



## STUDY OF THE PREVALENCE OF PREGNANCY INDUCED HYPERTENSIVE SPECTRUM DISORDER AND RELATED FETO MATERNAL COMPLICATION IN A TERTIARY CARE HOSPITAL IN WESTERN COAST OF INDIA

### Obstetrics & Gynaecology

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### ABSTRACT

**Background:** Pregnancy induced hypertensive spectrum disorders are significant challenge globally, contributing to maternal morbidity and mortality. These disorders, including preeclampsia and gestational hypertension, are characterized by elevated blood pressure levels and systemic manifestations such as proteinuria. The exact causes are multifactorial, involving vascular dysfunction, immune maladaptation, and placental abnormalities. Early detection and management are crucial to mitigate adverse outcomes for both mother and fetus, emphasizing antenatal surveillance and pharmacological interventions. The objective of this study was to estimate incidence & Prevalence of various pregnancy induced hypertensive spectrum disorders & feto maternal complications along the west coast of India. **Methods:** A prospective study was done on patients came to our hospital from October 2022 to September 2023 in that met inclusion criteria. The analysis was done using STATA 20.0 software. The prevalence of hypertension in pregnancy was estimated using both mixed-effects and random-effects models. **Results:** A total of 10404 patients came to our department. Among them 1152 (11.07 %) patients were having one of the pregnancy related hypertensive spectrum disorders, those were included in this study. Among the various pregnancy related hypertensive spectrum disorders prevalence of pre-eclampsia was 35.3 % (highest), followed by gestational hypertension (26.6 %) and severe pre-eclampsia (19.8 %) subsequently. At the same time we had estimate the fetal and maternal complications of among the patient with pregnancy related hypertensive spectrum disorders. Among all the patients with pregnancy related hypertensive spectrum disorders prevalence of the maternal complications was 8.36 % and prevalence of fetal complications was 48.5 %. **Conclusions:** The overall study shows high prevalence, i.e., 1 out of 9 women suffers from one of the pregnancy related hypertensive spectrum disorder along with high prevalence (48.5 %) of fetal complications in the study population demands multidisciplinary approach involving obstetricians, midwives, internists, and neonatologists for understanding and refine management strategies, aiming for safer pregnancies and healthier outcomes worldwide.

### KEYWORDS

Pregnancy induced hypertensive spectrum disorder, Pregnancy Induced Hypertension (PIH), Eclampsia, Pre-eclampsia, India

### INTRODUCTION

Pregnancy represents a critical phase for both maternal and fetal well-being. Approximately 15% of pregnant women are anticipated to experience life-threatening complications during pregnancy, delivery, or the postpartum period. Hypertensive disorders of pregnancy (HDOP) significantly contribute to these complications. Worldwide, nearly 10% of pregnancies are complicated by hypertension, with pregnancy-induced hypertension defined as blood pressure (BP)  $\geq 140/90$  mmHg on two occasions or  $\geq 160/110$  mmHg on one occasion in a previously normotensive woman.

The American College of Obstetricians and Gynecologists (ACOG) provides guidelines for the diagnosis of pregnancy-induced hypertensive disorders (PIHD). These guidelines aim to assist healthcare professionals in accurately identifying and managing these conditions.

1. Gestational Hypertension: Elevated blood pressure (BP) of 140/90 mmHg or higher on two occasions after 20 weeks of gestation in previously normotensive women. Absence of proteinuria or other systemic findings suggestive of preeclampsia.
2. Chronic Hypertension: Elevated BP ( $\geq 140/90$  mmHg) present before pregnancy or identified within the first 20 weeks of gestation. Persistent hypertension beyond 12 weeks postpartum indicates chronic hypertension.
3. Pre-eclampsia: New-onset hypertension ( $\geq 140/90$  mmHg) occurring after 20 weeks of gestation accompanied by proteinuria ( $\geq 300$  mg in a 24-hour urine collection or  $\geq 30$  mg/dL in a random urine sample) or other systemic manifestations. Other systemic manifestations include thrombocytopenia, impaired liver function, new-onset renal insufficiency, pulmonary edema, or cerebral or visual disturbances.
4. Eclampsia: Presence of seizures in a woman with pre-eclampsia, not attributable to other causes. May occur during pregnancy, labor, or postpartum period.
5. HELLP Syndrome: Hemolysis, Elevated Liver enzymes, and Low

Platelet count syndrome. May present as a severe variant of pre-eclampsia.

6. Superimposed Pre-eclampsia: Worsening of pre-existing chronic hypertension with the development of superimposed pre-eclampsia features, including proteinuria or other systemic manifestations.

Pregnancy induced hypertensive spectrum disorders are global concern, affecting 5%-8% of all pregnant women worldwide. Among these, pre-eclampsia and eclampsia are significant contributors to maternal and perinatal morbidity and mortality. Pre-eclampsia, characterized by hypertension and proteinuria, affects 5%-7% of all pregnancies.

### ETIOPATHOGENESIS

- Exposure to chronic villi for the first time.
- Exposure to super abundance of chronic villi as with twice / H.mole
- Preexisting conditions associated with endothelial cell activation / inflammation
- Genetic predisposing + hypertension developing during pregnancy.
- Placental implantation with abnormal trophoblastic invasion of uterine vessels.
- Dysfunctional immunological tolerance between maternal, paternal, fetal tissues.
- Maternal maladaptation to cardiovascular or inflammatory changes of normal pregnancy.

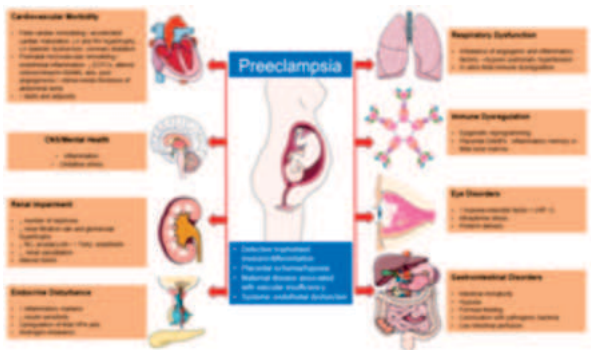
### RISK FACTORS:

1. **Genetic factors:** Race and ethnicity - More common in Blacks and Asians; Family history of pre-eclampsia (RR of 3%)
2. **Age and Parity:** young maternal age; Primigravida status

Risk factors for pregnancy-induced hypertension (PIH) encompass young maternal age, primigravida status, twin gestation, a history of

diabetes or pre-existing hypertension, and prior PIH episodes. PIH poses substantial repercussions on maternal and neonatal health, precipitating complications such as preterm birth, intrauterine growth restriction, placental abruption, intrauterine fetal demise, and maternal morbidity and mortality.

COMPLICATIONS:



Studies conducted in developing countries like Ethiopia, Mozambique, Nigeria, Pakistan, and India highlight varying prevalence rates of hypertension among pregnant women, ranging from 1.8% to 16.7%. Pre-eclampsia and eclampsia contribute significantly to maternal deaths in these regions, with pre-eclampsia alone accounting for 40%-60% of maternal mortality. Region-specific studies within India reveal varying prevalence rates of HDOP, possibly influenced by factors such as poverty, malnutrition, and inadequate obstetric facilities.

Like all these studies, this study had been conducted in one of the tertiary care hospital along western coast of India in Jamnagar city of Gujarat to calculate incidence & Prevalence of pregnancy induced hypertensive spectrum disorder & fetomaternal complication in a tertiary care hospital in west coast of India and for facilitating the development of evidence-based interventions at the regional level.

METHOD:

A prospective observational study was conducted in the Department of Obstetrics and Gynaecology, M P Shah Govt. Medical College and Guru Govind Singh Hospital- Jamnagar, Gujarat, India from October 2022 to September 2023. The study was approved by the institutional review board, and written informed consent was attained from all the patients. Eligible patients included those diagnosed with at least one Pregnancy induced hypertensive spectrum disorder (Gestational HTN, Pre-eclampsia, Severe pre-eclampsia, Eclampsia, Chronic HTN) who were admitted in the department for further treatment.

Hypertensive disorder of pregnancy was diagnosed per ACOG definition [13]. Patients with no pregnancy-related hypertensive disorder, who did not consent to participate, or those who were received in such an emergency that they were in delirium and were unable to communicate were excluded from the study. All the patients were undergone General & systemic examination, Routine investigation including – CBC, RFT, LFT, Coagulation profile and detailed history of present and past medical illness was obtained. Gestational age was confirmed via ultrasound. All patients were observed for the development of any complication during their hospital stay (before, during, and after delivery/expulsion).

All the included patients were divided into five different categories according to ACOG criteria: 1. Gestational HTN, 2. Pre-eclampsia, 3. Severe pre-eclampsia, 4. Eclampsia and 5. Chronic HTN.

From various fetal and maternal complications blow mentioned complications had been taken in to consideration for this study.

Maternal Complications:

1. Convulsions 2. HELLP syndrome 3. Kidney injury 4. Placental Abruption 5. Maternal Death

Fetal Complications:

1. Pre term 2. Low Birth Weight 3. IUGR 4. Still Birth

Data were analyzed using Microsoft excel. Prevalence were calculated for Pregnancy induced hypertensive spectrum disorder, as well as

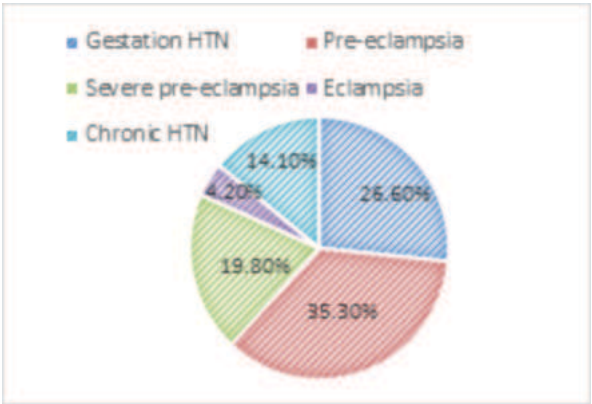
Prevalence of various maternal and foetal complications.

RESULTS:

Prospective study of 10404 patients came to the Department of Obstetrics and Gynecology, Guru Gobind Singh Govt. Hospital from October 2022 to September 2023. Among them 1152 having one of the pregnancy related hypertensive spectrum disorders. Out of them 306 patients having Gestation HTN, 407 patients having pre-eclampsia, 228 patients having severe pre-eclampsia, 163 patients having chronic hypertension, 48 patients having eclampsia.

PREVALENCE OF VARIOUS PREGNANCY RELATED HYPERTENSIVE SPECTRUM DISORDER:

| Disorder             | Number | Percentage |
|----------------------|--------|------------|
| Gestational HTN      | 306    | 26.6%      |
| Pre-eclampsia        | 407    | 35.3%      |
| Severe pre-eclampsia | 228    | 19.8%      |
| Eclampsia            | 48     | 4.2%       |
| Chronic HTN          | 163    | 14.1%      |
| Total                | 1152   | 100        |



Maternal Complication

| Complications  | Number | Percentage |
|----------------|--------|------------|
| Convulsions    | 48     | 4.16%      |
| HELLP syndrome | 05     | 0.4%       |
| Kidney injury  | 10     | 0.9%       |
| Abruption      | 26     | 2.3%       |
| Maternal Death | 07     | 0.6%       |
| Total          | 96     | 8.36 %     |

Fetal Complication

| Complications | Number | Percentage |
|---------------|--------|------------|
| Preterm birth | 219    | 19%        |
| LBW           | 184    | 16%        |
| IUGR          | 120    | 10.4%      |
| Still birth   | 36     | 3.1%       |
| Total         | 559    | 48.5 %     |

## DISCUSSION:

Hypertension frequently occurs during pregnancy, both in developed and developing nations. In less economically developed regions, this issue can be exacerbated by socio-cultural and economic elements. In Southeast Asia, hypertensive disorders of pregnancy contribute to an 11.35% mortality rate among women of reproductive age.<sup>[1]</sup> In India, 18.35% of maternal morbidity and 0.96% of maternal mortality are linked to hypertensive disorders during pregnancy.<sup>[2]</sup>

The present study shows the prevalence of Various pregnancy related hypertensive spectrum disorders and prevalence of maternal and foetal complication among them. According to this study, the prevalence of pregnancy related hypertensive spectrum disorders in the population along waste cost of India is approximately 11.07%. The identified rate was notably greater than the global average.<sup>[3]</sup> Global differences in prevalence may stem from variations in socio-cultural practices, as well as disparities in the accessibility and utilization of antenatal healthcare services.

In India, the regional variation in the prevalence was observed, with highest in North Zone and lowest in East zone of India.<sup>[4]</sup> The variation in the prevalence maybe due to difference in available health care services, Lifestyle, dietary factors and physical activity. According to NFHS-4 analysis report, only 21% of pregnant women in India utilise full ANC services.<sup>[5]</sup> Utilization rates were notably lowest in the Eastern states, contrasting sharply with the highest rates observed in the Southern region. Factors such as illiteracy and affiliation with socially disadvantaged groups (OBC/SC/ST) have been identified as contributing factors to the lower utilization of ANC services. Despite the WHO recommendation of a minimum of eight ANC visits during pregnancy, it is concerning that over half of women in India did not receive even the minimum of four ANC visits, highlighting persistent gaps in healthcare access and delivery.<sup>[5]</sup>

In this study, 11.07 % of pregnant women were diagnosed with one of the pregnancy related hypertensive spectrum disorders; the major contributors were preeclampsia ( 35.3%) and gestational hypertension (26.6%). It's evident that pre-eclampsia is the most prevalent disorder, followed by gestational hypertension, severe pre-eclampsia, chronic hypertension, and eclampsia, in descending order of prevalence. These statistics offer valuable insight into the distribution of various hypertensive disorders among the pregnant women within the study population.

Pre-eclampsia stands as a significant contributor to elevated morbidity and mortality rates for both mothers and fetuses, especially within the context of developing nations.<sup>[6]</sup>

Among the 1152 pregnant women diagnosed with one of the pregnancy related hypertensive spectrum disorders, approximately 8.36 % of women experienced complications various such as Convulsions, Placental abruption, HELLP syndrome , Kidney injury, Maternal death. Among the various maternal complications; prevalence of convulsion ( 4.16%) was found to be highest, followed by placental abruption which was 2.3%.

Pregnancy-related hypertensive spectrum disorders represent a dual concern, impacting not only maternal health but also exerting significant repercussions on fetal well-being. These disorders encompass a range of complications that can detrimentally affect the developing fetus, including but not limited to preterm birth, low birth weight, intrauterine growth restriction, placental insufficiency, fetal distress, and stillbirth.

In this study, particular emphasis is placed on investigating the prevalence and implications of preterm birth, low birth weight, intrauterine growth restriction, and stillbirth within the context of pregnancy-related hypertensive disorders. The findings unveil a complex landscape wherein approximately 48.5% of cases have encountered at least one of these fetal complications. Among these complications, preterm birth emerges as the most prevalent, affecting approximately 19% of cases, thus underscoring the significant burden it poses within this population. Following closely is the prevalence of low birth weight, observed at approximately 16%. These statistics not only highlight the multifaceted nature of fetal complications associated with hypertensive disorders of pregnancy but also emphasize the imperative of addressing these challenges comprehensively within maternal healthcare frameworks.

## CONCLUSION:

The study highlights the significant burden of pregnancy-related hypertensive disorders, with 11.07% of pregnant women diagnosed, predominantly with preeclampsia and gestational hypertension. Preeclampsia emerges as the most prevalent disorder, contributing to high morbidity and mortality rates for both mothers and fetuses, especially in developing countries. Maternal complications such as convulsions and placental abruption, along with fetal complications including preterm birth and low birth weight, underscore the multifaceted impact of these disorders on maternal and foetal health. The prevalence of fetal complications among cases studied is notably high, with approximately 48.5% experiencing one or more complications. Efforts to address pregnancy-related hypertensive disorders must focus on early detection, comprehensive management, and targeted interventions to mitigate adverse outcomes and improve maternal and foetal well-being.

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