ISSN: 2710-3390

Assessment of Community Pharmacist Knowledge, Attitude and Practice Towards Medication Safety Among Pregnant Women in Sana'a (Yemen)

Kadi H. O, Jalal H.Abdullah and Abdullah S. Saadallah

Sana'a University, faculty of medicine and health sciences Sana'a,Yemen, Sana'a University, faculty of pharmacy, Sana'a, Yemen, Amran University, faculty of medicine and health sciences, Amran. Yemen

Corresponding: Prof. Dr. Hussien O. Kadi, Yemen University, Sana;a, Yemen, E-mail: hussien62@yahoo.com

Abstract

Pregnancy is a crucial period for women, with 90% using prescription or over-the-counter medications. Pregnant women face significant health concerns, including renal, diabetes, depression, thyroid, cardiovascular, and asthma conditions. Healthcare providers must understand the potential risks of medication use during pregnancy and provide appropriate therapy. Pharmacists are essential for safe medication administration, advising expectant mothers on the risks of traditional and over-the-counter medications.

Objective: The aim of the study is to assess the community pharmacist's knowledge, attitude and Practice towards medication safety during pregnancy in Sana'a city (Yemen).

Methods:A cross-sectional descriptive study was conducted using self-administered questionnaire for pharmacists in Sana'a from October 2022 to February 2023.A total of 337 community Pharmacists (CPs) were enrolled in the study.

Results: Majority of the pharmacists are males (314; 93.2%), possess bachelor in pharmacy (201; 59.6%) and Most pharmacists (187; 55.5%) have less than 5 years of experience. Among 337 CPs, only 102 (29.1%) had high knowledge, 308 (91.4%) had positive attitude and 214 (63.5%) have safe practice towards medication safety during pregnancy.

Conclusion: Community pharmacists have low knowledge about using safe medications while pregnant and have a good attitude. Still, there is a large knowledge gap between community pharmacists' practices and knowledge regarding safe medication use in expectant pregnant women.

Key Words: Knowledge, Attitude, Practice, Community Pharmacist, Medication Safety, Pregnancy

Received:12/3 /2024
Accepted:25/3 /2024
DOI: https://dx.doi.org/10.57117/j.v8i9.52024

Address corresponding:**Kadi H. O. Yemen University, Sana'a, Yemen E-mail:** hussien62@yahoo.com

Introduction

Pregnancy is described as "mother carrying an embryo and fetus in her womb for a duration of nine months" by the World Health Organization (WHO)[1],This is a period of enormous happiness and fulfillment for the majority of women. All pregnancies will be extensively watched by knowledgeable healthcare providers because of the significant health concerns that both the pregnant lady and her unborn child confront during this time[2]. From the last three to four decades, there has been a marked increase in the number of pregnant women taking drugs. According to estimates, 90% of pregnant women use at least one prescription or over-the-counter medication, excluding vitamins and minerals [3].Increased pre-existing co-morbidities, changes in demographics, and obstetric problems are the main causes of this increase in pharmaceutical use during pregnancy[4, 5]. Renal illness, diabetes, depression, thyroid problems, cardiovascular diseases, and asthma are some of the most prevalent chronic conditions that call for medication throughout pregnancy. If the proper medication therapy is not given under these circumstances, it might have negative consequences on the fetus and necessitate post-natal care for the infant[6]. Because the majority of medications lack clinical trial data on the danger of pregnancy, health care providers must increase their understanding of how a drug may work as a teratogen before prescribing or distributing medications to pregnant patients[7]. While taking medications while pregnant cannot be totally avoided, the pharmacokinetic changes and placental crossing of many medications can result in serious damage to the developing child[8]. Understanding the advantages and disadvantages of a drug's usage on pregnant women and fetuses is essential for safe pharmaceutical use during pregnancy. Pharmacists are regarded as drug experts across the world due to their extensive understanding of pharmacology and pharmacokinetics as well as their training in the use of evidence in clinical practice. The pharmacist must be qualified to advise expectant mothers about the dangers of using traditional medicines, prescription and over-the-counter medications, and substances like alcohol and nicotine analogs[9].Of all healthcare providers, community pharmacists are the ones who are easiest for the general population to contact. They bear enormous responsibility for the safe administration of medications to expectant mothers by distributing the safest medications and disseminating pertinent information to minimize the likelihood and potential dangers associated with the medications[10].

Material and methods:

Study design and participants

The cross-sectional study was conducted in community pharmacy premises, which are located in Sana'a of Yemen. All retail community pharmacies which serve medication needs of the residing public by a qualified pharmacist are eligible sites for this study. The study was conducted over a period of five months from October 2022 to February 2023. A due permission was sought from all community pharmacy owners before initiation of the study.

Working community pharmacists who are qualified and having a minimum of one-year experience were included in the study. Community pharmacists who are not willing to participate were excluded from the study.

Study Population

The researchers were unable to gather statistical information on the population to be examined since the research community was made up of all community pharmacists working in the Sana'a city.

Study Sample

The required sample size was calculated as 339 by using Cronbach's Alpha equation with an assumption of 50% of community pharmacists have optimal knowledge toward medication safety during pregnancy, 95% confidence interval and 5% precision. With a 3.7% of nonresponse rate the final sample size was calculated as 350.in addition 337 are respond and 13 not respond.

The method of selecting the sample was by systematic random sampling.

Study tool

A total of 350 randomly selected community pharmacists from various community pharmacy premises located in various areas of Sana'a district were enrolled and subjected for a self-administrated questionnaire about medication safety during pregnancy. The questionnaire comprises of two parts to gather information related to socio-demographic characteristics and KAP towards medication safety during pregnancy among community pharmacists. The socio-demographic characteristics included are age, gender, educational qualification and work experience.

Knowledge toward medication safety during pregnancy

The community pharmacist's knowledge regarding medication safety during pregnancy was assessed by using a 31-point scale. The maximum points expected were 31 and a minimum of 10. Points to, knowledge about FDA pregnancy drug risk categories (each category 1 point; total=5 points), knowledge about 11 prescription drugs safety in pregnant women (each drug 1

point: total=11 points), knowledge about 15 non-prescription drugs safety in pregnant women (each drug 1 point: total=15 points), If the responding pharmacist scores less 16 points considered as having low knowledge and more than 16 points considered as having high knowledge.

Attitude toward medication safety during pregnancy

The community pharmacist's attitude was assessed by putting eight statements regarding medication safety during pregnancy on Likert's scale. Each statement on Likert's scale has both positive and negative replies that ranged from strongly agree 5, agree 4, neither agree or nor disagree 3, disagree 2 and strongly disagree 1. The maximum score expected from all statements are 40 and minimum of 8. If the persons scored above or equal to 20, will be considered as a positive attitude and < 20 considered as a negative Attitude toward medication safety during pregnancy.

Likert's method was also used to analyze the five-point scale to find out the level of Attitude for each paragraph, and Table No. 6 illustrates this.

Table1: Discretionary scale according to the five-point Likert scale

Response	*Weighted mean*	*Class length*	*Level*
Strongly disagree	1-1.79	0.79	Low
Disagree	1.80-2.59	0.79	
Neither agree or nor disagree	2.60-3.39	0.79	Medium
Agree	3.40-4.19	0.79	High

Strongly agree	4.20-5	0.80

Practice toward medication safety during pregnancy

Community pharmacists dispensing practice toward medication safety during pregnancy was assessed by using five closed ended questions. If the respondent says "yes" to less than three question will be considered having irregular practice towards medication safety during pregnancy. If the respondent says "yes" to three or more questions will be considered having regular practice towards medication safety during pregnancy.

Likert's method was also used to analyze the two-point scale to find out the level of Attitude for each paragraph, and Table No. 2 illustrates this.

Table2: Discretionary scale according to the two-point Likert scale

Response	*Weighted Mean*	*Class Length*	*Level*
Yes	1-1.5	0.5	Low
No	1.51-2	0.51	High

Statistical methods

The data collected was cleaned, organized, and entered in the Statistical Package for Social Sciences SPSS version 27. The demographic characteristics of the sampled population was analyzed and grouped based on their descriptive statistics. To determine the community pharmacists' knowledge, attitudes and practices about medication safety during pregnancy.

The Statistic Package for the Social Science (SPSS) software version 24 was used for analysis:

Questionnaire Reliability and validity test

Cronbach's alpha was used for internal consistency reliability test to confirm that the questionnaire can measure what it intends to measure. The acceptable alpha value is more than 0.7 and low value of alpha indicates that the questionnaire should be revised.

Descriptive analysis

Descriptive statistical analysis such as mean, standard division (SD), Chi-square test, T- Test and ANOVA test were used to describe demographics in relation to knowledge, attitude and practice of participants. P value less than 0.05 was considered as statistically significant.

Correlation analysis

Spearman's correlation coefficient statistic was used to determine relationships of sociodemographic and KAP and knowledge-attitude, attitude -practice and practice-knowledge. P value less than 0.05 was considered as statistically significant.

Regression analysis

Simple linear regression was used to find out if there is an effect on knowledge, Attitude, and practice by socio-demographic variables, and to find out whether there is an effect of knowledge on Attitude, knowledge on practice, and Attitude on practice.

Association analysis

To find out the association between demographic variables and knowledge, Attitude and practice among community pharmacists. Chi square test was used for independence

Result and Discussion

Internal consistency, reliability and validity test

Cronbach's alpha was applied for analysis of internal consistency reliability test. The alpha values were 0.792, 0.472, and 0.532 in knowledge-, attitude- and practice section respectively in early test. as show in Table 8.

Table 3: Cronbach's alpha value in each section in reliability test

Section	*Number of Items*	*Cronbach's Alpha (reliability)*	*Validity*
Knowledge	31	0.792	0.889
Attitude	8	0.472	0.687
Practice	5	0.532	0.729

Demographic Characteristics

A total of 350 questionnaires were distributed. only 337 were responded to representing an 96.28% response rate.

Table 4: Demographic Characteristics of participants

Demographic Characteristics		**Total no of participants n=337(%)**
Gender	Male	314 (93.2)
	Female	23 (6.8)
Age group in years	≤20 Years	4 (1.2)
	21-30 years	226 (67.0)
	31-40 years	95 (28.2)
	41-50 years	12 (3.6)
	Mean ± SD	29.19 ±5.4
Level of Education	Diploma in Pharmacy	135 (40.1)
	Bachelor in Pharmacy	201 (59.6)
	Master in Pharmacy	1 (0.3)
Years of professional experience	Less than 5 years	187 (55.5)
	From 5 to 9 years	105 (31.1)
	From 10 to 14 years	31 (9.2)
	From 15 to 19 years	13 (3.8)
	From 20 to 25 years	1 (0.3)
	Mean ± SD	5.1±3.8

Table4presents that the majority of the respondents in this study (67%) were between the age of 21–30 years, (28.2%) were within the age bracket of 31 and 40 years while (3.6%) of the respondents were between the age of 40–50 years.

Majority of the respondents were males (93.2%) with women taking a minority status in the community pharmacy circles (6.8%). To a large extent, the samples collected represented the opinion of pharmacists on all the blocks of the country. Majority of the pharmacists working in the country have a minimum qualification of a bachelor's degree, (59.6%). For years of practice, 31.1 % of the surveyed population had 5–9 years of experience as pharmacists,55.5% had 1–4 years of experience, 13.3% of the population had over ten years of experience as CPs.

4.1.3 Knowledge of CPs about Medication Risk during Pregnancy

A) Knowledge about FDA category:

Table 5: Knowledge of CPs about FDA drug risk category in pregnant women

Items	*Safe in first trimester*		*Risk and benefit must be considered*		*not safe*		*Don't know*		*Level of knowledge*
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
K1: Category A	303	89.9	5	1.5	16	4.7	13	3.9	High
K2: Category B	191	56.7	104	30.9	25	7.4	17	5.0	Medium
K3: Category C	14	4.2	187	55.5	116	34.4	20	5.9	Medium
K4: Category D	12	3.6	75	22.3	225	66.8	25	7.4	Medium
K5: Category X	10	3.0	17	5.0	280	83.1	30	8.9	High
Level of knowledge about FDA category					***High***				

Table 5 presents that the majority of participants gave correct answers to the knowledge questions about FDA category and safe use of prescription drugs in pregnancy. The knowledge about Category A and Category X was high, while Category C was the least known among community pharmacists, but in general the knowledge was satisfactory for FDA Category.

B) Knowledge about POM Medications:

Table 6: Knowledge of CPs about safe use of prescription drugs in pregnancy

Items	*Safe in first trimester*		*Risk and benefit must be considered*		*not safe*		*Don't know*		*Level of knowledge*
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
K6: Tetracycline	17	5.0	33	9.8	277	82.2	10	3.0	High
K7: Lamotrigine	21	6.2	57	16.9	225	66.8	34	10.1	Low
K8: Statins	19	5.6	48	14.2	228	67.7	42	12.5	Medium
K9: Ciprofloxacin	26	7.7	52	15.4	248	73.6	11	3.3	High
K10: Budesonide inhaler	110	32.6	84	24.9	104	30.9	39	11.6	Low
K11: Methyldopa	262	77.7	28	8.0	45	13.4	2	0.6	High
K12: Azithromycin	230	68.2	66	19.6	23	6.8	18	5.3	High
K13: Valproic acid	32	9.5	60	17.8	211	62.6	33	9.8	Medium
K14: Warfarin	22	6.5	64	19.0	218	64.7	33	9.8	Medium
K15: Isotretinoin	20	5.9	55	16.3	231	68.5	31	9.2	High
K16: metronidazole	124	36.8	118	35.0	77	22.78	18	5.3	Low
Level of knowledge about POM medications					***Medium***				

Table 6 presents the CPs' response to drug safety during pregnancy. Most of the respondents (77.7%) believed that methyldopa is safe in first trimesters while 13.4% of respondents believed that it is unsafe in the first trimester and a small number of participants (8.0%) said that it is used on the basis of risk-benefit assessment. Also, most of CPs (64.7%) said that warfarin is not safe in first trimesters, but few PPs (32.6%) knew that budesonide is safe in first trimesters. Only 68.5% of participants knew that isotretinoin is unsafe for use by pregnant women. For central nerves system drugs, about 62.6% of PPs identified valproic acid as not safe, and approximately one-fifth of CPs correctly identified that lamotrigine should be used only if the potential benefit justifies the potential risk. Finally, the Knowledge of community pharmacists regarding prescribed medications was medium and satisfactory to some extent.

C) Knowledge about OTC Medication:

Table 7: Knowledge of CPs about safe use of OTC in pregnancy

Items	*Safe in first trimester*		*Risk and benefit must be considered*		*not safe*		*Don't know*		*Level of knowledge*
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
K17: Diclophenac sodium	27	8.0	83	24.6	209	62.0	18	5.3	Low
K18: Pseudoephedrine Hydrochloride	20	5.9	82	24.3	197	58.5	38	11.3	Low
K19: Dextromethorphan hydro bromide	46	13.6	81	24.0	158	46.9	52	15.4	Low
K21: Acetaminophen	239	70.9	34	10.1	42	12.5	22	6.5	High
K22: Drotaverine	238	70.6	43	12.8	38	11.3	18	5.3	High
K23: Aspirin	185	54.9	87	25.8	49	14.5	16	4.7	Low
K24: Scenidazole	37	11.0	87	25.8	180	53.4	33	9.8	Medium
K25: Diphenhydramine	73	21.7	68	20.2	163	48.4	33	9.8	Low
K25: Topical corticosteroid	65	19.3	129	38.3	105	31.2	38	11.3	Low
K26: Ivy extract	158	46.9	73	21.7	53	15.7	53	15.7	Medium
K27: Bisacodyl	69	20.5	78	23.1	163	48.4	27	8.0	Low
K28: Loperamide	70	20.8	109	32.3	134	39.8	24	7.1	Low
K29: Codeine	27	8.0	36	10.7	263	78.0	11	3.3	High
K30: Metoclopramide	110	32.6	91	27.0	122	36.2	14	4.2	Low
K31: Senna	58	17.2	65	19.3	199	59.1	15	4.5	Medium
Level of knowledge about OTC medications					***Low***				

Table 7 shows the CPs response to the use of POM drugs during pregnancy. Among non-prescribed analgesics, the majority of CPs (70.9%) knew that acetaminophen is safe in first trimesters; however, they were in doubt about aspirin usage during pregnancy while 24.6% reported that Diclophenac may be used if the potential benefit justifies the potential risk. A few of the PPs 25.8% knew that Aspirin is used only if the potential benefit justifies the potential risk. Only 32.6% of the CPs knew that metoclopramide is safe in first trimester as well as most of the respondents (39.8%), (48.4%), (48.4%) and (46.9%) believed that loperamide, Bisacodyl, Diphenhydramine, Dextromethorphan hydro bromide are unsafe in first trimester.Finally, the knowledge of community pharmacists about non-prescription medications was low and unsatisfactory.

4.1.4 Attitude of CPs about Medication Risk during Pregnancy

Among all community pharmacists, most of the pharmacist's attitude was "strongly agree" and "agree" about various statements regarding safe medication use during pregnancy as represented in Table 13. The majority of the community pharmacists are shown positive attitude for pregnant women as shown in Table 15.

Table 8: Attitude of CPs on medication safety during pregnancy

Items	*Mean*	*Std. Deviation*	*Rank*	*Level of Attitude*
A1: You are more confident about dispensing drugs during pregnancy	3.80	1.01	2	High
A2: An extra caution is required while dispensing drugs during pregnancy	3.81	1.09	1	High
A3: All OTC drugs are not safe in pregnant women	2.66	1.23	8	Medium
A4: Only some drugs are proven teratogen	3.64	1.16	3	High
A5: Only some of the antibiotics are contra indicated in pregnant women	3.57	1.13	4	High
A6: Diuretics and Beta blockers are contra indicated in pregnant women for the management of hypertension	3.30	1.13	6	Medium
A7: Most of the presently available drugs are safe during pregnancy	2.88	1.13	7	Medium
A8: I take a chance and dispense safest drugs in pregnant women	3.45	1.20	5	High
weighted mean	***3.39***	***0.53***		***Medium***

From Table No.8 It appears The Attitude of CPs on medication safety during pregnancy came with a medium degree, as it obtained a mean (3.39), and a standard deviation (0.53), and these results indicate the homogeneity of the research sample. Regarding the Attitude of CPs on medication safety during pregnancy, Paragraph No. (2) ranked first, represented by (*An extra caution is required while dispensing drugs during pregnancy*), with a mean of (3.81), with a standard deviation of (1.09) with a high degree, while Paragraph No. (3) got the last rank represented by (*All OTC drugs are not safe in pregnant women*) with a medium degree, with a mean of (2.66), and a standard deviation of (1.23).

4.1.5 Practice of CPs about Medication Risk during Pregnancy

Table 9: practice of CPs on medication safety during pregnancy

Items	*Mean*	*Std. Deviation*	*Rank*	*Level of Practice*
P1: Do your advice pregnant women about non-prescription drugs that not to be taken during pregnancy period	1.65	0.48	5	High
P2: Do your advice pregnant women about prescription drugs that not to be taken during pregnancy period and change it by consultation of physician	1.80	0.40	2	High
P3: Do your advice pregnant women about herbal medicine which should not to be taken during pregnancy	1.70	0.46	4	High
P4: Did you gone through any drug information resources for any unknown drug before dispensing in pregnant women	1.77	0.42	3	High
P5: Do you regularly update your knowledge about safe medication dispensing in pregnant women	1.86	0.34	1	High
weighted mean	***1.76***	***0.25***		***High***

From Table No.9 It appears The practice of CPs on medication safety during came with a high degree, as it obtained a mean (1.76), and a standard deviation (0.25), and these results indicate the homogeneity of the research sample. Regarding the Attitude of CPs on medication safety during pregnancy, Paragraph No. (5) ranked first, represented by (*Do you regularly update your knowledge about safe medication dispensing in pregnant women*), with a mean of (1.86), with a standard deviation of (0.34) with a high degree, while Paragraph No. (1) got the last rank represented by (*Do your advice pregnant*

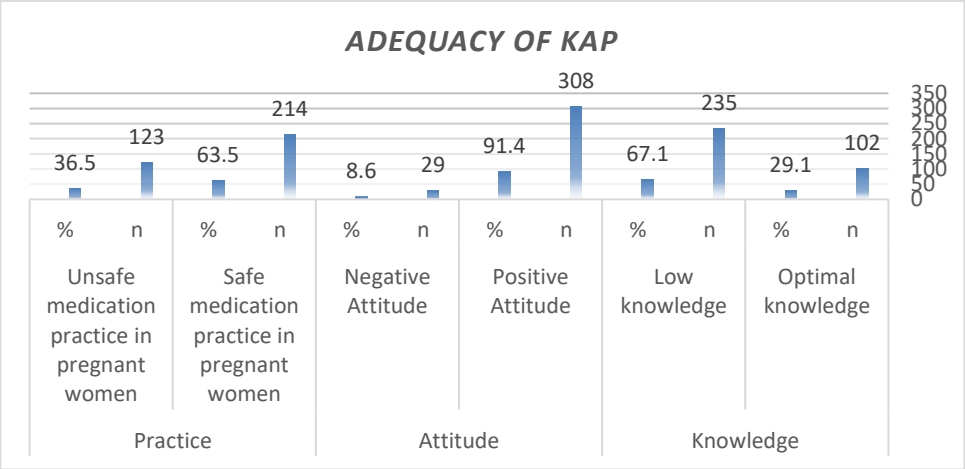
women about non-prescription drugs that not to be taken during pregnancy period) with a high degree, with a mean of (1.65), and a standard deviation of (0.48).

4.1.6 Adequacy of KAP of CPs towards medication Risk during pregnancy

Table 10: Adequacy of KAP towards medication safety during pregnancy

Knowledge				***Attitude***				***Practice***			
high knowledge		***Low knowledge***		***Positive Attitude***		***Negative Attitude***		***Safe medication practice in pregnant women***		***Unsafe medication practice in pregnant women***	
n	***%***	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***
102	29.1	235	67.1	308	91.4	29	8.6	214	63.5	123	36.5

From Table No.10 It appears that the majority of the participants in the research from CPs 235 (67.1%) have a low level of knowledge about the risks of medications for pregnant women. While the majority of participants had a Positive Attitude 308(91.4%) and safe practice 214(63.5%) of the risks of medications for pregnant women.



Differences results for KAP of CPs towards medication Risk during pregnancy

Parametric tests were used because the sample follows a normal distribution to find out the differences between the participants' responses depending on the socio-demographic variables.

A) The Gender Variable:

The T-test was used to find out the significance of the statistical differences between the averages of the answers of the research sample, which are attributed to the difference in gender (male, female), as in the following table:

Table 11: T-test result for Gender Variable

The Gender Variable		***N***	***Mean***	***Std. Deviation***	***T value***	***Sig. value***	***Decision***
First Field Knowledge ***of Community Pharmacy about FDA category Medication Risk during Pregnancy***	*Male*	*314*	*2.27*	*0.5*	*1.6*	*0.11*	There are no differences
	Female	*23*	*2.1*	*0.33*			
Second Field ***Knowledge of Community Pharmacy about POM Medication Risk during Pregnancy***	*Male*	*314*	*2.08*	*0.35*	*0.095*	*0.9*	There are no differences
	Female	*23*	*2.09*	*0.39*			
Third Field Knowledge of Community Pharmacy about OTC Medication Risk during Pregnancy	*Male*	*314*	*2.11*	*0.41*	*0.369*	*0.7*	There are no differences

	Female	*23*	*2.15*	*0.50*			
First axis Knowledge of Community Pharmacists about Medication Risk during Pregnancy	*Male*	*314*	*2.12*	*0.3*	*0.077*	*0.9*	There are no differences
	Female	*23*	*2.11*	*0.35*			
Second axis Attitude of Community Pharmacists about Medication Risk during Pregnancy	*Male*	*314*	*3.38*	*0.53*	*1.5*	*0.13*	There are no differences
	Female	*23*	*3.55*	*0.5*			
Third axis Practice of Community Pharmacists about Medication Risk during Pregnancy	*Male*	*314*	*1.8*	*0.25*	*1.3*	*0.2*	There are no differences
	Female	*23*	*1.7*	*0.25*			
The tool as a whole *KAP of Community Pharmacists about Medication Risk during Pregnancy*	*Male*	*314*	*2.31*	*0.22*	*0.5*	*0.67*	There are no differences
	Female	*23*	*2.33*	*0.23*			

From Table No.11 It appears the value of (T) is not statistically significant, as the values of the significance probability (0.67) were greater than the value of the level of significance (0.05), and this means that there are no differences between the averages of the responses of the participants of the research sample.

B) The Age Variable:

The ANOVA test was used to find out the significance of the statistical differences between the averages of the answers of the research sample, which are attributed to the difference in Age, as in the following table:

Table 12: ANOVA test result for Age Variable

The Age Variable		***Sum of squares***	***df***	***Mean square***	***F value***	***Sig. value***	***Decision***
First Field Knowledge *of Community Pharmacy about FDA category Medication Risk during Pregnancy*	*Between groups*	.254	3	.085	.354	.786	There are no differences
	Within groups	79.314	332	.239			
	Total	79.567	335				
Second Field *Knowledge of Community Pharmacy about POM Medication Risk during Pregnancy*	*Between groups*	.434	3	.145	1.203	.309	There are no differences
	Within groups	39.912	332	.120			
	Total	40.346	335				
Third Field Knowledge of Community Pharmacy about OTC Medication Risk during Pregnancy	*Between groups*	.417	3	.139	.811	.488	There are no differences
	Within groups	56.845	332	.171			
	Total	57.262	335				
First axis Knowledge of Community Pharmacists about Medication Risk during Pregnancy	*Between groups*	.104	3	.035	.372	.773	There are no differences
	Within groups	30.980	332	.093			
	Total	31.084	335				
Second axis Attitude of Community Pharmacists about Medication Risk during Pregnancy	*Between groups*	.637	3	.212	.767	.513	There are no differences
	Within groups	91.895	332	.277			

The Age Variable		Sum of squares	df	Mean square	F value	Sig. value	Decision
	Total	92.531	335				
Third axis Practice of Community Pharmacists about Medication Risk during Pregnancy	Between groups	.247	3	.082	1.343	.260	There are no differences
	Within groups	20.392	332	.061			
	Total	20.640	335				
The tool as a whole *KAP of Community Pharmacists about Medication Risk during Pregnancy*	Between groups	.046	3	.015	.316	.814	There are no differences
	Within groups	16.258	332	.049			
	Total	16.304	335				

From Table No.12 It appears the value of (F) is not statistically significant, as the values of the significance probability (0.814) were greater than the value of the level of significance (0.05), and this means that there are no differences between the averages of the responses of the participants of the research sample.

C) The Level of Education Variable:

The ANOVA test was used to find out the significance of the statistical differences between the averages of the answers of the research sample, which are attributed to the difference in Level of Education, as in the following table:

Table 13: ANOVA test result for Level of Education Variable

The Level of Education Variable		Sum of squares	df	Mean square	F value	Sig. value	Decision
First Field Knowledge *of Community Pharmacy about FDA category Medication Risk during Pregnancy*	Between groups	1.987	2	.993	4.277	.015	There are differences
	Within groups	77.581	334	.232			
	Total	79.567	336				
Second Field *Knowledge of Community Pharmacy about POM Medication Risk during Pregnancy*	Between groups	.531	2	.265	2.219	.110	There are no differences
	Within groups	39.946	334	.120			
	Total	40.477	336				
Third Field Knowledge of Community Pharmacy about OTC Medication Risk during Pregnancy	Between groups	.034	2	.017	.099	.906	There are no differences
	Within groups	57.357	334	.172			
	Total	57.391	336				
First axis Knowledge of Community Pharmacists about Medication Risk during Pregnancy	Between groups	.320	2	.160	1.739	.177	There are no differences
	Within groups	30.766	334	.092			
	Total	31.086	336				
Second axis Attitude of Community Pharmacists about Medication Risk during Pregnancy	Between groups	.072	2	.036	.130	.878	There are no differences
	Within groups	92.479	334	.277			
	Total	92.551	336				
Third axis Practice of Community Pharmacists about Medication Risk during Pregnancy	Between groups	.008	2	.004	.063	.939	There are no differences
	Within groups	20.634	334	.062			
	Total	20.642	336				
The tool as a whole *KAP of Community Pharmacists about Medication Risk during Pregnancy*	Between groups	.161	2	.080	1.662	.191	There are no differences
	Within groups	16.144	334	.048			
	Total	16.304	336				

From Table No.13 It appears the value of (F) is not statistically significant, as the values of the significance probability (0.191) were greater than the value of the level of significance (0.05), and this means that there are no differences between the averages of the responses of the participants of the research sample. However, there were differences in knowledge of the FDA category among the average respondents.

D) The Years of experience Variable:

The ANOVA test was used to find out the significance of the statistical differences between the averages of the answers of the research sample, which are attributed to the difference in Years of experience, as in the following table:

Table 14: ANOVA test result for Years of experience Variable

The Years of experience Variable		*Sum of squares*	*df*	*Mean square*	*F value*	*Sig. value*	*Decision*
First Field Knowledge *of Community Pharmacy about FDA category Medication Risk during Pregnancy*	*Between groups*	3.553	4	.888	3.879	.004	There are differences
	Within groups	76.015	332	.229			
	Total	79.567	336				
Second Field *Knowledge of Community Pharmacy about POM Medication Risk during Pregnancy*	*Between groups*	.197	4	.049	.407	.804	There are no differences
	Within groups	40.280	332	.121			
	Total	40.477	336				
Third Field Knowledge of Community Pharmacy about OTC Medication Risk during Pregnancy	*Between groups*	.445	4	.111	.649	.628	There are no differences
	Within groups	56.945	332	.172			
	Total	57.391	336				
First axis Knowledge of Community Pharmacists about Medication Risk during Pregnancy	*Between groups*	.029	4	.007	.076	.989	There are no differences
	Within groups	31.058	332	.094			
	Total	31.086	336				
Second axis Attitude of Community Pharmacists about Medication Risk during Pregnancy	*Between groups*	.533	4	.133	.481	.750	There are no differences
	Within groups	92.018	332	.277			
	Total	92.551	336				
Third axis Practice of Community Pharmacists about Medication Risk during Pregnancy	*Between groups*	.064	4	.016	.260	.904	There are no differences
	Within groups	20.577	332	.062			
	Total	20.642	336				
The tool as a whole *KAP of Community Pharmacists about Medication Risk during Pregnancy*	*Between groups*	.033	4	.008	.166	.956	There are no differences
	Within groups	16.272	332	.049			
	Total	16.304	336				

From Table No.14 It appears the value of (F) is not statistically significant, as the values of the significance probability (0.956) were greater than the value of the level of significance (0.05), and this means that there are no differences between the averages of the responses of the participants of the research sample. However, there were differences in knowledge of the FDA category among the average respondents, Where the significance value was 0.004, which is statistically significant at the 0.05 significance level.

Correlation Results for KAP of CPs towards medication Risk during pregnancy

Spearman's correlation coefficient statistic was used to determine relationships of sociodemographic and KAP and knowledge-attitude, attitude -practice and practice-knowledge. P value less than 0.05 was considered as statistically significant.

A) Correlation of Sociodemographic characteristics and KAP of CPs towards medication Risk during pregnancy:

Table 15: Spearman's correlation test result for Research variable

Research variable		*Correlation Coefficient*	*Sig. (2-tailed)*
Knowledge of Community Pharmacists about Medication Risk during Pregnancy	Gender Variable	-0.089	0.103
	Age Variable	0.008	0.883
	Level of Education Variable	0.143	0.009
	Years of experience Variable	0.87	0.110
Attitude of Community Pharmacists about Medication Risk during Pregnancy	Gender Variable	0.001	0.987
	Age Variable	0.49	0.372
	Level of Education Variable	-0.031	0.573
	Years of experience Variable	-0.013	0.815
Practice of Community Pharmacists about Medication Risk during Pregnancy	Gender Variable	0.015	0.787
	Age Variable	0.052	0.343
	Level of Education Variable	0.038	0.484
	Years of experience Variable	0.001	0.995

From Table No.15 It appears that there is no correlation between knowledge, Attitude, practice and demographic variables of the participants.

B) Correlation of Knowledge and attitude of CPs towards medication Risk during pregnancy:

Table 16: Spearman's correlation test result for Knowledge - Attitude

Research variable	*Correlation Coefficient*	*Sig. (2-tailed)*
Knowledge-Attitude	-0.231	0.001

From Table No.16 the results show that there is a correlation between knowledge and attitude, and this correlation is negative, meaning that the more knowledge increases, the less attitude among the participants, as the value of significance was 0.001, meaning that it is statistically significant at the level of significance of 0.05.

C) Correlation of Attitude and Practice of CPs towards medication Risk during pregnancy:

Table 17: Spearman's correlation test result for Practice- Attitude

Research variable	*Correlation Coefficient*	*Sig. (2-tailed)*
Attitude –Practice	0.097	0.075

From Table No.22 the results show that there is no correlation between attitude and practice, as the significance value was 0.075 and it is not statistically significant at the 0.05 significance level.

D) Correlation of Knowledge and practice of CPs towards medication Risk during pregnancy:

Table 18: Spearman's correlation test result for Knowledge - Practice

Research variable	*Correlation Coefficient*	*Sig. (2-tailed)*
knowledge- practice	0.023	0.677

From Table No.18 the results show that there is no correlation between Knowledge and practice, as the significance value was 0.677 and it is not statistically significant at the 0.05 significance level.

Regression Results for KAP of CPs towards medication Risk during pregnancy

A simple linear regression test was used to find out if there is an effect between the research variables.

A) Regression of Sociodemographic characteristics and KAP of CPs towards medication Risk during pregnancy:

Table 19: Regression result for Sociodemographic variables

	R square	***0.051***
	F value	4.490
	F(sig.value)	0.002
Gender	Beta value	0.073
	T value	1.33
	T(Sig.value)	0.182
Age	Beta value	0.221
	T value	2.85
	T(Sig.value)	0.005
Level of Education	Beta value	0.175
	T value	3.2
	T(Sig.value)	0.001
Years of professional experience	Beta value	0.196
	T value	2.5
	T(Sig.value)	0.011

From Table No.19 it appears that gender does not affect the research variables, as there was no regression among them, while age showed an effect on the research variables, as it showed a linear regression at the level of significance 0.005, which is statistically significant, and also the level of education showed a regression with the research variables at the level of significance 0.001 Also, years of experience showed that it affected the research variables, as the level of significance was 0.011, which is statistically significant at the level of significance of 0.05.

B) Regression of CPs knowledge with Practice and Attitude:

Table 20: Regression result for knowledge variables

	R square	***0.13***
	F value	2.17
	F(sig.value)	0.115
Practice	Beta value	0.073
	T value	1.5
	T(Sig.value)	0.181
Attitude	Beta value	0.035
	T value	1.7
	T(Sig.value)	0.086

From Table No.20 the results showed that there is no regression effect between knowledge and attitude, where the level of significance was higher than 0.05, so it is considered not statistically significant.However, there is a linear regression between knowledge and practice, and the extent of the impact of knowledge on practice is estimated at 13%, and the effect is fairly good.

C) Regression of CPs Practice and Attitude:

Table 21: Regression result for practice variables

	R square	***0.009***
	F value	3.18
	F(sig.value)	0.075
Attitude	Beta value	0.097
	T value	1.78
	T(Sig.value)	0.075

Variables		**Age Variable**				**Total**	**X^2 (Sig.value)**
		≤20 Years	**21-30 years**	**31-40 years**	**41-50 years**		
Knowledge	***High***	0	77	23	1	102	0.06
		0	22.9%	6.8%	0.3%	30.3%	
	Low	3	149	72	11	235	
		0.9%	44.3%	21.4%	3.3%	69.7%	
Attitude	***Positive***	2	211	84	10	308	0.13
		0.6%	62.8%	25%	3%	91.4%	
	Negative	1	15	11	2	29	
		0.3%	4.5%	3.3%	0.6%	8.6%	
Practice	***Safe practice***	2	141	60	10	214	0.53
		0.6%	42%	17.9%	3%	63.5%	
	Unsafe practice	1	85	35	2	123	
		0.3%	25.3%	10.4%	0.6%	36.5%	

From Table No.21 the results showed that there is no regression between practice and attitude, as the significance value was 0.075 and it is not statistically significant at the 0.05 level of significance.

Association Results for KAP of CPs towards medication Risk during pregnancy

A) Association between knowledge of medication Risk during pregnancy among CPs and Sociodemographic characteristics:

Table 22: Chi –square test result for Sociodemographic variables

Variables		***Gender***		***Total***	***X^2 (Sig.value)***
		Male	***Female***		
Knowledge	***High***	97	5	102	0.356
		28.8%	1.5%	30.3%	
	Low	217	18	235	
		64.4%	5.3%	69.7%	
Attitude	***Positive***	287	21	308	0.987
		85.2%	6.2%	91.4%	
	Negative	21	2	29	
		8%	0.6%	8.6%	
Practice	***Safe practice***	200	14	214	0.786
		59.3%	4.2%	63.5%	
	Unsafe practice	114	9	123	
		33.8%	2.7%	36.5%	

Variables	**Level of Education**			**Total**	**X^2 (Sig.value)**
	Diploma in Pharmacy	**Bachelor in Pharmacy**	**Master in Pharmacy**		

Knowledge	***High***	37	64	1	102	0.216
		11%	19%	0.3%	30.3%	
	Low	98	137	0	235	
		29.1%	40.7%	0	69.7%	
Attitude	***Positive***	122	185	1	308	0.082
		36.2%	54.9%	0.3	91.4%	
	Negative	13	16	0	29	
		3.9%	4.7%	0	8.6%	
Practice	***Safe practice***	89	124	1	214	0.052
		26.4%	36.8%	0.3	63.5%	
	Unsafe practice	46	77	0	123	
		13.6%	22.8%	0	36.5%	

Variables		**Years of professional experience**					**Total**	**X^2 (Sig.value)**
		Less than 5 years	**5 -9 years**	**10 - 14 years**	**15 -19 years**	**20 - 25 years**		
Knowledge	***High***	61	30	9	2	**0**	102	0.65
		18.1%	8.9%	2.7%	0.6%	**0**	30.3%	
	Low	126	75	22	11	1	235	
		37.4%	22.3%	6.5%	3.3%	0.3%	69.7%	
Attitude	***Positive***	172	97	27	11	1	308	0.77
		51%	28.8%	8%	3.3%	0.3%	91.4%	
	Negative	15	8	4	2	**0**	29	
		4.5%	2.4%	1.2%	0.6%	**0**	8.6%	
Practice	***Safe practice***	120	62	22	10	**0**	214	0.35
		35.6%	18.4%	6.5%	3%	**0**	63.5%	
	Unsafe practice	67	43	9	3	1	123	
		19.9%	12.8%	2.7%	0.9%	0.3%	36.5%	

From Table No.22 it appears that there is no Association between the research variables and the demographic characteristics of the participants, as the significance value of the chi square test is not statistically significant and all of them are higher than 0.05 and it is not statistically significant and this indicates the independence of the variables as they are not affected by the demographic variables of the participants.

Table 23: Chi –square test result for KAP variables

Variables		***Attitude***		***Total***	***X^2(Sig.value)***
		Positive Attitude	***Negative Attitude***		
Knowledge	*High*	97	5	102	0.11
		28.8%	1.5%	30.3%	
	Low	211	24	235	
		62.6%	7.1%	69.7%	
Practice	*Positive*	200	14	214	0.07
		59.3%	4.2%	63.5%	
	Negative	108	15	123	
		32%	4.5%	36.5%	

Variables		**Practice**		**Total**	**X^2(Sig.value)**
		Safe practice	Unsafe practice		
Knowledge	*High*	60	42	102	0.25
		17.8%	12.5%	30.3%	
	Low	154	81	235	
		45.7%	24%	69.7%	

From Table No.23 it appears that there is no Association between the Knowledge and the Attitude or Knowledge and Practice or Practice and Attitude of the participants, as the significance value of the chi square test is not statistically significant and all of them are higher than 0.05 and it is not statistically significant and this indicates the independence of the variables as they are not affected by the demographic variables of the participants

Discussion

KAP studies in community pharmacists concerning about safe medication use during pregnancy are very limited. Community pharmacist plays a vital role in promotion of medication safety during pregnancy by providing appropriate medication counseling and drug information to pregnant women [65]. Also, CPs are the most accessible health care personnel to

the public.

Medication use during pregnancy is common, and prevalence continues to increase as women's age at pregnancy increases. Pharmacy professionals must carefully appraise the potential risks of medication use versus risks of untreated disease during pregnancy [61].The KAP (Knowledge, Attitude & Practices) study was conducted among community pharmacists towards medication safety in pregnant women. A total of 337 community pharmacists agreed to participate in the study. A total of 337 community pharmacists were enrolled in the study, in which 314 male pharmacists and 23 female pharmacist. Age wise distribution among the community pharmacists is shown in Table 4. The age of the pharmacist participated in the study was between 20 to 50 years. More number of study participants were seen in 21-30 years 226 (67%), followed by 31-40 years 95(28.2%), and least number in 41-50 years 12(3.6%). In Narayana G et al study, majority of the community pharmacists were present in the age group of above 30 years, which is difference with our study results [60].while in Abdu Tuha et al., majority of the community pharmacists were present in the age group between 20-30 ,which is similar with our study result. The distribution of the participants by their level of education is shown in Table 4. Majority of the subjects had Bachelor in pharmacy 201(59.6%) followed by diploma Pharmacy 135(40.1%) and M.Pharma 1(0.3%). Majority of our participants have diploma qualification with less knowledge towards safe use of medication during pregnancy. This suggests that there is a need to upgrade of minimum qualification to B.Pharm for practice of pharmacy in community setup. The majority of the study subjects 187 (40.1%) had less than 5 years of professional experience, 105 (31.1%) had 5 -9 years and at least number 13(3.8%) had greater than 15 years. The distribution of professional experience is shown in Table 5. These results are similar to a study Z Alrabiah et al[10].

Knowledge of CPs about Medication safety during Pregnancy

The USFDA classified all drugs into five categories (A, B, C, D and X) to promote safe use and to prevent teratogenic effects of drugs in pregnant women and fetus. Pharmacist need to aware about the drugs comes under D and X category, because these drugs are proven teratogens in pregnant women. The study findings revealed that the most of the pharmacists are aware about only category A and X pregnancy risk categories While Few have enough knowledge about category C and D. Exactly the countrary of findings but with very lower awareness are also observed in the study conducted by Narayana G et al[60]Table 6 presents the CPs' response towards safe use of drugs during pregnancy. Most of respondents correctly

identified valproic acid 211(62.6%), isotretinoin 231(68.5%) are not safe and methyldopa 262(77.7%) & Azithromycin 230(68.2%) are safe during pregnancy except for the drugs like tetracycline 17(5%) and statins 19(5.6%) believed wrongly as safe drugs. Remaining replied don't know for safe use of drugs like statin 42(12.5%), budesonide inhaler 39(11.6%), and warfarin 33(9.8%) during pregnancy.

In nonprescription drugs, most of CPs 239(70.9%) and 238(70.6%) said that acetaminophen and drotaverine are safe. A majority of CPs 185(54.9%) to be used by pregnant. For drugs like dextromethorphan hydrobromide158(46.9%) and topical corticosteroid 105(31.2%)and loperamide134(39.8%) and bisacodyl163(48.4%) believed wrongly as not safe drugs. In herbal medicine, CPs identified Senna 58(17.2%) as safe herbal drug to use during pregnancy. Similar types of findings are also observed in the study conducted by Morgan et al [66].

Most of the community pharmacists are having poor knowledge 235 (67.1%) towards medication use during pregnancy. The study agrees with the results obtained by Narayana G et al[60], as it was shown in his study that most of the community pharmacists218(54.1%)have a poor knowledge.

These findings suggest that, community pharmacist needs to undergo continuous training and educational program about medication safety during pregnancy. This will promote safe medication practice during pregnancy and prevents unwanted effects offered by the drugs. This cross-sectional study revealed that CPs have insufficient knowledge about the risk of medications used by pregnant women[61].

Attitude of CPs of Medication safety during Pregnancy

Among all community pharmacists, most of the pharmacist's attitude was agree about various statements like 131(38.9%) an extra caution is required while dispensing drugs during pregnancy, followed by 159(47.2%): Only some of the antibiotics are contra indicated in pregnant women, 145(43%) only some drugs are proven teratogen, 149(42.6%): You are more confident about dispensing drugs during pregnancy and 124(36.8%) pharmacists take a chance and dispense safest drugs in pregnant women except for the statements like All OTC drugs are not safe in pregnant women 141(41.8%), diuretics and beta blockers are contra indicated in pregnant women for the management of hypertension 72(21.4%) and most of the presently available drugs are safe during pregnancy 105(31.2%) replied disagree by pharmacists.

about safe medication use during pregnancy. Another study by Narayana G et al [60]reported thatirrespective of age, qualification, area of practice and experience, more than 90% of the CPs had shown a positive attitude towards medication safety during pregnancy. This may be due to CPs believed that medication safety is one of the major concern in the pregnancy period. Definitely, this positive attitude will give a space for providing educational intervention to improve the knowledge and to channel this into a practice. In general, most of the community pharmacists308(91.4%) had a Positive Attitude. The study agrees with the results obtained by Narayana G et al[60], as it was shown in his study that most of the community pharmacists380(94.2%) have a Positive Attitude.

Practice of CPs towards Medication Risk during Pregnancy

Majorly, pharmacists 220(65.3%) advised pregnant women about non-prescription drugs that not to be taken during pregnancy period and 270(80.1%) advised pregnant women about prescription drugs that not to be taken during pregnancy period and change it by consultation of physician. Remaining practices by community pharmacists like 46(13.6%) replied have not regularly update your knowledge about safe medication dispensing in pregnant women, 78(23.1%) have not gone through any drug information resources for any unknown drug before dispensing in pregnant women, 100(29.7%) have never advised pregnant women about herbal medicine which should not to be taken during pregnancy. The majority of the community pharmacists are shown safe dispensing practice for pregnant women as shown inTable 11. Overall, the study shows that most community pharmacists214(63.5%) have a good practice towards Medication Risk during Pregnancy. This study is not consistent with the results obtained by Narayana G et al[60], where most of the community pharmacists284(70.5%) had unsafe dispensing practice of medication used in pregnant women. The study agrees with the results obtained by Sameena,T[58], as it was shown in his study that most of the community pharmacists have a satisfactory practice.

Instantly, several measures need be taken to improve CPs knowledge about safe medication use during pregnancy like, free continuous educational programs about medication safety during pregnancy and providing readily available medication software to access the unbiased safety information about the drugs [60]. The lack of well-designed focused training and the scarce availability of continuing education programs about drugs usage in pregnancy may contribute to the poor knowledge of PPs towards medications safety during pregnancy [67].

Conclusion

The cross sectional study concluded that more number of study subjects were male between 21-30 years with bachelor in pharmacy education. The study found that community pharmacists are having a poor knowledge, positive attitude and safe practice about safe medication use in pregnant women. The study also showed that there are no differences between the answers of the respondents, and this indicates the similarity of the education they receive in universities, and that there is no self-information and research. The study showed that there is no correlation between research variables and demographic variables. There is a weak inverse relationship between knowledge and attitude. The study showed that there is no linear regression between the research variables and the demographic variables. While there is a regression and effect of knowledge on attitude and practice by 13%. The study showed that there is no association between research variables and demographic variables.

List of Reference

1. Heitkamp, A., et al., *Maternal mortality: near-miss events in middle-income countries, a systematic review*. Bulletin of the World Health Organization, 2021. **99**(10): p. 693.
2. Abasiubong, F., et al., *Self-Medication: potential risks and hazards among pregnant women in Uyo, Nigeria.* Pan African Medical Journal, 2012. **13**(1).
3. Mosley, J.F., L.L. Smith, and M.D. Dezan, *An overview of upcoming changes in pregnancy and lactation labeling information.* Pharmacy practice, 2015. **13**(2).
4. Ayad, M. and M.M. Costantine. *Epidemiology of medications use in pregnancy*. in *Seminars in perinatology*. 2015. Elsevier.
5. Al-Sadi, A.M., et al., *Genetic analysis reveals diversity and genetic relationship among Trichoderma isolates from potting media, cultivated soil and uncultivated soil.* BMC microbiology, 2015. **15**(1): p. 1-11.
6. Wyszynski, D.F. and K.E. Shields, *Frequency and type of medications and vaccines used during pregnancy.* Obstetric Medicine, 2016. **9**(1): p. 21-27.
7. Banu, G. and A.K. AK, *A questionnaire based survey on knowledge, attitude and practices of medical practitioners regarding the prescribing of medications during pregnancy.* International Journal of Reproduction, Contraception, Obstetrics and Gynecology, 2016. **5**(4): p. 984-989.

8. Zaki, N.M. and A.A. Albarraq, *Use, attitudes and knowledge of medications among pregnant women: A Saudi study.* Saudi pharmaceutical journal, 2014. **22**(5): p. 419-428.
9. Samuel, N. and A. Einarson, *Medication management during pregnancy: role of the pharmacist.* International Journal of Clinical Pharmacy, 2011. **33**(6): p. 882-885.
10. Alrabiah, Z., 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): p. 1093-1096
11. Narayana, G., et al., *Knowledge, Attitude and Practice of Community Pharmacists on Medication Safety during Pregnancy: A Cross-sectional Study.* International Journal of Pharmaceutical Investigation, 2.(4)9 .019
12. Tuha, A., Y. Gurbie, and H.G. Hailu, *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.* Journal of pregnancy, 201 .9 .2019
13. George, J., *Optimising medication use during pregnancy: the potential role of pharmacists*. 2011, Oxford University Press. p. 81-83.
14. Morgan, M.A., et al., *Obstetrician–gynaecologist knowledge of and access to information about the risks of medication use during pregnancy.* The Journal of Maternal-Fetal & Neonatal Medicine, 2010. **23**(10): p. 1143-1150.
15. Zaganjor, I., et al., *Describing the prevalence of neural tube defects worldwide: a systematic literature review.* PloS one, 2016. **11**(4): p. e0151586.
16. Sameena, T., *Assessment of Community Pharmacist Knowledge, Attitude and Practice towards Medication Safety among Pregnant Women*. 2021, JKK Nattraja College of Pharmacy, Kumarapalayam.