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RESEARCH ARTICLE

A HOSPITAL-BASED STUDY OF "THE IMPACT OF PREGNANCY INDUCED HYPERTENSION (PIH) ON MATERNAL AND FETAL HEALTH

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ABSTRACT

Background of the Study: Hypertension or high blood pressure is a complex public health problem. It refers to the Persistent elevation of Arterial blood pressure as hypertension gradually increases the pressure of blood flowing through the arteries thus can cause damaged and narrowed arteries. There occurs stiffness of arteries because the space in the arteries is narrower, the same amount of blood passing through them increases the blood pressure. Veins can constrict to reduce their capacity to hold blood, forcing more blood into the arteries. As a result, blood pressure increases. The higher the blood pressure in a community the higher is the risk of other health complications. Blood pressure elevations are associated with an increased risk of cardiovascular diseases such as cardiac arrest or coronary heart diseases. Starting at a blood pressure of 115/ 75 mmHg, every increase of 20mmHg in systolic blood pressure (SBP) and/or increase of 10mmHg in diastolic blood pressure (DBP) is associated with the doubling of the risk of death (Lewington,2002). **Aims and Objectives:** This research work was aimed to provide Pregnancy Induced Hypertension (PIH), a common complication affecting maternal and fetal health. This hospital-based study at SKIMS Soura Srinagar was aimed to investigate the prevalence of PIH and its associated maternal and fetal outcomes in a cohort of 150 patients. **Methods:** Data was collected from the medical records of pregnant women diagnosed with PIH between June 2023 and November 2023. Demographic information, clinical characteristics and neonatal outcomes were analyzed. The prevalence of PIH was found to be 40%. Maternal complications such as Preeclampsia, Eclampsia, Chronic hypertension, Gestational hypertension and Preeclampsia Superimposed on Chronic Hypertension were observed in 67%, 10.99%, 3.33%, 13.33%, 7% of cases respectively. Adverse fetal outcomes including preterm birth, low birth weight and IUGR were noted in less than 10% of pregnancies complicated by PIH. **Results:** The study observed a total of 32 patients with 4 diagnosed with transient eclampsia, 5 with eclampsia, 15 with pre-eclampsia, and 8 with gestational hypertension. Through meticulous analysis, researchers sought to elucidate the potential correlation between exposure to secondhand smoke and the severity or incidence of these conditions among pregnant individuals. The findings of this research endeavor hold significant implications for public health policies and interventions aimed at mitigating the adverse effects of secondhand smoking on vulnerable populations, particularly pregnant women and their unborn children. In the observed cohort, it was noted that the most administered drug among patients was Gravidol, prescribed at a dosage range of 50-100mg per day. Gravidol, known for its efficacy in managing various pregnancy-related conditions, was carefully administered under the supervision of healthcare professionals to ensure optimal maternal and fetal outcomes. **Conclusion:** The conclusions drawn from this study emphasize the critical importance of early detection, vigilant monitoring, and proactive management of Pregnancy-Induced Hypertension (PIH) to mitigate adverse maternal and fetal outcomes. Through comprehensive management protocols, including pharmacotherapy, dietary modifications, and lifestyle interventions, healthcare teams can effectively control PIH and minimize its detrimental effects on maternal and fetal health. Overall, the study underscores the imperative for proactive and integrated care approaches to PIH, emphasizing the importance of early intervention and ongoing monitoring to optimize pregnancy outcomes and ensure the well-being of both mother and baby.

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INTRODUCTION

Hypertension constitutes an important risk factor for heart, renal and stroke along with Eye complications. This is also the reason that Hypertension is also regarded as a **Silent Killer**.

Hypertension in pregnancy: Hypertension is also the leading risk factor for pregnancy. Hypertensive disorders are the most significant and intriguing unsolved problems in obstetrics and can complicate up to 5 - 10 % of all Pregnancies and together they are one of the members of deadly triad along with hemorrhages and infection that contributes greatly to maternal morbidity and mortality. Most of the hypertensive women during pregnancy are unaware of blood pressure elevations which can risk their lives and even the fetus is at higher risk of death.

Hypertensive disorders in pregnancy includes

- Gestational hypertension
- Chronic hypertension of any etiology
- Preeclampsia and eclampsia syndrome
- Preeclampsia superimposed on chronic hypertension (American College of Obstetrician & Gynecologists)

Gestational hypertension: Gestational hypertension is characterized by blood pressure that reaches 140/90mmHg or greater for the first time after mid pregnancy 2nd trimester which starts from 13 weeks (about 3 months) and ends up to 27 weeks (about 6 months). The patient with only gestational hypertension lacks proteinuria Therefore the criteria required for gestational hypertension is BP>140/90mmHg after 20 weeks (about 4 and a half months) in previously Normotensive women. Generally, Gestational hypertension is sub-classified into transient hypertension where GH does not develop into preeclampsia and BP returns to normal by 12 weeks (about 3 months) postpartum. However, almost half of the GH women develop preeclampsia.

NOTE:

Some of the patients ignore the elevation in BP as no proteinuria has been seen but it makes their condition worse with high fetomaternal complications. Eclampsia seizures occur before the overt proteinuria can be detected.

Local

- In the Department of Obstetrics and Gynecology at GMC and AH Rajouri, Jammu & Kashmir, India, Neelam Sharma, Chander Sheikher, and Amatul in 2023 evaluated the fetomaternal outcome in teenage pregnancy and came to the conclusion that teenage pregnancy is linked to a high risk of anemia, pre-eclampsia, eclampsia, PTVD, instrumental delivery, a high rate of LSCS, prematurity, low birth weight, and perinatal death.
- Misba Khan and Mudasir Maqbool examined the common pathophysiological alterations brought on by PIH and found that a generalized vasospasm was caused by an imbalance between the vasoconstrictor thromboxane and the vasodilator prostacyclin. Vasoactive chemicals are released as a result of endothelium injury. As a result, the extravascular volume increases and the intravascular volume decreases. Placental insufficiency

leads to difficulties because of this [Haram *et al.*, 2000; Granger *et al* 2001a; Chandiramani *et al.*, 2010]. These problems are reduced when antihypertensive medications are used to control hypertension during pregnancy. Antihypertensive medications that are most used during pregnancy include labetalol, methyldopa, Nifedipine, and β Adrenoceptor antagonists [Ghanem, F.A. and Movahed, A., 2008]. In our nation, these medications are routinely taken in combination or alone during pregnancy. Each of these medications acts in a unique way. Nifedipine is a vasodilator and calcium channel blocker. Methyl dopa is centrally acting antihypertensive. Labetalol is both α and β blocker. There were no clinical studies in which these drugs were compared in the same setting, when used orally with respect to their antihypertensive efficacy, side effects, maternal and neonatal outcome both in mild and severe PIH.

- In the district of Srinagar in Jammu and Kashmir 2017 Rouf Hussain rather, S.Mohammad Salim Khan and Shahnaz Daing conducted a small community based longitudinal study on the incidence of PIH in pregnant Kashmiri women and found that out of 100 pregnant female 40 got PIH. Preterm delivery, IUGR, neonatal death, and maternal morbidity and mortality are all significantly influenced by PIH. Furthermore, the diagnosis of preeclampsia was made if the hypertension was accompanied by proteinuria, and gestational hypertension was made if it was not.
- According to S.N. Ain *et al.*, pregnant women who are older and/or have a higher BMI are more likely to experience prenatal PIH. Women whose spouses smoked had increased PIH frequencies (the link was nearly significant). The previous history of PIH was linked to PIH in the current pregnancy, and it was advised to get married earlier and change one's lifestyle to keep one's BMI within a normal range.
- In a cross-sectional study on the prevalence and diagnosis technique of postpartum hypotension in pregnant Kashmiri women in the Hajin area, Dr. Reyana Qulsum *et al.* found that accurate blood pressure monitoring is essential for all pregnant women during prenatal exams in order to detect and treat hypertension early.

National

- Pregnancy-induced hypertension was more common in young primigravida (20–24 years old), and headache complaints were the most common presentation. The most frequent maternal problem was preterm labor, and the most common fetal complication in pregnancy-induced hypertension was prematurity. The most typical delivery method was vaginal birth. Significant thrombocytopenia was found in blood tests in Reduced prothrombin time and eclampsia in gestational hypertension.
- Joint research on the impact of hypertensive medications was done by **Kavita Babbar *et al.***, and the results indicated that labetalol and Nifedipine are safe to use during pregnancy due to the lower correlation between the negative effects experienced by the mother and the fetus and the greater hypotensive activity. Less risky and more rapid than reaching appropriate blood pressure management while significantly extending the pregnancy's duration and using fewer consequences when used to treat hypertensive problems in pregnant

women as well as the newborn. Apollo Hospital's Department of Cardiology and Obstetrics & Gynecology, located in Bilaspur, Chhattisgarh, 2015.

- From February 2009 to January 2010. A prospective randomized trial was conducted in the department of Obstetrics Loni India.

Conclusion of their Trial: PIH is a prevalent medical condition that is linked to pregnancy in rural populations, particularly in young primigravida who do not register as pregnant. Early detection and institutional care can lower maternal and fetal morbidity and mortality

According to Vishal Sharma *et.al* (2016)

Higher levels of beta HCG are linked to more severe PIH, and the serum beta HCG estimation t mid- Trimester (13-20 weeks) is a good predictor of PIH

- **Devika Gupta, S.kanta and Rita Thakur** concluded that optimal birth timing, early diagnosis and timely multidisciplinary treatment and routine prenatal checkups all lower the risk of complications and maternal death, perinatal mortality will go down these instances are managed and referred to enter with cutting edge neonatal facilities as soon as possible.

International

- **Salah Rosdy, Maamon Rajab Lina Katia *et.al* (2009)** Saudi Arabia, conducted a long-term prospective study on the impact of obesity on fetomaternal health and concluded that it is increased with the higher risk of preeclampsia, gestational diabetes, cesarean delivery and macrosomic infant.
- In a long-term comparative study of pregnancy-induced hypertension and infant mortality, XK Chen, SW Wen, G Smith, Q Yang, and M Walker (2000) found that the reduction in neonatal mortality among preterm singletons associated with PIH was greater in small-for-gestational age infants than in infants with normal growth, and stronger in infants born to nulliparous women than in infants born to multiparous women. As a result, in preterm births, PIH is linked to a lower infant death risk, while in term births, a higher risk.
- After analyzing data from population based retrospective cohort analysis involving 354944 Singleton birds in the USA Qiu ying Yang *et al* all came to the conclusion that maternal cigarette smoking lowers the incidence of PIH and eclampsia with eclampsia showing and apparent significance inverse exposure response connection.
- **Elizabeta Zisovska 2019 *et al.*** Came to conclusion that PIH may have an impact on this change in the postpartum growth and that in the IUGR baby's change in infant growth (example catch up development) during the critical early infant. May potentially have long term impacts on health later in the life so it is essential to research the postpartum baby growth rates of the infant bond to moms with PIH.
- The factors associated with PIH recurrence in a second pregnancy was explored by Sigrun Hjartardottir, MD, *et al.* And they concluded that while recurrence of hypertension problems in pregnancy is relevant it's not type specific recurrent hypertensive problems during pregnancy are linked to overweight and weight gain

during gestational hypertension and women regardless of body weight and early development of hypertension is risk factor

PREECLAMPSIA SYNDROME

Preeclampsia is pregnancy specific syndrome and affects virtually every organ system. It is more than simply gestational hypertension with proteinuria. The main primary diagnostic criterion of preeclampsia is appearance of proteinuria as it is objective marker and reflects the system wide endothelial leak. It can also lead to clotting issues that may affect organs, such as the liver and kidney. It occurs in 1 in 25 pregnancies and generally develops during the 3rd trimester (37-42 weeks). Preeclampsia can be divided into

- Early onset < 34 weeks (about 8 months)
- Late onset \geq 34 weeks (about 8 months)
- Preterm onset < 37 weeks (about 8 and a half months)
- Term onset \geq 37 weeks (about 8 and a half months)

Some women with preeclampsia neither overt proteinuria nor fetal growth restriction. So, other diagnostic criteria are developed. Multi organ involvement may be diagnosed with Thrombocytopenia, Renal insufficiency, Liver involvement, cerebral symptoms, pulmonary edema.

Indicators of Severity of Gestational Hypertension

ABNORMALITY	NONSEVERE	SEVERE
Systolic BP	<160mmHg	\geq 160mmHg
Diastolic BP	<110mmHg	\geq 110mmHg
Proteinuria	None to positive	None to positive
Headache and Visual disturbance along with upper abdominal pain	Absent	Present
Convulsions (Eclampsia)	Absent	Present
Serum creatinine Serum transaminase elevation	Normal Minimal	Elevated marked
Fetal growth restriction	Absent	Present

When does preeclampsia develop into eclampsia?:

Eclampsia seizures can occur antepartum, 20 weeks (about 4 and a half months) after gestation, intrapartum and postpartum. Eclampsia is a very serious complication of preeclampsia, which is characterized by one or more seizures during pregnancy or in the postpartum period. The preeclampsia is the precursor of eclampsia. If not diagnosed and recognized on time, eclampsia can risk both fetus and mother. Therefore, *eclampsia is the onset of generalized tonic-clonic seizures in a woman with preeclampsia.* The exact cause of eclampsia is still unclear despite the advances in the understanding of preeclampsia. It is proposed that there is increased permeability of blood brain barrier during preeclampsia, which causes an alteration to the blood flow due to impaired Autoregulation.

Chronic hypertension: Chronic hypertension in pregnancy is the blood pressure \geq 140 mmHg systolic and/or 90 mm Hg diastolic before pregnancy or 20 weeks (about 4 and a half months)' gestation. Chronic hypertension in pregnancy is associated with the host of adverse outcomes that include Preeclampsia, cesarean delivery, cerebrovascular accidents, fetal growth restriction, preterm birth, and maternal and perinatal death. Most Gravidas have essential primary

hypertension and a >20% risk of superimposed preeclampsia but generally experience successful gestation. Essential hypertension which in young women is often stage 1 (Bp 140-150/90-99), may remain unrecognized because of the early physiological decrease in blood pressure, and then incorrectly labeled Gestational hypertension or preeclampsia when frankly abnormal values appear after midgestation. Any chronic hypertensive disorder predisposes a woman to develop superimposed preeclampsia syndrome. It is diagnosed when pre-eclampsia occurs in a patient with preexisting chronic hypertension.

NOTE: Blood pressure needs to be recorded for several days before diagnosis of hypertension is made. BP is recorded twice daily, ideally in the morning and evening. Two consecutive readings are undertaken, at least a minute apart and with the person seated. The average value of all measurements is taken to confirm hypertension.

Epidemiology of pregnancy induced hypertension: PIH is relatively common, affecting about 6-8% of pregnancies worldwide. The prevalence can vary by region, population, and risk factors.

Risk Factors: Women with certain risk factors are more likely to develop PIH. These risk factors include obesity, maternal age (being very young or older than 35), a history of high blood pressure, diabetes, multiple pregnancies (e.g., twins or triplets), and certain medical conditions.

Gestational Age: PIH typically develops after 20 weeks (about 4 and a half months) of gestation but can occur earlier in some cases

Complications: If left untreated, PIH can lead to more serious conditions like preeclampsia and eclampsia, which can be life-threatening for both the mother and baby.

Maternal and Fetal Outcomes: PIH can result in various complications for both the mother and baby, including preterm birth, low birth weight, and the need for cesarean delivery.

Racial Disparities: Some studies have suggested that there may be racial and ethnic disparities in the prevalence and outcomes of PIH, with higher rates among certain ethnic groups

Geographic Variations: The prevalence of PIH can vary by region and country due to differences in healthcare access, socioeconomic factors, and population demographics.

Management: Timely diagnosis and management of PIH through prenatal care are crucial in preventing complications. This may involve lifestyle changes, medication, and close monitoring.

Etiology: The exact cause of pregnancy-induced hypertension (PIH) is not known. However, several factors are believed to contribute to its development.

Placental issues: Problems with the placenta, such as inadequate blood flow or abnormal development, can disrupt the normal regulation of blood pressure during pregnancy.

Hormonal changes: Hormonal shifts during pregnancy can impact blood vessel function and contribute to hypertension.

Immune system factors: An abnormal immune response to pregnancy may play a role in PIH.

Genetic predisposition: A family history of hypertension can increase the risk of developing PIH.

First pregnancy / Primigravida: PIH is more common in first pregnancies, suggesting that a woman's body may take time to adjust to the physiological changes of pregnancy.

Age and obesity: Older mothers and those with obesity are at a higher risk of developing PIH. It's essential for pregnant individuals to receive regular prenatal care to monitor blood pressure and detect PIH early to manage it effectively.

Differences Between Mild and Severe Preeclampsia

Parameters	Mild	Severe
Clinical parameters Sys. BP (mmHg)	140-60	≥160
Diastole BP (mmHg)	90-110	≥110
Headache, Visual disturbances, epigastric pain	Absent	Present
Laboratory parameters Urinary output	>500ml/24 hours	≤500ml/24 hours
Urinary protein	<5g/24 hours	≥5g/24 hours
IUGR	Not evident	Marked

METHODS

Study Area: The Centre of Research: In Srinagar District, the hospital-based research was carried out from June 2023 to November 2023. The participants in the study were residents of both the surrounding districts and the neighboring areas of Srinagar. Srinagar has more than dozens of hospitals but we carried out our regress study in Maternity Hospital SKIMS, Soura during OPD hours between 10AM to 4PM, where patients from Srinagar and its neighbouring areas even from villages came to diagnose and treat their diseases such as Hypertension.



For comparison studies, we included both normotensive and hypertensive pregnant individuals. In this hospital, the patients were receiving follow-up care for their illnesses. On various follow-up days, multiple readings were obtained. We tried to comprehend the effects of hypertension on these various expectant mothers as well as the fetal consequences of PIH in this way

Objectives

- To analyze the influence of maternal age on hypertension
- Interrelations of Gravidity and Hypertensive Disorders of Pregnancy
- Relationship of Smoking to PIH
- Obstetric outcome of PIH
- Association of PIH with other morbidities

Instrument used: We used a device called a Sphygmomanometer, which is more commonly known as a Blood Pressure Cuff, to measure blood pressure. There, we used the Digital Sphygmomanometer. The most cutting-edge sphygmomanometer in terms of technology is the Automatic Digital Model. Blood pressure is measured using an electronic sensor, and the results are shown on a digital monitor. The device measures the variations in the arteries to determine blood pressure.

Location of measurement : The brachial artery is the usual site of blood pressure measurement. It is important to remember that systolic and diastolic pressure differ significantly in different parts of the arterial tree, with systolic pressure rising and diastolic pressure falling as arteries become farther distal. The subject rested for at least five minutes while seated, and a validated digital sphygmomanometer was used to place an appropriately sized cuff on the right arm.

Medication use: Every medication prescribed in the months prior was documented. Patients were asked to present all of their prescription medications to prevent underreporting. Every medication's trade name was noted. The drug names were reported in accordance with the WHO's recommended Anatomic Therapeutic Chemical classification.

Eligibility criteria

Inclusion criteria: All pregnant women who were on follow up and visited SKIMS maternity hospital for delivery service whose gestational age 34 – 40 weeks (about 9 months) were included. Women who represented the cases were diagnosed with pregnancy-induced hypertension if their SBP was greater than 140 mmHg and their DBP was greater than 90 mmHg. Women who were receiving delivery care in identical medical facilities and who represented the Control group were not diagnosed with pregnancy-induced hypertension.

Exclusion criteria: Women who were not willing to give permission or who had a known diagnosis of a neurological condition like epilepsy were also excluded from the study.

Sample size: The sample size for this study is 150 pregnant patients which was obtained after 5% unresponsive rates. Each pregnant PIH lady gave verbal informed consent prior to data collection. The respondent's right to refuse or end the study at any moment preserved their dignity. By keeping the information private and only using it for the purpose of the study, as well as by destroying it once it was finished, confidentiality of the data was preserved. The respondent's right to refuse or end the study at any moment preserved their dignity. By keeping the information private and only using it for the purpose of the study, as well as by destroying it once it was finished, confidentiality of the data was preserved. Face to face interview was conducted at the separate corner of the

room using a structured questionnaire. Obstetrics and gynecology professionals used the patient's medical history, physical examination, and aberrant PIH profile to confirm the diagnosis of the cases and their kinds (preeclampsia, eclampsia, gestational hypertension etc.)

Microsoft Excel 365 was used to analyze the data and plot the graphs for the study.

Dependent variables

Fetomaternal outcomes of pregnancy induced hypertension.

Independent variables.

Socio demographic variables, maternal age, residence, educational status, occupation

Medical variables.

Previous history of pregnancy induced hypertension. History of early surgeries, Renal disease, Obesity etc.

Hypertensive disorders

Signs and symptoms of pregnancies on admission, level of blood pressure during visit, vomiting, proteinuria, Typical symptoms like headache, gastric pain, etc.

RESULTS:

The research study was carried out at SKIMS Maternity Hospital, Srinagar. Following a proper structured protocol on Pregnancy Induced Hypertensive Patients visiting for regular checkups were evaluated.

Comparison between Hypertensive patients and Normotensive patients: In the present study concerning the hypertension among pregnant women, 150 patients were evaluated as depicted in Table 1 and Fig 1.

Table 1. Showing the comparison between number of Normotensive and hypertensive patients

S.NO	Patient type	Frequency
1	Normotensive	90
2	Hypertensive	60

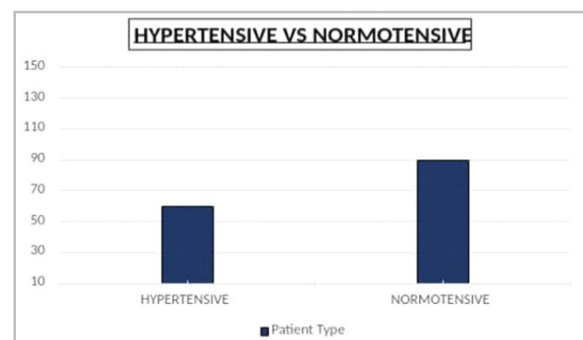


Fig. 1. The frequency of normotensive patients is more predominant than hypertensive patients

Age group and Hypertension: Out of total 60 Hypertensive patients, 2 Patients were in the age group of (18 to 25) and both were 25 years old.

Table 2: Age wise Observations

Age group	Number of patients	Average age observed
18 to 25	2	25
26 to 33	40	27 to 32
34 to 41	18	35 to 37

40 patients belong to the age group of (26 to 33) mostly 26 to 33 years old and 18 patients were in the age group of (34 to 41) mostly 35 to 37 years old

Showing age wise breakup of all the patients enrolled in this study

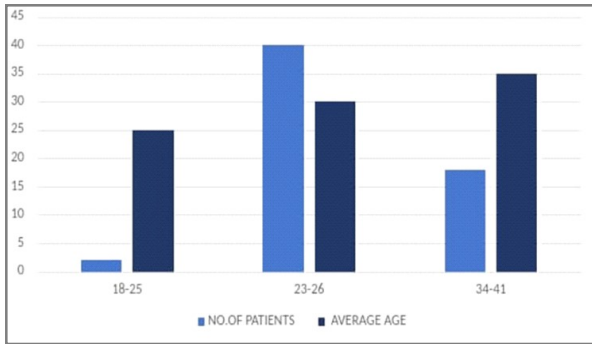


Fig. 2. Graphic representation of age wise distribution of case studies

Table 2. It is evident that Hypertension in the case of group 2nd (26 to 33) age group is more prevalent than other age groups

Obstetric outcome of pregnancy is complicated by hypertensive disorders

- Pre-eclampsia.
- Eclampsia.
- Gestational hypertension.
- Chronic Hypertension.
- Preeclampsia superimposed on chronic hypertension.

Table 3. The pre-eclampsia & eclampsia is more predominant among all PIH complications by 76.6%

Hypertensive complication	Patients	Percentage
Preeclampsia + Eclampsia	46	76.6%
Gestational hypertension	8	13.33%
Chronic hypertension	2	3.33%
Superimposed preeclampsia	4	6.66%

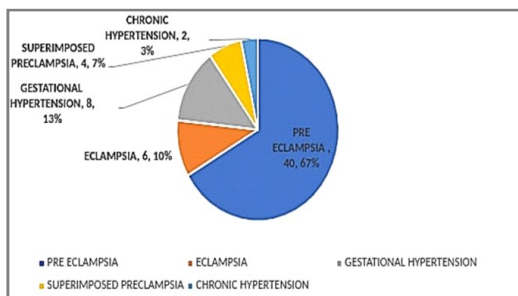


Fig 3: Representation of the prevalence of hypertension disorders in pregnancy

Out of total 60 hypertensive cases, 40 patients were of pre-eclampsia. 8 having gestational hypertension and 4 of pre-Eclampsia superimposed on Chronic Hypertension and 2 of

chronic hypertension. Prevalence of pregnancy induced hypertension in Primigravida and multigravida. Out of total 60 PIH patients, 21 patients belong to Primigravida group & 39 in Multigravida as described below:

Table 4. In the above table it is observed that the higher instances of PIH are seen mostly in Multigravida pregnancies

S.No.	PATIENT TYPE	PERCENTAGE
•	PRIMIGRAVIDA	21 35 %
•	MULTIGRAVIDAS	39 65 %

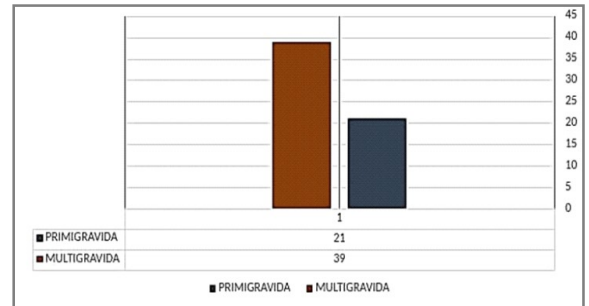


Fig. 4. Multigravidas are at higher risk of maternal morbidity and mortality due to PIH

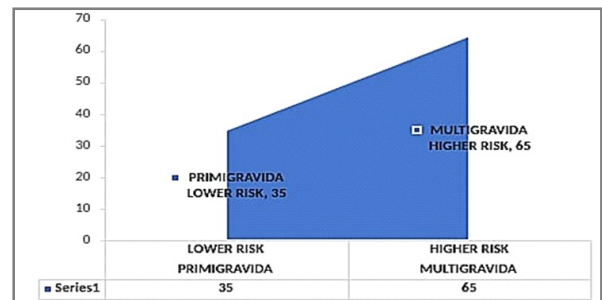


Fig 5. Higher Risk of PIH due to Presence of Multigravidity

The Association between secondhand smoking exposure and PIH

Table 5. Representation of PIH complication in patients having smoking partners

Age	No.of patients with smoking partners	PIH Complication
27	3	Transient hypertension
29	5	Eclampsia
30	10	Preeclampsia
31	2	Gestational hypertension
35	6	Gestational hypertension
36	1	Transient hypertension
37	3	Preeclampsia

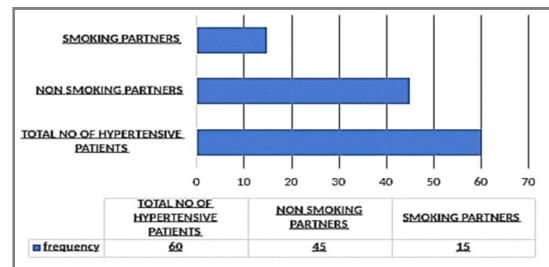


Fig 6. Represents the patients with smoking and non-smoking partners

DISCUSSION

The findings of this study revealed a concerning prevalence rate of high blood pressure induced by pregnancy among

women attending the hospital, with 60 out of 150 pregnant patients (40%) affected. This high prevalence underscores the significant burden of hypertensive disorders during pregnancy and the potential implications for maternal and fetal health outcomes. High blood pressure during pregnancy poses a serious risk to both the mother and the fetus, potentially leading to a range of complications that can significantly increase morbidity and mortality rates. If left unmanaged, pregnancy-induced hypertension can escalate into more severe conditions such as preeclampsia or eclampsia, which are associated with life-threatening complications including seizures, organ damage, and even maternal death. Moreover, Hypertension during pregnancy can compromise fetal well-being by impairing placental function and restricting oxygen and nutrient delivery to the developing fetus. This can result in intrauterine growth restriction, preterm birth, and other adverse fetal outcomes. The identification of high blood pressure during pregnancy is therefore critical for initiating appropriate preventative measures and management strategies to mitigate the risks to both the mother and the fetus. Timely monitoring, early detection, and comprehensive management protocols, including medication, lifestyle modifications, and close antenatal care, are essential in preventing the progression of hypertension and reducing the likelihood of adverse outcomes. Failure to implement effective preventative measures and adequately manage pregnancy-induced hypertension can indeed serve as the initial root cause of maternal death or serious illness.

Therefore, proactive efforts to address hypertension during pregnancy are imperative to safeguard maternal and fetal health, highlighting the critical role of healthcare providers in ensuring optimal pregnancy outcomes. Moreover, the population demographics in different regions of India can significantly influence research outcomes. Variations in lifestyle practices, cultural norms, socioeconomic status, access to healthcare facilities, and health-seeking behaviors among pregnant women can all contribute to differences in the prevalence and severity of PIH. For instance, dietary habits, level of physical activity, exposure to environmental pollutants, and genetic predispositions may vary between populations, potentially influencing the incidence and management of PIH. Furthermore, cultural beliefs and traditional practices surrounding pregnancy care can influence healthcare-seeking behavior and adherence to medical advice, thereby impacting the observed outcomes. Understanding these contextual factors is crucial for interpreting and contextualizing research findings, as they highlight the importance of culturally sensitive and tailored interventions to effectively address PIH and its associated complications across diverse populations in India. In summary, while the findings align with those reported in other parts of India, it is essential to recognize and account for minor discrepancies stemming from differences in study parameters, methodology, and population characteristics. By acknowledging these nuances, healthcare professionals can better tailor interventions and strategies to address the unique needs and challenges posed by PIH in various regions of the country. Multiple risk factors associated with pregnancy-induced hypertension were also found in the present study. The family history of PIH elevated the probability of having PIH by practically five times. This may have happened because of the genetic components that support PIH's physiological tendency to do so. Moreover, Age is another important associated factor which contributes beneficially for the onset of PIH. While studying the PIH

patients, we found that in pre-eclampsia patients, older mothers are more likely to encounter worse outcomes regarding the mother and the unborn child. The presence of older mothers in pre-eclampsia should alert medical professionals to the obligation for closer monitoring, comprehensive screening, and early intervention that warranted to reduce the likelihood of complications. Gravidity has a strong relationship with hypertension induced in pregnancy. In our study, we observed that PIH is more likely to encounter the multigravida females. However, 20% of the cases in our study was of third pregnancy and there was no sudden rise in the blood pressure and females were normal during the entire journey of 40 weeks (about 9 months).

The most common observed symptom was headache with mild abdomen pain but normal vision. As far as medical variables are concerned the serum creatinine levels were higher than the normal range 0.8mg/dl and 90% of preeclampsia patients show Thrombocytopenia (low platelet count) and low fetal weight of about 1300g (about 2.87 lb.). The most common drug given was Gravidol 100mg which acts as a beta blocker to lower Hypertension in pregnancy. Patients in the study were strongly advised against self-discontinuation of their prescribed medication, particularly due to the potential risk of exacerbating their already elevated blood pressure levels. Abrupt cessation of medication could lead to a sudden increase in blood pressure, posing serious risks to both maternal and fetal health. Therefore, strict adherence to medication regimens was emphasized to ensure optimal management of Pregnancy-Induced Hypertension (PIH) and minimize the likelihood of adverse outcomes. For patients diagnosed specifically with Gestational Hypertension, special precautions were taken regarding medication administration. Gravidol, the drug commonly prescribed in the study, was administered cautiously to these patients. Additionally, regular monitoring of blood sugar levels (BSL) was recommended as a precautionary measure. This monitoring was crucial as Gravidol usage has the potential to mask symptoms of hypoglycemia, a condition characterized by dangerously low blood sugar levels. By closely monitoring BSL, healthcare providers could promptly identify and address any potential hypoglycemic episodes, thus ensuring the safety and well-being of patients with Gestational Hypertension. This comprehensive approach to medication management highlights the importance of individualized care in the management of PIH. By providing tailored guidance and closely monitoring patients' responses to treatment, healthcare professionals can optimize therapeutic outcomes while minimizing the risks associated with medication use, ultimately enhancing the overall quality of care for pregnant individuals affected by hypertensive disorders.

CONCLUSION

The conclusions drawn from this study emphasize the critical importance of early detection, vigilant monitoring, and proactive management of Pregnancy-Induced Hypertension (PIH) to mitigate adverse maternal and fetal outcomes. Through comprehensive management protocols, including pharmacotherapy, dietary modifications, and lifestyle interventions, healthcare teams can effectively control PIH and minimize its detrimental effects on maternal and fetal health. Overall, the study underscores the imperative for proactive and integrated care approaches to PIH, emphasizing the importance

of early intervention and ongoing monitoring to optimize pregnancy outcomes and ensure the well-being of both mother and baby.

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Conflict of Interest statement

Manuscript title: *A hospital-based study of "The impact of Pregnancy Induced Hypertension (PIH) on Maternal and Fetal health*

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