



Review Article

PRESCRIPTION PATTERN OF DRUGS IN PREGNANCY: A REVIEW

Fatima Tahniyath^{1*}, Fatima Hafeez¹, Hasbeen Sultana¹, Md. Ashfaq Hussain¹, Roya Rozati²

¹Pharm D (PB) intern students of Deccan School of Pharmacy, Hyderabad, Telangana, India

²Professor, Department of Obstetrics and Gynaecology, Deccan College Of Medical Sciences & Owaisi Group of Hospitals, Hyderabad, Telangana, India

*Corresponding Author Email: ftahniyath@gmail.com

Article Received on: 11/05/15 Revised on: 13/06/15 Approved for publication: 18/07/15

DOI: 10.7897/2230-8407.06783

ABSTRACT

Authors carried out a systematic review of peer-reviewed literature published from 2005-2014. We incorporated studies assessing individual-level exposures to medicines prescribed during pregnancy. We selected only those studies conducted in India and published in English. Published drug utilization studies reveal about 22% to 69.8% overall use of prescribed drugs during pregnancy excluding vitamins and minerals. On measuring antenatal drug use, the medications with positive evidence of risk (FDA category D) ranged from 4.8% to 24.25%. Iron, folic acid and vitamin supplements were most commonly prescribed drugs globally depending on the need of the patient and their benefit ratio. Overall drug use estimates are examined, use of drugs by therapeutic categories and by potential for fetal risk is considered while updating this review. Several studies consistently reported the usage of drugs with potential risks during pregnancy. Due to such extensive use, it is essential to develop standards for assessing and reporting antenatal exposures to refine any future research in this field. The prescribing practices of Indian physicians are similar to those in developed countries.

Key words: pregnant women, drug utilization, drugs, teratogenicity, prescription, ante natal.

INTRODUCTION

Drugs play an important role in improving human health and promoting well-being. Therefore judicious use of drugs, adequate knowledge, positive approach and awareness towards the drug use are mandatory prerequisites for good maternal and child health¹.

Pregnant women are generally excluded from clinical trials on ethical grounds. Safety information regarding drug use in pregnancy is gathered through case reports, epidemiological studies and animal studies, all of which have limitations. Results related to effect of drug on pregnant animals cannot always be extrapolated in human population².

Presently drug utilization studies are in an evolving era, to estimate disease prevalence, drug expenditures, appropriateness of prescriptions and adherence to evidence based recommendations³. It becomes essential to assess the drug utilization pattern in pregnancy for scope of improvement in the current prescribing practices⁴. Studies done in India by Collaborative Group on Drug Use in Pregnancy⁵, have confirmed that at present, some drugs are widely used in pregnancy than is justified by the knowledge available.

Self-medication, medical advice from layperson or suggestions by pharmacists related to the treatment of various ailments is prevalent in developing countries. In pregnant woman, such an unsafe practice may lead to detrimental effects on the foetus⁶.

Due to the harmful prospects and the dearth of safety information for many medicines in pregnancy, prescription drug use is addressed with caution in pregnant women by their health care providers. By identifying the medications used repeatedly with unknown potential risks, it may help in organizing priorities for epidemiological research.

In addition to the safety of mother and child, knowledge on the use of drugs during pregnancy is not available in most of the ante-natal clinics hence careful assessment during pregnancy for rational use of drugs is required for which reviews should be considered to prescribe drugs during pregnancy, patient counselling should be done to reduce medication errors and elevate patient safety⁷. The purpose of the review is to evaluate the prescription pattern, use of herbal drugs, self-medication and the knowledge of contraceptives in pregnant women.

Moreover in India, due to easy availability of drugs associated with inadequate health care services, increased proportions of drugs are used as self-medication (for common complains and infective conditions), as compared to the prescribed drugs⁸. Hence, these consumers always face the threat of adverse drug reactions and drug interactions between active hidden ingredients of both herbal and allopathic drugs.

Rational use of drugs should follow rule of RIGHT (right drug, right patient, right dosage, right cost) and SANE criteria (safety, affordability, need, efficacy). The irrational use of drugs is a major problem of present day medical practice and its consequences include the development of resistance to antibiotics, ineffective treatment, adverse effects and an economic burden on the patient and society. The use of medications in pregnancy is common and based on complex risk-benefit discussions between physicians and patients^{9,10}. The use of the pregnancy registry design has allowed for the collection and analysis of data on the effects of drug exposure on human pregnancies that have otherwise been difficult to obtain¹¹.

Two important factors to consider when assessing the teratogenic potential of a medication are the stage of pregnancy at which the exposure occurred and the amount of medication taken¹². The main causes of unfavourable outcomes continue to be infections, haemorrhage, anaemia and pre eclampsia which can be prevented by optimum antenatal care.

An estimated 10% or more of birth defects resulting from maternal drug exposure has led the US Food and Drug Administration to assign risk categories to drugs in pregnancy¹³.

Supplementary drug treatment like iron, folic acid, calcium, vitamins are most frequently prescribed to improve overall nutritional status of mother and foetus. In addition, drugs may also be prescribed for conditions not related to pregnancy such as upper respiratory infections, urinary tract infections and gastrointestinal infections etc¹⁴. However, pregnant women are prescribed drugs to treat pre-existing chronic conditions such as diabetes, hypertension or epilepsy or to treat pregnancy related disorders such as pregnancy induced hypertension and gestational diabetes.

Though 60% of patients in the USA are estimated to consult a healthcare professional when selecting an OTC product¹⁵, this projection may not be applicable to other countries.

The studies conducted in developed countries where drug-prescribing practices are considered to be superior, have identified need for interventional measures aimed at rational prescribing during the prenatal period^{16, 17}.

Inclusion Criteria

The studies published in English and done in India which evaluated Drug Prescription Pattern of Pregnant women visiting ante natal outpatient department of a tertiary care hospital were taken up for review after successfully contacting the authors and obtaining their permission, clarification or additional data. We included only peer-reviewed journal articles published from 2005- 2014. We incorporated studies assessing individual-level exposures to medicines prescribed during pregnancy. We selected only those studies of human subjects, the reference list of other articles which met study inclusion criteria were also considered.

Exclusion Criteria

We excluded studies that did not report outpatient utilization rates of prescription drugs, over-the-counter drugs, illicit drugs, drugs used in hospital; herbal drugs and prescription drugs. We also excluded studies that pursued only a single period of gestation or specific therapeutic categories without providing an estimate of drug use for all prescription drugs.

Study Design

We engrossed detailed information on the methodology of all included studies, including study sample, types and number of pregnancies (i.e. parity or plurality) included, gestational age, drug exposure data source, and the inclusion and classification of prescribed drugs, the mean of different drugs used by pregnant women. Our review is thus not a systematic review of studies of drug use for a particular therapeutic class or any particular FDA risk classification of drugs. Rather, we systematically included all studies that examined specific therapeutic or risk classifications as part of an overall assessment of prescribing drugs during pregnancy in an area (country, region etc.). Thus, our design provides greater context within which rates by trimester, therapeutic class and risk classification can be compared along with drugs used by a pregnant women for a healthy well - being of the mother and the foetus.

RESULTS

Our search strategy identified 25 citations. Full text review of only 14 citations was available out of which only 10 met our inclusion criteria out of which 1 study was excluded as it did not provide any relevant data and the author did not agree to provide any additional data so other studies outside India was taken up just as a reference and not for comparison.

Main findings of the study

In a study from Maharashtra by Rathod AM, Iron, calcium, folic acid and vitamins were most commonly used during pregnancy with an average of 1.93 to 2.89 drugs per pregnant women. Phenobarbitone, progesterone, NSAIDs, antibiotics, anti-emetics, proton pump inhibitors/H2 blockers, isoxsuprine, antacids, paracetamol and antihypertensive drugs (nifedipine, methyldopa) were the other commonly used drugs¹⁸⁻²⁰. This study revealed a careful prescribing for pregnant women under antenatal care. Vitamins, minerals and nutritional supplements were the highest group followed by antibacterial drugs and antacids. However, the habit of prescribing drugs by generic names should be inculcated among the prescribers.

A study from Mumbai by S.R Gawde, concluded that Iron supplementation is strongly recommended for all pregnant women in developing countries. Oral iron intake is the treatment of choice, and almost all women can be treated effectively with oral preparations²¹. All pregnant women attending antenatal OPD were prescribed iron and folic acid as a positive result compared to other studies where the percentages of women prescribed iron & folic acid were – West Africa (33.33%)²², Germany (iron- 54%)²³, Nepal (72.8%)²⁴ and Pakistan study (79.4%)²⁵. Thus Findings of this study showed that all eligible pregnant women were provided with prophylactic iron and folic acid therapy. Additional drugs were prescribed only if required. Pregnant women with medical conditions like hypertension, epilepsy and diabetes were continued with the appropriate drugs considering the risk benefit ratio and no drug of category X was prescribed. Most of the drugs were prescribed in generics and not in brand names.

In an Indian study conducted by Reddy et al.²⁶ reported that iron was prescribed only to 2.8% women in first trimester, 39.3% women in second trimester and 50% women in third trimester whereas folic acid was prescribed to 74.2% , 32.7%, 2% women in first, second and third trimester respectively.

Similarly studies from North India reveals that pregnant women most commonly used iron, calcium and vitamins averaging 1.73 – 2.89 drugs per pregnant woman²⁷. Another study of North India by Sharma et al. reported that folic-acid was taken by less than 50% of women and Ayurveda / homeopathic drugs constituted 6.42, 3.68 and 1.46% of total drugs used during the first, second and third trimester of pregnancy, respectively. A similar trend for use of herbal drugs like cannabis, ginger, raspberry leaf etc. during pregnancy was reported from other countries such as Norway and Australia discussed below^{28, 29}.

Likewise a study from Hyderabad by V.Jayawardhan revealed the same about the most frequently prescribed drugs i.e oral iron, folic acid preparations, antacids, antibacterial and analgesics. No incidence of category X drugs prescription was seen as opposed to category C drugs which were most commonly prescribed. The above study was conducted to create awareness about rational use of drugs. Majority of the drugs prescribed were in accordance with WHO criteria for the same except for prescription by generic names even though the dose and duration of drug usage was clearly mentioned, it should not be left unnoticed.

Another study from Hyderabad by Md. Ilyaz et.al revealed that the commonly prescribed drugs in all trimesters were Iron, Folic acid and Calcium Supplements. The occurrence of high risk medicines being desirably low as no drug of US-FDA risk category (X) was prescribed. The commonly used antibiotic was amoxicillin and its substituents, most of the drugs were written as brand names and not generic which was a limitation for the study as it promotes a specific brand which leads to prescription error during dispensing.

Other studies conducted globally as one in South Western Finland based prospective study which reveals that the most frequently

prescribed drugs were iron and vitamin supplementation followed by analgesics, tocolytic agents, drugs for chronic conditions and common pregnancy symptoms³⁰.

In a retrospective, register-based cohort study in Finland, it was found that 20.4% of women purchased at least one drug classified as potentially harmful during pregnancy and 3.4% purchased at least one drug classified as clearly harmful³¹.

According to the HIMAGE study from France, 4.6% of women were exposed to drugs (mainly NSAIDs), involved in risk during pregnancy³².

In a study from Bratislava and Nitra, it was reported that a vast majority of prescribed drugs during pregnancy, belonged to category-C³³.

In another study from Australia, folate (70%), iron (38%) and multivitamins (27%) were the most frequently taken drugs by pregnant women; along with herbal drugs like, ginger (20%) and rasperry leaf (9%)²⁸.

A study from Norway reported herbal drug use by 36% pregnant women and factors like prior use of herbs, high knowledge about herbal drugs and age between 26 and 35 years, were associated with it³⁴.

In Netherlands, a study on drug prescriptions during pregnancy for chronic, occasional and pregnancy-related complaints showed that during the first trimester of pregnancy, 1.7% of drugs prescribed for chronic conditions and 2.3% of the drugs used occasionally were harmful³⁵.

DISCUSSION

The results of published literature on antenatal prescription drug use confirm that prescription medication used during pregnancy is the norm in many areas. Studies also consistently find that women use medicines with established risks without knowing how harmful it may be for both mother and foetus. There is a considerable variation in medication use and amount of drug usage which causes potential harm in pregnancy. While these findings highlight the importance of research on prenatal drug exposures and related health outcomes, differences in study methods and reports limit conclusions that may be drawn to highlight a need for improving standards for studies of drug exposures during pregnancy.

CONCLUSION

Antenatal care is a key entry point for pregnant women to receive a broad range of health-promotion and preventive health services including nutritional support. It is time to counsel women about the benefits of child spacing. Rural and uneducated women of India are least likely to receive antenatal care. Targeted assessment based on the women's individual situation to ensure normal progress of pregnancy and facilitate the early detection to provide special care for chronic conditions, complications and other potential problems. Our study concludes that despite few positive adherences of FDA-safety drugs for pregnancy, the mother and foetal health might be at risk. Hence, prescribers must be encouraged to adhere to the standard FDA guidelines for drugs that are safe during pregnancy for better antenatal care. Educational programmes on prescribing in pregnancy will be a benefit for both care providers and pregnant women's. The use of prescribed medicines during pregnancy is widespread. Avoidable differences in study methods made reporting results of drug utilization studies difficult to compare. In 1990, Bonati and colleagues concluded that there is a "challenging need" for a research protocol on drug use in pregnancy with standardized outcome

variables³⁶. Twenty years later, the results of a review by Daw et al suggests that a need for such a research protocol still exists.

There is a need to educate and council women of child-bearing age regarding advantages and disadvantages of drug use during pregnancies, with a special reference to use of oral contraceptives, alternative therapies and self-medication. A study from Canada had demonstrated significant improvement in preventive care, continuity of care and indicators of diagnostic performance in doctors after transition from a traditional curriculum to a community-oriented problem-based learning curriculum³⁷.

It was also observed that the prescribing behaviour in most countries or states was almost similar and in accordance with US FDA guidelines and risk categories. Iron, folic acid, vitamin supplements were most commonly prescribed drugs globally depending on the need of the patient and their benefit ratio. The prescribing behaviour of the clinicians opting for brand names and not by generic remains inconclusive. Hence there is a need to establish such consistent exposure to improve current prescribing practices in clinical communities and content of prescription drug use during pregnancy deserves further attention.

However, the magnitude of difference in estimation of overall use and those seen by therapeutic category suggest that there is variation in both the extent and content of prescription drug use during pregnancy globally that deserves further attention. Hence, such periodic studies are further required in diverse environmental, social, educational and cultural conditions, so that the therapeutic guidelines could be revised accordingly, to give rational care to the community.

REFERENCES

1. Mitchell AA et al , Gilboa SM, Werler MM, Kelley KE, Louik C, Hernandez-Diaz S, Study T.B.D.P. Medication used during pregnancy, with particular focus on prescription drugs: 1976-2008. *American Journal of Obstetrics and Gynaecology* .2011; 205(1):51.e1-8.
2. Ward RW et al . Difficulties in the study of adverse fetal and neonatal effects of drug therapy during pregnancy. *International Journal of Pharmacy, Semin Perinatol.* 2001; 25:191-5.
3. Gama H et al. Drug utilization studies. *Arquivos De Medicina.* 2008; 22(2/3):69-74.
4. De Jong LT et al, Van den Berg PB. A study of drug utilization during pregnancy in the light of known risks. *International Journal of Risk Safety Medicines.* 1990; 1:91-105.
5. Yusuff et al, Collaborative Group on Drug Use in Pregnancy (CGDUP). Medication during pregnancy: an intercontinental cooperative study. *International Journal of Gynaecology Obstetrics* 1992; 39:185-96.
6. Henry A et al , Crowther C. Patterns of medication use during and prior to pregnancy: the MAP study. *Australian and New Zealand Journal of Obstetrics and Gynaecology* 2000; 40:165-72.
7. Sivasakthi. R et al . Assessment of pregnancy prescriptions in an ante-natal clinic *Der Pharmacia Lettre,* 2011,3(3):306-310.
8. Sharma R et al , Verma U, Sharma CL, Kapoor B. Self-medication among urban population of Jammu city. *Indian Journal of Pharmacology* 2005;37:37-45.
9. Andrade SE et al, Gurwitz JH, Davis RL, Chan KA, Finkelstein JA, Fortman K, et al. Prescription drug use in pregnancy. *American Journal of Obstetrics and Gynecology* 2004;191(2):398-40.
10. Engeland A et al , Bramness JG, Daltveit AK, Ronning M, Skurtveit S, Furu K. Prescription drug use among fathers and mothers before and during pregnancy. A population-based cohort study of 106,000 pregnancies in Norway 2004-2006. *British Journal of Clinical Pharmacology* 2008;65(5):653-660.
11. Shields KE et al, Wiholm BE, Hostalley LS, Striano LF, Arena SR, Sharrar RG. Monitoring outcomes of pregnancy following

- drug exposure: a company-based pregnancy registry program. *Drug Safety*. 2004; 27(6):353–367.
12. FDA Pregnancy categories, compiled by CARE Northwest Available: <http://depts.washington.edu/druginfo/Formulary/Pregnancy.pdf>
 13. Koren G et al , Pastuszak A, Ito S. Drugs in pregnancy. *New England Journal of Medicine* 1998; 338: 1128–37.
 14. Briggs GG , Greeman RK, Yaffe SJ, editors. *Drugs in pregnancy and lactation: a reference guide to foetal and neonatal risk*, 6th ed. Philadelphia: Lippincott Williams and Wilkins; 2002.
 15. Black RA, Hill DA. Over-the counter medications in pregnancy. *American Family Physician* [serial on the internet] 2003 June 15 [cited 2008 March 21st]; 67(12).
 16. Beyens MN et al , Guy C, Ratrema M, Ollagnier M. *Therapie* 2003, 58:505-511.
 17. Medication during pregnancy: an intercontinental cooperative study. Collaborative Group on Drug Use in Pregnancy (C.G.D.U.P.). *International Journal of Gynaecology and Obstetrics* 1992, 39:185-196 (no authors listed).
 18. Czeizel AE et al, Dudas I. Prevention of the first occurrence of neural-tube defects by periconceptional vitamin supplementation. *New England Journal of Medicines* 1992; 327:1832-5.
 19. Czeizel AE et al, Prevention of congenital abnormalities by periconceptional multivitamin supplementation. *British Medical Journal* 1993;306:1645-8.
 20. Czeizel AE et al, Reduction of urinary tract and cardiovascular defects by periconceptional multivitamin supplementation. *American Journal Medical Genetics* 1996;62:179-83.
 21. Sharma JB et al. A prospective, partially randomized study of pregnancy outcomes and hematologic responses to oral and intramuscular iron treatment in moderately anemic pregnant women. *American Journal of Clinical Nutrition* 2004;79(1):116-22.
 22. Potchoo Y et al, Redah D, Gneni MA, Guissou IP. Prescription drugs among pregnant women in Lome, Togo, West Africa. *European Journal of Clinical Pharmacology*. 2009;65(8):831-8.
 23. Egen-Lappe V et al , Hasford J. (2004) Drug prescription in pregnancy: analysis of a large statutory sickness fund population. *European Journal of Clinical Pharmacology*. 2004;60(9):659-66.
 24. Das B et al, Sarkar C, Datta A, Bohra S. A study of drug use during pregnancy in a teaching hospital in western Nepal. *Pharmacoepidemiological Drug Safety*. 2003;12(3):221–5.
 25. Rohra DK et al , Das N, Azam AI, Solangi NA, Memon Z, Shaikh AM, Khan NH. Drug prescribing patterns during pregnancy in the tertiary care hospitals of Pakistan: a cross sectional study. *BMC Pregnancy Childbirth*. 2008;8:24.
 26. Reddy SB et al , Patil N, Hinchageri SS, Kamala S. Assessing the pattern of drug use among pregnant women and evaluating the impact of counseling on medication adherence among them. *Int Res J Pharm*. 2011;2(8):148-53.
 27. Banhidy F et al , Lowry RB, Czeizel AE. Risk and Benefit of Drug Use During Pregnancy. *International Journal of Medical Sciences* 2005;2:100-6.
 28. Maats FH et al , Crowther CA. Patterns of vitamin, mineral and herbal supplement use prior to and during pregnancy. *Australian New Zealand Journal of Obstetrics and Gynaecology* 2002;42:494-6.
 29. Westfall RE et al , Janssen PA, Lucas P, Capler R. Survey of medicinal cannabis use among childbearing women: Patterns of its use in pregnancy and retroactive self-assessment of its efficacy against 'morning sickness'. *Complement Therapeutic Clinical Practice* 2006;12:27-33.
 30. Heikkila AM et al , Erkkola RU, Nummi SE. Use of medication during pregnancy- A prospective cohort study on use and policy of prescribing. *Ann Chir Gynaecol Supplement* 1994;208:80-3.
 31. Malm H et al, Martikainen J, Klaukka T, Neuvonen PJ. Prescription of hazardous drugs during pregnancy. *Drug Safety* 2004;27:899-908.
 32. Beyens MN, Guy C, Ratrema M, Ollagnier M. Prescription of drugs to pregnant women in France: The HIMAGE study. *Therapie* 2003;58:505-11.
 33. Tisonova J, Magulova L, Goboova M, Wawruch M, Lassanova M, Bozekova L, et al. Consultation activity of two Slovak centres for pharmacotherapy during pregnancy and lactation. *Cas Lek Cesk* 2006;145:154-9.
 34. Nordeng H et al, Havnen GC. Impact of sociodemographic factors, knowledge and attitude on the use of herbal drugs in pregnancy. *Acta Obstetrics Gynecology Scand* 2005;84:26-33.
 35. Refuerzo JS, Blackwell SC, Sokol RJ, LaJeunesse L, Firchau K, Kruger M et al. Use of over-the-counter medications and herbal remedies in pregnancy. *American Journal Perinatology* 2005; 22: 321–4.
 36. Bonati M et al, Bortolus R, Marchetti F, Romero M, Tognoni G. Drug use in pregnancy: an overview of epidemiological (drug utilization) studies. *European Journal of Clinical Pharmacology*. 1990; 38(4):325–8. [PubMed: 2140553]
 37. Tamblyn R, Abrahamowicz M, Dauphinee D, Girard N, Bartlett G, Grand'Maison P, et al. Effect of a community oriented problem based learning curriculum on quality of primary care delivery by graduates: Historical cohort comparison. *British Medicine Journal* 2005;331:1001-5.

Cite this article as:

Fatima Tahniyath, Fatima Hafeez, Hasbeen Sultana, Md. Ashfaq Hussain, Roya Rozati. Prescription pattern of drugs in pregnancy: A review. *Int. Res. J. Pharm.* 2015; 6(7):403-406 <http://dx.doi.org/10.7897/2230-8407.06783>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IRJP is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IRJP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of IRJP editor or editorial board members.