



Drug Prescription Pattern in Pregnant Women Attending Antenatal Out Patient Department of a Tertiary Care Hospital

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Authors' contributions

This work was carried out in collaboration between all authors. Authors SRG, SSB and TCP designed the study, wrote the protocol, wrote the first draft of the manuscript and managed the analyses of the study. Authors ARC, NMM and SBS managed the literature searches and helped in writing the first draft of the manuscript. All authors read and approved the final manuscript.

Research Article

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ABSTRACT

Aims: Pregnant women requiring medication represent a challenge to healthcare providers to avoid any teratogenic risk to fetus. The purpose of this study was to provide information about the drug use among pregnant women in a tertiary care hospital, Mumbai, India.

Study Design: Cross-sectional study.

Place and Duration of Study: Department of Obstetrics and Gynecology and Department of Pharmacology, Seth GSMC & KEM Hospital, between July 2011 and December 2011.

Methodology: A cross sectional study was conducted by reviewing the antenatal care Outpatient department case papers of 760 random pregnant women. Demographic profile, detailed medical history and drug intake in current pregnancy was noted. The prescription pattern was assessed and the drugs were classified based on the US FDA Risk Classification.

Results: Out of 760 women, one third (33.18%) women were anemic. Majority drugs were prescribed for the treatment of upper respiratory tract infection, vaginal discharge,

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fever with chills, nausea and vomiting. The average number of drugs per prescription was 2.27. Only 4% drugs were prescribed by their brand name and 96 % by generic name. Iron, folic acid and calcium were prescribed to all pregnant women. Majority of the patients were prescribed Category A and B drugs. No patient was given Category X drugs.

Conclusion: Findings of our study showed that all pregnant women were provided with prophylactic iron and folic acid therapy. The occurrence of contraindicated medicines was desirably low, thereby minimizing overall risk to developing fetus. Thus prescribing pattern observed in our study sets a good example, as selection of drugs was rational in most of the cases.

Keywords: Observational study; prescribing patterns; pregnant women; drug utilization.

1. INTRODUCTION

Antenatal care is organized medical service including examination and advising a pregnant woman with the objective that every wanted pregnancy culminates in the delivery of a healthy baby without impairing the health of the mother. The maternal mortality in India ranges from 100/1,00,000 in Kerala to 1200 to 1500/ 1,00,000 in the Northern States with an average of 400/1,00,000. About 30% of the babies are of low birth weight and perinatal mortality is in the range of 70-80/1,000. Main causes for such unfavorable outcomes continue to be infections, haemorrhage, anemia and pre-eclampsia which can be prevented by optimum antenatal care [1]. Hence timely treatment of these conditions can reduce the perinatal morbidity and mortality. Pregnant women requiring prescription drugs pose a challenge to physicians to avoid any risk to the mother and to the fetus.

Thalidomide crisis in the 1960's and the teratogenic effects of use of diethylstilboestrol in 1971 led the US Food and Drug Administration [US FDA] to demonstrate safety and efficacy of any drug before it is marketed [2]. However, 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 population [3].

Regardless of the limited information on the safety of drugs in pregnancy, drug use in pregnancy is common [4,5]. Supplementary drug treatment like iron, folic acid, calcium, vitamins are prescribed commonly to improve overall nutritional status of mother and fetus. In addition, drugs may also be prescribed for conditions not related to pregnancy such as upper respiratory infections, urinary tract infections and gastrointestinal infections to name some. Also 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 [6]. Therefore, judicious use of drugs, adequate knowledge, positive approach and awareness towards the drug use are mandatory prerequisites for good maternal and child health [7].

Presently drug utilization studies are in an evolving era. Their scope is to evaluate the present practices in prescribing and future trends of drug usage, to estimate disease prevalence, drug expenditures, appropriateness of prescriptions and adherence to evidence-based recommendations [8]. It becomes essential to assess the drug utilization pattern in

pregnancy to see to what extent there may be scope for improvement in the current prescribing practices [9].

There appears to be considerable international variation in both overall rates of medicinal use and use for drugs with potential risk in pregnancy. The studies conducted in developed countries where drug-prescribing practices are considered to be advanced have reported the use of prescription medicines which have a potential for harm in pregnancy and hence identified the need for interventional measures [10]. Studies done in India by Collaborative Group on Drug Use in Pregnancy [11], have confirmed that at present, some drugs are widely used in pregnancy than is justified by the knowledge available. Another study conducted in Pakistan by Rohra et al., revealed careful prescribing behavior of the physicians to provide optimum care to pregnant women [12]. Hence magnitude of difference in estimates of overall use of drugs in pregnancy and those seen by therapeutic category suggest that there are notable differences in international and within country in both the extent and content of prescription drug use during pregnancy that deserves further attention.

Hence, the present study was planned to evaluate prescription pattern among the pregnant women attending antenatal Out Patient Department (OPD) of our institute.

2. METHODOLOGY

2.1 Study Design

This was a cross-sectional study conducted between June 2011 and December 2011, in antenatal Out Patient Department of gynaecology and obstetrics of Seth G.S. Medical College and KEM Hospital, Mumbai, India.

2.2 Ethics Committee Approval

The Institutional Ethics Committee permission was taken prior to initiation of the study. Written Informed Consent was taken from all the pregnant women before their prescriptions were analyzed.

2.3 Hospital Background

It is a tertiary care hospital which receives referrals from other private clinics, hospitals and general physicians. Most of the women attending this center for antenatal services belong to lower socioeconomic group. Every year, approximately 23,000 pregnant women attend the antenatal OPD which comes to around 70-100 pregnant women per day. There are approximately 13,000 inpatients and 5000 surgeries carried out every year. Annually, over 6000 women deliver in this centre.

2.4 Prescribing Practices

Pregnant women attending the OPD are examined either by professors, lecturers, registrars and house surgeons which are part of the unit and any one of these can give hand-written prescriptions on OPD case paper to the pregnant women. There is no facility to maintain pregnant women's health records electronically. Pregnant women receive the drugs prescribed to them either from hospital pharmacy, free of cost, if available or they need to purchase it from a medical store.

2.5 Patient Enrollment

Pregnant women were enrolled via convenience sampling, only after obtaining written informed consent. Pregnant women in any trimester, attending antenatal outpatient department, ≥ 18 years of age, with or without co morbidities, who presented with the prescription written on the OPD case paper were included in the study. Pregnant women diagnosed with acute and chronic medical conditions requiring hospitalization were excluded from the study. Physicians were asked neither to change their routine-practice behaviors nor to selectively invite pregnant women for participation.

2.6 Patient Data Collection Form

Demographic profiles of pregnant women along with parity, present and past history of associated medical, surgical, gynaecological and obstetrical illness, documented in OPD case paper were recorded on the Case Record Form. The detailed information on the prescription records given in the past and at the time of enrolment were recorded from OPD case papers. From prescription records, number of drugs prescribed per prescription, use of generic/brand names, drug dose, dosage form, frequency, duration of treatment was recorded. Prescriptions obtained were sorted and classified in accordance with US FDA Risk Classification for pregnancy [4]. The data abstraction was done by only one person, who was not involved in prescribing.

2.7 Statistical Analysis

Statistical analysis was done by using descriptive statistics. Data were collected in a predesigned Microsoft® Excel 2007. Continuous variables were presented as mean values \pm standard deviation (SD), and categorical variables were presented as percentages.

3. RESULTS AND DISCUSSION

3.1 Study Period

The study was conducted over a period of 6 months from July 2011 to December 2011.

3.2 Demographic Profile

Out of 839 pregnant women approached for the study, total 760 women agreed to give informed consent for study participation. Demographic information is depicted in Table 1.

Average age of pregnant women was 25.39 ± 4.07 years (Range 18 to 40 years). Age distribution coincides with pregnant women profile seen in literature [13,14]. Majority of pregnant women were housewives and only few (14.9%) were working. This may not affect the source of family funding but may definitely impose socio economic burden on the family. As the study was conducted in urban area, majority of the pregnant women were literate. This was an encouraging finding, as it can make them understand the intricacies of therapy and the benefits gained.

Table 1. Demographic information of pregnant women attending antenatal Outpatient department

Demographic data	Results
Age in years (mean \pm SD)	25.39 \pm 4.07
Literacy status [number (%)]	
a) Illiterate	67 (8.8)
b) Primary education	258 (33.9)
c) Secondary education	332 (43.7)
d) Graduate	94 (12.4)
e) Post graduate	12 (1.6)
Employment [number (%)]	
a) Unemployed	647 (85.1)
b) Employed	113 (14.9)
Gravida [number (%)]	
a) Primigravida	333 (43.8)
b) Secondgravida	257 (33.8)
c) Multigravida	168 (22.1)
Trimesters [number (%)]	
a) First	74 (9.73)
b) Second	212 (27.89)
c) Third	474 (62.37)

Associated medical, surgical, obstetrical and gynecological conditions in these pregnant women are depicted in Table 2.

Table 2. Associated medical, surgical, obstetrical and gynecological history of pregnant women

Associated medical/surgical/obstetrical/gynecological condition	Number of patients
Anemia	257
Preeclampsia	14
Gestational Diabetes	10
Congenital Heart Disease	7
Recurrent pregnancy loss	7
Hypothyroidism	6
Epilepsy	5
Ovarian Cyst	3
Thalassemia	3
HIV	3
Asthma	2

Out of 760 women one third women (33.18%) were anemic. Anemia was classified according to the WHO classification - severe anemia (<7 g/dl), moderate anemia (7-8.9 g/dl) and mild anemia (9-10.9 g/d) [15]. Hemoglobin level more than 11 g/dl was classified as non-anemic. Average Hemoglobin value per woman was found to be 10.57 \pm 1.08 g/dl. Percentages of women having mild anemia in 1st, 2nd and 3rd trimester were found to be 81%, 83% and 82% respectively, percentages of women having moderate anemia in 1st, 2nd and 3rd trimester were found to be 16%, 12% and 16% respectively, percentages of women

having severe anemia in 1st and 2nd trimester were only 2%. Very few antenatal registered women (0.005%) had severe anemia in their third trimester (Fig.1).

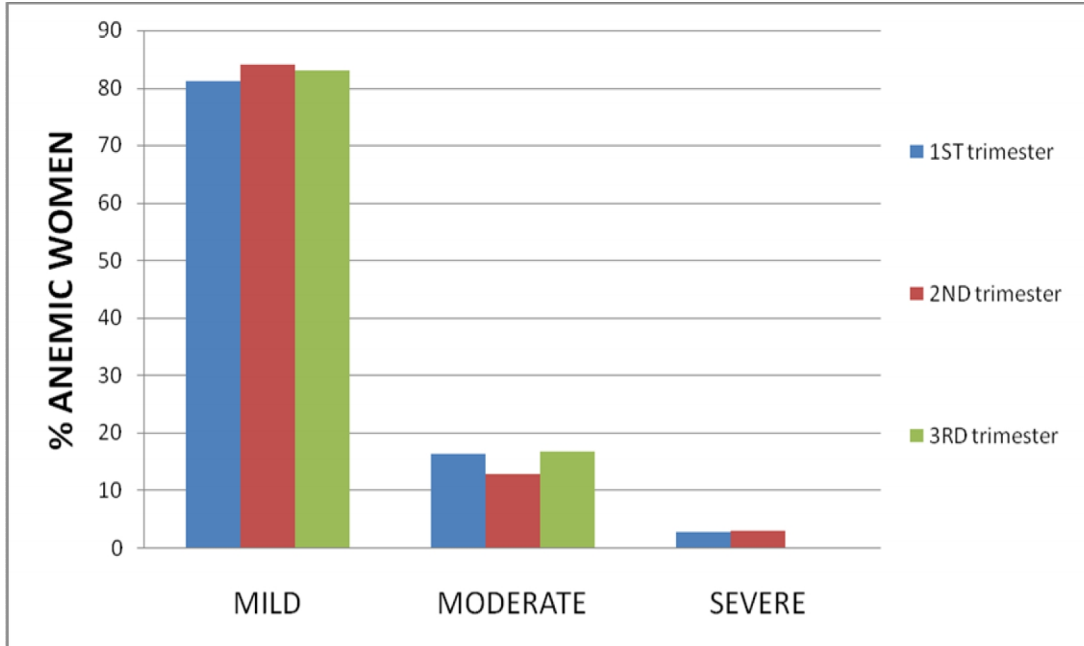


Fig. 1. Distribution of women having mild, moderate and severe anemia in 1st, 2nd and 3rd trimester according to WHO classification (Data expressed in percentages)

Out of 760 pregnant women, 10 women presented with history of vomiting, 9 women were diagnosed with upper respiratory tract infection, 8 women had history of vaginal discharge, 3 gave history of fever with chills, 2 had loose motions, 1 had constipation and 1 had abdominal pain. Except these symptoms some of them (n=18) gave past history of fever with chills during current pregnancy for which appropriate treatment was given.

The pattern of medical conditions obtained in our study varied from those reported in Nepal study [16] and North India study [14], where problem oriented drug use was mainly for nausea and vomiting, dyspepsia, and vaginal spotting/ bleeding. In our study, problem oriented drug use was mainly for upper respiratory tract infections (URTI), fever with chills, vaginal discharge and nausea and vomiting. However, high incidence of URTI and fever may be because the study was conducted in the monsoon (between June and September), when the incidence of URTI and malaria is high in our region.

3.3 Prescription Details

The average number of drugs was found to be 2.27 ± 0.66 [range 2 – 7]. The maximum number of drugs prescribed was 7 in 2 pregnant women. This is because one of them had severe asthma and the other had congenital heart disease.

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 preparations [17]. All pregnant women attending antenatal OPD were prescribed iron and folic acid in antenatal clinic which is a positive result as compared to other studies where the percentages of women prescribed iron & folic acid were - West Africa (33.33%) [18], Germany (iron- 54%) [19], Nepal (72.8%) [16] and Pakistan study (79.4%) [12]. In an Indian study conducted by Reddy et al. [13] 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% women in first trimester, 32.7% women in second and 2% women in third trimester. A study done in North India, by Sharma et al. reported that folic-acid was taken by less than 50% of women (130, 160 and 120 women in the first, second and third trimester, respectively) [14].

Women in first trimester were commonly prescribed anti-emetics for morning sickness, antacids for acidity, paracetamol for fever, thyroxine for hypothyroidism. In the second trimester protein supplements, antimicrobials for treatment of infections, methyl dopa for pregnancy induced hypertension and in the third trimester protein supplements, antimicrobials, betamethasone, proton pump inhibitors/H2 blockers were prescribed.

The distribution of medicines prescribed to these pregnant women is given in Table 3 along with their US FDA classification.

Table 3. Prescribed drugs and their US FDA classification

Drug class	Number of prescriptions	FDA risk
Alimentary Tract drugs		
Ranitidine	32	B
Doxylamine Succinate	23	A
Pantoprazole	9	B
Ondansetron	8	B
Gelusil	5	A
Dicyclomine	3	B
Lactulose	3	B
Rabeprazole	3	B
Cardiovascular Agent		
Methyldopa	13	B
Aspirin	6	C
Atenolol	5	D
Furosemide	4	C
Digoxin	2	C
Nicardipine	1	C
Hormones		
Insulin	8	C
Thyroxine	6	A
Betamethasone	6	C
Prednisone	1	C
Antimicrobials		
Metronidazole	16	B
Clotrimazole	11	B
Amoxicillin	11	B
Cefixime	10	B
Azithromycin	10	B
Erythromycin	9	B

Table 3 continued.....

Benzathine Penicillin	6	B
Clindamycin	5	B
Rifampicin	1	C
Isoniazid	1	C
Antimalarials		
Chloroquine	8	C
Artesunate	5	NA
Nervous System		
Paracetamol	18	B
Phenytoin sodium	2	D
Valproate sodium	1	D
Respiratory system		
Ambroxol	9	B
Dexchlorpheniramine	6	B
Levocetirizine	5	B
Dextromethorphan	2	C
Salbutamol	2	C
Phenylephrine	1	C
Formoterol	1	C
Budesonide	1	B
Deriphyllin	1	C
Blood and Blood Forming Agent		
Ferrous sulfate	760	N/A
Folic Acid	760	A
Calcium Lactate	676	A
MVBC	16	A

NA- Not applicable, MVBC- Multivitamin B complex

Chloroquine (n=8) was the most frequently prescribed antimalarial drug. For treatment of chloroquine resistant malaria 5 pregnant women were prescribed artesunate. Eight different types of antibiotics were encountered in the study. Penicillin group of drugs (n=17) were the most frequently used antibiotic for treating upper respiratory tract infection. Other antibacterial agents prescribed included macrolides e.g azithromycin, erythromycin (n=19), cefixime (n=10), metronidazole (n=16), antitubercular drugs (n=1). Anti fungal drugs like clotrimazole (n=11) and terbinafine (n=1), were prescribed in topical application. Most commonly prescribed antisecretory agent was ranitidine (n=32), followed by pantoprazole (n=8). Antiemetics like doxylamine succinate (n=23) and ondansetron (n=8), were prescribed most commonly in 1st trimester.

Gestational diabetes mellitus was treated by insulin. Methyl dopa was prescribed to treat pregnancy induced hypertension. For treatment of cough and cold, women were prescribed ambroxol cough syrup; to relieve congestion dexchlorpheniramine was given in 4 women. Phenylephrine was also prescribed to 1 woman. Out of two asthma patients one was prescribed inhalational formoterol and the other was prescribed budesonide. Out of 2 pregnant women with history of epilepsy, one was continued on valproate sodium and the other on phenytoin sodium.

Different drug utilization studies used different classification systems to assess risk of fetal harm by drug use in pregnancy. Studies using different systems are difficult to compare: as of 2000, only 26% of the drugs common to all three major systems (US FDA, Swedish, and

Australian) were placed in the same risk factor category [20]. However many drug utilization studies done in various countries including India have used US FDA classification system as a tool to evaluate the prescribing pattern of the physicians in pregnancy [14,21,22], hence we decided to analyze the drugs based on the US FDA classification system.

Out of 760 prescriptions, only 292 prescriptions had drugs other than iron, folic acid and calcium lactate. Of 292 prescriptions, 50 prescriptions had drugs belonging to category A (17.1%), 189 (64.7%) prescriptions had category B drugs, 45 (15.4%) prescriptions had category C drugs and 8 (2.7%) prescriptions had drugs belonging to category D (Fig. 2). Majority of the drugs (apart from iron, folic acid and calcium supplements) used during pregnancy were from category B, followed by category A and category C.

Only 8 women were given category D drugs, which is certainly less as compared to the findings of the other studies. No woman was prescribed category X drug. There are reports of use of potentially harmful drugs in other studies including developed countries. A study conducted in US has reported that 4.8% of pregnant women filled one or more prescriptions for a drug rated by the US FDA as having positive evidence of risk in pregnancy (category D) and that 4.6% filled a prescription for one or more drug rated by the US FDA as contraindicated in pregnancy (category X) [21]. A study conducted in Italy found that 2% of pregnant women filled one or more prescription for a category D drug and 1% filled one or more prescription for a category X drug [22]. Study done in Scotland found that Category D drugs were dispensed to 4.2% pregnant women [23]. In a study conducted in France, it was found that 4.6% of women were exposed to drugs (mainly NSAIDs), involved in risk during pregnancy [24].

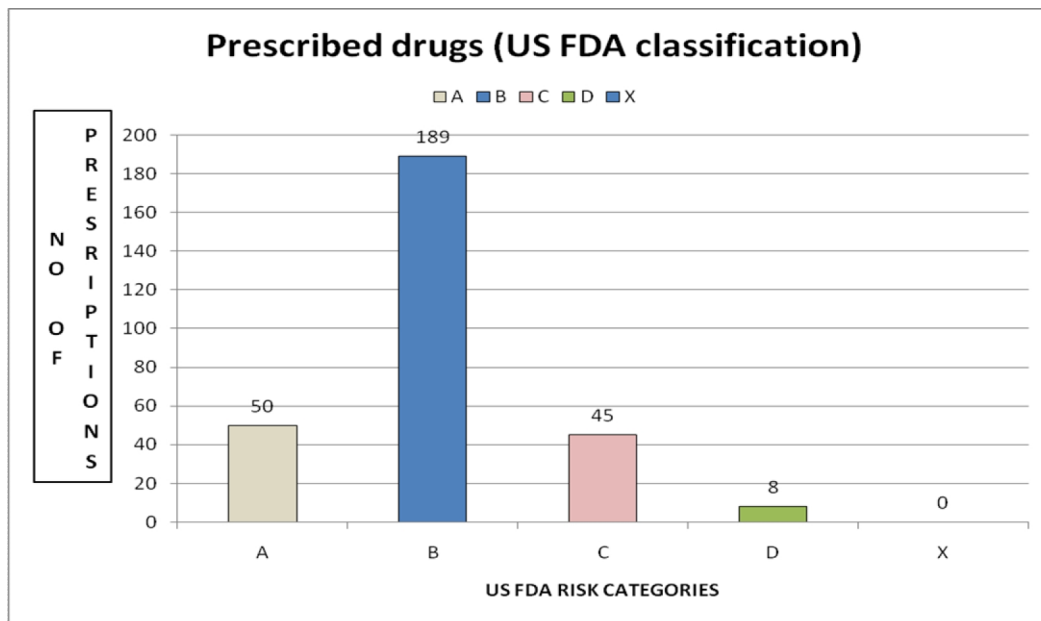


Fig. 2. Number of prescribed drugs according to US FDA classification

In India, a study done by Sharma et al., category C and X drugs constituted 2.9% and 5.7% of drugs used during the third trimester and first trimester, respectively [14]. Recent prescription analysis study conducted in Pakistan revealed that less than one percent of the pregnant women were prescribed teratogenic drugs [12]. Another study conducted in Gulbarga, India, did not find use of contraindicated medicine during pregnancy [13]. Only 5.93% drugs were prescribed by their brand name and the remaining 94.07% were in generic name which is an encouraging finding as it does not promote specific brand and avoids confusion and prescribing errors at the level of pharmacist, involved in dispensing.

4. CONCLUSION

Findings of our study showed that all eligible pregnant women were provided with prophylactic iron and folic acid therapy. Additional drugs were prescribed only if required. The occurrence of contraindicated medicines was desirably low. No woman was prescribed Category X drug. Pregnant women with diseases like hypertension, epilepsy and diabetes were continued with the appropriate drugs considering the risk benefit ratio. Most of the drugs were prescribed in generics and not in brand names. Thus, prescribing pattern observed in our study sets a fine example of prescribing behavior.

Anemia was common among all pregnant women and therefore it raises the concern about high morbidity and mortality associated with pregnancy outcome. This can be minimized by educating pregnant women about importance of balanced diet and utilization of antenatal facilities right from first trimester of pregnancy.

As the study was cross-sectional, we were unable to obtain data on pregnancy outcome. Data represents the prescribing pattern in a tertiary care hospital located in urban area which cannot reflect healthcare facilities available to all health centers particularly in the rural areas. Hence, further studies are required in different regions of India with diverse cultural and socioeconomic background so as to provide optimum healthcare to improve the overall health of the mother and baby in community.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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