

## Drug Utilization Pattern during Pregnancy in a Government Maternity Hospital – A Prospective Study

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**Abstract:** There are limited studies involving general medication use in pregnancy from the developing countries and most studies reviewed were from developed countries. Descriptive drug utilization research is intended to profile the population's use of medicines in order to identify areas deserving of further study or where interventions to address the irrational use of medicines may be appropriate. The importance of conducting descriptive drug utilization studies in high-risk populations such as pregnant women, children, and the elderly is widely recognized. Careful consideration of the benefit to the mother and the risk to the fetus is required while prescribing drugs during pregnancy. In the present study 1000 pregnant women attending antenatal outpatient department of Modern Government Maternity Hospital, Petlaburg, Hyderabad were interviewed by questionnaire method to determine the drug utilization pattern during pregnancy. Iron, calcium, B complex and folic acid were the most frequently prescribed drugs. It was observed that majority of the prescribed drugs were from category A, the safest category during pregnancy, followed by category C. Antiepileptic drugs-Phenytoin And Efavirenz were the only drugs of category D. Co-morbid conditions like PIH, hypothyroidism, gestational diabetes mellitus, T.B, HIV were properly attended.

**Keywords:** Pregnancy, Drug utilization, Iron, Folic acid, B complex

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### I. Introduction

Drug utilization research was defined by WHO in 1977 as “the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences”. The principal aim of drug utilization research is to facilitate rational use of drugs in population, thereby improving the health outcome.[1]

The drug utilization pattern in pregnancy presents a special concern because it is associated with physiological changes in the pharmacokinetic and pharmacodynamic actions of the drugs and also it poses a great risk to the maternal and fetal life.

Inamdar et.al.,2012 stated that pregnancy is a special physiological condition where drug treatment presents a special concern. The rationale for use of drugs during pregnancy requires a careful assessment as in addition to the mother, the health and life of her unborn child also.[2]

Most of the pregnant women need permanent drug treatment due to their chronic diseases such as epilepsy, diabetes mellitus, bronchial asthma, hypertension, thyroid disorders, migraine, and severe depression (PunamSachdeva et.al.,2009).[3]

Drug utilization studies have been an increasing importance in pharmacoepidemiology by means of bridging more closely to other areas like public health, pharmacovigilance, pharmacoconomics, eco pharmacovigilance and pharmacogenetics.

Medication use by women of childbearing age is common. During pregnancy, medications should be used cautiously because some are teratogenic and/or fetotoxic, especially during the first trimester. Few studies have assessed exposure to contraindicated medications in developing countries.

The easy availability of a wide range of medicines and in the case of developing countries, the inadequate health services result in increased proportions of medicines used for self-medication compared to prescribed medicines (Shankar et al.,2002).[4]

With the ease of access to over-the-counter (OTC) medications and alternative therapies, there has been an increase in the use of non-prescribed medications and herbal remedies in pregnancy.

At present it is recommended that drugs should be avoided as much as possible during pregnancy.

The question of prescription quality and drug use by practitioners and women has not been adequately clarified or regularly reported. In addition, the pattern of drug prescribing in pregnancy may change rapidly as a consequence of changes which occur in the pharmaceutical market. Patients vary substantially in regard to their

knowledge about safe medication use during pregnancy. Although many authorities have argued for restraint in medication prescribing during pregnancy, drug usage still continues.

In the developing world; poor health seeking behavior of patients, delayed initiation of antenatal care (ANC), low level of educational status of mothers, lack of up to date information of health care providers, poor access to health facilities, and lose control over prescription and non-prescription drugs could aggravate irrational use of drugs during pregnancy (**Gebremichael Lemlem et al., 2014**).[5]

Thus, medications use by pregnant women should be viewed as a public health issue due to numerous gaps in knowledge about deleterious consequences of medications on the fetus (**Beyens et al., 2003**).[6]

Pharmacoepidemiological studies can help in minimizing the inherent risk of drug use in pregnancy, by establishing a profile of drug consumption, by evaluating the existing health services and by investigating the interventional measures.

This study underscores on the need to understand drug utilization patterns for pregnant women and investigate safety of drugs taken by the target population through the identification of the type of drugs prescribed and the pattern of drug prescription to pregnant females in Govt. Maternity hospital, Petlaburg, Hyd, India.

### **1.1 Aims and objectives**

- To enumerate the total number of pregnant women attending antenatal O.P.D during the study period, the time since their 1<sup>st</sup> antenatal check- up and the number of visits.
- To evaluate total drugs and their frequency of use in each trimester.
- To evaluate the category (Category A to X) to which the drug belong.
- To evaluate the percentage of pregnant women who are taking self medications or usage of Herbal and Homeopathic medications along with the prescribed medicines.
- To evaluate any adverse effects of the all drugs used in pregnancy in those pregnant ladies.

## **II. Patients And Methods**

This is an open label Pharmacoepidemiological data collection study to assess the drug prescribing pattern in outpatient department of Modern govt. maternity hospital, A tertiary care hospital at Petlaburg, Hyderabad, Telangana, India to determine the drug utilization pattern during pregnancy.

The study is designed and conducted in accordance with Good Clinical Practice guidelines. The study started after getting written approval from Osmania Medical College Institutional Ethics Committee. The present study was conducted in outpatient department of Modern govt. maternity hospital which is a tertiary care hospital to determine the drugs prescribing pattern in pregnant patients.

**2.1 Study design:** open label pharmacoepidemiological, data collection study.

**2.2 Sample size:** 1000 subjects.

**2.3 Study period:** 1 year (2015-2016)

**2.4 Selection criteria:**

**Inclusion Criteria:**

- Pregnant ladies of age >18 years
- Pregnant ladies who gave informed consent
- Pregnant ladies with comorbid conditions like Gestational Diabetes, Mild Pregnancy Induced Hypertension, Infections (HIV, T.B, Hepatitis B, Fungal infections, Other infections), Mild Heart Diseases, Hypothyroidism, Epilepsy, Oligohydramnios, etc.

**Exclusion Criteria**

- Non Pregnant ladies.
- Pregnant ladies who are in active labour.
- Pregnant ladies with severe Eclampsia, Heart diseases and any emergency conditions.

**2.5 Methodology**

The present study was conducted as an open label pharmacoepidemiological, data collection study in 1000 pregnant ladies attending antenatal outpatient department of Modern Govt. Maternity Hospital, Petlaburg, Hyderabad. The study was initiated after obtaining approval from the Osmania Medical College Institutional Ethics Committee. Written informed consent was obtained from the pregnant women attending antenatal OPD of Modern Govt. Maternity Hospital, Petlaburg and the reason for questionnaire was explained in their respective languages. Informed consent were prepared in 4 languages, English, Hindi, Telugu, Urdu and the consent was taken in the participants own language.

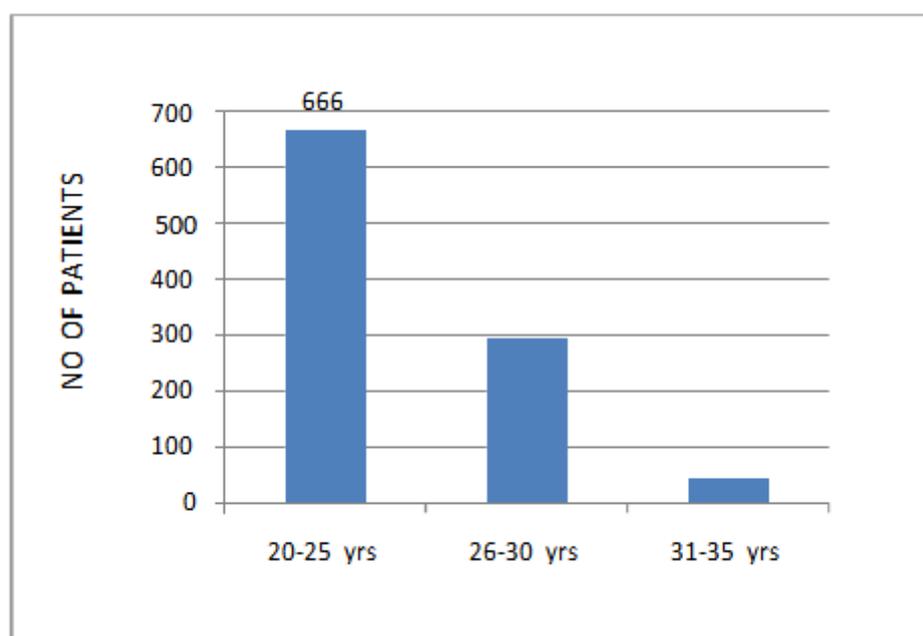
## 2.6 Study Procedure

A total of 1000 cases was studied in outpatient with in a period of one year. All prescribing pattern of drugs was reviewed and details are collected in obstetrics outpatient department of Modern Maternity Govt. Hospital. A structured Questionnaire was designed based on previously done studies and contextualized to fit for the setting. It included basic demographic details, chief complaints of the patient, Hospital OP number, gestational age, Parity, duration of pregnancy, duration of symptoms, number of drugs written in each order sheet, prescriptions and, supplements, relevant medical history, co-morbidities and common ailment ,marital history, menstrual history, gestational history like trimester wise history, number of antenatal checkups, personal history, investigation history, history of self or herbal medication, drug history like name, , dose, route, frequency, duration of treatment, availability from hospital pharmacy, category of drugs according to FDA. A face-to-face interview was conducted along with simultaneous review of medical charts. All the information about prescriptions, was collected from pregnant woman via interview and additional information like investigations viz, TSH, T3 AND T4 levels, blood sugar levels, immunoassays for HIV and Hbs A getcwas extracted from women’s medical charts. The questionnaire was pre- tested to assess the clarity, sensitivity, reaction, interview time to the study instrument and logistic materials.

## III. Observations And Results

**Table 1:** Age wise distribution of pregnant women

Age in years	Number(n)	%
20-25	666	66.6
26-30	292	29.2
31-35	42	4.2



**Figure 1:** Age wise distribution of pregnant women

**Table 2:** Trimester wise distribution of pregnant women.

Trimester	No. of pregnant women	%
First	0	0
Second	279	27.9
Third	721	72.1

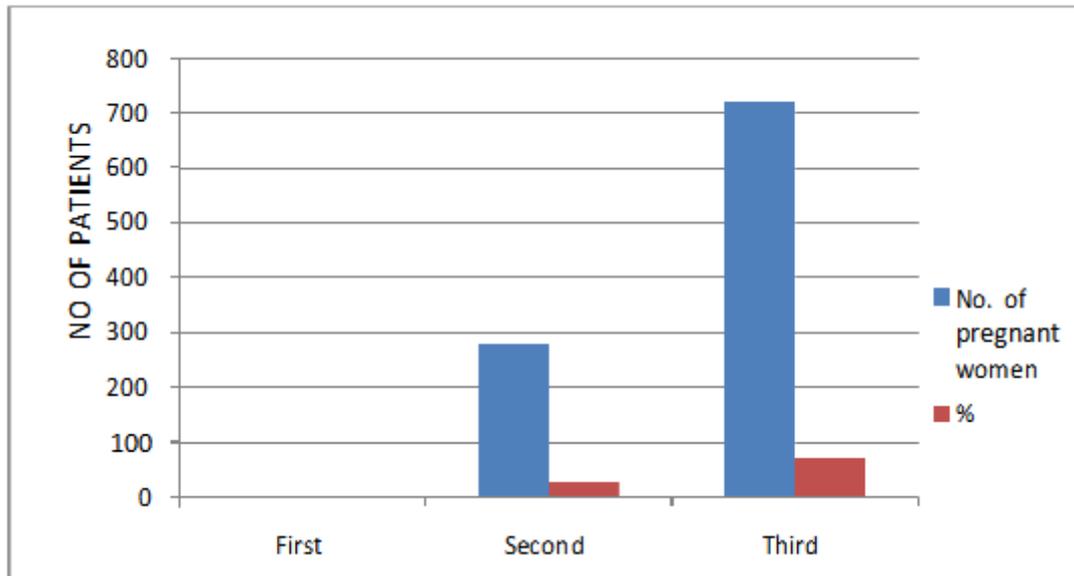


Figure 2: Trimester wise distribution of pregnant women

Table 3: Gravidity wise distribution of pregnant women

Gravida	Number	%
Primi	341	34.1
Gravida 2	390	39.0
Gravida 3	258	25.8
Gravida >4	11	1.1

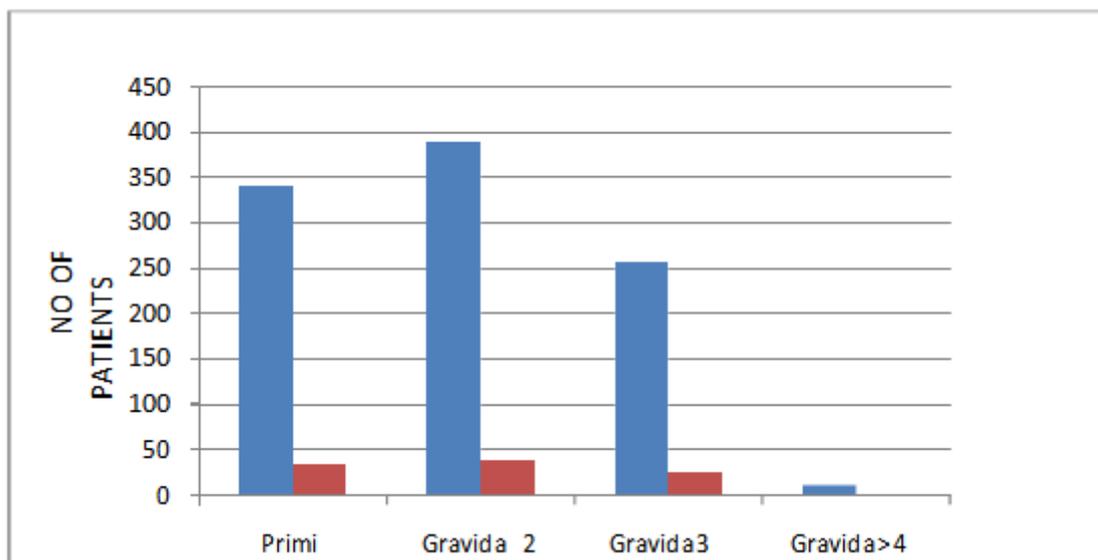


Figure 3: Gravidity wise distribution of pregnant women

Table 4: Number of antenatal visits of pregnant women.

No. of antenatal visits	Number	%
<3	311	31.1
3-5	487	48.7
>5	202	20.2

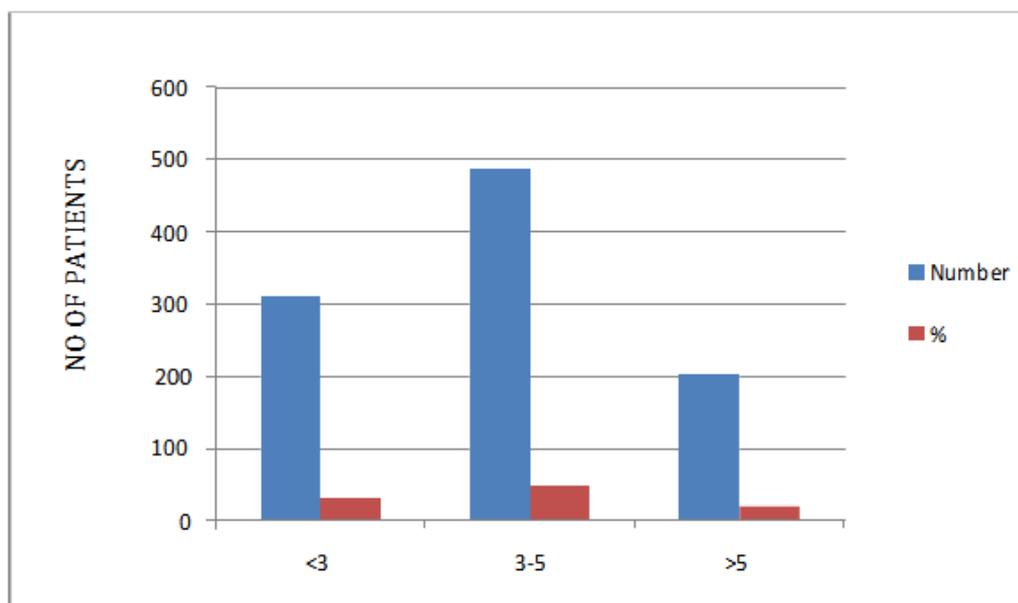


Figure 4: Number of antenatal visits of pregnant women

Table 5: Time of first antenatal checkup.

Trimester	No. of pregnant women	%
First	0	0
Second	892	89.2
third	108	10.8

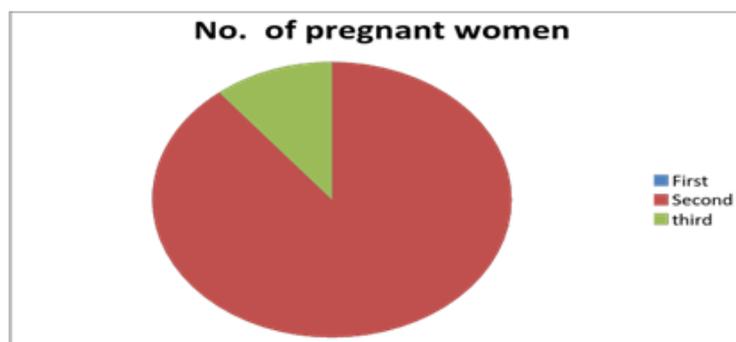


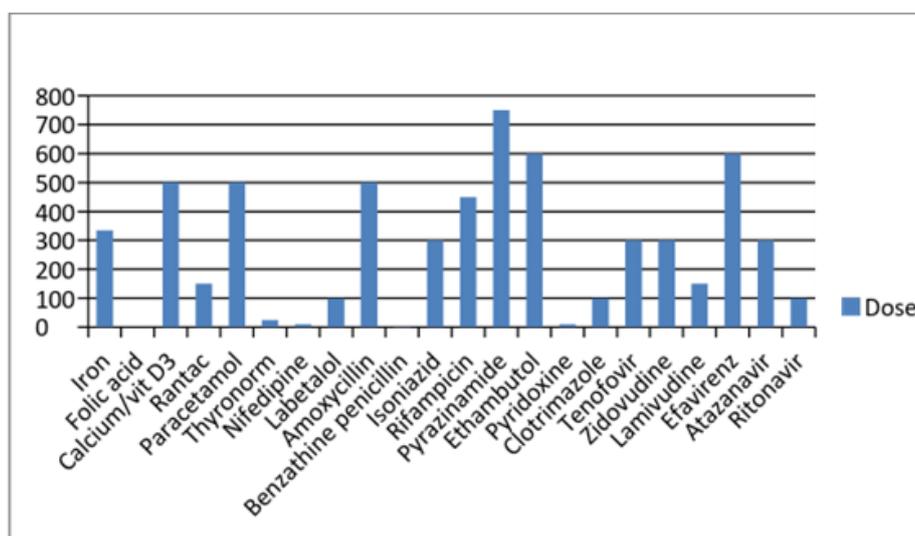
Figure 5: Time of first antenatal checkup.

Table 6: Pattern of drugs used during pregnancy.

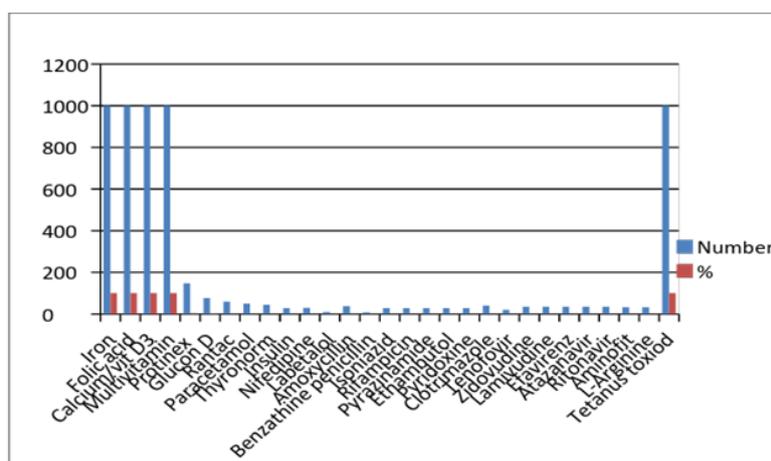
Drug	DosageForm	Dose	Route	Frequency	Number	%
Iron	Tablet	335mg	oral	O.D	1000	100
Folic acid	Tablet	0.5mg	oral	O.D	1000	100
Calcium/vit D3	Tablet	500mg/250i.u vit D3	oral	O.D	1000	100
B complex	Tablet	B1,B2-5mg, B6-2mg,B7-50mg	oral	O.D	1000	100
Protinex	Powder	1teaspoonwith milk	oral	O.D	148	2.26
Glucon D	Powder	2 teaspoon	oral	O.D	76	1.16
Rantac	Tablet	150mg	oral	B.D	59	0.9
Paracetamol	Tablet	500mg	oral	B.D	50	0.76
Thyronorm	Tablet	12.5mcg,25 mcg,50mcg,75m cg	oral	O.D before breakfast	12.5mcg-0.06 25mcg-0.25mcg- 2950mcg-65mcg- 5	0.4450mcg-0.76 75mcg-0.76
Insulin	Injection	humanmixtard insulin	s.c	B.D/T.I.Dbefore meals	29	0.44
Nifedipine	Tablet	10mg	oral	B.D	30	0.45
Labetalol	Tablet	100mg	oral	B.D	9	0.13
Amoxycillin	Capsule	500mg	oral	T.I.D	38	0.58

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Benzathinepenicillin	injection	1.2 million i.u	i.m		8	0.12
Isoniazid	Tablet	300	oral	O.D thrice a week for 9 months	29	0.44
Rifampicin	Tablet	450	oral	O.D thrice a week for 9 months	29	0.44
Pyrazinamide	Tablet	750	oral	O.D thrice a week for 9 months	29	0.44
Ethambutol	Tablet	600	oral	O.D thrice a week for 9 months	29	0.44
Pyridoxine	Tablet	10	oral	O.D thrice a week for 9 months	29	0.44
Clotrimazole	Tablet	100	vaginal	O.D	41	0.62
Tenofovir	Tablet	300	oral	Q.I.D	20	0.30
Zidovudine	Tablet	300	oral	O.D	35	0.53
Lamivudine	Tablet	150	oral	O.D	35	0.53
Efavirenz	Tablet	600	oral	O.D	35	0.53
Atazanavir	Tablet	300	oral	O.D	35	0.53
Ritonavir	Tablet	100	oral	O.D	35	0.53
Aminofit	Capsules		oral	O.D	33	0.50
L-Arginine	Granules		oral	O.D	33	0.50
Tetanus toxoid	Injection	0.5ml	i.m	2 doses, in 5th and 7th month	1000	100
				Total	6534	



**Figure 6:** Doses of prescribed drugs.



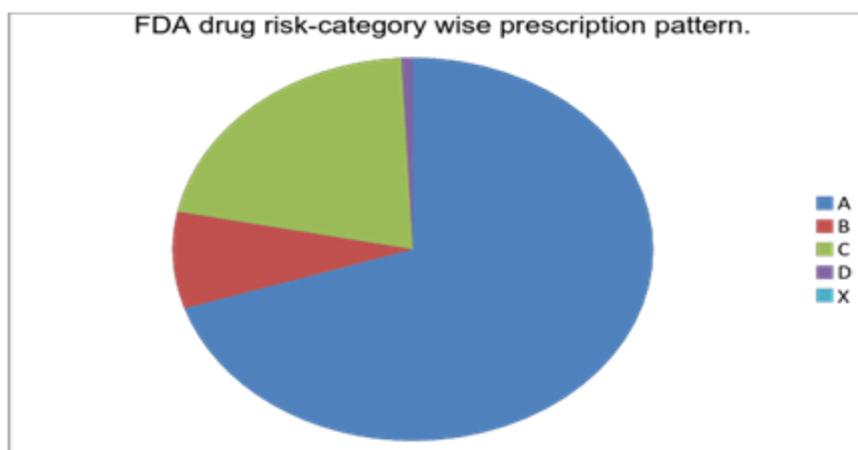
**Figure 7:** Pattern of drugs used during pregnancy.

**Table 7:** WHO core drug prescribing indicators.

Indicator	Value (%)
Average number of drugs per prescription	4.75
Percentage of drugs prescribed by generic name	65.62
Percentage of encounters with antibiotic prescribed	6.25
Percentage of encounters with injection prescribed	9.37
Percentage of drugs prescribed from essential drug list	71.87

**Table 8:** Prescription pattern according to FDA drug risk- category wise.

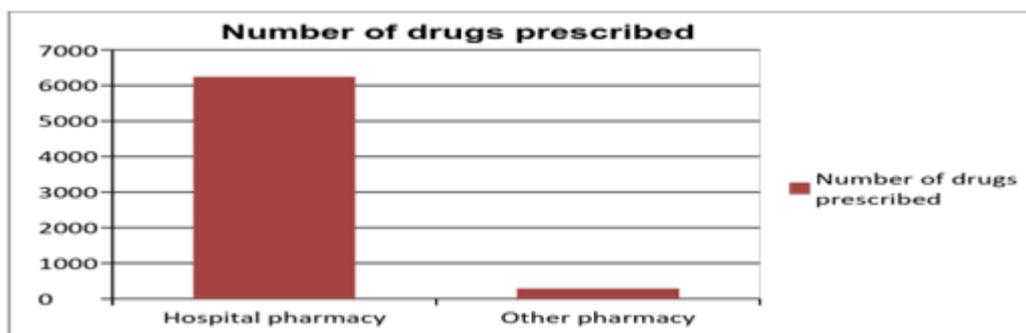
Category of drugs	Number	%
A	4297	65.76
B	896	13.71
C	1294	19.8
D	47	0.79
X	0	0



**Figure 8:** Prescription pattern according to FDA drug risk- category wise

**Table 9:** Pattern of drug prescribed from pharmacy.

A	Number of drugs prescribed	%
Hospital pharmacy	6244	95.56
Other pharmacy	290	4.43



**Figure 9:** Pattern of drug prescribed from pharmacy.

**Table 10:** Adverse effects of prescribed drugs.

Drug	Adverse effect	Number	%
Iron(ferroussulfate)	nausea, vomiting, heartburn, constipation	214	21.4
Antitubercular (HRZE)	nausea, vomiting, diarrhoea, anorexia, joint pain, and fatigue	18	62
Clotrimazole	Vaginal burning and itching	12	29.2
Nefedipine	Headache and flushing	8	26.6
	TOTAL	271	

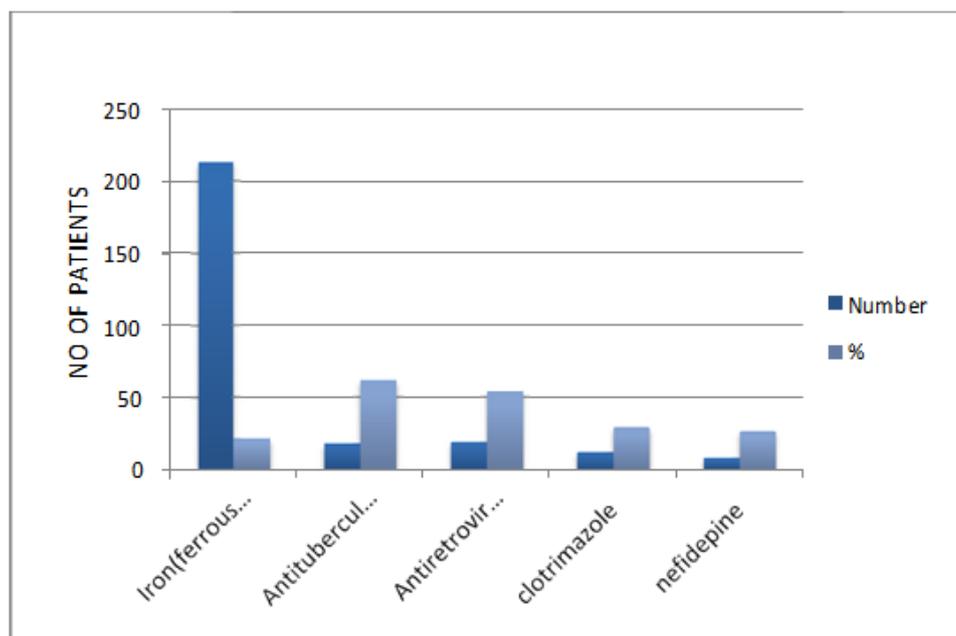


Figure 10: Adverse effects of prescribed drugs

#### IV. Discussion

In this study out of 1000 pregnant women, about 666 (66.6%) were in between 20-25 yrs of age, 292 (29.2%) were in between 26-30 yrs, and 42 (4.2%) were in between 31-35 yrs of age. Age profile of pregnant women differs from country to country. In Indian studies majority of the pregnant women were in between 20-25 yrs whereas in western studies majority of the pregnant women were in between 25-35 yrs of age.

In this study maximum pregnant women were in 20-25 yrs range 666 (66.6%) which is similar to the studies of **Priya et al., 2015 [7]** in Kadapa (49.28 %).

In this study there were no women above 35 years of age when compared to the study by **Krishna et al., 2015** in Haryana 20.3% (41) women among 202 were more than 35 years of age.[8].

In our study among 1000 pregnant women, none of the women registered for the antenatal checkup during the first trimester. 279 (27.9%) were in second trimester, and 721(72.9%) were in third trimester during their first visit for antenatal checkups which is similar to the study done by **Varghese et al., 2016[9]** in Bangalore in which majority of women were in third trimester 214 (85.6%) followed by second trimester 19 (7.6%) and first trimester 17(6.8%).

In our study among 1000 pregnant women, 341(34.1%) were primigravida, 390 (39%) were gravida 2, 258 (25.8%) were gravida 3 and 11 (11%) were more than 4 gravida which can be compared by the study of **Sasidharan et al., 2016[10]** in Pondicherry in which 43(59.72%) were primigravida, 20 (27.78%) were the second gravida, 8 (11.11%) were the third gravida, and a least 1 (1.39%) was the fourth gravida.

In our study among 1000 pregnant women 311 (31.1%) had less than 3 antenatal checkups, 487 (48.7%) pregnant women had 3-5 antenatal checkups and 202 pregnant women (20.2%) had more than 5 antenatal checkups which can be compared to the study done by **Krishna et al., 2015[8]** in Haryana in which less than three, three to five and more than five antenatal visits were attended by 25.2% (51), 33.7% (68) and 41.1% (83) women, respectively. In Haryana maximum women had more than five antenatal visits when compared to our study in which maximum women had 3-5 antenatal checkups which is similar to the study done by **Inamdar et al., 2012[11]** in Nanded in which less than three, three to five and more than five antenatal visits were attended by 25% (125), 61% (305) and 14% (70) women, respectively.

In our study among 1000 pregnant women 892 pregnant women (89.2%) had their first antenatal checkup during their second trimester and 108(10.8) pregnant women registered their first antenatal checkup during their third trimester. None of the women had come for their antenatal checkups during their first trimester which is similar to the study done by **Varghese et al., 2016[9]** in Bangalore in which the timing of the first prenatal visit showed that most of the women attended clinics during 12–25 weeks.

In our study the total numbers of drugs prescribed were 6,534. The most frequently prescribed drugs were iron, folic acid, calcium, B.complex tablets and T.T injection which were prescribed to all patients attending antenatal O.P.D. Iron tablets were prescribed as 335mg of elemental iron to all pregnant women once a day for 1 month until the next antenatal visit. It was dispensed by hospital pharmacy free of cost. Folic acid tablets were prescribed as 0.5mg tablet once a day for 1 month to all pregnant women until the next antenatal

visit. Calcium was also prescribed to all pregnant women as 500mg of calcium carbonate along with 250 i.u of vit D3 once a day for 1 month until the next antenatal visit. B complex capsules were also prescribed to all pregnant women attending antenatal O.P.D once a day for 1 month until the next antenatal visit. Injection T.T was also prescribed to all pregnant women as 0.5ml of i.m injection, 2 doses once in 5<sup>th</sup> month and once in 7<sup>th</sup> month with a gap of 4 weeks. Those who registered for the first time during their 3<sup>rd</sup> trimester or before labour, they were prescribed at that time. Protein supplement was prescribed to 148 (1.67%) of pregnant women who appeared malnourished. They were advised to consume 1 teaspoon along with milk once a day. Glucon D powder was prescribed to 76 (0.85%) of pregnant women. They were advised to consume 2 teaspoon with water once a day. Rantac was prescribed to 59 (0.60%) pregnant women as 150mg tablet twice a day who complained of heart burn. Paracetamol tablet was prescribed to 50 (0.56%) of pregnant women as 500mg twice a day to those who complained of fever, headache, cold. Thyronorm was prescribed to 44 pregnant women as 12.5mcg to 4 (0.04%) pregnant women, as 25mcg tablet to 29 (0.32%), 50mcg to 6 (0.06%) and 75mcg to 5 (0.05%) of pregnant women who had low levels of T3 and T4. They were advised to consume one tablet before breakfast once a day throughout their pregnancies. Insulin injection was prescribed to 29 (0.32%) of pregnant women who had high blood sugar levels during their routine investigation. It was prescribed as 30% soluble human mixtard insulin S.C injection, the dose being dependent on their blood sugar levels. All such patients who had gestational diabetes mellitus were hospitalized. Nefedipine was prescribed as 10mg tablet twice a day to 30 (0.33%) of pregnant women who had raised blood pressure above 130/90. Labetalol was prescribed as 100mg tablet twice a day to 9 (0.1%) of pregnant women.

Amoxicillin was prescribed as 500mg capsule, thrice a day to 38 (0.42%) of pregnant women. Benzathine penicillin was prescribed as 1.2 million I.U i.m injection once a day for a week to 8 (0.09%) pregnant women who had rheumatic heart disease. The antitubercular drugs were prescribed to 29 (0.32%) of pregnant women as isoniazid (300mg), rifampicin (450mg), pyrazinamide (750mg), ethambutol (600mg), pyridoxine 10mg tablets thrice a week for 9 months. Clotrimazole was prescribed as 100mg vaginal tablets once a day to 41 (0.46%) of pregnant women. Tenofovir was prescribed as 300mg tablets, four times a day to 20 (0.22%) of HbsAg positive pregnant women. Zidovudine / lamivudine were prescribed orally as 300/150mg tablets once a day to 35 (0.39%) of pregnant women along with efavirenz (600mg, once a day), atazanavir (300mg), ritonavir (100mg) once a day to all HIV positive pregnant women. Aminofit tablets and L- Arginine sachets were prescribed once a day to 33 (0.37%) pregnant women who had low liquor volume on USG. In our study all women were prescribed drugs only in 2<sup>nd</sup> and 3<sup>rd</sup> trimesters. Organogenesis occurs mostly in the 1<sup>st</sup> trimester. They are exposed to drugs in the phase when organogenesis had already taken place.

Our study can be compared to the study done by **Sasidharan et al.**, 2016 [10] in Pondicherry in which a total of 358 drugs were prescribed to 72 antenatal patients. According to various categories of drugs classified, vitamins and mineral supplements were the most commonly prescribed drugs (n = 205; 57.26%). complex (0.49%) and oral vitamin C (0.49%). The next most commonly prescribed drug group was intravenous fluids (IVF) (n = 45; 12.57%), of which ringer lactate (46.67%) was the most frequently given IVF, followed by the other two maintenance fluids namely dextrose normal saline (26.67%) and normal saline (26.67%) in this drug category. IV fluids were not prescribed in our study as the study is restricted to the outpatient prescription pattern.

In our study iron, folic acid, calcium and B complex were the most frequently prescribed drugs. All the women in this study were prescribed these medications which can be compared to the study by **Harsh Joshi et al.**, (2012) [12] in Ahmedabad, in which iron salts (78.2%), calcium (77.1%) and folic acid (46.3%) were most frequently prescribed drug groups followed by uterine relaxants (24.4%), nutritional preparations (18.5%), antiemetic drugs (14.3%) and antimicrobial agents (11.9%) and others.

Antiemetic (n = 30; 8.38%) was the next major drug category prescribed to antenatal patients, among which oral and parenteral ondansetron (66.67%) was the most commonly prescribed followed by oral doxylamine succinate (30%) which was the most safest antiemetic drug for treating hyperemesis gravidarum in pregnancy mentioned as category A drug by the FDA drug risk category for pregnancy.

In our study antiemetics were not prescribed as none of the pregnant women attended antenatal check-up in the first trimester and none of the women complained of vomiting during the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters.

The next frequently administered group was antimicrobials agents (AMA) accounting for n = 29, 8.10%, wherein the most commonly prescribed drugs were oral metronidazole and mebendazole (27.59% each) followed by parenteral cefixime (24.14%), and the most least prescribed AMA was oral doxycycline (3.45%) which was mentioned in the FDA drug risk category as a category D drug. In our study only amoxicillin (0.42%) and i.m benzathine penicillin (0.09%) were only prescribed among antimicrobials.

The next most commonly prescribed drug category was antiulcer drugs (n = 16; 4.47%). Among them, oral and parenteral ranitidine (87.5%) was the most frequently prescribed drug followed by parenteral pantoprazole (12.5%). In our study oral rantac (0.60%) was prescribed.

Among the analgesics (n = 12; 3.52%), the most frequently prescribed drug was oral paracetamol

(58.33%) for the management of intermittent abdominal pain during gestation period and followed by parenteral diclofenac (41.67%). In our study also paracetamol was prescribed among analgesics (0.56%) which is similar to the study of **Belay et al.**, 2013[13] in Ethiopia in which among antibiotic groups, Amoxicillin 58(33.5%) was highly prescribed followed by ampicillin 28(16.2%). Paracetamol 131(87.9%) was the most frequently prescribed analgesic. Miscellaneous drugs include vaccines such as tetanus toxoid (n = 07; 1.96%), nutritional supplements such as arginine (n = 05; 1.40%). Miscellaneous drugs in our study include vaccines such as tetanus toxoid given to all women and nutritional supplements such as arginine and aminofit tablets(0.37%).

In our study a total of 6,534 drugs with an average of 4.75 drugs /woman were prescribed during antenatal checkups. This study is comparable to the study done by **Gawde et al.**, 2013[14] in Mumbai in which the average number of drugs was found to be  $2.27 \pm 0.66$ .

Our studies can be compared to a study by **Krishna et al.**, 2015 in Haryana[8] in which iron, folic acid, vitamins and calcium were the most frequently used drugs, during all the three trimesters of the pregnancy and to the study of **Priya et al.**, 2015[7] in Kadapa in which folic acid, calcium, iron, multivitamins were the four drug classes prescribed either alone or in combination in about 48.91% (n=652) of the prescriptions which is similar to our study.

In our study protein supplements, antimicrobials, thyronorm tablets, anti-tubercular drugs, anti-retroviral drugs, depin, labetalol, insulin, antiepileptics were prescribed during the second trimester. During the third trimester arginine, aminofit tablets were prescribed along with the drugs prescribed in the second trimester to the indicated pregnant women.

This prescription pattern can be compared with other studies. In a study done by **Harsh Joshi et al.**, (2012)[12] in Ahmedabad, iron salts (78.2%), calcium (77.1%) and folic acid (46.3%) were most frequently prescribed drug groups followed by uterine relaxants (24.4%), nutritional preparations (18.5%), antiemetic drugs (14.3%) and antimicrobial agents (11.9%) and others. Most frequently prescribed drugs were calcium carbonate (51.6%), folic acid (46.3%), ferrous fumarate (41.3%), isoxsuprine (24.4%) and doxylamine + pyridoxine combination (12.5%) and in the first trimester folic acid (33.4%) was most frequently prescribed followed by antiemetic drugs (14.6%), nutritional preparation (12.1%), iron (10.8%), calcium (10.9%) and uterine relaxants (5.8%). In the second trimester, apart from iron (28.4%), calcium (28.1%) and folic acid (12.1%), uterine relaxants (8.1%) and nutritional preparations (5.3%) were most commonly prescribed drugs. In the third trimester, iron (29.5%), calcium (29.5%), folic acid (12.1%) were most frequently prescribed followed by uterine relaxants (8.2%), nutritional preparations (4.4%), analgesics (4.1%) and antimicrobial agents (3.7%).

All the drugs needed to be supplemented during pregnancy like iron tablets, folic acid and calcium were provided free by the hospital which is similar to our study. Mean cost of these drugs was less than one rupee per day. Three thirty nine patients were prescribed other drugs for co morbid conditions like diabetes mellitus, hypertension, anemia etc. The cost of such drugs per day ranged from rupees 3.50 to rupees 26.0, mean cost being rupees 6.70.

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/H<sub>2</sub> blockers were prescribed whereas in our study protein supplements, antimicrobials for treatment of infections, nefidipine and labetalol for pregnancy induced hypertension, insulin for gestational diabetes and thyronorm for hypothyroidism were prescribed and in the third trimester protein supplements, antimicrobials, L Arginine and aminofit tablets for oligohydramnios were prescribed.

In our study Nefidipine and Labetalol were prescribed for pregnancy induced hypertension. Out of 2 pregnant women with history of epilepsy, one was continued on valproate sodium and the other on phenytoin sodium. In our study 12 pregnant women with history of epilepsy was prescribed phenytoin and leviteracetam.

In this study WHO core drug prescribing indicators did not meet WHO standards. Average number of drugs per prescription was 4.75 was above the range of the standard set by WHO (1.6-1.8). The implication could be the patient might have more medicines than she can cope in terms of cost and adherence when compared to a study by **Belay et al.**, 2013[13] in Ethiopia in which the average number of drugs per encounter was found to be 1.72 (range 1 –6).

In a study by **Sasidharan et al.**, (2016)[10] percentage of drugs prescribed from NLEM was high (95.53%) whereas in our study percentage of drugs prescribed from essential drug list was 71.87%.

In our study among 6534 drugs prescribed, category A drugs were most prescribed which constituted 4297 (65.76%), category B constituted 896 (13.71%), category C constituted 1294 (19.8%) and category D constituted 47 (0.79%). No drugs were prescribed from category X when compared to a study in Ahmedabad by **Harsh Joshi et al.**, (2012)[12] in which majority of drugs were from category A (77.49%) followed by category B (12.64%), category C (9.15%) and category D (0.72%). No drugs were prescribed from category X.

In our study drugs included in category B are Rantac, Depin, Paracetamol, Tenofovir, Atazanavir, Ritonavir, Amoxicillin, Benzathine Penicillin, L Arginine And Aminofit Tablets.

Few of the participants received category C drugs which included calcium antagonists, opioid

analgesics and vasodilators used for hypertension. (Varghese et al., 2016).[9]

In our study category c drugs included are Labetalol, Leviteracetam, T.T Injection, Rifampicin, Isoniazid, Pyrazinamide, Ethambutol, Zidovudine, Lamivudine, and Clotrimazole.

Category B drugs were most commonly prescribed drugs in the studies of **Sasidharan et al.,(2016)**[10]in Pondicherry, which constituted 56.25% (18) followed by category C, A, and D which account for 25%, 15.63%, and 3.13%, respectively. However, category X was never prescribed during any trimester, **FasaluRahiman OM et al.,(2015)**[15]in Kerala, which constituted (61.14%) and Schedule A (28.43%).Mifepristone is the drug belongs to Schedule X, which is prescribed for the pregnant women in order to abort the ectopicpregnancy.

Almost all drugs prescribed are provided free of cost from the hospital pharmacy. Among the total 6534 drugs prescribed, 6244(95.56%) drugs are provided from hospital pharmacy. 290(4.43%) drugs are bought from outside pharmacy by the pregnant women attending antenatal outpatient of Modern Govt. Maternity Hospital.

The HIV, HbsAg positive and T.B infected pregnant women are referred to Osmania General Hospital, Afzalung, Hyderabadand those women are prescribed drugs in Osmania general hospital and are available free of cost at that hospital. In our study adverse effects were reported from the use of iron, antitubercular drugs, antiretroviral drugs, nifedipine,and clotrimazole. Among 1000 pregnant women who were prescribed iron therapy 214(21.4%) complained of nausea, vomiting, heartburn, constipation. Among 30 pregnant women who were prescribed nefidipine for pregnancy induced hypertension, 8 (26.6%) women complained of headache and flushing. Among 29 pregnant women who were prescribed antitubercular drugs, 18(62%) complained of nausea, vomiting, diarrhoea, anorexia, joint pain, and fatigue. 4(13.7%) of pregnant women complained of yellow discoloration of eyes, fever, andinsomnia.

Among 35 pregnant women who were prescribed antiretroviral therapy, 19(54.2%) complained of nausea, vomiting, diarrhoea, headache, dizziness, mood changes and depression. Among 41 pregnant women who were prescribed clotrimazole vaginal tablets, 12(29.2%) complained of vaginal burning anditching.

In this study among 1000 pregnant women attending antenatal outpatient department 88(8.8%) were taking paracetamolto relieve pain as self medication and none of the pregnant women wastaking any herbal medicine. All pregnant women included in this study are aware of the harmful effect of drugs if being usedpregnancy.

**Krishna et al., 2015**[8] reported that self-medication was significantly higher in literates as compared to illiterates. Another study on similar study subjects revealed that over the counter medication including contraindicated medications like ibuprofen were used at unexpectedly high rates during pregnancy (**Glover, 2003**)[16]. In an epidemiological study, NSAID use during conception or during pregnancy in 5% women was associated with an 80% increased risk of miscarriage (**Li,2003**).[17]

## V. Conclusion

The total numbers of drugs prescribed were 6,534. In this study it was observed that the most frequently prescribed drugs were iron, folic acid, calcium, multivitamin tablets and T.T injection which were prescribed to all patients attending antenatal O.P.D. Protien supplement and Glucon D powder was prescribed to 1.67%& 0.85% of pregnant women who appeared malnourished respectively. Rantac was prescribed to 0.60%pregnant women as 150mg tablet twice a to day. Paracetamol tablet (500mg) was prescribed to 0.56% of pregnant women. Thyronorm was prescribed to 44 pregnant women who were diagnosed with hypothyroidism. Insulin injection was prescribed to 0.32% of pregnant women who had high blood sugar levels during their routine investigation. Nefidipine and labetalol was prescribed to 0.33%and 0.1% of pregnant women who were diagnosed with Pregnancy Induced Hypertension. Amoxicillinand Benzathinepenicillin was prescribed to 0.42% and 0.09% of pregnant women respectively. The antitubercular drugs HRZE regimenwas prescribed to 0.32% of pregnant women. Clotrimazole was prescribed as 0.46% of pregnant women. Tenofovir was prescribed to 0.22% of HbsAg positive pregnant women. Zidovudne /Lamivudine, Efavirenz ,Atazanavir, Ritonavir were prescribed to all HIV positive pregnant women. Aminofit tablets and L-Arginine sachets were prescribed to 0.37% pregnant women who were diagnosed withOligohydramnios.

It was observed that average number of drugs per prescription was 4.75. Percentage of drugs prescribed by generic name was 65.62%, percentage of encounters with antibiotic prescribed was 6.25%, percentage of encounters with an injection prescribed was 9.37%, and percentage of drugs prescribed from essential drug list was 71.87%. Category A drugs were the most commonly prescribed drugs. Almost all drugs prescribed are provided free of cost from the hospital pharmacy and provided from hospitalpharmacy.

It was observed that adverse effects were reported from the use of iron, antitubercular drugs, antiretroviral drugs, Nifedipine and Clotrimazole. None of the pregnant women was taking anyherbal medicine. Only 8.8% of the women were taking self-medication. All pregnant women included in this study are aware of the harmful effect of drugs if being usedpregnancy.

In this study it was observed that there was total absence of pregnant women in the first trimester. Many women had ANC in their third trimester and many of them came for the first ANC only in the third trimester. There should be awareness among pregnant women regarding the importance of antenatal check-ups in the first trimester and need of regular antenatal check-up throughout the pregnancy.

On the basis of the finding of this study, less percentage of drugs were prescribed from essential drugs list (71.87%) and generic drug prescription was also less (65.62%), according to WHO core prescribing indicators which if improved can lessen the economic burden in the developing country like India and can improve health status and secure development gains.

It was observed that average number of drugs per prescription was 4.75 which is higher than the WHO standard (1.6-1.8) that indicates polypharmacy which may be acceptable in this study as nutraceuticals are mostly prescribed due to deficiency and are safe to use in pregnancy. This can be supported with the other observation of lesser percentage of encounters with antibiotic and injections (6.25% and 9.37%) respectively. Less antibiotic usage may minimize drug resistance and less injectables prescribed in this study denotes less chance of acquiring infections in pregnant women.

This type of study can help in evaluating the existing drug use pattern and in planning appropriate interventions to ensure rational drug therapy.

In spite of illiteracy being common in developing country like India, it was observed that there is good awareness of harmful effects of self medication and herbal medication among pregnant women. Few women had adverse effects with iron, antitubercular drugs, antiviral drugs, Clotrimazole and Nifedipine. Most of the drugs are available from hospital pharmacy free of cost.

There is a need to increase the awareness about the antenatal care and antenatal visits during the entire period of pregnancy. The pregnant women should be encouraged to take the prescribed drugs at proper time and nutritive food for the good outcome of the pregnancy. This data can be utilized in strategic planning to ensure better patient care services in the institution and to improve rational drug use. Further studies should be done in health centres and health posts to see the extent of prescription during pregnancy.

#### **Strengths of the study**

- Antenatal care, medication and investigations are provided free of cost to all the pregnant women included in the study which improves compliance.
- Almost all drugs prescribed are safe, category A drugs.
- Other category drugs are prescribed in co-morbid conditions weighing risk-benefit ratio.
- There were very less women taking self medication. Almost all women are aware of harmful effects of drugs if being used during pregnancy.
- There were no women taking herbal medication.

#### **Limitations of the study**

- No women got registered during the first trimester which is an important period to access teratogenic effects of drugs (period of organogenesis).
- There were inadequate antenatal checkups by the pregnant women.
- Prescription pattern in this study did not meet WHO core prescription indicators in some aspects like no. of drugs prescribed by generic name, and the no. of drugs prescribed from essential medicine list.

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