-Llimos, F., Pontarolo, R., 2006. Community pharmacists' attitudes and knowledge on dispensing drugs to pregnant women. *Pharm. Pract.* 4 (1), 38–43.
- Bercaw, J., Maheshwari, B., Sangi-Haghpeykar, H., 2010. The use during pregnancy of prescription, over-the-counter, and alternative medications among Hispanic women. *Birth* 37, 211–218.
- Damase-Michel, C., Pichereau, J., Pathak, A., Lacroix, I., Montastruc, J.L., 2008. Perception of teratogenic and foetotoxic risk by health professionals: a survey in Midi-Pyrenees area. *Pharm. Pract. (Internet)* 6, 15–19.
- Garcia-Bournissen, F., Tsur, L., Goldstein, L.H., Staroselsky, A., Avner, M., Asrar, F., De Santis, M., 2008. Fetal exposure to isotretinoin – an international problem. *Reprod. Toxicol.* 25, 124–128.
- George, J., 2011. Optimising medication use during pregnancy: the potential role of pharmacists. *Int. J. Pharm. Pract.* 19, 81–83.
- John, L.J., Shantakumari, N., 2015. Herbal medicines use during pregnancy: a review from the Middle East. *Oman Med. J.* 30, 229.
- Kamuhabwa, A., Jalal, R., 2011. Drug use in pregnancy: knowledge of drug dispensers and pregnant women in Dar es Salaam, Tanzania. *Indian J. Pharmacol.* 43, 345.
- Lapeyre-Mestre, M., 2004. Drug counselling in pregnancy: an opinion survey of French community pharmacists. *Pharmacoepidemiol. Drug Saf.* 13, 711–715.
- Mayet, Ahmed Y., Al-Shaikh, Ghadeer K., Al-Mandee, Hazem M., Alsaleh, Nada A., Hamad, Amani F., 2017. Knowledge, attitudes, beliefs, and barriers associated with the uptake of influenza vaccine among pregnant women. *Saudi Pharm. J.* 25 (1), 76–82.
- Morgan, M.A., Cragan, J.D., Goldenberg, R.L., Rasmussen, S.A., Schulkin, J., 2010. Obstetrician-gynaecologist knowledge of and access to information about the risks of medication use during pregnancy. *J. Matern.-Fetal Neonat. Med.* 23, 1143–1150.
- Zaki, N.M., Albarraq, A.A., 2014. Use, attitudes and knowledge of medications among pregnant women: a Saudi study. *Saudi Pharmaceut. J.* 22, 419–428.