

# Evaluation of knowledge and practice of primary health care physicians regarding medication prescribing during pregnancy in Jeddah, Saudi Arabia 2021

Reham O. Alzahrani (1)

Reem M. Alqahtani (2)

Shada M. Alharbi (3)

(1) Family medicine resident at King Abdulaziz University Hospital, Jeddah city, Saudi Arabia

(2) Consultant Family physician, King Abdulaziz University, Jeddah city, Saudi Arabia

(3) Senior specialist at Al Azizya PHC center, Jeddah city, Saudi Arabia

## Corresponding author

Dr. Reham O. Alzahrani

Jeddah, Saudi Arabia

Tel.: 00966538381707

Email: Rehamalza@hotmail.com

Received: March 2022 Accepted: April 2022; Published: May 1, 2022.

Citation: Reham O. Alzahrani et al. Evaluation of knowledge and practice of primary health care physicians regarding medication prescribing during pregnancy in Jeddah, Saudi Arabia 2021. World Family Medicine. 2022; 20(5): 12-24.

DOI: 10.5742/MEWFM.2022.9525031

## Abstract

**Background:** Despite adequate guidelines that support medication prescribing during pregnancy, primary health care physicians' practice in Saudi Arabia is still not assessed.

**Objectives:** to assess knowledge and practice of physicians towards medication prescription during pregnancy and to determine obstacles in prescribing medications.

**Methods:** Across-sectional study was done on of 168 PHC physicians in Jeddah, Saudi Arabia. A questionnaire was distributed to physicians online, including questions about their knowledge about medication prescribing (categories), reading sources, and practice.

**Results:** 78.6% of PHC physicians faced obstacles in prescribing medication for pregnant women, where lack of time to read limited information about patient and treatment and pregnant women education level were the most common obstacles found. Amoxicillin (86.9%), Levothyroxine (75.6%), Methylodopa (73.8%), Calcium carbonate (71.4%), Nasal fluticasone (57.1%), and Penicillin G were the most commonly reported medications as being safe during pregnancy by participants (56.5%). Doxycycline (64.9%), methotrexate (63.7%), warfarin (54.2%), and statins were the most commonly

reported unsafe medications. Participants aged 25-35 years had a significantly higher percentage of facing a lack of time to read as an obstacle in prescribing medication for pregnant women, whereas GPs had a significantly higher percentage of facing obstacles, such as the level of education of pregnant women, a lack of privacy in a PHC, and a lack of pregnancy education.

**Conclusion:** There is insufficient awareness and practice of PHC physicians regarding medication prescribing during pregnancy. It is necessary to raise their awareness about the FDA guidelines.

**Keywords:** knowledge, practice, PHC, medication, pregnancy, Jeddah

## Introduction

During pregnancy medication use is common and almost 90% of pregnant women took either prescribed or over-the-counter medication (1). About 8 out of 10 women reported the use of some medications during their pregnancies (2). Although not all medications are safe to take during pregnancy, some medications have maternal side effects and others have a special concern in fetal teratogenicity. Drug prescription during pregnancy is sometimes mandatory, particularly for those with a medical history of acute or chronic illnesses (3).

Pregnancy involves a variety of maternal physiological changes which poses the risk of developing symptoms like; morning sickness, constipation, heartburn, hypertension, and infections. In such cases, the use of medications might be unavoidable (4). Thus, all pregnant women should be educated and have insight into the risks and benefits of the medications they use (5).

Part of the education responsibility relies on the primary healthcare physicians. In Saudi Arabia, primary health care centers are positioned to be the first access point to the health care system. So, maternal and child health are considered to be a cornerstone of their daily practice (6).

In order to improve medical practice and decrease risk during pregnancy, the U.S Food and Drug Administration (FDA) established categories of five letter risk - A, B, C, D or X - indicating potential birth defects and fetal harm, as resources of accessing the drug information that health care professionals need in prescribing medication[7]. Category A indicates there is no risk to the foetus in the first trimester of pregnancy and no evidence of risk in the later trimesters, and category B indicates that animal reproduction studies have failed to demonstrate a risk to the foetus and there are no adequate and well-controlled studies in pregnant women, and category C indicates that animal reproduction studies have shown an adverse effect on the foetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks. Category D indicates that there is positive evidence of human foetal risk based on adverse reaction data from investigational or marketing experience or human studies, but potential benefits may justify use of the drug in pregnant women despite potential risks, and category X indicates that studies in animals or humans have demonstrated foetal abnormalities and/or there is positive evidence of human foetal risk based on adverse reaction data from investigational or marketing experience or human studies (7). In that regard, despite the sufficient guidelines that support medication prescribing in pregnancy, primary health care physicians' practice is still not up to the mark in Saudi Arabia (7).

A study conducted in Ethiopia, showed that the main sources of information of dispensed medication for pregnant women was (41.9%) pharmacists and (21.3%) were general practitioner physicians, besides, they reported about 6.8% of the pregnant women stated that

they only checked the leaflet of the medication rather than asking physicians (8). In Italy in 2018, a study conducted among pregnant women, regarding medication use during pregnancy, stated that (75.3%) of advice was from physicians, who are the most common source of receiving information during pregnancy (9).

In Saudi Arabia, one study was conducted in Riyadh, showed that (66%) of healthcare professionals have been prescribing teratogenic medications for pregnant women (10). In 2013, another study was conducted in Taif city, Saudi Arabia, among pregnant women, and reported that they have been receiving drug information from pamphlet rather than physicians or pharmacists, due to inadequate supervision of physicians (11). Thus, primary health care physicians should be aware and have adequate medical knowledge towards medication prescription for pregnant women attending PHC.

Adequate supervision of the medications used during pregnancy should be undertaken. Thus, physicians should be aware of medications they prescribe for pregnant women attending PHC centers (5).

To the best of our knowledge, insufficient studies have been done in Saudi Arabia assessing knowledge and practice of PHC physicians about medication prescribed during pregnancy. The aim of this study was to assess knowledge and practice of PHC physicians towards medication prescription during pregnancy and to determine obstacles that physicians face in prescribing these medications.

## Subjects and Methods

**Study Design, setting and time frame:** a cross-sectional study was done on PHC physicians at Ministry of Health (MOH) Jeddah, Saudi Arabia in the time from August to November 2021. Jeddah city is the second largest city in Saudi Arabia and is located on the Red Sea and is the gateway to Makkah, the holiest city in Islam. Jeddah has five MOH hospitals and a total of 48 PHC centers attached to it.

**Study participants:** the inclusion criteria were family medicine physicians (family medicine residents, specialist and consultant), general practitioners, and dentists. And the exclusion criteria were other specialty physicians and those who did not want to participate in the study.

**Sample size:** By using Epi-info version 7, the sample size was 148 PHC physicians based on the following assumptions: the expected frequency knowledge regarding medication prescribing during pregnancy as 50% (since there is no specific figure), with confidence interval (95%) and acceptable margins of error (5%). The sample was increased by 10% to be 168 physicians to compensate for the possible drop-out.

**Sampling technique:** Stratified random sampling technique with proportional allocation was done to select primary healthcare centers, representing all the five sectors in Jeddah. Consequently, all PHC physicians

in the selected PHCCs were invited to fill in the study questionnaire. This process continued till the required sample size was reached. Questionnaires were sent by hand and online to the participants by the researcher and her trained assistants.

**Data collection tool:** A self-administered questionnaire was distributed to all physicians who work in PHC, Jeddah. Data were collected during the daytime working hours from participants either male or female by distributing a self-administered questionnaire in General Clinics. The questionnaire included items to collect data about age, gender, nationality, specialty, (GP, residents, Specialists), scientific degree, years of experience and knowledge about medication prescribing (categories) reading sources (websites, leaflet). Practice data was collected and items about obstacles regarding medication prescribing were added.

**Ethical approval:** Ethical approval for the study was obtained from the Ministry of Health Research committee and written consent were taken from all participants.

**Data analysis:** Data were analyzed statistically by the SPSS program version 26. To test the relationship between variables, qualitative data was expressed as numbers and percentages, and the Chi-squared test ( $\chi^2$ ) was used. A p-value of 0.05 was considered statistically significant.

## Results

Table 1 shows that 64.9% of studied participants had an age ranging from 25-35 years, 57.1% were females, 75% had 10 years of working experience and most of them (36.9%) were general practitioners (GPs). The most common sources of checking pregnancy safety information for medicine used were secondary resources: websites or applications (e.g. Uptodate, BMJ, Epocrates, Micromedex) (82.7%), regulatory agencies websites (Food and Drug Administration [FDA] (55.4%) and Product leaflet/insert (44.6%).

Table 2 demonstrates that the most common practice always followed by the participants on prescribing medication to pregnant women were: check each time the medication history of pregnant women (e.g. folic acid and other vitamins) (70.8%), discuss the importance of medication adherence with pregnant women who are using medicines for chronic health condition (e.g. thyroid disease, DM, HTN) (65.5%), ask if presenting women are pregnant or not before prescribing a medication (63.1%), follow up medication of pregnant women (60.7%) and check for updates concerning the safety information for medicines when deciding to prescribe a medication to pregnant women (57.1%).

(Figure 1) illustrates that most of the participants (No.:132 (78.6%)) were facing different types of obstacles regarding prescribing medication for pregnant women.

(Figure 2) shows that of the 132 participants facing obstacles regarding prescribing medication for pregnant

women, the most common obstacles faced were: Lack of time to read (82.6%), limited information about patient and treatment (60%), pregnant women education level (58.3%), lack of education about pregnancy (57.5%) and no knowledge about pregnancy medicines available resources (53%).

Table 3 shows that the most common medications reported by the participants to be safe during pregnancy were: Amoxicillin (86.9%), Levothyroxine (75.6%), Methyldopa (73.8%), Calcium carbonate (71.4%), Nasal fluticasone (57.1%) and Penicillin G (56.5%). And the most common medications reported by the participants not to be safe during pregnancy were: Doxycycline (64.9%), Methotrexate (63.7%), Warfarin (54.2%), Statins (48.8%), Diazepam (35.1%), Estazolam (34.5%) and Pseudoephedrine hydrochloride (31.5%).

On assessing the relationship between participants' age and practice experience and their practice and frequency of prescribing medication to pregnant women, all tests were non-significant at a p-value of ( $> 0.05$ ). Table 4 shows that in comparison with male participants, female participants had a significant higher percentage of always: 1) prescribing a medication to pregnant women, 2) checking each time the medication history of pregnant women, 3) ask if coming women is pregnant or not before prescribing a medication, 4) follow up medication of pregnant women, 5) discuss the importance of medication adherence with pregnant women who are using medicines for chronic health condition, 6) provide clear and evidence-based information on the safety of specific medicines during pregnancy, 7) have any experience of using medications during pregnancy that caused teratogenicity and 8) check for updates concerning the safety information for medicines when deciding to prescribe a medication to pregnant women ( $p < 0.05$ ).

Table 5 shows that consultants had a significantly higher percentage of prescribing a medication to pregnant women compared to other positions ( $p < 0.05$ ). Family medicine (FM) residents had a significantly higher percentage of: 1) checking each time the medication history of pregnant women (e.g. folic acid and other vitamins), 2) follow up medication of pregnant women, 3) discuss the importance of medication adherence with pregnant women who are using medicines for chronic health condition and 4) checking for updates concerning the safety information for medicines when deciding to prescribe a medication to pregnant women ( $p < 0.05$ ).

Figure 3 illustrates that participants with an age ranging from 25-35 years had a significantly higher percentage of those who were facing lack of time to read as an obstacle in prescribing medication for pregnant women ( $p < 0.05$ ). Figures 4, 5 and 6 illustrate that GPs had a significant higher percent of those who were facing the level of education of pregnant women (more educated women are more aware, willing to share information with physicians), lack of privacy in a PHC and lack of education regarding pregnancy as obstacles in prescribing medication for pregnant women ( $p < 0.05$ ).

**Table 1. Distribution of studied participants according to their demographics, experience, position and source of checking pregnancy safety information for a medicine used (No.:168)**

Variable	No. (%)
Age	
25-35 years	109 (64.9)
36-45 years	43 (25.6)
≥ 46	16 (9.5)
Gender	
Male	72 (42.9)
Female	96 (57.1)
Practice experience	
10 years	126 (75)
11-19 years	24 (14.3)
≥ 20 years	18 (10.7)
Position	
Consultant	17 (10.1)
Family medicine resident	37 (22)
General practitioner	62 (36.9)
Dentist	20 (11.9)
Family medicine specialist	32 (19)
When checking pregnancy safety information for a medicine you will use, what is the source?	
Product leaflet/insert	75 (44.6)
Secondary resources: websites or applications (e.g Uptodate, BMJ, Epocrates Micromedex)	139 (82.7)
British National Formulary (BNF)	47 (28)
Regulatory agencies websites (Food and Drug Administration [FDA])	93 (55.4)
Drug and poison information center	41 (24.4)
Expert healthcare provider	57 (33.9)
Other	

**Table 2. Distribution of studied participants according to their practice and frequency of prescribing medication to pregnant women (No.:168)**

Variable	Never	Sometimes	Usually	Always
Do you prescribe a medication to pregnant women?	9 (5.4)	114 (67.9)	19 (11.3)	26 (15.5)
Check each time the medication history of pregnant women (e.g folic acid and other vitamins)	12 (7.1)	11 (6.5)	26 (15.5)	119 (70.8)
Ask if coming women are pregnant or not before prescribing a medication?	1 (0.6)	23 (13.7)	38 (22.6)	106 (63.1)
Follow up medication of pregnant women	8 (4.8)	24 (14.3)	34 (20.2)	102 (60.7)
Discuss the importance of medication adherence with pregnant women who are using medicines for chronic health condition (e.g thyroid disease, DM, HTN)	9 (5.4)	17 (10.1)	32 (19)	110 (65.5)
Provide clear evidence-based information on the safety of specific medicines during pregnancy	16 (9.5)	25 (14.9)	49 (29.2)	78 (46.4)
Have any experience of using medications during pregnancy that caused teratogenicity?	94 (56)	26 (15.5)	21 (12.5)	27 (16.1)
Check for updates concerning the safety information for medicines when deciding to prescribe a medication to pregnant women?	6 (3.6)	23 (13.7)	43 (25.6)	96 (57.1)

Figure 1. Percentage distribution of studied participants according to facing obstacles regarding prescribing medication for pregnant women

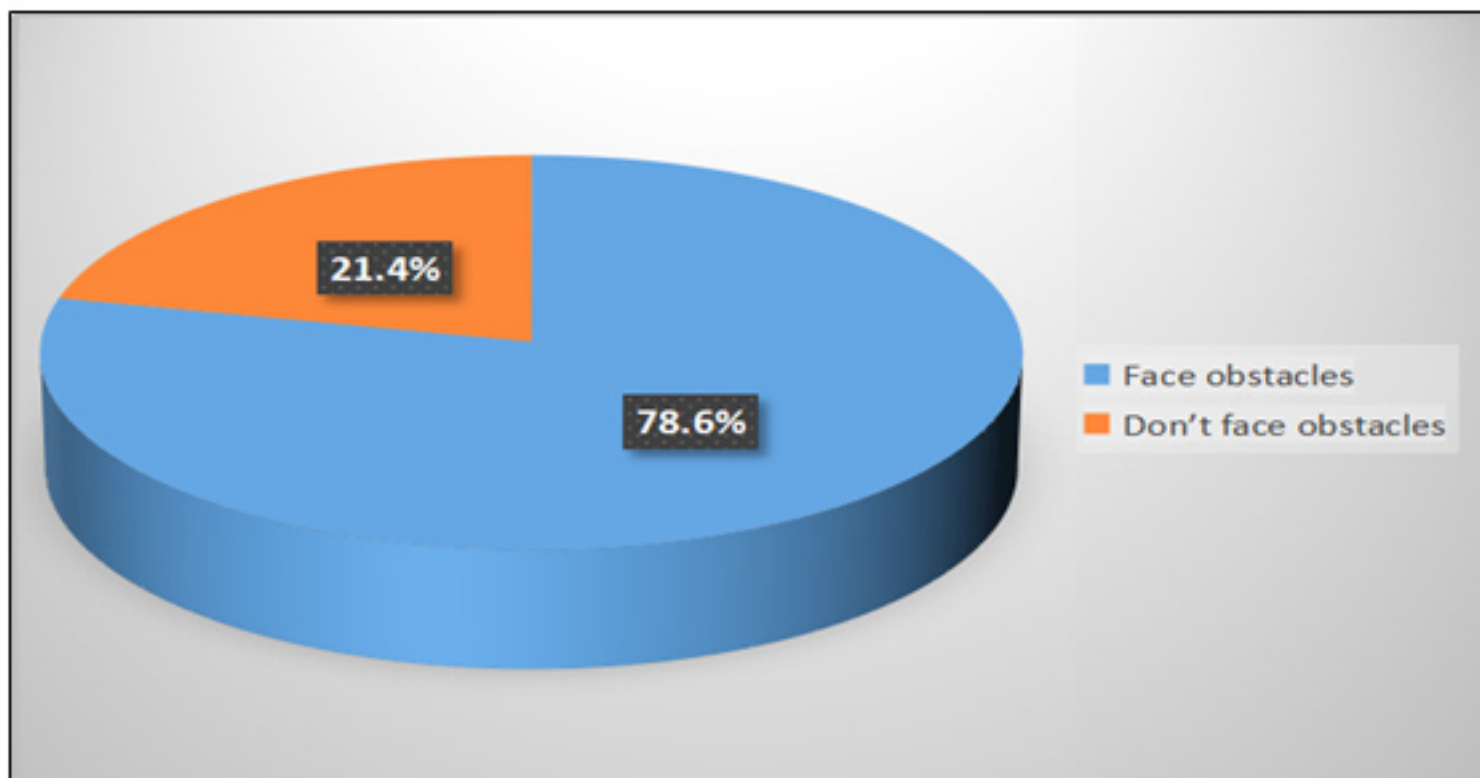
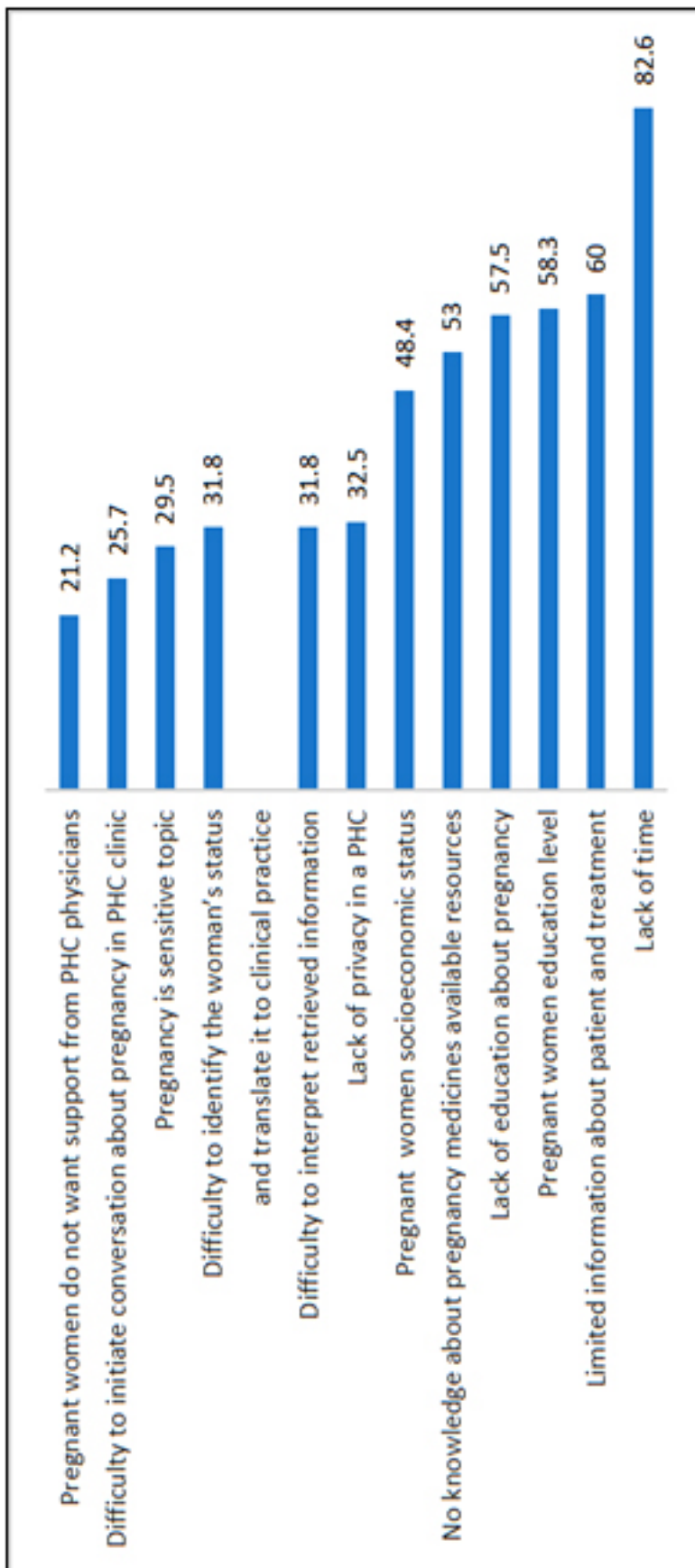


Table 3. Distribution of studied participants' opinion about safety of medications given to pregnant women (No.:168)

Variable	Don't know	Risk/ benefit	Not safe during pregnancy	Safe during pregnancy
Doxycycline	35 (20.8)	11 (6.5)	109 (64.9)	13 (7.7)
Amoxicillin	4 (2.4)	7 (4.2)	11 (6.5)	146 (86.9)
Penicillin G	43 (25.6)	9 (5.4)	21 (12.5)	95 (56.5)
Warfarin	36 (21.4)	19 (11.3)	91 (54.2)	22 (13.1)
Metformin	18 (10.7)	30 (17.9)	44 (26.2)	76 (45.2)
Methyldopa	24 (14.3)	9 (5.4)	11 (6.5)	124 (73.8)
Estazolam	84 (50)	15 (8.9)	58 (34.5)	11 (6.5)
Statins	43 (25.6)	14 (8.3)	82 (48.8)	29 (17.3)
Methotrexate	37 (22)	7 (4.2)	107 (63.7)	17 (10.1)
Valproic acid	50 (29.8)	28 (16.7)	68 (40.5)	22 (13.1)
Levothyroxine	20 (11.9)	7 (4.2)	14 (8.3)	127 (75.6)
Aspirin	21 (12.5)	25 (14.9)	27 (16.1)	95 (56.5)
Diazepam	61 (36.3)	27 (16.1)	59 (35.1)	21 (12.5)
Acetaminophen	23 (13.7)	8 (4.8)	21 (12.5)	116 (69)
Loperamide	77 (45.8)	16 (9.5)	37 (22)	38 (22.6)
Ranitidine	37 (22)	21 (12.5)	36 (21.4)	74 (44)
Chlorpheniramine	56 (33.3)	28 (16.7)	37 (22)	47 (28)
Dextromethorphan hydrobromide	59 (35.1)	22 (13.1)	43 (25.6)	44 (26.2)
Diphenhydramine	54 (32.1)	27 (16.1)	35 (20.8)	52 (31)
Pseudoephedrine hydrochloride	66 (39.3)	24 (14.3)	53 (31.5)	25 (14.9)
Kaolin and pectin	114 (67.9)	19 (11.3)	23 (13.7)	12 (7.1)
Nasal fluticasone	36 (21.4)	23 (13.7)	13 (7.7)	96 (57.1)
Calcium carbonate	25 (14.9)	9 (5.4)	14 (8.3)	120 (71.4)

Figure 2. Percentage distribution of studied participants according to type of obstacles faced regarding prescribing medication for pregnant women



**Table 4. Relationship between participants' gender and their practice and frequency of prescribing medication to pregnant women (No.:168)**

Variable	Gender		$\chi^2$	p-value
	Male	Female		
Do you prescribe a medication to pregnant women?				
Never	5 (55.6)	4 (44.4)	9.33	0.025
Sometimes	56 (49.1)	58 (50.9)		
Usually	6 (31.6)	13 (68.4)		
Always	5 (19.2)	21 (80.8)		
Check each time the medication history of pregnant women (e.g folic acid and other vitamins)				
Never	8 (66.7)	4 (33.3)	16.08	0.001
Sometimes	9 (81.8)	2 (18.2)		
Usually	15 (57.7)	11 (42.3)		
Always	40 (33.6)	79 (66.4)		
Ask if coming woman is pregnant or not before prescribing a medication?				
Never	1 (100)	0 (0.0)	16.58	0.001
Sometimes	18 (78.3)	5 (21.7)		
Usually	17 (44.7)	21 (55.3)		
Always	36 (34)	70 (66)		
Follow up medication of pregnant women				
Never	5 (62.5)	3 (37.5)	19.26	< 0.001
Sometimes	18 (75)	6 (25)		
Usually	18 (52.9)	16 (47.1)		
Always	31 (30.4)	71 (69.6)		
Discuss the importance of medication adherence with pregnant women who are using medicines for chronic health condition				
Never	8 (88.9)	1 (11.1)	25.39	< 0.001
Sometimes	13 (76.5)	4 (23.5)		
Usually	18 (56.3)	14 (43.8)		
Always	33 (30)	77 (70)		
Provide a clear and evidence-based information on the safety of specific medicines during pregnancy				
Never	13 (81.3)	3 (18.8)	16.63	0.001
Sometimes	8 (32)	17 (68)		
Usually	26 (53.1)	23 (46.9)		
Always	25 (32.1)	53 (67.9)		
Have any experience of using medications during pregnancy that caused teratogenicity?				
Never	42 (44.7)	52 (55.3)	3.59	0.308
Sometimes	9 (34.6)	17 (65.4)		
Usually	12 (57.1)	9 (42.9)		
Always	9 (33.3)	18 (66.7)		
Check for updates concerning the safety information for medicines when deciding to prescribe a medication to pregnant women?				
Never	5 (83.3)	1 (16.7)	9.05	0.029
Sometimes	11 (47.8)	12 (52.2)		
Usually	23 (53.5)	20 (46.5)		
Always	33 (34.4)	63 (65.6)		

Table 5. Relationship between participants' position and their practice and frequency of prescribing medication to pregnant women (No.:168) (continued next page)

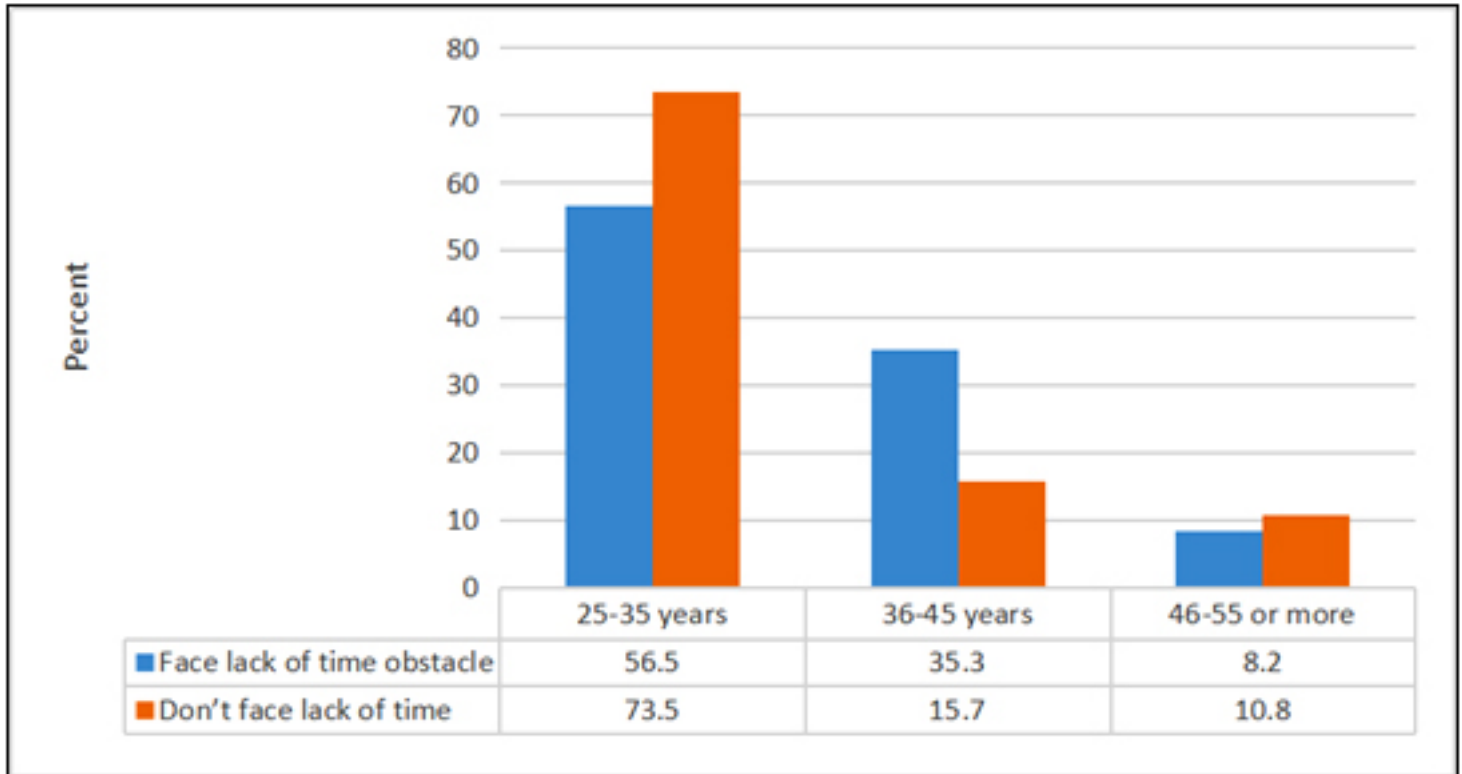
Variable	Position					$\chi^2$	p-value
	Consultant	Family medicine resident	General practitioner	Dentist	Family medicine specialist		
<b>Do you prescribe a medication to pregnant women?</b>							
Never	0 (0.0)	1 (11.1)	5 (55.6)	3 (33.3)	0 (0.0)	31.4	0.002
Sometimes	8 (7)	23 (20.2)	46 (40.4)	16 (14)	21 (18.4)		
Usually	1 (5.3)	8 (42.1)	6 (31.6)	0 (0.0)	4 (21.1)		
Always	8 (30.8)	5 (19.2)	5 (19.2)	1 (3.8)	7 (26.9)		
<b>Check each time the medication history of pregnant women (e.g folic acid and other vitamins)</b>							
Never	0 (0.0)	0 (0.0)	3 (25)	9 (75)	0 (0.0)	56.96	< 0.001
Sometimes	1 (9.1)	3 (27.3)	3 (27.3)	3 (27.3)	1 (9.1)		
Usually	4 (15.4)	6 (23.1)	6 (23.1)	2 (7.7)	6 (23.1)		
Always	12 (10.1)	28 (23.5)	28 (23.5)	6 (5)	25 (21)		
<b>Ask if coming women are pregnant or not before prescribing a medication?</b>							
Never	0 (0.0)	0 (0.0)	1 (100)	0 (0.0)	0 (0.0)	15.5	0.215
Sometimes	2 (8.7)	6 (26.1)	9 (39.1)	1 (4.3)	5 (21.7)		
Usually	2 (5.3)	12 (31.6)	15 (39.5)	0 (0.0)	9 (23.7)		
Always	13 (12.3)	19 (17.9)	37 (34.9)	19 (17.9)	18 (17)		
<b>Follow up medication of pregnant women</b>							
Never	0 (0.0)	1 (12.5)	3 (37.5)	4 (50)	0 (0.0)	35.48	> 0.001
Sometimes	0 (0.0)	5 (20.8)	11 (45.8)	4 (16.7)	4 (16.7)		
Usually	5 (14.7)	15 (44.1)	11 (32.4)	2 (5.9)	1 (2.9)		
Always	12 (11.8)	16 (15.7)	37 (36.3)	10 (9.8)	27 (26.5)		
<b>Discuss the importance of medication adherence with pregnant women who are using medicines for chronic health condition</b>							
Never	0 (0.0)	0 (0.0)	3 (33.3)	6 (66.7)	0 (0.0)	47.48	< 0.001
Sometimes	1 (5.9)	3 (17.6)	11 (64.7)	1 (5.9)	1 (5.9)		
Usually	2 (6.3)	14 (43.8)	10 (31.3)	3 (9.4)	3 (9.4)		
Always	14 (12.7)	20 (18.2)	38 (34.5)	10 (9.1)	28 (25.5)		



**Table 5. Relationship between participants' position and their practice and frequency of prescribing medication to pregnant women (No.:168) (continued)**

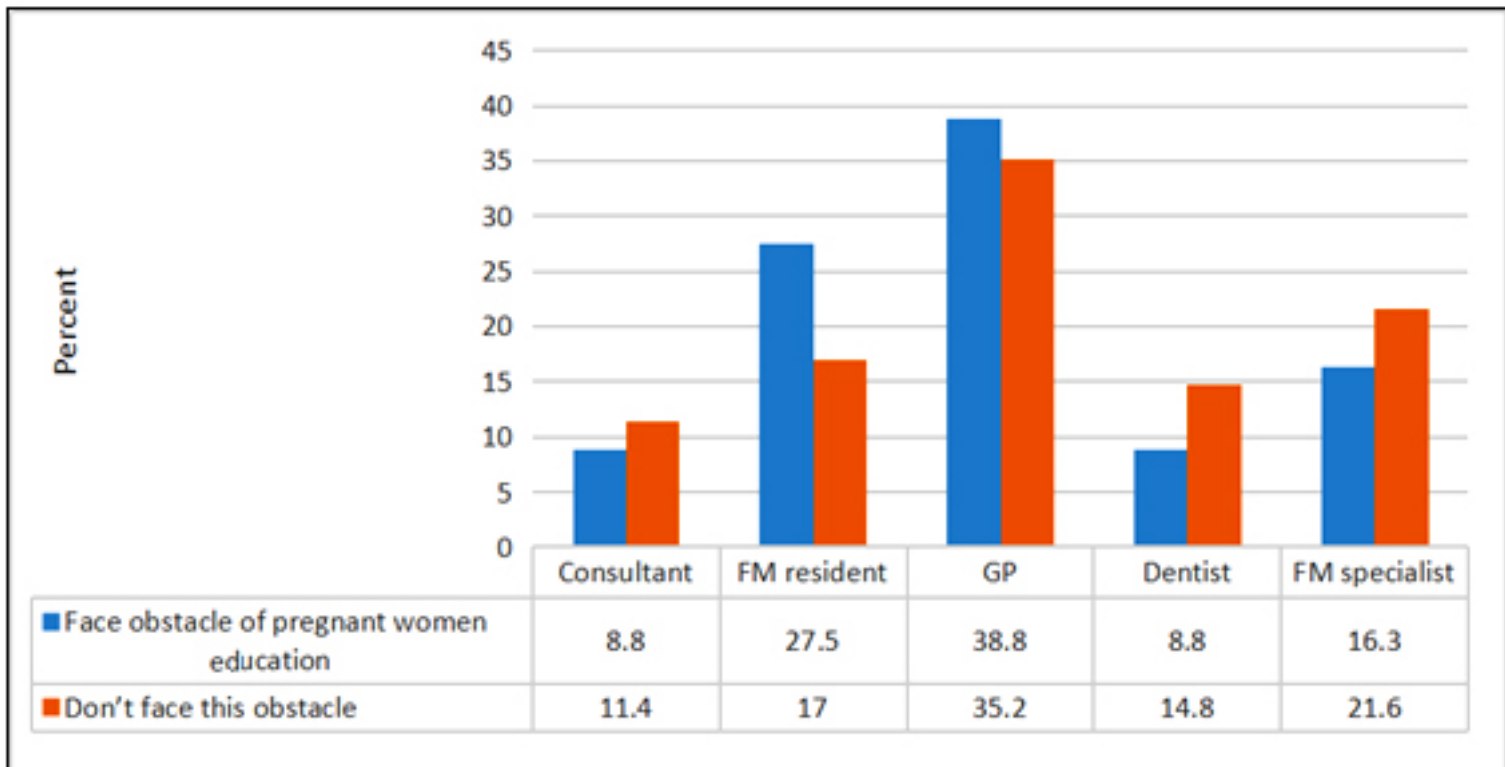
<b>Provide clear and evidence-based information on the safety of specific medicines during pregnancy</b>							
Never	0 (0.0)	1 (6.3)	10 (62.5)	3 (18.8)	2 (12.5)	13.07	0.364
Sometimes	1 (4)	8 (32)	9 (36)	3 (12)	4 (16)		
Usually	6 (12.2)	14 (28.6)	15 (30.6)	4 (8.2)	10 (20.4)		
Always	10 (12.8)	14 (17.9)	28 (35.9)	10 (12.8)	16 (20.5)		
<b>Have any experience of using medications during pregnancy that caused teratogenicity?</b>							
Never	8 (8.5)	21 (22.3)	29 (30.9)	15 (16)	21 (22.3)	15.53	0.213
Sometimes	3 (11.5)	7 (26.9)	11 (42.3)	0 (0.0)	5 (19.2)		
Usually	2 (9.5)	7 (33.3)	8 (38.1)	3 (14.3)	1 (4.8)		
Always	4 (14.8)	2 (7.4)	14 (51.9)	2 (7.4)	5 (18.5)		
<b>Check for updates concerning the safety information for medicines when deciding to prescribe a medication to pregnant women?</b>							
Never	0 (0.0)	0 (0.0)	3 (50)	3 (50)	0 (0.0)	25.35	0.013
Sometimes	1 (4.3)	8 (34.8)	7 (30.4)	4 (17.7)	3 (13)		
Usually	1 (2.3)	14 (32.6)	17 (39.5)	3 (7)	8 (18.6)		
Always	15 (15.6)	15 (15.6)	35 (36.5)	10 (10.4)	21 (21.7)		

**Figure 3. Relationship between participants' age and facing lack of time as an obstacle in prescribing medication for pregnant women (No.:168)**



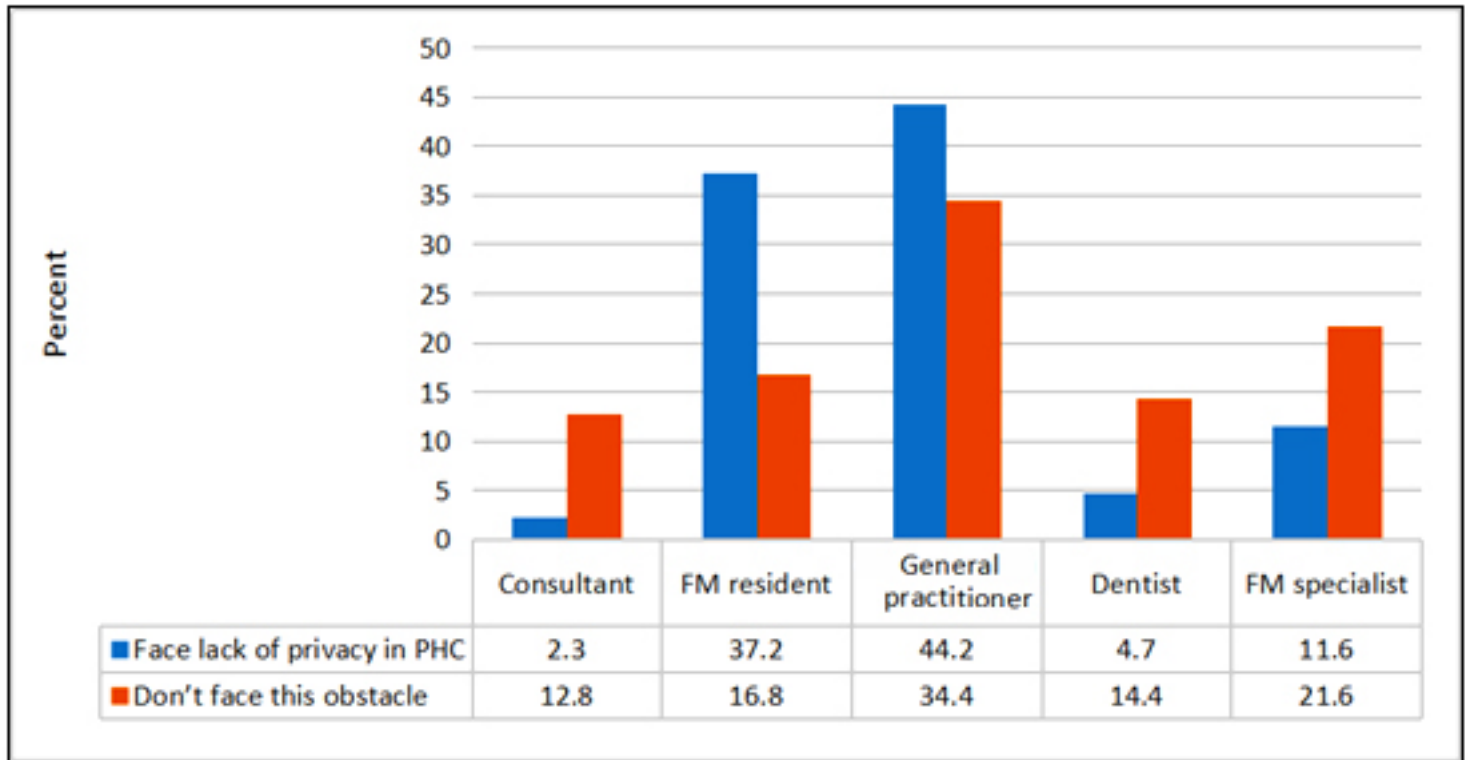
N.B.: ( $\chi^2 = 8.49$ , p-value = 0.014)

**Figure 4. Relationship between participants' position and facing level of education of pregnant women (more educated women are more aware, willing to share information with physicians) as an obstacle in prescribing medication for pregnant women (No.:168)**



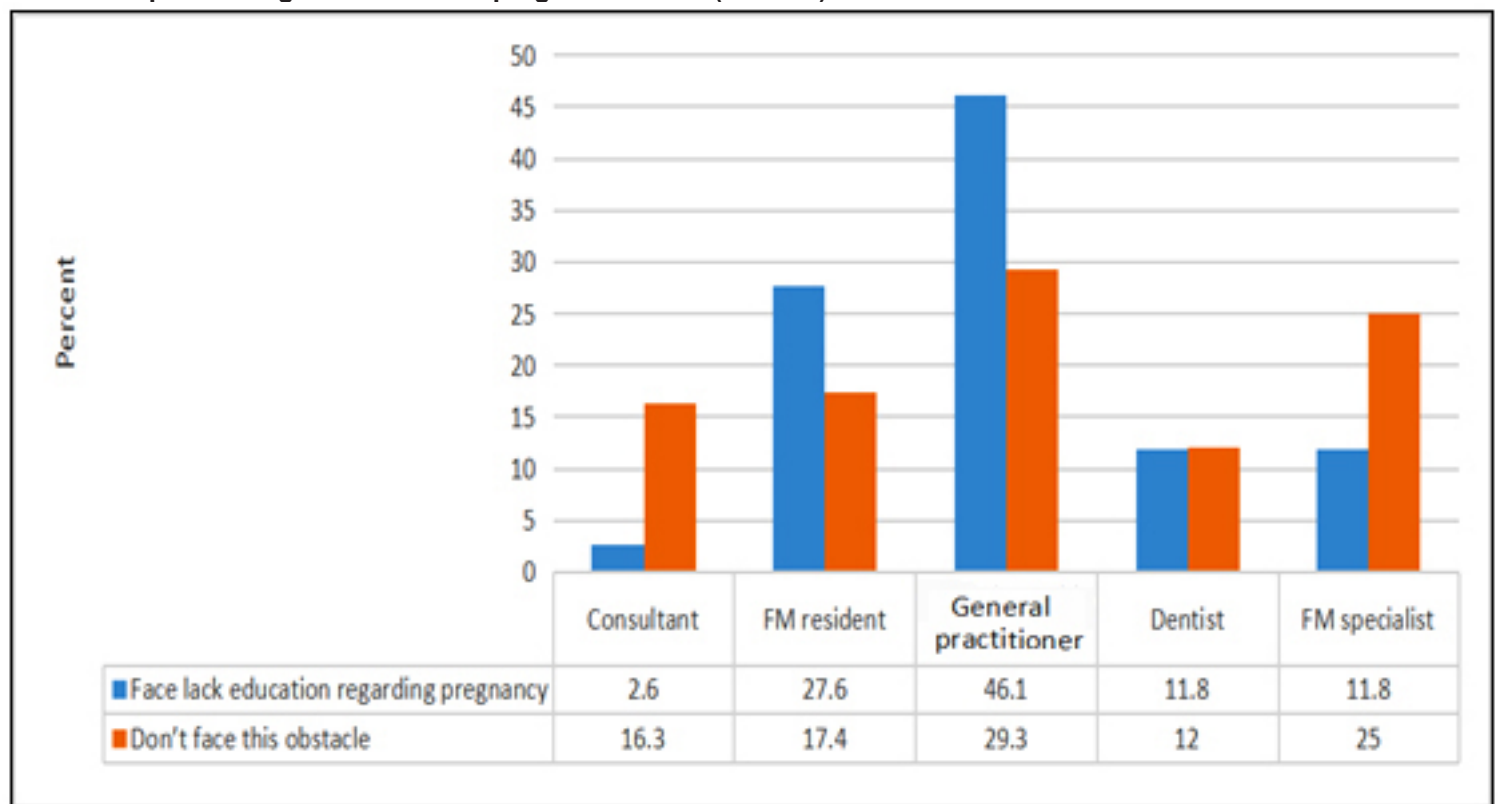
N.B.: ( $\chi^2 = 11.81$ , p-value = 0.019)

**Figure 5. Relationship between participants' position and facing lack of privacy in a PHC as an obstacle in prescribing medication for pregnant women (No.:168)**



N.B.: ( $\chi^2 = 14.57$  , p-value = 0.006)

**Figure 6. Relationship between participants' position and facing lack of education regarding pregnancy as an obstacle in prescribing medication for pregnant women (No.:168)**



N.B.: ( $\chi^2 = 16.6$  , p-value = 0.002)

## Discussion

PHC Physicians should be aware of all medications they prescribe for pregnant women attending PHC centers. In order to improve quality of care given to pregnant women during their visits to PHC centers, this study aimed to assess knowledge and practice of PHC physicians toward some of the medications for most common diseases. In addition, physicians were asked about the most common obstacles they face in medication prescribing for pregnant women.

Regarding the knowledge, this study revealed that most of the participants have insufficient knowledge about some of medications they prescribe for pregnant women. Among studied physicians, the most common medications reported by the participants to be safe during pregnancy were: Amoxicillin (86.9%), Levothyroxine (75.6%), Methyldopa (73.8%) and Calcium carbonate (71.4%) and acetaminophen (69%). While the most common medications reported to not be safe during pregnancy were: Doxycycline (64.9%), Methotrexate (63.7%) and Warfarin (54.2%). This agrees with a study done in Ethiopia, where 61.8% of the participants chose acetaminophen to be safe during pregnancy (12). This result also agrees with that found in a previous Saudi study, where acetaminophen was considered as being safe for use in pregnant women (13).

In the present study, 45% of the participants chose metformin to be safe during pregnancy. In contrast to an Ethiopian study, only 6.6% knew that budesonide is safe (12). This work revealed that 33% of the participants didn't know about chlorpheniramine \ is a category B antihistamine, 23% reported that it was safe and 28% reported it to be unsafe. The previously mentioned Ethiopian study found that about 18.4% of the study participants knew that chlorpheniramine could be used after weighing risks and benefits for individual patients.

The present study found that 86.9% of the participants reported that amoxicillin is safe during pregnancy which is category B in FDA classification (7,14). This is compared to 64.5% in the Ethiopian study (12).

About 75% (75.6%) of the participants of the present work chose Levothyroxine to be safe, which is category B (FDA). However, 11.9% didn't know about the medication and 8.9% wrongly answered that it is not safe. Of them, 73.8% chose Methyldopa to be safe, which is category B and 14.3% didn't know about it. And 71.4% of them chose Calcium carbonate to be safe during pregnancy, which is category C and generally regarded as safe. Very few PHC physicians (7%) knew that kaolin and pectin is safe in pregnancy which is category B and a drug used as an antidiarrheal, while, 67%.9 didn't know about the medication. At the same time, 35% of the participants did not know about Dextromethorphan, and 25% and 26% reported it to be safe and not safe respectively. This drug is category C (FDA), and appears to be safe.

Pseudoephedrine was not known by 39% of the participants, however 31% don't know that it is safe and category B (FDA). For Diphenhydramine which belongs to category B, about 32% of participants didn't know about the medication and 31% chose it as safe. Among the most common medications reported by the participants not to be safe during pregnancy, which are category X, were: 63.7% for Methotrexate. This drug is contraindicated and category X (FDA). Around half of the participants (54.2%) knew that Warfarin is not safe. Warfarin is contraindicated and category X (FDA). A similar result was found in the Ethiopian study, where 59.2 % chose Warfarin to not be safe (12).

Of the studied participants, 48.8% knew that statins are not safe, which is category X. 64.9% reported that Doxycycline is not safe which is category D and 29.8% didn't know about medication safety of Valporic acid, which is category D (FDA). 35.1% chose Diazepam not to be safe which is category D (FDA), and 31.5% chose Pseudoephedrine hydrochloride to not be safe which is category B (FDA). For Ranitidine which is category B only 44% knew that it is safe, and 56% chose Aspirin to be safe, however it is considered as category D (FDA). The same doubt about Aspirin was revealed from a previous study (12). In comparison to a previous study, of all medicines prescribed, 17% were included in the foetal risk category C and 5% in category D (15). Compared to a study done in Qatar, the majority of the respondents had average knowledge about medication use in pregnancy (16).

Among studied participants, the most common sources of checking pregnancy safety information for a medicine used were secondary resources: websites or applications (e.g Uptodate, BMJ, Epocrates Micromedex) (82.7%), regulatory agencies websites (Food and Drug Administration [FDA] (55.4%) and Product leaflet/insert (44.6%). A previous study done in Qatar found that Micromedex® was the most used source as a reference to check pregnancy information, followed by Lexicomp® and the Drug and Poison Information Centers (16).

The obstacles faced in prescribing medications to pregnant mothers were assessed in this study. The most common obstacles faced were: Lack of time to read (82.6%), limited information about patient and treatment (60%), pregnant women education level (58.3%), lack of education about pregnancy (57.5%) and no knowledge about pregnancy medicines available resources (53%). Similar results were found in a previous study, where lack of clinical time was the most common obstacle when practicing medications prescription to pregnant mothers (17). In a previous study done in Qatar, lack of available resources and unknown pregnancy status were the main barriers to dispensing medication to pregnant women (16).

### Limitations

A limitation of the present study is having a cross-sectional design that could reveal the association between variables but not the causal relationships.

## Conclusion

This study found that 78.6% of PHC physicians were facing obstacles in prescribing medication for pregnant women. The most common obstacles were Lack of time to read, limited information about patient and treatment, pregnant women education level and lack of education about pregnancy. The most common medications reported by the participants to be safe during pregnancy were: Amoxicillin (86.9%), Levothyroxine (75.6%), Methyldopa (73.8%), Calcium carbonate (71.4%), Nasal fluticasone (57.1%) and Penicillin G (56.5%). And the most the most common medications reported not to be safe were: Doxycycline (64.9%), Methotrexate (63.7%), Warfarin (54.2%) and Statins. Participants with an age ranging from 25-35 years had a significantly higher percentage of facing lack of time to read as an obstacle in prescribing medication for pregnant women, while GPs had a significant higher percentage of facing the level of education of pregnant women, lack of privacy in a PHC and lack of education regarding pregnancy, as obstacles. There is a need to increase PHC physician's awareness about the FDA guidelines and categories of drug prescribing in pregnancy. Emphasis on the importance of double-checking medicine pregnancy safety information is needed to ensure safe use.

## Acknowledgement

The authors gratefully acknowledge all participants' cooperation.

## References

- Mitchell AA, Werler MM, Kelley KE, Louik C, Hernández-Díaz S. National Birth Defects Prevention Study. Medication use during pregnancy, with particular focus on prescription drugs: 1976–2008. *Am J Obstet Gynecol*. 2011;205(1):51.e1–51.e8.
- Lupattelli A, Spigse O, Twigg MJ, Zagorodnikova K, Mårdby AC, Moretti ME. Medication use in pregnancy: a cross-sectional, multinational web-based study. *BMJ Open*. 2014; 4(2):1-11.
- McCarter-Spaulding DE. Medications in pregnancy and lactation. *MCN Am J Matern Child Nurs*. 2005;30(1):10–17.
- Bech BH, Kjaersgaard MI, Pedersen HS, Howards PP, Sørensen MJ, Olsen J, et al. Use of antiepileptic drugs during pregnancy and risk of spontaneous abortion and stillbirth: population based cohort study. *BMJ*. 2014;22:349-60.
- McBride W. Thalidomide and congenital abnormalities. *Lancet* 1961; 2:303-305.
- Almalki M, Fitzgerald G, Clark M. Health care system in Saudi Arabia: an overview. *East Mediterr Health J*. 201;17(10):784-93
- The U.S Food and Drug Administration (FDA). FDA/CDER SBIA Chronicles. Drugs in Pregnancy and Lactation: Improved Benefit-Risk Information. Accessed August 1, 2019 at <https://www.fda.gov/files/drugs/published/%22Drugs-in-Pregnancy-and-Lactation--Improved-Benefit-Risk-Information%22-January-22--2015-Issue.pdf>
- Tefera YG, Gebresillassie BM, Getnet Mersha A, Belachew SA. Beliefs and Risk Awareness on Medications Among Pregnant Women Attending the Antenatal Care Unit in Ethiopia University Hospital. *Overestimating the Risks Is Another Dread*. *Front Public Health*. 2020; 3(8):28-37.
- Navaro M, Vezzosi L, Santagati G, Angelillo IF; Collaborative Working Group. Knowledge, attitudes, and practice regarding medication use in pregnant women in Southern Italy. *PLoS One*. 2018; 19;13(6):e0198618.
- Alshammari TM, Alrwisan AA, Aljeraisly MI, Taher KW, Alissa FM, Mahmoud MA, Hassali MA, Aljadhey HS. Knowledge and attitude of healthcare professionals toward medication pregnancy category systems in Saudi hospitals. *Saudi Med J*. 2014;35(7):704-11.
- Zaki NM, Albarraq AA. Use, attitudes and knowledge of medications among pregnant women: A Saudi study. *Saudi Pharm J*. 2014;22(5):419-28.
- Tuha A, Gurbie Y, Hailu HG. Evaluation of Knowledge and Practice of Pharmacy Professionals regarding the Risk of Medication Use during Pregnancy in Dessie Town, Northeast Ethiopia: A Cross-Sectional Study. *Hindawi Journal of Pregnancy*. 2019;2019: 1-8  
file:///C:/Users/DELL/Downloads/Evaluation\_of\_Knowledge\_and\_Practice\_of\_Pharmacy\_P%20(1).pdf
- Alrabiah ZN, Al-Arifi MM, Alghadeer S, Wajid S, AlQahtani A, Almotari N, et al. Knowledge of community pharmacists about the risks of medication use during pregnancy in central region of Saudi Arabia. *Saudi Pharmaceutical Journal*. 2017; 25(7):1093-6
- FDA. Content and Format of Labeling for Human Prescription Drug and Biological Products; Requirements for Pregnancy and Lactation Labeling. Federal Register. 2008; 73(104):1-54.
- Eze UI, Eferakeya AE, Oparah AC, Enato EF. Assessment of prescription profile of pregnant women visiting antenatal clinics. *Pharm Pract (Granada)*. 2007 ;5(3):135-9.
- Rouf PA, Thomas B, Elkassew W, Tarannum A, Al Saad D, Gasim MM, Al Hail M. Knowledge and practice characteristics of pharmacists in Qatar towards medication use in pregnancy: a cross-sectional survey. *East Mediterr Health J*. 2018; 3;24(2):137-45.
- Schwarz EB, Santucci A, Borrero S, Akers AY, Nikolajski C, Gold MA. Perspectives of primary care clinicians on teratogenic risk counseling. *Birth Defects Res A Clin Mol Teratol*. 2009 ;85(10):858-63.