

Study to Analyse Prescription Pattern of Antihypertensive Drugs Used in Preeclampsia Patients at a Secondary Care Hospital: A Prospective Observational Study

Jinalben V Desai¹, Saloni Patel², Dr. Merin Sara Phillip³, Dr. Riddhi Vaghani⁴

^{1,2,3,4}Department of Doctor of Pharmacy, Shree Dhanvantary Pharmacy College, Kudsad Road, Olpad, Kim-394110, Gujarat, India

¹Corresponding Author Email: [zinaldesai1122\[at\]gmail.com](mailto:zinaldesai1122[at]gmail.com)
+91 8758962271

²Corresponding Author Email: [docsalu1699\[at\]gmail.com](mailto:docsalu1699[at]gmail.com)
+91 8347443184

Abstract: Hypertension is one of the common medical complications of pregnancy and contributes significantly to maternal and perinatal morbidity and mortality. Once the hypertension is diagnosed starting with the antihypertensive therapy help to manage the outcomes of pregnancy, for both mother and baby. The main objective of the study was to assess prescribing patterns of antihypertensive drugs in pregnant women. It was prospective observational study, which was conducted for 4 months from November 2021 to February 2022. A total 120 prescriptions were analysed. Through the current study, we could assess the utilization of antihypertensive drugs in pregnant women. The study reveals that most of the patients having preeclampsia were from primi gravida in age group 25-28 years old. The study also shows that Labetalol an alpha-beta blocker is mostly prescribed as monotherapy followed by Nifedipine a calcium channel blocker, or combination of Labetalol with Nifedipine. Also according to study 12% of patients, showed co morbidities and other 88% were without co morbidities. Other than antihypertensive prescribed to maximum patients were combination of several supplements that are protein powders, iron- calcium supplement (protex powder, Anaport powder, LG-9 sachet, bio folate, calcium supplements, hbcare, cc250, RG-9 sachet). The current study assessed that most of the patients showed mild to moderate preeclampsia that is blood pressure between 140-160 mmhg. It has provided the insight into the prescription pattern of drugs in pregnant women with respect to B.P control. It will help the prescriber to pay more attention on outcomes of B.P during pregnancy. If preeclampsia can be treated rationally, the complication of pregnancy that affect mother and baby can be overcome and there would be significant reduction in maternal and perinatal morbidity and mortality.

Keywords: Pregnancy induced Hypertension, Pre-eclampsia, Antihypertensives, Alpha+beta blocker, CCB

1. Introduction

The principle aim of prescription pattern analysis was to facilitate rational use of drugs in population. For individual patient use of rational use of drugs implies the prescription of well- documented drug at an optimal dose, with correct information and affordable price.

Prescription pattern analysis also provides insight into the efficacy of drug use, i.e. whether certain drug therapy provides value for money and the result of such research can be used to help to set priorities for the ration allocation of health care budgets.

High Blood pressure is defined as a systolic blood pressure (BP) \geq 140mmhg/diastolic pressure \geq 90mmhg. The diastolic pressure represents the pressure during the ventricular relaxation in diastolic and systolic pressure represent the peak pressure due to ventricular contraction during systole. Either or both have specified upper limit of normal and elevated pressure, which are used to define hypertension. According to Joint National Committee on Prevention, detection, Evaluation, and Treatment of High Blood Pressure JNC 8th report (2004) hypertension is defined and classified as: Blood Pressure categories in Adult

Category	Systolic (mmHg)	Diastolic (mmHg)
Normal	<140	<80
Elevated	140-159	<80
Hypertension		
Stage 1	130-129	Or 80-89
Stage 2	\geq 140	Or \geq 90

2. Preeclampsia

Definition:

Preeclampsia is a multisystem disorder of unknown etiologic characterized by development of hypertension to the extent of 140/90 mm Hg or more with proteinuria after the 20th

week in a previously normotensive and non-protein uric woman. Some amount of edema is common in anormal pregnancy. Edema has been excluded from the diagnostic criteria unless it is pathological. The preeclampsia features may appear even before the 20th week as in cases of hydatid form mole and acute polyhydramnios. The term, "Pregnancy-induced hypertension (PIH)" is defined as the

Volume 12 Issue 4, April 2023

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

hypertension that develops as a direct result of the gravid state. It includes—(i) gestational hypertension, (ii) preeclampsia and (iii) Eclampsia.

Medication to treat hypertension in pregnancy:

Centrally acting alpha-2 adrenergic agonist:

Methyldopa is a centrally acting alpha-2 agonist used in pregnancy. Methyldopa has a long history of use in pregnancy and does not appear teratogenic; it's safe as it does not impair uteroplacental circulation and consequent foetal growth. The dose of methyldopa is similar to that of non-pregnant patient.

Clonidine is also an alpha-2 centrally acting drug having similar safety and efficacy as methyldopa and used as a third line agent in control of hypertension. However, according to FDA, methyldopa is a class B drug and clonidine is a class C drug. According to World Health Organization/Thomson, lactating rating methyldopa is usually more compatible with breast milk as clonidine has possible breast milk effects.

Peripherally acting adrenergic-receptor antagonist:

Labetalol a non-selective beta-blocking agent with vascular alpha-1 receptor blocking in patient having foetal growth restriction and low placental weight were usually given atenolol during second trimester, but not with beta blocking agent such as labetalol, which is for the treatment of acute hypertension during pregnancy and has slower equivalent efficacy and better tolerability compared to hydralazine.

Calcium channel blocker:

Oral nifedipine and verapamil are frequently seen as second line agents used for the treatment of hypertension in pregnancy. Calcium channel blocker does not appear to be teratogenic. According to FDA, nifedipine and verapamil are class C drugs, which are usually compatible with breast milk.

Direct Vasodilators:

Hydralazine is now predominantly used intravenously for treatment of severe hypertension in pregnancy. It does not appear teratogenic but there have been reports of neonatal thrombocytopenia, rare cases of a pyridoxine-responsive polyneuropathy with chronic use, and drug induce lupus. However, labetalol or oral nifedipine are more preferable as first line agents as compared to intravenous hydralazine, which is class C drug according to FDA and is compatible with breast milk. Sodium nitroprusside is rarely used in pregnancy and is reserved for life threatening hypertension.

Diuretics: The diuretic therapy remains controversial, primarily due to theoretical concerns about reduced plasma volume. Thiazide are class B drugs according to FDA. They may cause volume contraction and electrolyte abnormalities but rare with small doses. Diuretic may reduce milk production. Spironolactone is not recommended due to potential foetal antiandrogen effects.

Renin angiotensin system drugs:

Angiotensin converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARB) are contraindicated in pregnancy due to their association with adverse foetal

effects. ACE inhibitors is labelled as FDA class C drugs for the first trimester of pregnancy and class D for third trimesters.

3. Methodology

The study was conducted according to the ICH GCP guidelines. The study was conducted once institute ethics committee granted the permission.

The study was designed as prospective observational. This is single site study, which was conducted in SDA diamond hospital, Surat. For patients who have been diagnosed with preeclampsia. The main aim was to determine the most commonly used antihypertensive agents in preeclampsia with its dose, frequency and route. Also, evaluated types of drug therapy (monotherapy/combination therapy) and to find out the average number of drugs per prescription. The number of patients in the study was 120. The primary criteria were the patient should have preeclampsia.

Study Duration and Population:

This study estimates a total duration of 3 months. The total enrolment of patients was 120.

Study design and criteria:

It was a prospective observational study. Pregnant women were enrolled into the study by considering the following criteria:

Inclusion criteria:

- Pregnant women diagnosed with preeclampsia with or without comorbidities
- Pregnant women with history of preeclampsia with or without comorbidities.
- Pregnant women above the age of 18 years.

Exclusion criteria:

- Pregnant women having age below 18 years.

Source of data: 26

Ethical Clearance:

The study protocol was submitted to the Shree Dhanvantary Pharmacy College ethics committee on human subject research and applied for clearance. The study was approved by institutional ethics committee and issued ethical clearance certificate.

Study materials:

The following study materials were prepared and used during the study period.

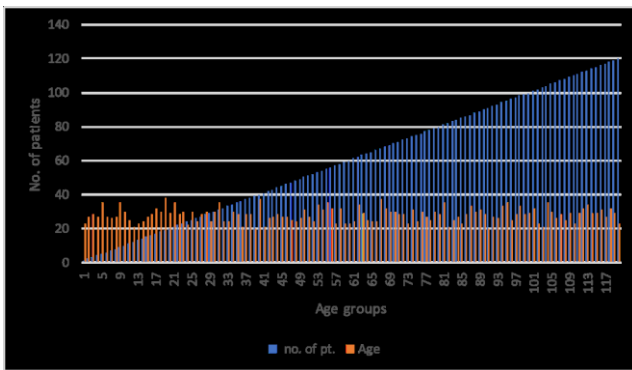
Patient data collection form:

Prescriptions of the pregnant women containing at least one drug were analysed and the drugs prescribed were classified according to their pharmacological class. The pregnant women were divided according to their Gravida, age, BP and the prescriptions were analysed for different classes of drugs.

4. Result

1) No. of patient v/s Age:

No. of pt. v/s age ;(n=120) Age	No of patient	%
20-22	8	6.67%
22-25	28	23.4%
25-28	34	28.4%
28-31	26	21.7%
31-34	13	10.8%
34-37	10	8.34%
37-40	1	0.83%



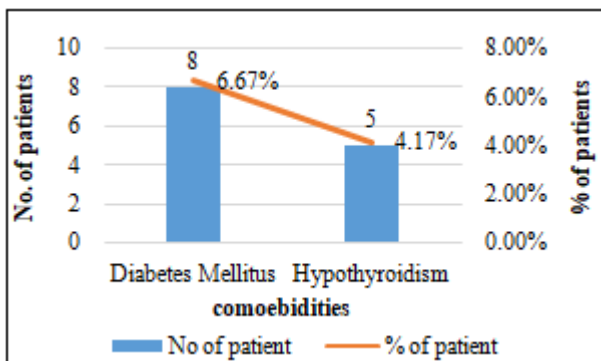
According to the study maximum pregnancy, induced hypertension cases were seen in **Age Group 25-28** (28.4%).

2) No. of patient v/s comorbidities:

The study reveals that **12%** of females were found to have PIH with comorbidities other **88%** of females had PIH without comorbidities.

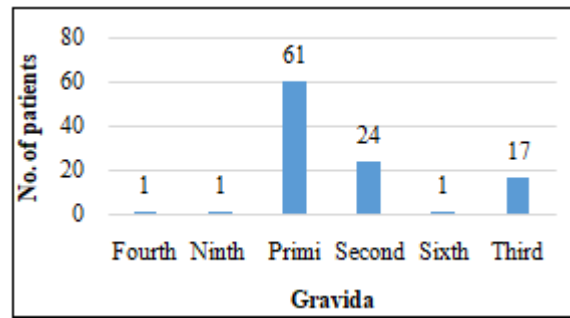
Comorbidities	No. of patient	% of patient
Diabetes Mellitus	8	6.67%
Hypothyroidism	5	4.17%

% of patient having comorbidities	
No comorbidities	88%
Comorbidities	12%



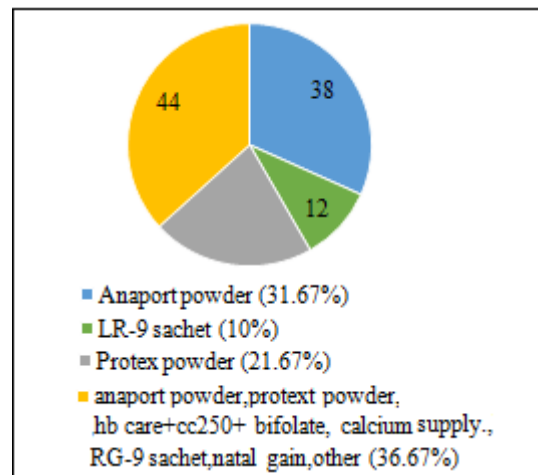
Among 12% having comorbidities 61.50%, patients had diabetes mellitus (gestational diabetes) and 38.46% patients had hypothyroidism.

3) Gravida



According to study maximum PIH cases were seen in **primi gravida** (50.8%) that is first pregnancy

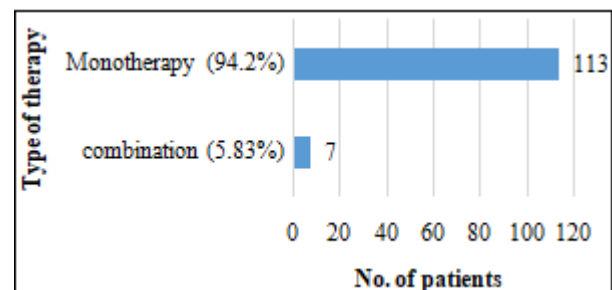
4) Other than antihypertensive



Study revealed that supplements such as Anaport powder (31.67%), LR-9 Sachet (10%), Protex powder (21.67%), and more than one supplements (36.67%). In maximum PIH patient more than one supplements (other than antihypertensive) were preferred.

5) Type of therapy

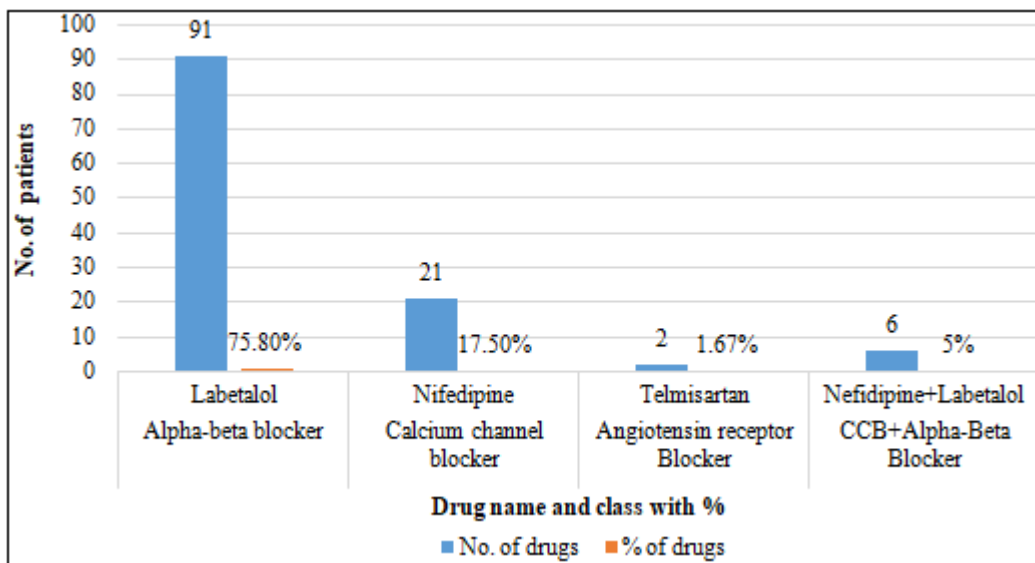
Therapy	No. of patients
Combination (5.83%)	7
Monotherapy (94.2%)	113



The study says that (94.2%) of PIH patient were prescribed monotherapy therapy and only (5.83%) were prescribed with combination therapy.

6) Class of antihypertensive (n=120)

Class of drug	Name of drug	No. of drugs	% of drugs
Alpha-beta blocker	Labetalol	91	75.8
Calcium channel blocker	Nifedipine	21	17.5
Angiotensin receptor Blocker	Telmisartan	2	1.67
CCB+Alpha-Beta Blocker	Nefidipine+Labetalol	6	5



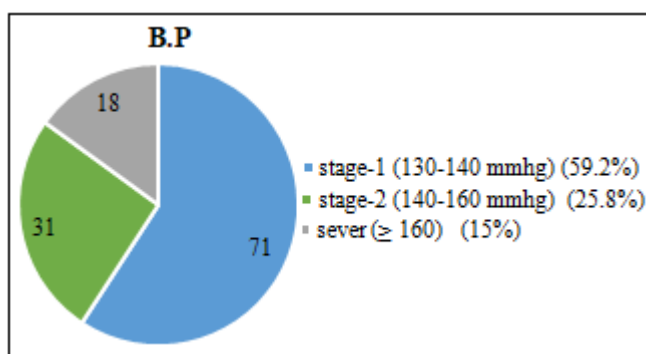
The study says that maximum drug prescribed was from alpha-beta blocker class (Labetalol-75.8percentage). Other drugs were from calcium channel blocker (Nifedipine – 17.5%), combination (Labetalol+Nefidipine-5percentage), and ARB (Telmisartan-1, 67%).

(Alpha-beta blocker), followed by Nifedipine 17.5% (Calcium channel blocker), Telmisartan 1.67% (ARBs), Combination of Labetalol +Nifedipine (CCB + Alpha-beta blocker). In our study, only 12% of preeclampsia patient had comorbidities other 88% were with no comorbidities.

7) Stages of preeclampsia:

Stages of preeclampsia	B.P
Stage-1 mild (130-140 mmhg) (59.2%)	71
Stage-2 moderate (140-160 mmhg) (25.8%)	31
Sever (≥ 160) (15%)	18

There is an increase chance of in young primi gravida under 20 years and all over 30 years. According to our study, maximum preeclampsia cases were seen in **primi gravida 50.8%**.



According to study 59.2% patient had mild preeclampsia (stage-1 1130-140 mmhg), 25.8% had moderate (stage-2 140-160 mmhg), and 15% had severe (≥160 mmhg).

Our study was performed on 120 patients where most commonly prescribed drugs was labetalol (Alpha-Beta Blocker) as monotherapy. Second common drug was nifedipine (Calcium channel blocker) followed by combination of labetalol and nifedipine (CCB+ alpha beta-blocker) and rarely telmisartan (ARB).Other than antihypertensive were also prescribed that is supplemental therapy, which is required in pregnancy. In our study maximum number of patient that is 36.67% patient more than one supplements were preferred (that is Anaport powder+ Protex powder + LR 9 -sachets + RG 9sachet + HB care + CC250 + calcium supplements + Bifolates), followed by Anaport powder in 31.67% pt., Protex powder in 21.67% pt., and LG-9 sachets in 10% pts.

5. Discussion

Hypertension in pregnancy is considered a major worldwide health problem leading to an increased risk of perinatal and maternal mortality. Preeclampsia is more frequent in patients under 21 years of age than in older than 35 years. In our study 96 (80%) patient lies in age group, 20-30 and 24 (20%) patients lie above 30 age group. The main antihypertensive given to the patient was Labetalol 75.8%

Similarly, in a study done by IJBCP (international journal of basics and clinical pharmacology) that most commonly used drug was Labetalol given to 75 patients followed by Methyldopa given to 42 patients followed by other drugs like nifedipine, amlodipine. 33.33% patients belonging to second gravida constitute the majority of patients i.e. 50 patients while 30%belong to third gravida. In addition, most of the patients were of moderate and mild type corresponding to 48% and 32% respectively and only 20% of patients belong to severe cases.

6. Conclusion

Hypertension in pregnancy has become one of the major alarming situation in a pregnant women's life. Our study concluded that Labetalol was most commonly prescribed in preeclampsia in secondary care hospital due to its benefits followed by Nifedipine, Telmisartan or combination of Labetalol + Nifedipine. To conclude our study gave an overall idea regarding prescribing pattern of antihypertensive during pregnancy and we should focus on ration drug prescribing, in our study most of the PIH patient (59.2%) belongs to stage-1 that is mild preeclampsia having B.P between 130-140 mmhg. Similar study should be done to promote the rational prescribing pattern, which will ultimately reduce the chances of further complication of PIH in pregnant women, lead to healthy mother, and reduce infant mortality rate.

7. Summary

The study provides an insight to the drug utilization patterns of antihypertensive drugs in pregnant women with respect to the level of B.P control. It will help the prescribers to pay more attention to the specific factors that affect the B.P and also help prevent further complication related to hypertension in pregnant women and reduce infant mortality. In the study where 120 patients were employed, maximum preeclampsia cases were seen in age group 25-28 (28.4%). In Pregnancy, there are several comorbid condition to occur like DM, Hypothyroidism, hypertension, kidney functional disturbances etc. The study also reveals that among 120 PIH patients only 12% seems to have comorbidities where other 88% patients were without comorbidities. In 12% of patients with comorbidities, maximum patients had DM (that is 6.67%) and remaining had hypothyroidism (that is 4.17%).

According to the study, maximum PIH cases were seen in primi gravida (first pregnancy) that is 50.8%. Study of drug utilization patterns include type of drug therapy, choice of drugs, also other drugs such as supplemental therapy etc. According to the study, performed maximum patients were on monotherapy 94.2% and only 5.83% patients were on combination therapy. The most common drug that was prescribed was labetalol (100mg OD) an alpha-beta blocker that is 75.80%, followed by Nifedipine (20mg OD) a calcium channel blocker that is 17.50%, and combination of labetalol + Nifedipine (CCB+ Alpha-beta blocker) that is 5%. Other than antihypertensive drugs that is supplemental therapy is must in pregnant women. Several supplements such as protein powders, calcium supplements, iron supplements are prescribed. According to our study maximum patient that is 36.67% were given.

The study reveals that 59.2% patients had mild preeclampsia (that is B.P between 130-140mmhg), 25.8% patients had moderate (that is 140-160mmhg) and 15% patients had severe (that is B.P between \geq 160mmhg). PIH can be treated if drugs are prescribed rationally. In addition, patients need to show interest to know more about the drugs that they have been prescribed, this help to promote self-knowledge on their illness and special care which ultimately improve quality of life. Therefore educational strategies must be carried out on utilization of antihypertensive medication in PIH patients and overcome individual risk factors. Also

raising patient trust in their physician may improve patient motivation to take prescribed medicines.

References

- [1] Incidence of pregnancy induced hypertension and prescription pattern of antihypertensive drugs in pregnancy MANJUSHA SAJITH*1 , VANDANA NIMBARGI2 , AMIT MODI3 , RONAK SUMARIYA3 , ATMARAM PAWAR 1. Assistant Professor, Department of Clinical Pharmacy, Bharati Vidyapeeth Deemed University, Poona College of Pharmacy, Pune, Maharashtra, India. 4 2. Professor, Department Of Obstetrics and Gynaecology, Bharati Hospital and Research centre, Pune, Maharashtra, India. 3. Student, PharmD Program, Bharati Vidyapeeth University, Poona College of Pharmacy, Erandwane, Pune, Maharashtra, India. 4. Vice-Principal and Head, PharmD Programme, Poona College of Pharmacy, Bharati Vidyapeeth Deemed University, Pune.
- [2] manjusaji1@yahoo.com
- [3] Study on Prescribing Pattern of Antihypertensives in Pregnancy at a Tertiary Care Teaching Hospital, India Soodabeh Kanafileskookalayeh *, Chitra Bhojan, Askari Mirzaei, Ebin Siby Doctors of pharmacy, College of Pharmacy, SRIPMS, Coimbatore, India
- [4] N. Divyashree , V. J. Divya , Tapendra Bhattarai, J.Sasidhar, Prescription Pattern of Drugs In Pregnancy Induced Hypertension In A Tertiary Care Hospital, Asian Journal of Pharmaceutical Technology & Innovation, 05 (22); 01-05, 2017.
- [5] www.asianpharmtech.com
- [6] A retrospective study on evaluation of anti-hypertensive drugs used in gestational hypertension Kousalya Prabahar1 *, Teja Katikam2 , Saranya Punniyakotti2 and Praveen Devanandan2 1Department of Pharmacy Practice, Faculty of Pharmacy, University of Tabuk, Kingdom of Saudi Arabia 2Department of Pharmacy Practice, School of Pharmaceutical Sciences, Vels University, Chennai, Tamil Nadu, India.
- [7] Analysis of prescription pattern of antihypertensive drugs in pregnancy in a tertiary care Hospital Dr. Deepanjali Lomte Associate. Prof., Dept. Of. Pharmacology, S.B.H. Govt. Medical College Dr. A.W. Patil Professor & Head, 37 Dept. Of. Pharmacology, S.B.H. Govt. Medical College Dr. Praveenkumar Patil Assistant Prof., Dept. Of. Pharmacology, S.B.H. Govt. Medical College Antihypertensive Drugs used during Pregnancy: an Evaluation Leena Alfred1, Shobha Rani R. H. 1, Surjith K. Sharma2, Jai Prakash S. Vastrad1, *Mahvash
- [8] Iram1 1. Department of Pharmacy Practice, Al-Ameen College of Pharmacy, Bangalore-560027, Karnataka, India. 2. Department of Gynecology & Obstetrics, St. Martha's Hospital, Bangalore-560001, Karnataka, India
- [9] Oral antihypertensive regimens (nifedipine retard, labetalol, and methyl dopa) for management of severe hypertension in pregnancy: an open-label, randomised controlled trial Thomas Easterling, Shuchita Mundle,

Hillary Bracken, Seema Parvekar, SulabhaMool, Laura A Magee, Peter von Dadelszen, Tara Shochet, Beverly Winikof.

- [10] Sharma R, Kapoor B, Verma U. Drug Utilization Pattern during Pregnancy In north India. Indian J Med Sci 2006; 60(7):277-84.
- [11] Hooli TV, Santoshkumar J, Manjunath S, Vinodkumar CS. Drug utilization study of antihypertensives in obstetric practice in a tertiary care hospital. IJABPT 2010;1(3):1006-10. 38