



Impact of Hypertensive Disorders in Pregnancy and Clinical Pharmacist Interventions for its Management

¹Shinu C., ²Aysha Hiba K.K., ³Nazija MPC

^{1,2,3} Department of Pharmacy Practice, Al Shifa College of Pharmacy, Perinthalmanna, Kerala, India.

ABSTRACT

BACKGROUND: Pregnancy induced hypertension is an important cause of maternal and fetal morbidity and mortality. It is the elevation of the blood pressure to $\geq 140/90$ mm Hg with or without proteinuria after 20 weeks of gestation. This study was done to analyze the risk factors, complications and management in women with maternal hypertension.

OBJECTIVES: To assess the safety and efficacy of antihypertensives and role of clinical pharmacist in its management. Through this study the risk factors and complications of hypertensive disorders in pregnancy was also detected.

METHODOLOGY: A Prospective Interventional study was conducted in women with pregnancy induced hypertension. These patients were then followed up to delivery to identify maternal and fetal outcomes. Patient's arterial blood pressure and other laboratory parameters were analyzed. Patient counselling and leaflets were provided and medication adherence was measured before and after counselling.

RESULTS&DISCUSSION: A total of 97 cases were collected and it was observed that age above 30, obesity, other co-morbidities and previous history of hypertension were predisposing to development of hypertension during pregnancy. Labetalol was the commonly prescribed drug. Majority cases blood pressure lowered after delivery. Incidence of Cesarean section was high. Patient's knowledge about drugs and disease improved through interventions.

CONCLUSION: Early recognition and accurate supervision of patients regarding drug use, strict fluid balance, optimum time of delivery and proper medication use and life style modifications would control the consequences of this disorder

Keywords: Hypertensive disorders; Labetalol; blood pressure; medication adherence; complications; cesarean section.

INTRODUCTION

Hypertensive disorders during pregnancy are found to be the most common reason for maternal and fetal morbidity and mortality. The incidence of Pregnancy induced hypertension (PIH) is around 3-10% of all pregnancies^[1]. For most women, Pregnancy is a physiological phenomenon, but a small number of people develop difficulties during the evolution of pregnancy, placing both conceptus and the mothers health at risk. Hypertension is also known as High blood pressure, is a long term medical condition in which the blood pressure in the arteries is persistently elevated to $\geq 140/90$ mm Hg with or without proteinuria, which emerges after 20 weeks of gestation and normally resolves by 12 weeks postpartum^[2].

The main five categories of PIH includes chronic hypertension, gestational hypertension, preeclampsia, preeclampsia superimposed on chronic hypertension and eclampsia^[3]. Hypertension during pregnancy occurs more often in women exposed to the chorionic villi for the first time (primigravidae); those exposed to excess of chorionic villi (multiple pregnancy and hydatidiform mole); having preexisting hypertension or vascular disease and in genetically predisposed women^[4]. It can also happens in absence of fetus (hydatidiform mole) and in absence of chorionic villi in uterus (eg: ectopic pregnancy).

Clinical symptoms experienced during PIH are headache, epigastric/ abdominal pain, visual/ cerebral disturbances, elevated systolic and diastolic BP, convulsions, Fetal growth restriction, pulmonary edema, oliguria and cardiac dysfunction. PIH also causes important changes in biochemical parameters like increased levels of blood glucose, serum urea, creatinine, uric acid, transaminases, lactate dehydrogenase and increased level of proteinuria with hypoalbuminemia which are used as indicator of disease severity. Biochemical changes also includes alteration of lipid level, because hypertension is associated with peripheral vascular diseases, so gestational hypertension appears to be crucial justification in changes of lipid^[5]. The major goal of antihypertensive medication in PIH is to prevent or treat severe hypertension and its associated complications and to prolong pregnancy for as long as possible^[6]. The aim is to reduce and stabilize the blood pressure, also to minimize the risks such as placental abruption, maternal cardiac failure, and cerebral hemorrhage; at the same time they should not have any adverse effects on the utero-placental circulation and the fetus^[7].

This study was carried out in order to access the safety and effectiveness of antihypertensives in pregnancy and to analyze the role of clinical pharmacist for its proper management. Pregnancy induced hypertension is condition that may lead to adverse maternal and fetal outcomes. Through this study risk factors predisposed for development of PIH and complications occurred during and after delivery to fetus and mother were identified.

Clinical pharmacist played an important role in hypertensive management and prevention of adverse effects due to this disorder. In this study clinical pharmacist interventions were also accessed. Interventions such as patient counselling, provision of patient information leaflets and also measurement of medication adherence before and after counselling were performed.

Patient counseling is an important means of achieving pharmaceutical care. It should include an assessment of whether or not the information was received as intended and whether the patient understood about the provided information^[8]. This study was conducted to assess the impact of PIH on pregnancy outcome as well as to assess and improve the knowledge towards PIH among pregnant women through interventions. Through this study the fetal morbidity and mortality can be reduced. Also patient understanding about disease can be increased through counselling. After provision of counselling medication adherence can be improved and patient awareness about disease, medication use and also risk factors can also be increased.

METHODOLOGY

A Prospective Interventional study was carried out among the inpatients and outpatients of Gynecology department of KIMS Al Shifa Super Specialty Hospital, a multispecialty tertiary level referral hospital situated in Perinthalmanna. The pregnant women with Hypertensive Disorders were selected from gynecology department. All the patients with PIH from 20th weeks of gestation were collected. The subjects were selected based on the proposed inclusion and exclusion criteria specified in the protocol submitted to the Institutional Ethics Committee. Pregnant women with hypertension irrespective of age, women with previous history of pre eclampsia and gestational age between 20-40 weeks were included in the study. Psychiatric patient, pregnant women with renal, hematological and heart disease and those patients who are not willing to conduct their delivery in this hospital were excluded from the study.

All the other data required were obtained from system based patient case files and by direct interaction with physician. Arterial blood pressure were noted during 3 trimesters. The parameters like hematology, coagulation profile, diabetic profile, liver function test (LFT), renal function test(RFT), electrolytes, thyroid function test (TFT), serology, Urine routine examination reports noted during pregnancy and at the time of delivery. The details of patient previous medical and medication histories, fertility status, obstetric history were noted. Then they were followed up to delivery to detect stages of hypertensive disorder, the risk factors and also maternal and fetal complications. The data's such as Pregnancy outcomes, mode of delivery, and BP status after delivery were collected.

Clinical pharmacist interventions for hypertensive management was done through patient counselling and provision of patient information leaflets. Data's needed for MMAS-4 was also collected from patients through direct interview or telephonic communication. Medication adherence scale scoring was done. Finally all collected data from the study was tabulated in Microsoft excel 2013 and were keyed into SPSS computer software version 23 for windows and analysed by appropriate statistical methods. For categorical variables frequencies and percentage were computed with Pearson Chi square test. For quantitative variables paired T-test was used. Repeatability among clinical parameters was analysed using repeated measure ANOVA. Significant level was set at <0.05. Results were interpreted with p-value which is probability of accepting null hypothesis.

RESULTS AND DISCUSSION

An Interventional study was conducted on pregnant women who developed PIH in order to access its impact on mother and fetus. During the one year study, approximately 275 patients were visited in the gynecology department and 97 patients were selected based on the inclusion and exclusion criteria.

Among 97 cases, patients' were categorized into 3 age groups, 59% (n=57) of cases were under the age group of 25-35 yrs followed by 31% (n=30) within the group below 25 yrs and only 10% (n=10) lies under the age above 35yrs and this may be due to the fact that age is a risk factor for development of PIH and increased duration between pregnancies and previous history of hypertensive disorders predisposing for this condition. This was similar to the study conducted by Lavanya *et al*^[9] regarding the age of patients. Another study conducted by Dr Gogaram *et al*^[10] identified that highest incidence of PIH occurred among those aged 23-27 yrs.

Patients' were classified into 3 groups based on their BMI status. Among the collected cases (n=97), 48% (n=47) constitutes BMI of 25-30 followed by 29% (n=28) above 30 and 23% (n=22) below 25. Obesity enhances the threat of development of hypertensive disorders. Women who reap weight during pregnancy were likely to acquire hypertension. In this study 48% of cases having BMI between 25-30 kg/ m². This was analogous to the study conducted by Minimol *et al*^[3].

Stages of hypertension were noted during the study based on clinical parameters. It was noticed that pre eclampsia was the most prevalent hypertensive disorder (49%) followed by gestational hypertension (32%), eclampsia (11%) and chronic hypertension (7%). This was parallel to the study conducted by Ahmed Hussein Subki *et al*^[11]. Another study conducted by Dr Gogaram *et al*^[10] observed that majority of patients were having gestational hypertension. The incidence of eclampsia was lesser. It may be due to the early detection and appropriate management of hypertensive disorders in high risk patients.

Arterial Blood pressure monitored for all cases in 3 trimesters and analysed by repeated measure annova. It was observed that there was significant difference in BP level from first trimester to the second but there was no significant variation from second to the third trimester. This indicates antihypertensive therapy found effective in patients and controlled BP elevation with p value 0.00. Thus interventions given were successful.

The core objective of antihypertensive therapy was to control BP and prevent complications and protect the safety of mother and fetus and subsequent delivery of a healthy baby. Both monotherapy and combination therapy were used in our hospital. Use of combination therapy suggested increased severity of illness where optimal BP control not achieved on monotherapy. Need of combination therapy may be due to inappropriate medication taking behavior of patients'. Most commonly used and safest antihypertensives in pregnancy includes calcium channel blockers (Nifedipine), selective alpha and non-selective beta blocker (labetalol), centrally acting antiadrenergics (methyl dopa) etc. Out of 97 patients 67% (n=65) subjects had taken labetalol followed by 22% (n=21) had taken nifedipine and 10% (n=10) cases with combination therapy of both labetalol and nifedipine. Only 1% (n=1) patients had given other antihypertensives. This was similar to the study conducted by Mahmoud Alalfy *et al*^[12], Vidya A. Thobbi *et al*^[13] and Manjusha Sajith *et al*^[14].

Labetalol is the safest and effective antihypertensive drug during pregnancy since there is no effect on utero placental perfusion and this reduce the risk of preterm delivery and also it has better tolerability. Another study conducted by Sagar. B. Bhagat *et al*^[19] observed that Labetalol was found to be the effective drug .A study conducted by Minimol. P.V *et al*^[3] with a contrast result, they identified methyl dopa as first line agent.

Most of the patients' BP controlled after delivery and thus 71% (n=69) cases had not given any medications after delivery. 26% (n= 25) of patients given with nifedipine followed by 2% (n=2) with combination of labetalol and nifedipine and 1% (n=) with labetalol.

Major risk factors pinpointed in the current study was age above 33, pregnancy related factors, disorders etc. Among 97 subjects, 49% (n=48) cases were having no risk factors but 25% (n=24) cases observed with age followed by 22% (n=21) with disorders and 4% (n=4) with pregnancy related as risk factors. This corresponds with the study conducted by Larry Jones *et al*^[15]. They observed that advanced maternal age of 35-39 years, consumption of Tran's fatty food, and a family history of hypertension and history of previous pre-term delivery were found to be significantly associated with Pregnancy-induced hypertension.

Mode of delivery of patients were noted and it includes normal delivery and cesarean section. Most of the patients delivered by cesarean section; might be due to the seriousness of condition or previous history as C-section. This was analogous to the study conducted by Solwaya Ngwenya^[16]. C-section was an important maternal complication observed in our study and this may be due to delayed presentation or lack of time to consider normal delivery. This was unrelated to the study conducted by Dr Anujeet Kaur Randhawa *et al*^[17]. They observed that majority of patients were having vaginal delivery.

Hypertensive disorders developed during pregnancy may lead to maternal complications during and after the delivery. In this study, cesarean section were identified as the important complications and 72% (n=70) subjects having C-section as mode of delivery.31% (n=30) having preterm delivery followed by 15% (n=15) spontaneous abortions and 11% (n=11) with seizures and 5% (n=5) with placental abruption, 4% (n=4) with blood clotting problems and 1% (n=1) pulmonary edema and depression had recognized as maternal complications in the collected cases. This was related to the study conducted by Nankali A *et al*^[18].

In pregnancies complicated by hypertensive disorders there was an increased risk of antagonistic fetal and neonatal consequences. In this study, it was observed that 18 cases were having Oligohydramnios, 11 with IUGR, 10 fetal distress and 7 with placental infarction. There was no cases observed with intra uterine asphyxia. This was analogous to the study piloted by C.S. Madkar *et al*^[19]. Complications ripened during pregnancy may be due to the abnormal development of blood vessels and this may be due to insufficient blood flow to the uterus, damage of blood vessels or immunological or genetic factors.

In this present study the adverse fetal outcomes observed includes fetal death (n=4). It may be due to severity of condition and also inadequate follow up of physician. In this study patients with mild diseases had an improved outcome. This was analogous to the study led by Dr. Anujeet Kaur Randhawa *et al*^[17]. They observed that eclamptic patients had increased risk of such outcomes.

Patient counselling provided to all patients in order to increase patient knowledge about diseases, drugs, life style modifications and all. Majority of patients were unaware about the seriousness of disease and related complications and also importance of medication to control BP. To strengthen the verbal instructions patients were stipulated with a leaflet. This includes all informations regarding the foods that can be used and avoided, exercises, general instructions to be followed and also advices on medication use, storage of drugs and drug side effects.

Clinical pharmacist play a major role in improving patient knowledge and medication adherence by provision of patient counselling and patient information leaflet regarding the life style modifications. This was corresponding to the study directed by J. Jayasutha *et al*^[8]. They detected that patient's adherence improved through pharmacist interventions.

In the present study MMAS-4 item is used and scoring was done before and after counselling. The result showed that 92 cases expanded adherence after intervention. It was analyzed by chi-square method. P- Value (0.00) obtained denoted that there was a significance difference in medication adherence before and after provision of counselling. This shown that the interventions were successful. However the previous study done by Lavanya *et al*^[20], few cases were non- adherent and it was in contrast to our findings, in this study no cases shown non-adherent after interventions.

This study was only limited in a private hospital sector and it should be extended for improving outcome and benefits to the society and more data related to non-adherence should be collected and assessed inorder to strengthen the results. High consumption of fatty foods which is a factor for PIH is not measured in this hospital.

Further study should be conducted to access the birth outcome on effect of PIH. Health education programs should be conducted in community on factors leading to development of PIH. All pregnant women should be screened to identify PIH for proper hypertensive management.

CONCLUSION

Hypertensive disorders of pregnancy are the second most common disorder observed during pregnancy. Prevalence of hypertensive disorders was more in patients with previous history of hypertension, increased age, BMI, other co-morbid conditions. The key objective of study was to gauge the impact of hypertensive disorders of pregnancy and role of clinical pharmacist in hypertensive management. Also to pinpoint the maternal and fetal complications progressed due to this disorder.

Patient counselling and PILS provided to all patients and medication adherence and knowledge about disease were improved after intervention. All pregnant women should be screened for PIH at the first prenatal visit and periodical follow up must be needed. Health care professionals should step up patient counselling and PILS on disease, proper use of antihypertensives, storage of medicines and life style modifications.

PIH is a serious medical condition and if kept untreated may lead to adverse fetal and maternal outcomes. Early recognition and accurate supervision of patients regarding drug use, strict fluid balance, and optimum time of delivery along with life style modifications can control the consequences of this disorder.

ACKNOWLEDGEMENTS:

The authors are grateful to the authorities of Gynaecology & obstetrics department of the hospital , Perinthalmanna for the facilities.

CONFLICT OF INTEREST:

The authors declare no conflict of interest.

FIGURES

1. AGE WISE DISTRIBUTION

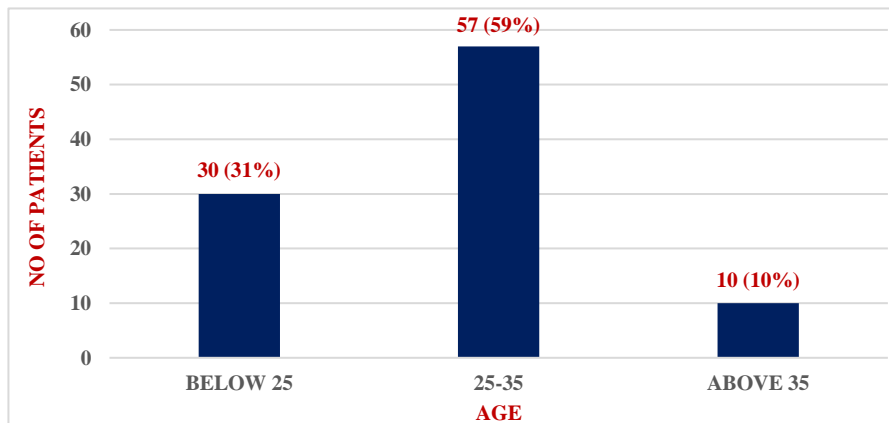
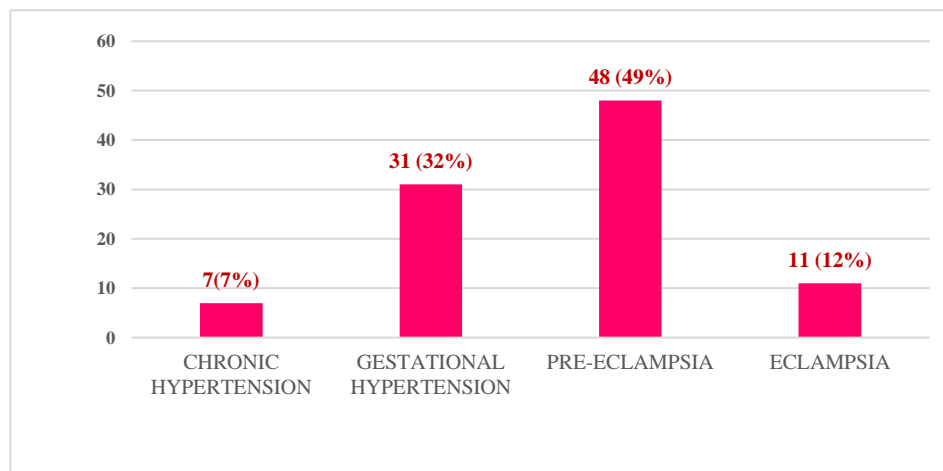


FIGURE 1

2. STAGES OF HYPERTENSION



3. ANTIHYPERTENSIVE THERAPY

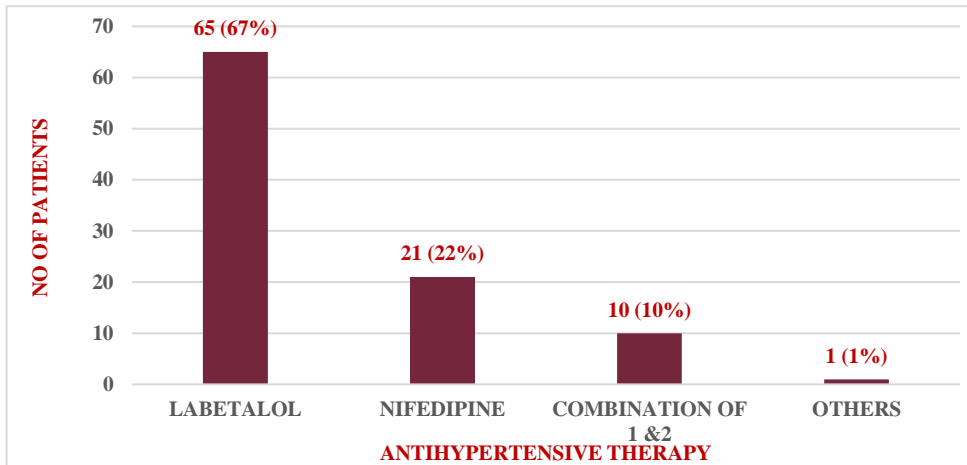


FIGURE 3

4. RISK FACTORS

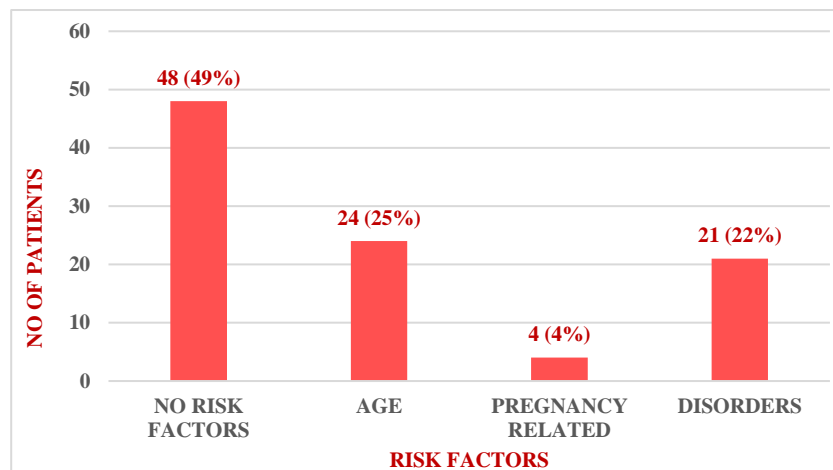


FIGURE 4

5. MODE OF DELIVERY

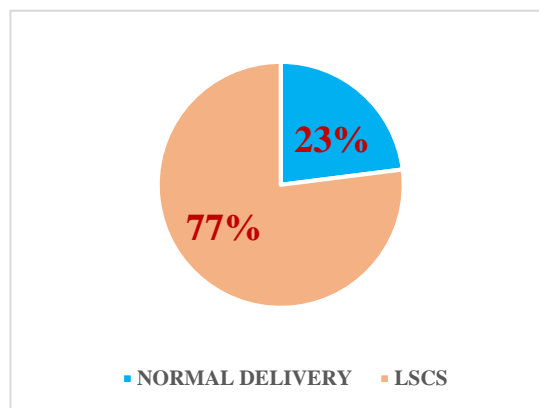


FIGURE 5

6. MEDICATION ADHERENCE

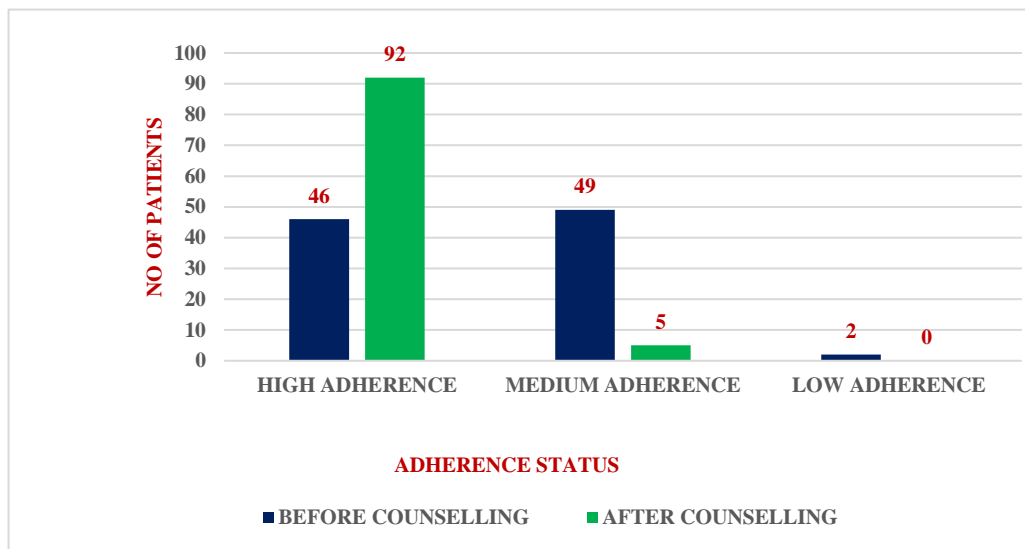


FIGURE 7s

References

- i. Kavita Babbar, Meena Armo, Rajib Lochan Bhanja. A comparative study of efficacy of antihypertensive drugs and fetomaternal outcome in the treatment of pregnancy induced hypertension. *Int J Reprod Contracept Obstet Gynecol* 2015; 4(6): 1846-52.
- ii. Ravikant Patel, Hinal Baria, Hinaben R. Patel, Sunil Nayak. A study on pregnancy induced hypertension and foetal outcome among patient with PIH at tertiary care hospital, Valsad. *International Journal of Community Medicine and Public Health* 2017; 4(II): 4277-81.
- iii. Minimol. P.V, Dr. C I Sajeeth, Mrs. Thangamani. Prevalence, Risk factors and current treatment strategies for PIH in various hospitals-Palakkad. *International Journal of Pharmacy and Pharmaceutical Research* 2016; 6(3): 88-101.
- iv. Dr J B Sharma. Text book of obstetrics. Hypertensive disorders of pregnancy: 422-43.
- v. Tarig Karar *et al.* Assessment of Biochemical Changes in Pregnancy Induced Hypertension (PIH) among Saudi Population at KAMC-Riyadh. *BJMMR* 2016; 15(10): 1-6.
- vi. Dr. Deepanjali Lomte. An open label, prospective, single center study to evaluate the efficacy of methyldopa & labetalol in treatment of patients with pregnancy-induced hypertension. *WJPS* 2015; 4(9): 1235-41.
- vii. Sushrut D, Girija. Labetalol-An Emerging first line drug for PIH. *Indian Journal of Clinical practice*; 23(10): 640-41.
- viii. J. Jayasutha, A.M. Ismail, R. Senthamarai, Sandesh Kumar Visoriya. Assessment of impact of pregnancy-induced hypertension and patient counseling on pregnancy outcome. *BioMedRx* 2013; 1: 86-89.
- ix. Sagar B Bhagat, Ketaki C Patil. Analysis of the current trend in the prescription of anti-hypertensive drugs among pregnant females in a tertiary care hospital. *Int J. of Res. In Pharmacology and Pharmacotherapeutic* 2014; 3(4): 358-65.
- x. Dr Gogaram, Dr Hanuman Prasad, Dr Sarad Misha. Prevalence of pregnancy induced hypertension in Churu District. *Indian Journal of Basic and Applied Medical Research* 2018; 7(3): 271-76.
- xi. Ahmed Hussein Subki *et al.* Prevalence, Risk factors and foetal and maternal outcomes of hypertensive disorders of pregnancy. *Oman Journal* 2018; 33(5): 409-415.
- xii. Mahmoud Alalfy, E. Eltaieb and Mahmoud. Soliman. Labetalol in Comparison to Methyl Dopa in Treatment of Gestational Hypertension, a Randomized Trial. *Journal of Gynecology Research* 2014; 4(1): 1-10.
- xiii. Vidya A. Thobbi and Afreen Anwar. A study of maternal morbidity and mortality DUE to Pre eclampsia and eclampsia. *BMJ* 2016; 6: 1-11.
- xiv. Manjusha Sajith, Vandana Nimbargi, Amit Modi, Ronak Sumariya, Atmaram Pawar. Incidence of pregnancy induced hypertension and prescription pattern of antihypertensive drugs in pregnancy. *IJPSR* 2014; 5(4): 163-70.
- xv. Larry Jones *et al.* Risk Factors Associated with Pregnancy Induced Hypertension in the Hohoe Municipality of Ghana. *J Prev Med Health* 2017; 1(3): 1-8.
- xvi. Solwaya Ngwenya. Severe pre-eclampsia and eclampsia: Incidence, complications, & perinatal outcomes at a low resource setting, Mpilo Central Hospital, Bulawayo, Zimbabwe. *International J of women's: Health* 2017; 9: 353-57.

-
- xvii. Dr. Anujeet Kaur Randhawa, Dr. Amarbir Singh, Dr. Sudersan Kapoor. Pregnancy induced hypertension: A retrospective study of 200 cases of pregnant women. IOSR JDMS 2016; 15(6): 36-43.
- xviii. Nankali A, Malek Khosravi Sh, Zangeneh M, Rezaei M, Hemati Z, Kohzadi M. Maternal complications associated with severe pre-eclampsia. The Journal of obstetrics and gynecology of India 2013; 63(2): 112-15.
- xix. C.S Madkar, Garima Sinha, Shankar Burute, Mangal S. Puri, Pankaj Prakash Salvi. Effect of PIH on maternal and fetal outcomes. Indian Journal of Obstetrics and Gynecology, Research 2018; 5(1):20-26.
- xx. Lavanya S *et al.* Impact of Clinical Pharmacist Education Knowledge of Pregnancy Induced Hypertension among Pregnant Women. IJPTP 2015; 6(4): 2603-08.