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# Knowledge, Attitude and Practice of Community Pharmacists on Medication Safety during Pregnancy: A Cross-sectional Study

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## ABSTRACT

**Background:** Safe medication use during pregnancy requires a great understanding of the benefits and risks associated upon use of the drug. Community Pharmacists (CPs) are the most accessible health care professionals for the pregnant women to get safety information about drugs. Evaluation of Knowledge, Attitude and Practices (KAP) of community pharmacists on medication safety during pregnancy. **Methods:** A cross-sectional study was conducted among community pharmacists of various community pharmacies located in Anantapur district. A total of 403 CPs were enrolled and subjected for interview by using pre-validated self-administered KAP questionnaire on medication safety during pregnancy. Descriptive statistics were used to represent the socio-demographic characteristics and KAP levels. Chi-square test was used to associate demographic profile with KAP levels. **Results:** A total of 403 community Pharmacists (CPs) were enrolled in the study. Majority of the pharmacists are males (345; 85.6%), residing in semi-urban area (184; 45.6%), possess diploma in pharmacy (232; 57.5%) and having more than 10 years' of experience. Among 403 CPs, only 21 (5.2%) had good knowledge, 380 (94.2%) had positive attitude and 119 (29.5%) have safe practice towards medication safety during pregnancy. Respondent's age, qualification and experience were significantly associated with good knowledge and safe practices. **Conclusion:** Community pharmacists are having a positive attitude and some knowledge about safe medication use in pregnant women. Still, there is a wide gap in knowledge levels and practices of CPs towards safe medication use in pregnant women. This gap can be fulfilled by providing focused educational intervention to all CPs.

**Key words:** Knowledge, Attitude, Practice, Community Pharmacist, Medication Safety, Pregnancy, South India.

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## INTRODUCTION

According to World Health Organization (WHO), pregnancy is defined as "woman carries an embryo and fetus in her womb for a period of nine months". For most women this is a time of great happiness and fulfillment.[1] However, during pregnancy, both the woman and her developing child face various health risks, so all pregnancies will be closely monitored by skilled health care professionals.[2] The number of women taking medications during pregnancy has been drastically raised from past 3-4 decades. It was estimated that 90% of pregnant women take at least one prescription or non-prescription drug other than a vitamin or mineral supplements.[3] This raise in medication consumption during pregnancy is majorly due to, change in demographic characteristics, high prevalence of pre-existing co-morbidities and obstetric conditions.[4,5] The most common chronic disorders warrant drug therapy in pregnancy include renal disease, diabetes, depression, thyroid disorders, cardiovascular disorders and asthma. If appropriate drug therapy is not provided in these conditions, it may lead to develop adverse effects on the fetus and require post-natal care of the newborn.[6]

Most of the drugs do not comprise clinical trial evidence on pregnancy risk, this makes health care professionals to enrich their knowledge about drug acts as a teratogen before prescribing or dispensing of drugs in the pregnant women.[7] Medication use during pregnancy cannot be completely avoided, however, change in pharmacokinetics and placental crossing of many drugs may attribute to cause significant harm in the growing fetus.[8] Safe medication use during pregnancy requires a great understanding of the benefits and risks associated with pregnant women and fetuses upon use of the drug.

Globally, pharmacists are considered as medication experts with great knowledge in pharmacology, pharmacokinetics and trained to apply evidence in clinical practice. The pharmacist must in a position to counsel pregnant women about the risks associated with prescription and non-prescription drugs, traditional medicines and abuse of substances such as alcohol and nicotine like substances.[9] Community pharmacists are the most accessible personal to the general public in all health care professionals. They have a huge responsibility in safe medication delivery in pregnant women by dispensing safest drugs and providing appropriate information during pregnancy to reduce the possibility and potential risks of the drugs.[10] In India, provision of quality community pharmacy services is severely compromised by huge population burden, growing unemployed youth and easy availability of manpower with a low cost and high number of non-qualified pharmacists owing the pharmacy.[11] There was a lack evidence in relation to assessment of community pharmacist's knowledge, attitude and practice towards medication safety during pregnancy in Indian settings. The objective of this study was to evaluate the community pharmacist's knowledge, attitude and practice towards medication safety during pregnancy.

## MATERIALS AND METHODS

### Study design and participants

A cross-sectional study was conducted in community pharmacy premises, which are located in and around the Anantapur district, Andhra Pradesh, India. All retail community pharmacies which serves medication needs of the residing public by a qualified pharmacist are eligible sites for this study. The study was conducted over a period of six months from December 2017 to June 2018. A due permission was sought from all community pharmacy owners before initiation of the study. The study was approved by RIPER institutional Review Board with a registration number of (RIPER/IRB/PP/2017/010). 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.

### Sample size determination

The required sample size was calculated as 384 by using Epi Info 7 Dos version 3.5.1 software (Centers for Disease Control and Prevention, Clifton Road, Atlanta, USA) with an assumption of 50% of community pharmacists have optimal knowledge toward medication safety during pregnancy, 95% confidence interval and 5% precision. With a 5% of non-response rate the final sample size was calculated as 403.

### Sampling technique

A total of 1900 community pharmacists are working in both retail (1498) and whole sale (402) pharmacies settings of Anantapur district. All retail pharmacy addresses are gathered from Drug Regulatory Office located in Anantapur City. All 1498 retail pharmacies were assigned a number and a simple random sampling technique (random number generator) was used to select the 403 study samples.

### Study tool

A total of 403 randomly selected community pharmacists from various community pharmacy premises located in various areas (rural and urban) of Anantapur district were enrolled and subjected for a face to face interview by using pre-validated 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, type of working pharmacy, location of working pharmacy, qualification and number of prescriptions dispensed per day.

### Knowledge toward medication safety during pregnancy

The community pharmacist's knowledge regarding medication safety during pregnancy was assessed by using a 32 point scale. The maximum points expected were 32 and a minimum of zero. Points to, aware of teratogen definition (1 point), knowledge about FDA pregnancy drug risk categories (each category 1 point; total=5 points), knowledge about 10 prescription drugs safety in pregnant women (each drug 1 point: total=10 points), knowledge about 8 non-prescription drugs safety in pregnant women (each drug 1 point: total=8 points), knowledge about 5 herbal drugs safety in pregnant women (each drug 1 point: total=5 points) and knowledge about physical activity, nutritional interventions (3 points). If the responding pharmacist scores ≥ 16 points considered as having optimal knowledge and less <16 points considered as having poor knowledge about medication safety during pregnancy.

### 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 Likens 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.

### 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 four question will be considered having irregular practice towards medication safety during pregnancy. If the respondent says "yes" to four or more questions will be considered having regular practice towards medication safety during pregnancy.

### Data analysis

Descriptive statistics like mean, proportion, standard deviation and frequency were used to represent the socio-demographic characteristics and KAP levels of the respondents. Chi-square test was used to associate socio-demographic profile with KAP levels of medication safety during pregnancy. *P* value less than 0.05 was considered as statistically significant.

## RESULTS

A total of 403 community pharmacists were enrolled in the study. Most of the respondents (206; 51.1%) are between the age 31 and 40 years, with a mean age of 34.1±7.59. The majority of the pharmacists is males (345; 85.6%), semi-urban area (184; 45.6%), diploma in pharmacy qualification (232; 57.5%), more than 10 years' experience and dispenses 301 to 500 prescriptions per day as shown in Table 1.

Most of the community pharmacists are aware about teratogens (342; 84.8%). Very less number of pharmacists are having knowledge regarding all pregnancy risk categories (22; 5.4%), answered about safe use of ten prescription drugs (58; 14.4%), eight non-prescription drugs (45; 11.1%) and five herbal drugs (36; 8.9%) in pregnancy. More than 70% of pharmacists are aware about nutritional and physical activity requirement in pregnant women as depicted in Table 2.

Among all community pharmacists, most of the pharmacist's attitude was "strongly agree" and "agree" about various statements about safe medication use during pregnancy as represented in Table 3. The majority of the community pharmacists are shown unsafe dispensing practice for pregnant women as shown in Table 4.

Among all respondents, majority of the respondents have poor knowledge (218; 54.1%), positive attitude (380; 94.2%) and unsafe dispensing practice (284; 70.5%) of medication used in pregnant women as shown in Table 5. An association of respondent's socio-demographic characteristics towards KAP of medication safety during pregnancy was shown in Table 6.

## 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.[12] This study explores the knowledge gap and current practices and future requirements of community pharmacists in relation to 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 80.6% of the pharmacists are unaware about USFDA pregnancy risk categories and only 5.4% of them were able to answer all

**Table 1: Demographic characteristics of community (*n*=403).**

| Characteristics | Frequency (%) |
|---|---|
| **Age:** | |
| ≤20 Years | 13 (3.2) |
| 21-30 years | 99 (24.5) |
| 31-40 years | 206 (51.1) |
| 41-50 years | 75 (18.6) |
| >50 Years | 10 (2.5) |
| Mean ± SD | 34.1±7.59 |
| **Gender** | |
| Male | 345 (85.6) |
| Female | 58 (14.3) |
| **Location of Community Pharmacy:** | |
| Rural | 280 (69.4) |
| Urban | 123 (30.5) |
| **Qualification:** | |
| Diploma in Pharmacy | 232 (57.5) |
| Bachelor in Pharmacy | 96 (23.8) |
| Master in Pharmacy | 75 (18.6) |
| **Experience:** | |
| Less than 5 years | 33 (8.2) |
| From 5 to 9 years | 49(12.1) |
| From 10 to 14 years | 85(21.0) |
| From 15 to 19 years | 93(23.1) |
| From 20 to 24 years | 75(18.6) |
| ≥ 25 years | 68(16.8) |
| **Average number of prescriptions dispensed per day:** | |
| ≤ 100 | 25 (6.2) |
| 101 - 200 | 59 (14.6) |
| 201 - 300 | 71 (17.6) |
| 301 - 400 | 106 (26.3) |
| 401 - 500 | 120 (29.8) |
| > 500 | 22 (5.4) |

SD: Standard Deviation

**Table 2: Knowledge of community pharmacists towards medication safety during pregnancy.**

| Variable | Frequency (%) |
|---|---|
| Aware about teratogens | 342 (84.8) |
| Knowledge about FDA drug risk category in pregnant women | 22 (5.4) |
| Category A | 78 (19.3) |
| Category B | 57 (14.1) |
| Category C | 22 (5.4) |
| Category D | 34 (8.4) |
| Category X | 35 (8.7) |
| Don't know | 325 (80.6) |
| Knowledge about safe use of prescription drugs in pregnancy | 58 (14.4) |
| Valproicacid | 192 (47.6) |
| Tetracycline | 239 (59.3) |
| Statins | 84 (20.8) |
| Phenobarbitone | 108 (26.8) |
| OCP | 92 (22.8) |
| Lamotrigine | 58 (14.4) |
| Ciprofloxacin | 234 (58.1) |
| Isotretinoin | 124 (30.7) |
| Budesonide inhaler | 94 (23.3) |
| Amoxicillin | 202 (50.1) |
| Don't know | 169 (41.9) |
| Knowledge about safe use of non-prescription drugs in pregnancy | 45 (11.1) |
| Ibuprofen | 87 (21.6) |
| Pseudoephedrine Hydrochloride | 45 (11.1) |
| Guaifenesin | 58 (14.4) |
| Dextromethorphan hydro bromide | 158 (39.2) |
| Bismuth subsalicylate | 92 (22.8) |
| Acetaminophen | 234 (58.1) |
| Aspirin | 164 (40.7) |
| Supplement Vitamin A | 182 (45.1) |
| Don't know | 169 (41.9) |
| Knowledge about safe use of herbal medicine during pregnancy | 36 (8.9) |
| Senna | 222 (55.1) |
| Ginseng | 124 (30.7) |
| Ipecac | 156 (38.7) |
| Shanchpushpi | 98 (24.3) |
| Ephedra | 36 (8.9) |
| Don't know | 181 (44.9) |
| Knowledge about nutritional and physical activity intervention during pregnancy | 289 (71.7) |
| Physical activity | 312 (77.4) |
| Daily oral iron and folic acid supplementation | 350 (86.8) |
| Daily calcium supplementation | 289 (71.7) |
| Don't know | 114 (28.2) |

FDA: Food and Drug Administration; OCP: Oral Contraceptive Pill

risk categories. Similar type of findings are also observed in the study conducted by Kamuhabwa A *et al.*[13]

The study found that, most of the community pharmacists were answered prescription drugs like Valproicacid (192; 47.6%), Isotretinoin (124; 30.7%), Phenobarbitone (108; 26.8%), non-prescription drugs like Aspirin (164; 40.7%), Dextromethorphan (158; 39.2%) and herbal medicines like Senna (222; 55.1%), Ipecac (156; 38.7%) are not safe during first trimester of pregnancy. Similar type of findings are also observed in the study conducted by Morgan *et al.*[14] Most of the community pharmacists are having poor knowledge 344 (85.3%) and unsafe practice 284 (70.5%) towards medication use during pregnancy. Similar type of findings are also observed in the study conducted by Damase-Michel C *et al.*[15] 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.

Community Pharmacists (CPs) are the most accessible health care personnel to the public. Community pharmacist plays a major in providing information about OTC drugs, herbal medicines and dietary products.[16] The study found that most of the CPs are aware about dietary products (289; 71.7%) need to be taken during pregnancy, but a very less number

**Table 3: Attitude of community pharmacists on medication safety during pregnancy.**

| Variable | Frequency (%) | | | | |
|---|---|---|---|---|---|
| | Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
| You are more confident about dispensing drugs during pregnancy | 204 (50.6) | 90 (22.3) | 43 (10.6) | 47 (11.6) | 19 (4.7) |
| An extra caution is required while dispensing drugs during pregnancy | 181 (44.9) | 122 (30.2) | 50 (12.4) | 33 (8.1) | 17 (4.2) |
| All OTC drugs are not safe in pregnant women | 60 (14.8) | 222 (55.0) | 44 (10.9) | 49 (12.15) | 28 (6.9) |
| Only some drugs are proven teratogen | 181 (44.9) | 63 (15.6) | 59 (14.6) | 55 (13.6) | 45 (11.1) |
| Only some of the antibiotics are contra indicated in pregnant women | 198 (49.1) | 80 (19.8) | 54 (13.3) | 37 (9.1) | 34 (8.4) |
| Diuretics and Beta blockers are contra indicated in pregnant women for the management of hypertension | 163 (40.4) | 91 (22.5) | 55 (13.6) | 52 (12.9) | 42 (10.4) |
| Most of the presently available drugs are safe during pregnancy | 144 (35.7) | 123 (30.5) | 76 (18.8) | 39 (9.6) | 21 (5.2) |
| I take a chance and dispense safest drugs in pregnant women | 183 (45.4) | 50 (12.4) | 95 (23.5) | 44 (10.9) | 31 (7.6) |

OTC: Over the Counter

**Table 4: Practice of community pharmacists on medication safety during pregnancy (*n*=403).**

| Variable | Frequency (%) |
|---|---|
| Do you advice pregnant women about non-prescription drugs that not to be taken during pregnancy period | |
| Yes | 234 (58.1) |
| No | 169 (41.9) |
| Do you advice pregnant women about prescription drugs that not to be taken during pregnancy period and change it by consultation of physician? | |
| Yes | 112 (27.8) |
| No | 291 (72.2) |
| Do you advice pregnant women about herbal medicine which should not to be taken during pregnancy | |
| Yes | 178 (44.2) |
| No | 225 (55.8) |
| Did you gone through any drug information resources for any unknown drug before dispensing in pregnant women | |
| Yes | 198 (49.1) |
| No | 205 (50.8) |
| Do you regularly update your knowledge about safe medication dispensing in pregnant women | |
| Yes | 153 (37.9) |
| No | 250 (62.0) |

**Table 5: Adequacy of knowledge, attitude and practice towards medication safety during pregnancy (*n*=403).**

| Variable | Frequency (%) |
|---|---|
| Knowledge | |
| Optimal knowledge | 185 (45.9) |
| Poor Knowledge | 218 (54.1) |
| Attitude | |
| Positive attitude | 380 (94.2) |
| Negative Attitude | 23 (5.7) |
| Practice | |
| Safe medication practice in pregnant women | 119 (29.5) |
| Unsafe medication practice in pregnant women | 284 (70.5) |

of CPs are aware about OTC drugs (45; 11.1%) and herbal medicine (36; 8.9%) use during pregnancy.

Community pharmacist's age more than 30 years (49.8%, 34.3%), working in urban settings (57.7%, 41.4%), having B.Pharm or M. Pharm qualification (54.9, 70.0) and experience more than 15 years (68.4%, 33.7%) was significantly associated with optimal knowledge and safe practice respectively with a $P < 0.05$. This suggests that there is a need to upgrade of minimum qualification to B.Pharm for practice of pharmacy in community setup. Upgrade of qualification for practice of pharmacy requires a lot of change in the Indian pharmaceutical law that takes a long period. 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.

Irrespective 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 gives a space for providing educational intervention to improve the knowledge and to channel this into a practice.

The study will give insights for providing educational programs to CPs residing in Anantapur district. The study was conducted by self-administered questionnaire, so there is a risk of desirable bias in the study. The study was conducted in Anantapur district, so the results may not explored in nationwide.

**Table 6: Association of Socio-demographic characteristics with Optimal Knowledge, Positive Attitude and Safe Practice towards medication safety during pregnancy (*n*=403).**

| Variable | Total | Optimal Knowledge | | | Positive Attitude | | | Safe Practice | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 403 | N | % | $\chi^2$ (*P*-Value) | N | % | $\chi^2$ (*P*-Value) | *N* = | % | $\chi^2$ (*P*-Value) |
| | | 185 | | | 380 | | | 119 | | |
| **Age:** | | | | | | | 0.5 (0.4408) | | | |
| ≤ 30 Years | 112 | 40 | 35.7 | 6.4 (0.0108) | 104 | 92.8 | | 19 | 16.1 | 11.7 (0.0006) |
| > 30 Years | 291 | 145 | 49.8 | | 276 | 94.8 | | 100 | 34.3 | |
| **Gender** | | | | | | | | | | |
| Male | 345 | 164 | 47.5 | 2.5 (0.109) | 330 | 95.6 | 8.231 (0.004) | 100 | 28.9 | 0.339 (0.560) |
| Female | 58 | 21 | 36.2 | | 50 | 86.2 | | 19 | 32.7 | |
| **Location** | | | | | | | | | | |
| Rural | 280 | 114 | 40.7 | 9.9 (0.0016) | 264 | 94.2 | 0.0001 (0.992) | 68 | 24.3 | 12.1 (0.0004) |
| Urban | 123 | 71 | 57.7 | | 116 | 94.3 | | 51 | 41.4 | |
| **Qualification** | | | | | | | | | | |
| D. Pharm | 232 | 91 | 39.2 | 9.8 (0.0017) | 216 | 93.1 | 1.4 (0.23) | 13 | 5.6 | 150.5 (<0.00001) |
| B. Pharm (or) M. Pharm | 171 | 94 | 54.9 | | 164 | 95.9 | | 106 | 70.0 | |
| **Experience** | | | | | | | | | | |
| ≤ 15 Years | 172 | 27 | 15.7 | 110.2 (<0.00001) | 160 | 93.0 | 0.89 (0.343) | 41 | 23.8 | 4.6 (0.0306) |
| > 15 Years | 231 | 158 | 68.4 | | 220 | 95.2 | | 78 | 33.7 | |

## CONCLUSION

The study found that community pharmacists are having a positive attitude and some knowledge about safe medication use in pregnant women. Still, there is a wide gap in knowledge levels and practices of CPs towards safe medication use in pregnant women. This gap can be fulfilled by providing focused educational intervention to CPs, based on the lacunas observed in the study.

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## CONFLICT OF INTEREST

None.

## ABBREVIATIONS

**CP:** Community Pharmacist; **FDA:** Food and Drug Administration; **KAP:** Knowledge, Attitude and Practice; **OCP:** Oral Contraceptive Pill; **OTC:** Over the Counter; **SD:** Standard Deviation; **USA:** United States of America; **WHO:** World Health Organization.

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