"STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION(PIH) "

By

DR. PRIYANKA .P.V.N.L.N

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In partial fulfilment of the requirements for the award of the degree of

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IN

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Under the Guidance of

DR. PRAKASH M. PATIL, M.D

PROFESSOR

DEPARTMENT OF PATHOLOGY

BLDE (DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, 586103, KARNATAKA

2025

BLDE (DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, KARNATAKA

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Dr. PRIYANKA P.V.N.L.N

Postgraduate student,

Department of Pathology

BLDE (Deemed to be University)

Shri B.M. Patil Medical College, Hospital & Research Centre

Vijayapura, Karnataka

Date:

Place: VIJAYAPURA

BLDE (DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, KARNATAKA

CERTIFICATE BY THE GUIDE

This is to certify that this dissertation titled "STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION (PIH)" is a bonafide and genuine research work carried out by Dr. PRIYANKA P.V.N.L.N, in partial fulfilment of the requirements for the degree of Doctor of Medicine (Pathology).

DR. PRAKASH M. PATIL, M.D

Professor,

Department of Pathology

BLDE (Deemed to be University)

Shri B.M. Patil Medical College, Hospital & Research Centre

Vijayapura, Karnataka

Date:

Place: VIJAYAPURA

BLDE (DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, KARNATAKA

ENDORSEMENT BY THE HEAD OF DEPARTMENT

This is to certify that this dissertation titled "STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION (PIH)" is a bonafide and genuine research work carried out by Dr. PRIYANKA P.V.N.L.N, in partial fulfilment of the requirements for the degree of Doctor of Medicine (Pathology).

Dr. SUREKHA B. HIPPARGI

Professor and Head,

Department of Pathology

BLDE (Deemed to be University)

Shri B.M. Patil Medical College, Hospital & Research Centre

Vijayapura, Karnataka

Date:

Place: VIJAYAPURA

BLDE (DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, KARNATAKA

ENDORSEMENT BY PRINCIPAL / HEAD OF THE INSTITUTION

This is to certify that this dissertation titled "STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION (PIH)" is a bonafide and genuine research work carried out by Dr. PRIYANKA P.V.N.L.N, in partial fulfilment of the requirements for the degree of Doctor of Medicine (Pathology).

Dr. ARAVIND V. PATIL

Principal,

BLDE (Deemed to be University)

Shri B.M. Patil Medical College, Hospital & Research Centre

Vijayapura, Karnataka

Date:

Place: VIJAYAPURA

BLDE (DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA, KARNATAKA

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Dr. PRIYANKA P.V.N.L.N

Postgraduate student,

Department of Pathology

BLDE (Deemed to be University)

Shri B.M. Patil Medical College, Hospital & Research Centre

Vijayapura, Karnataka

Date:

Place: VIJAYAPURA

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Dr. PRIYANKA P.V.N.L.N

Postgraduate student,

Department of Pathology

BLDE (Deemed to be University)

Shri B.M. Patil Medical College, Hospital & Research Centre

Vijayapura, Karnataka

Date:

Place: VIJAYAPURA

LIST OF ABBREVIATIONS

ABBREVIATION	PARAMETER
aPTT	Activated Partial Thromboplastin Time
ASDR	Age-Standardized Death Rate
ASIR	Age-Standardized Incidence Rate
BP	Blood pressure
CT	Clotting Time
DIC	Disseminated Intravascular Coagulation
FDP	Fibrin Degradation Products
HDP	Hypertensive Disorders of Pregnancy
HELLP	Haemolysis, Elevated Liver enzymes, and Low Platelet count
INR	International Normalized Ratio
IUGR	Intrauterine Growth Restriction
LBW	Low Birth Weight
LDH	Lactate Dehydrogenase
MCV	Mean Corpuscular Volume
MPV	Mean Platelet Volume
NFHS	National Family Health Survey
NPV	Negative Predictive Value

NST	Non- Stress Test
PIGF	Placental Growth Factor
PIH	Pregnancy Induced Hypertension
PPH	Postpartum Haemorrhage
PPV	Positive Predictive Value
PT	Prothrombin Time
PWD	Platelet Distribution Width
RBC	Red Blood Cell
VEGF	Vascular Endothelial Growth Factor
WBC	White Blood Cell

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

INTRODUCTION

Hypertensive disorders of pregnancy affect approximately 10% of all pregnant women worldwide and 5-8% of pregnant women in India. These disorders are characterized by a reduction in systemic perfusion due to vasospasm and the activation of the coagulation system, with thrombocytopenia being the most common presentation observed. The hypercoagulable state in pregnancy associated with Pregnancy-Induced Hypertension (PIH), platelet indices, and coagulation profiles can serve as reliable early indicators of the onset of preeclampsia and eclampsia. A peripheral smear examination is a simple and cost-effective method that can detect red cell abnormalities and quantify platelet abnormalities commonly observed in patients with PIH. These routine tests can be conducted in all hospital settings, helping to reduce maternal and fetal mortality associated with pregnancy-induced hypertension (PIH) and ensuring an effective healthcare system for the population.

OBJECTIVES

- To evaluate the utility of platelet-count and peripheral smear examination as prognostic indicators in pregnancy-induced hypertension (PIH) and their role in improving maternal and fetal outcomes.
- To study the associated changes in peripheral smear, platelet count, prothrombin time (PT), and activated partial thromboplastin time (aPTT).

MATERIALS AND METHODS

A prospective observational study was conducted at BLDE (Deemed to be University), Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura, from April 2023 to March 2024. The study included 305 primigravid women diagnosed with PIH at gestational age ≥28 weeks. Hematological parameters, including platelet count and peripheral smear, were assessed alongside coagulation parameters such as PT, aPTT, and international normalized ratio (INR). Data were analyzed using Stata version 18.0, and statistical significance was determined using appropriate tests.

RESULTS

The mean age of participants was 24.2 years (SD 3.9). The majority presented with pre-eclampsia with severe features (29.51%), gestational hypertension (22.95%), and pre-eclampsia without severe features (22.95%). The median platelet count was 1,66,000/μL (IQR: 1,00,000 to 1,96,000), with thrombocytopenia observed in 31.15% of cases. PT was prolonged in 39.67% of patients, and aPTT was prolonged in 42.3%. Microscopic hypochromic anemia was the most common peripheral smear finding (44.92%). Platelet counts and coagulation parameters varied significantly across PIH subtypes ($p<0.001$).

CONCLUSION

Thrombocytopenia and prolonged coagulation parameters were significant indicators of disease severity in PIH. Peripheral smear examination proved to be a reliable tool in resource-limited settings. Regular monitoring of these hematological indices can aid in early diagnosis, guiding timely interventions to improve maternal and fetal outcomes.

KEYWORDS: Blood Coagulation Tests; Platelet Count; Pregnancy Complications, Hematologic; Pregnancy-Induced Hypertension; Thrombocytopenia.

“STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION(PIH)”

INTRODUCTION

Pregnancy-induced hypertension (PIH) is a significant complication, which accounts for 5–7% of all pregnancies and is a major cause of morbidity and mortality for both the mother and the foetus[1] . The burden of the condition is increasing steadily across the globe. The burden differs among various places in the world, but it is common in the high-income countries[2,3]. Despite the low burden, the low-income countries face major challenges in detecting it timely and in reducing the mortality and morbidity of mothers and the fetus due to lack of infrastructure[1].

Early detection and effective management of PIH are crucial to improving outcomes for both mother and child[4]. Haematological changes, particularly thrombocytopenia, are commonly observed in PIH and can serve as indicators of the severity of the disease[5,6]. Studies have demonstrated that platelet counts tend to decrease as the severity of PIH increases, suggesting that regular monitoring of platelet levels could be a valuable prognostic tool in the clinical assessment of PIH[7] .

Pregnancy-induced hypertension (PIH) is primarily driven by abnormal placentation during early pregnancy. This results in inadequate remodeling of the spiral arteries, leading to decreased perfusion to the placenta, causing ischaemia. The ischaemic placenta releases factors such as soluble fms-like tyrosine kinase-1 (sFlt-1) and soluble endoglin, which are anti-angiogenic, into the maternal circulation. These factors cause an imbalance between vascular endothelial growth factor

(VEGF) and placental growth factor (PlGF), resulting in endothelial dysfunction. Endothelial dysfunction leads to systemic vasoconstriction, increased vascular permeability, and activation of the coagulation cascade. These processes contribute to the cardinal features of PIH, including hypertension, proteinuria, and multi-organ involvement, particularly in severe cases[7-11] .

Pregnancy-induced hypertension (PIH) can lead to significant maternal and fetal complications if not managed timely. Maternal complications include placental abruption, eclampsia, disseminated intravascular coagulation (DIC), HELLP syndrome (haemolysis, elevated liver enzymes, and low platelet count), acute kidney injury, and pulmonary oedema. These conditions can result in life-threatening scenarios for the mother. Intrauterine growth restriction (IUGR), premature delivery, low birth weight, and perinatal mortality are all examples of fetal complications caused by placental insufficiency and hypoxia. Severe cases of PIH can potentially result in stillbirths or infant fatalities, emphasizing the importance of timely identification and treatment[12] .

Early detection of PIH is essential to minimize its complications and ensure better maternal and fetal outcomes. Regular antenatal checkups play a vital role in identifying early warning signs, such as elevated blood pressure, proteinuria, and abnormal weight gain. Screening methods, including monitoring of blood pressure, urine tests for protein levels, and Doppler studies to assess uteroplacental blood flow, are essential during pregnancy. Educating pregnant women about recognizing symptoms like severe headaches, visual disturbances, and pedal oedema can help in early reporting to healthcare providers. Implementing a comprehensive surveillance system for high-risk pregnancies, especially among women with predisposing factors such as obesity, multiple gestations, or pre-existing hypertension, can significantly reduce the adverse effects of PIH[10] .

In areas with limited resources where advanced automated analyzers may not be available, peripheral smear examination is a simple and an affordable method which is readily available.

Research indicates that peripheral smear assessments correlate well with automated platelet counts, making it a reliable alternative method for monitoring thrombocytopenia in pregnant women with PIH[13,14]. Additionally, coagulation parameters like prothrombin time (PT) and activated partial thromboplastin time (aPTT) may be altered in PIH, reflecting the status of the haemostatic system[15,16]. Monitoring these parameters can aid in early diagnosis and management of PIH, thus potentially improving maternal and fetal outcomes.

Platelet counts are essential for predicting the diagnosis and severity of pregnancy-induced hypertension (PIH). In PIH, endothelial dysfunction and increased vascular permeability led to platelet activation and consumption, resulting in thrombocytopenia. A progressive decline in platelet counts is often associated with severe forms of PIH, such as preeclampsia and eclampsia, and can indicate the onset of complications like HELLP (Haemolysis, Elevated Liver enzymes, and Low Platelets) syndrome. Platelet counts below 100,000/µL are particularly indicative of severe disease and an increased risk of morbidity. Monitoring platelet levels, along with other haematological and clinical parameters, is crucial for assessing disease progression and guiding timely interventions in PIH management[14] .

Understanding the relationship between platelet count, peripheral smear findings, and coagulation parameters in PIH is necessary for effective management strategies. By evaluating these haematological indices, healthcare providers can better predict disease progression and implement timely interventions to mitigate adverse outcomes. The purpose of this study is to evaluate the usefulness of platelet count and peripheral smear examination as prognostic indicators in PIH and to explore the associated changes in PT and aPTT, thereby contributing to improved maternal and fetal health[15] .

OBJECTIVES OF THE STUDY

- To evaluate the utility of platelet-count and peripheral smear examination as prognostic indicators in pregnancy-induced hypertension (PIH) and their role in improving maternal and fetal outcomes.
- To study the associated changes in peripheral smear, platelet count, prothrombin time (PT), and activated partial thromboplastin time (aPTT).

REVIEW OF LITERATURE

Pregnancy-Induced Hypertension (PIH) is a condition characterized by high blood pressure during pregnancy. It usually develops after 20 weeks of gestation in previously normotensive women[1,17].

Classification [1,17,18] :

- **Gestational Hypertension:**
  - High blood pressure (≥140/90 mmHg) detected after 20 weeks of gestation.
  - There is no presence of protein in the urine or any damage to the organs.
  - Blood pressure typically normalizes within 12 weeks after giving birth.
- **Preeclampsia:**
  - Elevated blood pressure accompanied by protein in the urine (≥0.3 g/24 hours).
  - Organ dysfunction can be seen, such as kidney or liver impairment.
  - Can progress to severe forms if untreated.
- **Severe Preeclampsia:**
  - Blood pressure ≥160/110 mmHg.
  - Severe organ damage or symptoms like headaches, vision problems, or reduced platelet count.
- **Eclampsia:**
  - Preeclampsia with seizures not related to neurological disorders.
  - A medical emergency requiring urgent treatment.
- **Chronic Hypertension with Superimposed Preeclampsia:**

- Pre-existing hypertension worsened by organ dysfunction or proteinuria after twenty weeks of period of gestation.

- **Chronic Hypertension:**
  - High blood pressure identified prior to pregnancy or before the 20th week of gestation.
  - Persists beyond 12 weeks postpartum.

Epidemiology of PIH

The prevalences of various subtypes are- Hypertensive disorders of pregnancy (5.2–8.2%), Pregnancy Induced Hypertension (4.1–19.4%), Gestational Hypertension (1.8–4.4%) and PE (0.2–9.2%) among all pregnancies[2,3].

1. PIH affects 5-10% of pregnancies worldwide.
2. Preeclampsia accounts for 2-8% of maternal deaths globally.
3. It is more common in countries with low and middle incomes due to limited access to healthcare.
4. PIH plays a major role in increasing maternal and perinatal illness and death rates.
5. Risk factors include primigravida, multiple pregnancies, advanced maternal age, obesity, and family history.

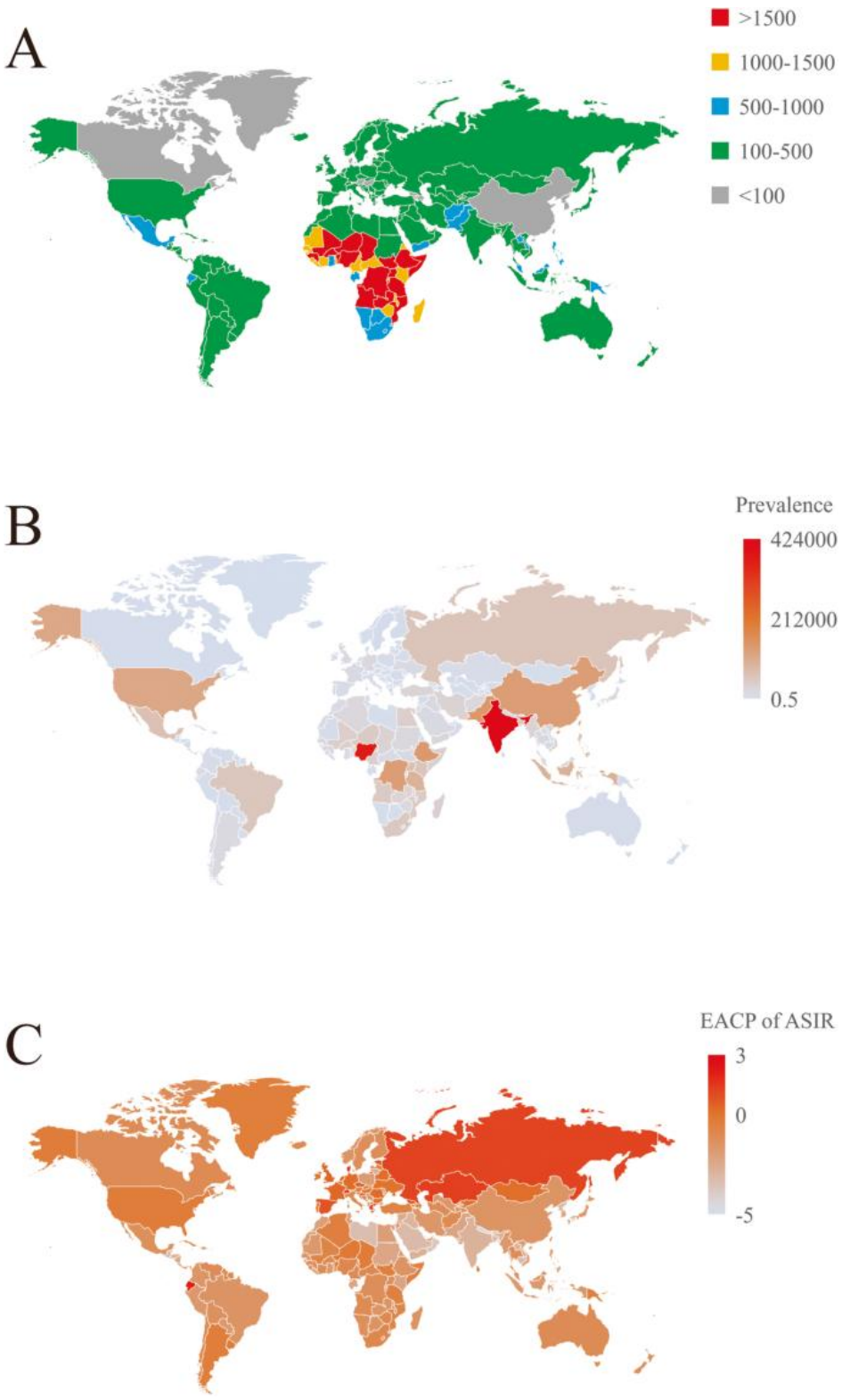


Figure 1: A summary of Hypertensive Disorders of Pregnancy (HDP) by country and region for both genders combined includes: a) the prevalence of HDP in 2019, b) the age-standardized incidence rate (ASIR) of HDP per 100,000 individuals in 2019, and c) the estimated annual percentage change (EAPC) in the age-standardized death rate (ASDR) of HDP from 1990 to 2019.

Perspective of PIH [19]:

1. The prevalence of PIH in India is estimated to be 7-10%.
2. Preeclampsia is a major contributor to maternal deaths in India.
3. Factors such as poor antenatal care, anemia, malnutrition, and delayed referrals worsen outcomes.
4. The National Family Health Survey (NFHS) data highlight regional variations, with higher prevalence in rural areas.
5. Lack of awareness and inadequate healthcare infrastructure remain major challenges.

Pathophysiology of PIH [7-11]

In PIH, the endothelial cells lining the blood vessels become damaged. This reduces the production of vasodilators like nitric oxide and prostacyclin while increasing vasoconstrictors like endothelin. As a result, blood vessels constrict, leading to increased vascular resistance and high blood pressure. The damaged endothelium also makes capillaries more permeable, causing protein loss in urine (proteinuria) and pedal edema (figure 2).

Placental abnormalities also play a key role in PIH. The uterine spiral arteries fail to remodel properly, remaining narrow and high resistance instead of widening to allow better blood flow. This leads to reduced oxygen supply to the placenta, causing hypoxia and oxidative stress. In response, the placenta releases harmful anti-angiogenic factors like sFlt-1 and endoglin into the mother's bloodstream. These compounds worsen endothelial dysfunction, further increasing blood pressure and organ stress.

PIH also triggers widespread vascular changes. Systemic vasoconstriction elevates blood pressure, while increased vascular permeability causes fluid leakage into tissues, leading to swelling. Small blood clots form in tiny vessels, damaging organs like the kidneys, liver, and brain. This can result in proteinuria, liver dysfunction, and, in severe cases, seizures (eclampsia).

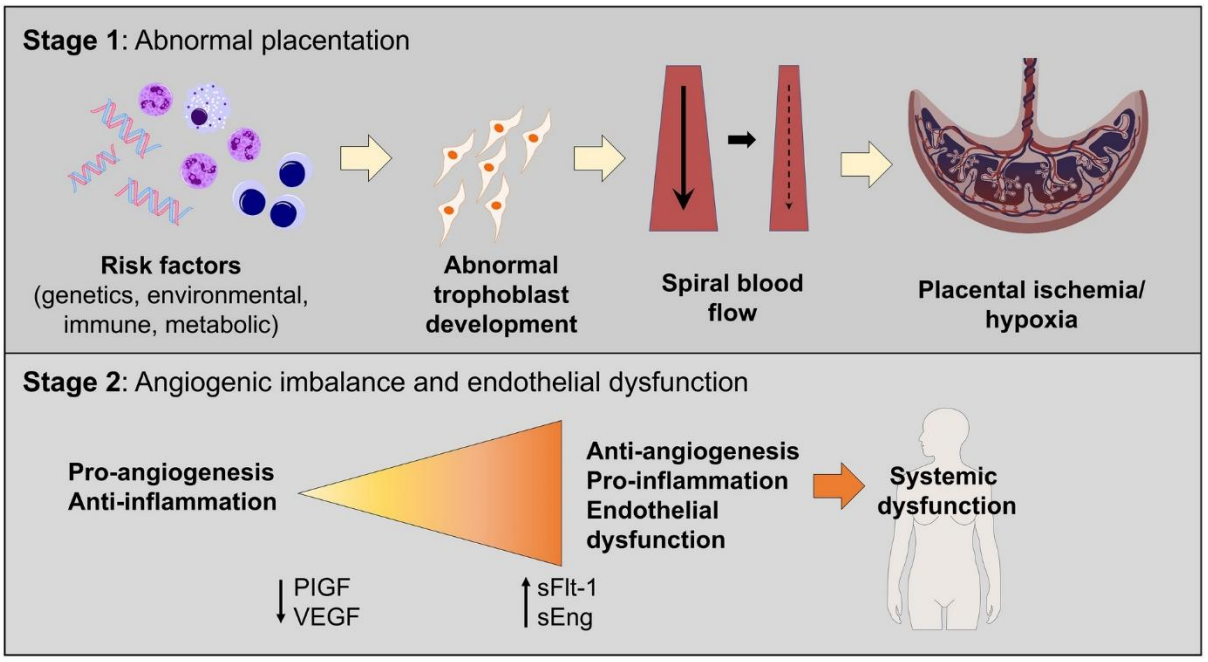


Figure 2: Pathophysiology of PIH

Clinical presentations of PIH [19-30]

1. Typical Presentation of PIH:

- **Hypertension:**
    - Blood pressure of 140/90 mmHg or higher occurring after twenty weeks of pregnancy.
    - Blood pressure should be measured twice, with an interval of four hours.
- **Proteinuria:**

- Exceeding **300 mg** in a 24-hour period or protein-to-creatinine ratio greater than 0.3
- Detected by dipstick test (≥1+).

- **Edema:**
  - Generalized swelling, especially in the hands, face, and legs.
  - May be associated with rapid weight gain.

- **Mild Symptoms (Early Stages):**
  - Headache (often mild and non-specific).
  - Slight visual disturbances like blurred vision.
  - Nausea or upper abdominal discomfort.

2. Atypical Presentation of PIH:

- **Hypertension without Proteinuria:**
  - Some patients present with gestational hypertension without significant proteinuria.
  - Requires monitoring for progression to preeclampsia.
- **Proteinuria without Hypertension:**
  - Rare cases where proteinuria is present in the absence of hypertension.
  - Requires evaluation for renal conditions or evolving preeclampsia.
- **Severe Symptoms in the Absence of Classic Signs:**
  - Severe headache resistant to analgesics.
  - Longstanding pain in the right upper quadrant or epigastric region.

- Sudden onset of dyspnea due to pulmonary edema.

- **Neurological Symptoms:**
  - Seizures without prior hypertension or proteinuria (eclampsia).
  - Hyperreflexia or clonus.

- **HELLP Syndrome:**
  - Hemolysis, Elevated Liver enzymes, and Low Platelet count.
  - Can present with nonspecific symptoms like fatigue, malaise, or vomiting.

- **Placental Abruption:**
  - Sudden vaginal bleeding, abdominal pain, and uterine tenderness.

- **Silent PIH:**
  - Diagnosed incidentally during routine antenatal checkups.
  - No obvious symptoms despite elevated BP and mild proteinuria.

Importance of Recognizing Atypical Presentations:

- Atypical cases may lead to delayed diagnosis and increased maternal and fetal risks.
- Healthcare professionals should maintain a strong level of suspicion and monitor high-risk women closely.

Maternal and Fetal Complications Associated with PIH [12]

Maternal Complications:

1. **Hypertensive Crisis:**
   - Severe elevation in blood pressure (>160/110 mmHg).

- Risk of stroke or heart failure.

2. **Eclampsia:**
    - Seizures due to severe preeclampsia.
    - A life-threatening emergency.
3. **HELLP Syndrome:**

- Hemolysis, Elevated Liver enzymes, and Low Platelet count.
- Increases the risk of liver rupture or bleeding.

4. **Renal Damage:**
    - Proteinuria and oliguria due to kidney involvement.
    - Progression to acute kidney injury in severe cases.
5. **Liver Damage:**
    - Elevated liver enzymes and subcapsular hematoma.
    - Rarely, liver rupture.
6. **Placental Abruption:**
    - Early detachment of the placenta from the wall of the uterus.
    - Causes severe bleeding and fetal distress.
7. **Postpartum Hemorrhage (PPH):**
    - Increased risk of excessive bleeding after delivery.
8. **Mortality:**
    - PIH remains one of the main causes for maternal deaths especially in areas with limited resources.

Fetal Complications:

1. **Intrauterine Growth Restriction (IUGR):**
    - Poor placental blood flow limits fetal growth.
2. **Preterm Birth:**
    - PIH often necessitates early delivery.
    - Increases neonatal morbidity and mortality.
3. **Low Birth Weight:**
    - Result of preterm birth or IUGR.
4. **Fetal Hypoxia:**
    - Reduced oxygenation due to placental insufficiency.
    - Can lead to stillbirth in severe cases.
5. **Neonatal Complications:**
    - Respiratory distress syndrome, sepsis, and feeding difficulties.
    - Long-term neurodevelopmental issues in severe cases.
6. **Perinatal Mortality:**
    - Higher rates of stillbirths and neonatal deaths in unmanaged PIH.

Hematological Changes in PIH [31-34]

Overview of Hematological Parameters in PIH

1. Platelet Count:

- **Thrombocytopenia** is common in PIH, especially in severe preeclampsia.

- Platelet count less than 100,000/μL is

  a marker of severity.
- Platelet consumption occurs due to endothelial damage and microthrombosis.

2. Haemoglobin and Haematocrit :

- **Haemoconcentration** may occur due to reduced plasma volume.
- Increased haematocrit levels can indicate severity and risk of complications.

3. Coagulation Profile:

- **Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT):**
  - In severe cases these markers may be prolonged indicating coagulopathy.
- **Fibrinogen:**
  - Levels may drop in disseminated intravascular coagulation (DIC).
- **D-Dimer:**
  - Elevated in severe preeclampsia due to hypercoagulable states.

4. Peripheral Smear Findings:

- **Schistocytes (Fragmented RBCs):**
  - Indicate microangiopathic hemolysis seen in HELLP syndrome.
- **Reduced Platelets:**
  - Reflect ongoing consumption in microthrombi.

5. White Blood Cell Count (WBC):

- **Leucocytosis** may be observed due to stress or inflammation.
- Elevated WBCs are non-specific but may indicate systemic inflammation.

6. Markers of Hemolysis (HELLP Syndrome):

- **Lactate Dehydrogenase (LDH):**
    - Elevated due to hemolysis and tissue damage.
- **Bilirubin:**
    - Indirect bilirubin increases due to hemolysis.
- **Haptoglobin:**
    - Decreased levels indicate hemolysis.

7. Erythrocyte Indices:

- **Decreased Mean Corpuscular Volume (MCV):**
    - Associated with iron deficiency anemia, which may coexist with PIH.
- **Reticulocyte Count:**
    - Increased in response to hemolysis.

8. Other Biomarkers of Endothelial Dysfunction:

- **Von Willebrand Factor and Thrombomodulin:**
    - Elevated in PIH due to endothelial damage.

Thrombocytopenia in PIH: Prevalence, Severity, and Prognostic Implications [35-37]

Thrombocytopenia is a common complication in Pregnancy-Induced Hypertension (PIH), particularly in preeclampsia and eclampsia. It affects 10-50% of these patients, with a higher prevalence in severe cases and those with HELLP syndrome. The occurrence varies globally, depending on healthcare accessibility and diagnostic criteria.

The severity of thrombocytopenia is categorized based on platelet count. Mild cases range from

100,000–150,000/μL, moderate from 50,000–100,000/μL, and severe cases have counts less than 50,000/μL. Severe thrombocytopenia is a poor prognostic sign, often linked to HELLP syndrome and disseminated intravascular coagulation (DIC). The underlying cause is endothelial damage, which triggers platelet activation and consumption. Microthrombosis in small blood vessels further depletes platelets, while anti-angiogenic factors worsen vascular injury.

Thrombocytopenia has significant maternal and foetal implications. In mothers, it increases the risk of complications like HELLP syndrome, postpartum haemorrhage, and kidney failure. Severe cases may require platelet transfusion and intensive care. For the foetus, it is associated with placental insufficiency, leading to intrauterine growth restriction (IUGR), preterm birth, and stillbirth. A platelet count below 100,000/μL is considered a marker of severe preeclampsia, indicating a higher risk of multi-organ dysfunction.

Monitoring platelet levels is crucial in PIH management. A declining platelet counts signals worsening endothelial damage and systemic involvement. Mild thrombocytopenia suggests early disease, while moderate levels indicate progression to severe preeclampsia or HELLP syndrome. Severe thrombocytopenia requires urgent intervention due to the risk of DIC and multi-organ failure. Low platelet levels also increase the risk of postpartum haemorrhage, requiring close monitoring and possible ICU care.

For foetal health, thrombocytopenia can indicate placental insufficiency, leading to low birth weight and preterm delivery. In severe cases, urgent delivery may be necessary, despite the risks of neonatal morbidity. Monitoring platelet trends helps track disease progression, with sudden drops signaling

complications like placental abruption or DIC. When combined with liver enzymes and hemolysis markers, platelet count plays a key role in diagnosing and managing HELLP syndrome, improving overall prognostic accuracy.

5. Management Considerations[35-37] **:**

- Regular monitoring of platelet count is essential in PIH.
- Severe thrombocytopenia may require delivery, irrespective of gestational age, to prevent maternal and fetal complications.
- Multidisciplinary care is crucial in severe cases.

Platelet Count as a Prognostic Indicator in PIH [38-50]

1. Importance of Platelet Count:

- Platelet count is a simple, cost-effective, and readily available test.
- It serves as a reliable marker for disease severity in pregnancy-induced hypertension (PIH), particularly preeclampsia.
- Declining platelet levels indicate worsening endothelial damage and systemic involvement.

2. Role in Predicting Severity of PIH:

- **Mild Thrombocytopenia (100,000–150,000/µL):**
    - Suggests early endothelial dysfunction.
    - Often seen in gestational hypertension or mild preeclampsia.
- **Moderate Thrombocytopenia (50,000–100,000/µL):**
    - Indicates progression to severe preeclampsia or HELLP syndrome.
    - Higher risk of maternal and fetal complications.
- **Severe Thrombocytopenia (<50,000/µL):**
    - Associated with disseminated intravascular coagulation (DIC) and multi-organ failure.

- Requires urgent intervention.

3. Prognostic Implications for Maternal Health:

- **Risk of Hemorrhage:**
  - Low platelets increase the risk of postpartum hemorrhage (PPH).
- **HELLP Syndrome:**
  - Significant thrombocytopenia is a key diagnostic criterion.
- **Need for Intensive Care:**
  - Severe cases often require ICU management and platelet transfusion.

4. Prognostic Implications for Fetal Health:

- **Placental Insufficiency:**
  - Associated with intrauterine growth restriction (IUGR) and low birth weight.
- **Preterm Delivery:**
  - Often necessary in severe thrombocytopenia, increasing neonatal morbidity.
- **Stillbirth:**
  - Higher incidence in untreated severe cases.

5. Monitoring Platelet Trends:

- Falling platelet counts over time indicate disease progression.
- Sudden drops may signal acute complications, such as abruption or DIC.

6. Integration with Other Indicators:

- Platelet count, along with liver enzymes (AST/ALT) and hemolysis markers, helps diagnose and stratify HELLP syndrome.

- Combining platelet trends with clinical findings improves prognostic accuracy.

Predictive Value of Platelet Count in Maternal and Fetal Outcomes

1. Platelet Count as a Predictor in Maternal Outcomes:

- **Severity of Preeclampsia:**
    - Platelet counts <100,000/μL are strongly associated with severe preeclampsia.
    - Lower counts indicate increased vascular injury and systemic involvement.
- **HELLP Syndrome:**
    - Thrombocytopenia is a diagnostic marker in HELLP syndrome.
    - A notable decrease in platelet count indicates high risk for liver damage, DIC and renal failure.
- **Risk of Postpartum Hemorrhage (PPH):**
    - Platelet levels below 50,000/μL greatly elevate the likelihood of severe bleeding during childbirth.
    - Transfusion may be required in these cases
- **Maternal Mortality:**
    - Severe thrombocytopenia is linked to an increased risk of maternal mortality, especially in areas with limited resources.

2. Platelet Count as a Predictor in Fetal Outcomes:

- **Intrauterine Growth Restriction (IUGR):**
    - Low platelet counts correlate with placental insufficiency, leading to IUGR.

- This affects the fetal weight and overall growth.

- **Preterm Birth:**
  - Severe thrombocytopenia often necessitates early delivery to prevent maternal complications.
  - Preterm infants face risks like respiratory distress and neonatal sepsis.
- **Stillbirth:**
  - Persistent thrombocytopenia and associated placental abnormalities increase the risk of stillbirth.
  - Fetal hypoxia due to reduced uteroplacental blood flow is a key contributing factor.
- **Low Birth Weight (LBW):**
  - Thrombocytopenia-related complications often result in LBW infants, increasing neonatal morbidity.

3. Prognostic Significance:

- Platelet count trends are more predictive than a single value.
- A sudden decline in platelets signals acute conditions like placental abruption or DIC, requiring immediate intervention.

4. Combining Platelet Count with Other Markers:

- **Liver Enzymes (AST/ALT):**
  - Elevated enzymes combined with low platelets predict poor maternal outcomes.
- **Fetal Doppler Studies:**
  - Used alongside maternal platelet counts to assess placental function and fetal well-being.

5. Implications for Clinical Management:

- Close monitoring of platelet counts helps identify high-risk cases early.
- Early delivery can be planned to optimize outcomes for both mother and fetus.
- Severe thrombocytopenia may necessitate interventions such as platelet transfusions or intensive care.

Role of Peripheral Smear Examination in PIH[43,44]

1. Significance of Peripheral Smear Examination:

- Peripheral smear examination is an affordable and readily available method.
- It provides crucial insights into hematological abnormalities in Pregnancy-Induced Hypertension (PIH), especially in severe cases like preeclampsia and HELLP syndrome.
- It helps assess platelet morphology, hemolysis, and the presence of microangiopathic changes.

2. Key Findings in PIH:

- **Schistocytes:**
    - Fragmented red blood cells (RBCs) indicate microangiopathic hemolysis.
    - Commonly seen in HELLP syndrome and severe preeclampsia.
- **Thrombocytopenia:**
    - Reduced platelet count with giant platelets or clumped platelets may be observed.
    - Confirms platelet consumption due to endothelial damage.
- **Anisocytosis and Poikilocytosis:**
    - Variation in RBC size and shape due to hemolysis and oxidative stress.

- **Polychromasia and Reticulocytosis:**
    - Suggests bone marrow response to anemia caused by hemolysis.
- **Leucocytosis:**
    - Elevated white blood cells may indicate systemic inflammation.

3. Predictive Value of Peripheral Smear in PIH:

- **Sensitivity and Specificity:**
    - Schistocytes have a sensitivity of ~78% and specificity of ~90% for diagnosing HELLP syndrome.
    - The sensitivity and specificity of thrombocytopenia observed on a smear are ~70% and ~85% , respectively, allowing for the prediction of severe eclampsia.
    - The combination of schistocytes and thrombocytopenia improves diagnostic accuracy.
- **Positive Predictive Value (PPV):**
    - Schistocytes on smear have a PPV of 88% for HELLP syndrome in high-risk cases.
- **Negative Predictive Value (NPV):**
    - Absence of schistocytes has an NPV of 85%, reducing the likelihood of severe microangiopathy.

4. Prognostic Role:

- The presence of schistocytes and thrombocytopenia correlates with severe maternal complications, including disseminated intravascular coagulation (DIC), renal failure, and hepatic dysfunction.

- Stillbirth and intrauterine growth restriction (IUGR) are negative fetal outcomes associated with these findings, but they are preventable.

5. Advantages of Peripheral Smear:

- Quick and accessible, especially in resource-limited settings.
- Can guide further investigations, such as coagulation profiles and liver enzyme tests.

6. Clinical Implications:

- Routine smear examination in PIH patients helps identify high-risk cases early.
- Guides the timing of interventions like delivery or transfusion.
- Improves maternal and fetal outcomes when combined with other diagnostic tools.

Coagulation Parameters in PIH [42,45]

1. The Alterations in Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT) in PIH

- **Prothrombin Time (PT):**
    - PT may remain normal in mild cases of PIH.
    - In severe preeclampsia or HELLP syndrome, PT may be prolonged due to consumption of clotting factors.
    - Prolonged PT indicates significant coagulation dysfunction, often linked to disseminated intravascular coagulation (DIC).
- **Activated Partial Thromboplastin Time (aPTT):**
    - PT, aPTT are usually normal in mild PIH.

- Prolonged aPTT in severe PIH reflects impaired clotting factor activity and fibrin deposition.
- Prolonged values are associated with poor outcomes like postpartum hemorrhage or placental abruption.

2. Significance of Coagulation Markers in Assessing Haemostatic Balance:

- **Fibrinogen Levels:**
  - Fibrinogen is typically elevated in normal pregnancy.
  - In PIH, severe cases may show reduced fibrinogen due to consumption in DIC.
  - Low fibrinogen is a critical predictor of bleeding complications.
- **D-Dimer Levels:**
  - Elevated D-dimer indicates ongoing fibrin degradation due to hypercoagulable states.
  - High levels are associated with endothelial damage and microvascular thrombosis.
- **Platelet Count:**
  - Low platelet count (<100,000/μL) suggests platelet consumption and is a hallmark of severe PIH or HELLP syndrome.
- **Antithrombin III (AT-III):**
  - Reduced AT-III levels indicate decreased anticoagulant activity and an imbalance favoring clot formation.
- **Fibrin Degradation Products (FDPs):**
  - Increased FDPs reflect excessive fibrinolysis and are often seen in DIC.

3. Comparison of Coagulation Changes Between Normal Pregnancies and PIH:

Table 1: Comparison of Coagulation Changes Between Normal Pregnancies and PIH

Parameters	Normal pregnancy	PIH
Platelet Count	Normal or mildly reduced	Decreased, especially in severe cases
PT/aPTT	Normal	Prolonged in severe PIH or HELLP syndrome
Fibrinogen	Elevated (pro-coagulant state)	Reduced in severe PIH/DIC
D-Dimer	Mild elevation	Markedly elevated
AT-III	Normal	Reduced
FDPs	Normal	Elevated

4. Clinical Implications:

- Regular monitoring of coagulation parameters helps detect progression to severe PIH or DIC.
- Prolonged PT/aPTT or low fibrinogen levels warrant immediate intervention, including platelet transfusion or delivery.
- Early identification of coagulation abnormalities improves maternal and fetal outcomes.

Role of Timely Intervention in Reducing Adverse Outcomes in PIH [22,27, 35-37]

Timely intervention plays a crucial role in reducing adverse outcomes associated with PIH. Early detection and prompt management can prevent disease progression to severe preeclampsia, eclampsia, HELLP syndrome, or disseminated intravascular coagulation (DIC), significantly improving maternal and foetal outcomes.

Key interventions include regular antenatal monitoring, which enables early diagnosis through

frequent blood pressure checks, urine protein estimation, and platelet count assessments. Antihypertensive therapy with medications like labetalol, nifedipine, and methyldopa helps prevent hypertensive emergencies such as stroke. In severe cases, magnesium sulphate is administered to prevent eclampsia, reducing seizure-related complications.

Timely delivery remains the definitive treatment for PIH, especially in severe cases where it mitigates maternal risks such as renal failure, placental abruption, and postpartum haemorrhage, while also preventing foetal complications like intrauterine growth restriction (IUGR) and stillbirth. Monitoring coagulation parameters aids in detecting thrombocytopenia or abnormal clotting, enabling timely interventions like platelet transfusion to prevent haemorrhagic complications. Regular foetal monitoring using Doppler studies and biophysical profiles ensures early identification of foetal distress, allowing for necessary interventions, including Caesarean delivery.

Early intervention is critically important as studies have shown that a 20-25% reduction in maternal mortality due to prompt preeclampsia management. The timely administration of magnesium sulphate has been associated with a more than 50% reduction in eclampsia incidence in low-resource settings. Early delivery has also been linked to significant improvements in perinatal mortality and morbidity.

Delayed intervention, on the other hand, increases the likelihood of complications such as eclampsia, HELLP syndrome, or DIC, raising maternal morbidity and mortality. For the foetus, delays can result in stillbirth, preterm birth, and the need for neonatal intensive care admission.

A multidisciplinary approach involving obstetricians, anesthesiologists, neonatologists, and critical care specialists is essential in ensuring comprehensive and timely management of PIH, ultimately reducing complications and improving outcomes for both mother and baby.

Current Diagnostic and Management Practices in PIH [35-37]

1. Diagnostic Practices:

- **Blood Pressure Monitoring:**

  - Regular BP measurement is the cornerstone for diagnosing PIH.
  - In a normotensive woman with a blood pressure of 140/90 mmHg or higher on two separate occasions, with at least a 4-hour interval, after 20 weeks of pregnancy.

- **Urine Protein Estimation:**

  - Detection of proteinuria (more than 300 mg/24 hours or urine protein: creatinine ratio more than 0.3).
  - Dipstick test is used for screening (≥1+ indicates proteinuria).

- **Hematological and Biochemical Tests:**

  - Platelet count: Identifies thrombocytopenia (<100,000/μL in severe cases).
  - Liver function tests: Elevated AST/ALT levels indicate liver involvement.
  - Kidney function tests: A serum creatinine level greater than 1.1 mg/dL indicates potential renal dysfunction.
  - Coagulation profile: PT/aPTT and fibrinogen levels for detecting DIC.

- **Fetal Assessment:**

  - Fetal growth monitoring by ultrasound and evaluation of amniotic fluid.
  - Doppler studies to evaluate uteroplacental blood flow.
  - Monitoring fetal heart rate by Non- Stress Test (NST).

- **Biomarkers (Emerging Diagnostics):**

  - sFlt-1/PlGF ratio (anti-angiogenic and pro-angiogenic factors) helps predict preeclampsia severity.

- Elevated D-dimer levels and reduced antithrombin-III indicate hypercoagulable states.

2. Management Practices:

- **General Principles:**
  - Management depends on the severity of PIH and gestational age.
  - Aim: To control maternal BP, prevent complications, and optimize fetal outcomes.

A. Non-Severe PIH:

- **Antihypertensive Medications:**
  - First-line drugs: Labetalol, nifedipine, methyldopa.
  - Target BP: <140/90 mmHg.
- **Lifestyle Modifications:**
  - Rest, reduced salt intake, and regular antenatal visits.
- **Maternal and Fetal Monitoring:**
  - Weekly BP, urine protein, and fetal growth assessment.

B. Severe PIH (BP ≥160/110 mmHg):

- **Hospitalization:**
  - Immediate admission for close monitoring.
- **Antihypertensives:**
  - IV labetalol or hydralazine for rapid BP control.
- **Seizure Prophylaxis:**
  - Magnesium sulphate (loading dose followed by maintenance infusion).

- **Fetal Monitoring:**
    - Frequent NST and Doppler studies.

C. HELLP Syndrome and Eclampsia:

- **Management:**
    - Intensive care with platelet transfusion if thrombocytopenia is severe.
    - Magnesium sulphate to control seizures.
- **Delivery:**
    - Immediate delivery, irrespective of gestational age, if maternal or fetal life is at risk.

3. Delivery Timing:

- **Non-Severe PIH:**
    - Delivery planned at 37 weeks to prevent progression.
- **Severe PIH/Eclampsia:**
    - Immediate delivery if maternal or fetal condition deteriorates.

4. Postpartum Care:

- Monitor BP for 6-12 weeks after delivery as hypertension may persist.
- Counsel on long-term cardiovascular risks and need for regular follow-ups.

5. Emerging Therapies:

- **Aspirin Prophylaxis:**
    - The administration of low-dose aspirin (75–150 mg per day) in women identified as high-risk has been shown to decrease the occurrence of preeclampsia.
- **Calcium Supplementation:**

- It is advisable for populations with insufficient dietary calcium consumption.

- **Novel Biomarkers and Therapies:**
  - sFlt-1/PlGF-targeted interventions are under research.

Haldar et al.[42] conducted a hospital-based analytical prospective study in West Bengal, from January 2017 to June 2018. They focused on the hematological and coagulation changes in PIH. The study aimed to evaluate whether platelet indices (Platelet count, Platelet Distribution Width [PDW], Mean Platelet Volume [MPV]) and coagulation parameters (Prothrombin Time [PT] and Activated Partial Thromboplastin Time [aPTT]) could serve as indicators of preeclampsia and eclampsia onset and severity. Results of 120 PIH patients showed a remarkable decrease in the platelet count and a notable raise in MPV along with PDW among preeclamptic and eclamptic patients compared to normotensive controls. Furthermore, the coagulation profile revealed elevated PT and APTT levels, with eclamptic patients showing the highest APTT values. The study concluded that platelet indices and coagulation profiles could be reliable markers for the early detection and severity assessment of preeclampsia and eclampsia.

Bangera et al. [43] conducted an observational study at Father Muller Medical College from May 2011 to April 2014 to evaluate platelet count and indices in Pregnancy-Induced Hypertension (PIH). The study involved 60 confirmed PIH cases, divided equally into preeclampsia and eclampsia groups, and 30 normotensive pregnant women as controls. The study revealed significant variations in platelet parameters across groups. The mean platelet count was lowest among eclampsia group (1.12 Lakhs/mm^3), followed by preeclampsia (1.36 Lakhs/mm^3), while the control group had the highest count (2.62 Lakhs/mm^3). Similarly, the Mean Platelet Volume (MPV) and Platelet Distribution Width (PDW) were increased in PIH cases, with notable increases in eclampsia compared to normotensive controls. These findings demonstrate significant alterations in platelet values and indices in PIH, emphasizing their potential as markers for disease

severity.

Boddapati et al.[44] conducted a study to assess hematological parameters in Pregnancy-Induced Hypertension (PIH) and their predictive value for severe complications like eclampsia and HELLP syndrome. The study involved 114 participants, categorized as gestational hypertension (n=35), mild preeclampsia (n=33), severe preeclampsia (n=40), and eclampsia (n=6), with 8 cases progressing to HELLP syndrome. Key findings showed significant reductions in hemoglobin levels (mean: 10.6 g/dL, $p=0.045$) and platelet counts (mean: 191 x 10^9/L, $p=0.008$) as PIH severity increased. Prothrombin time (13.12 seconds) and activated partial thromboplastin time (33.62 seconds) are notably high in severe cases ($p<0.05$). Liver enzymes, creatinine, and uric acid levels also rose significantly with disease progression ($p<0.05$). The study concluded that hematological parameters, including hemoglobin, platelet count, and coagulation markers, are reliable prognostic indicators of PIH severity and its complications.

Chauhan et al.[45] conducted a study in Uttarakhand between 2012 and 2013 to compare coagulation parameters in preeclamptic and eclamptic patients with normotensive pregnant women. The study recruited 100 hypertensive and 100 normotensive participants. The key findings showed a notable decrease in platelet count (mean: 157.18±56.66 lacs/cumm, $p<0.001$) in preeclamptic and eclamptic patients. While prothrombin time (PT), activated partial thromboplastin time (aPTT), and clotting time (CT) were within normal ranges, bleeding time (BT) was significantly prolonged (mean: 322.46±171.39 seconds, $p<0.001$). The authors concluded that significant coagulation abnormalities take place in hypertensive pregnancy disorders.

Manchanda et al.[46] conducted a hospital-based study on 100 cases of pregnancy-induced hypertension (PIH) and 100 controls to investigate the relationship between platelet indices and the severity of PIH. The study found that most cases occurred in women aged 22–26 years and among first-time mothers. The analysis showed that mean platelet volume (MPV), platelet distribution width (PDW), and platelet-large cell ratio (P-LCR) were significant risk factors linked to

hypertensive crises, correlating with elevated blood pressures. The conclusion drawn was that platelet indices were higher in PIH patients compared to those with normal pregnancies, highlighting their potential as risk markers for adverse outcomes in hypertensive pregnancies.

Sameer et al.[47] conducted a prospective study on 200 cases and 80 controls over two years to evaluate the reliability of platelet count as a predictive method for Pregnancy-Induced Hypertension (PIH), which includes gestational hypertension, pre-eclampsia, and eclampsia, affecting 11-29% of pregnancies in the Indian population. The study focused on the simplicity and cost-effectiveness of platelet count compared to other coagulation parameters like PT, APTT, and TT. Their observations indicated that platelet counts were significantly lower in severe pre-eclampsia and eclampsia cases compared to mild pre-eclampsia and controls, with thrombocytopenia present in 33 severe cases, leading to unfavorable fetal outcomes in 90.90% and poor maternal outcomes in 81.81%. The conclusion emphasized that routine tests such as CBC and platelet counts are crucial for early detection of coagulation issues, aiding in management to reduce morbidity and mortality rates for both mother and fetus.

Salvi et al.[48] conducted a prospective case-control study on 50 women to explore the relationship between platelet indices and preeclampsia, aiming to determine if these parameters could aid in early diagnosis. The participants were divided into non-severe preeclampsia (n=36) and severe preeclampsia (n=14) groups. The study analyzed platelet count, mean platelet volume (MPV), platelet distribution width (PDW), and platelet large cell ratio, correlating these indices with clinical severity, organ system involvement, and foeto-maternal outcomes. Results indicated a significant decrease in platelet count and an increase in MPV and PDW in the severe preeclampsia group compared to the non-severe group. Severe preeclampsia cases exhibited worse maternal and fetal outcomes, with significant alterations in platelet indices being more pronounced in these patients. The study concluded that decreasing platelet counts, alongside increasing MPV and PDW, serve as potential biomarkers for early diagnosis and severity assessment of preeclampsia.

Tejaswini et al.[49] conducted a study to assess the utility of platelet count as a prognostic indicator in pregnancy-induced hypertension (PIH). Hypertensive disorders are among the most common medical complications in pregnancy, significantly contributing to maternal and fetal morbidity and mortality. Thrombocytopenia, which complicates hypertensive disorders, accounts for about 20% of all cases of thrombocytopenia during pregnancy. This study included 76 cases of PIH over 18 months, where platelet estimation was performed, documenting thrombocytopenia in patients with platelet counts below 1,50,000/cumm. Results indicated that 42.1% of the cases were diagnosed with thrombocytopenia, with a notable increase in maternal and fetal morbidity and mortality. The study concluded that platelet count assays could be a valuable prognostic tool for managing hypertensive disorders in pregnancy, aiding in early detection and better pregnancy outcomes.

Woldeamanuel et al. [50] conducted a systematic review and meta-analysis to evaluate the association between platelet count and preeclampsia. The analysis included 56 studies with 4892 preeclamptic and 9947 normotensive pregnant women. The findings revealed that platelet count was significantly lower in preeclamptic women compared to normotensive controls, with a mean difference of −32.83. This significant reduction was consistent across mild and severe cases of preeclampsia, and in the second and third trimesters, as well as before the onset of the condition. The pooled sensitivity and specificity of platelet count as a predictive measure were 0.71 and 0.77, respectively, with an area under the curve of 0.80. The study concluded that decreased platelet count is a reliable marker for detecting preeclampsia severity and its complications, even before clinical onset.

MATERIALS AND METHODS

Ethical considerations: The present study has been approved by the institutional ethical committee of Shri B.M Patil Medical College, Hospital and Research Center, BLDE (Deemed to be University), Vijayapura. Written informed consent was obtained from all the participants.

Study Design: Prospective study.

Study Setting: The study will be carried out in Hematology laboratory, Department of Pathology, BLDE (Deemed to be University), Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura.

Study population: Patients who are diagnosed with Pregnancy Induced Hypertension(PIH) on routine ANC(antenatal care) visits and who are admitted to labor room in Department of Obstetrics and Gynecology at Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura.

Study period: From 1st May 2023 to 31st December 2024.

sample size: The estimated sample size of this study is **305**.

Data collection method:

- After obtaining informed consent from all patients, venous blood will be collected using 21 G disposable needle and disposable plastic syringe, under aseptic precautions.
- 4 cc of blood will be collected for the tests. Of this 2 cc will be collected in EDTA bulb for determination of hemoglobin, platelet count and to prepare peripheral smear. 1.8cc of venous blood will be collected in citrate bulb – 9 parts mixed with one part of trisodium citrate (3.2%) i.e., 1.8cc of blood + 0.2 ml citrate. This sample is then centrifuged immediately for 15mins at 1500-3000 rpm and platelet poor plasma transferred to a clean test tube and subjected to tests such as PT, APTT with INR in fully automated coagulation analyzer.

INCLUSION CRITERIA

1. All Primigravida who are newly diagnosed with Pregnancy Induced Hypertension.
2. Gestational age >28 weeks.

EXCLUSION CRITERIA

1. Multigravida.
2. Patients with history of chronic hypertension and other medical co-morbidities.
3. Patients who are on anticoagulants.

STATISTICAL ANALYSIS

- The data obtained is entered in a Microsoft Excel sheet, and statistical analyses are performed using a statistical package for the social sciences (SPSS)(Version 20).
- Results are presented as Mean, SD, counts and percentages, and diagrams.
- As per the study done by Priyanka P ,out of 350 PIH cases – 83 cases (23.71%) had severe pre-eclampsia. Considering the confidence limit of these studies to be 96% with 4% level of significance and margin of error 0.05. The sample size computed using the following formula:

  Sample size (n) = (Z 2 *p*(1-p)) /d 2 Where,

  z is the z score= 2.04 d is the margin of error = 0.05 n is the population size

  p is the population proportion = 0.2371, α is level of significance =0.04

THE ESTIMATED SAMPLE SIZE OF THIS STUDY IS 305.

RESULTS

Our study was conducted at the Department of Pathology, B.L.D.E. (Deemed to be University), Shri B.M. Patil Medical College, Hospital & Research Centre in Vijayapura, Karnataka. We evaluated the peripheral blood smears and coagulation profiles of 305 primigravida patients diagnosed with Pregnancy Induced Hypertension (PIH). The objective of this study was to determine the significance of coagulation profiles and peripheral smear examinations in the early diagnosis of PIH.

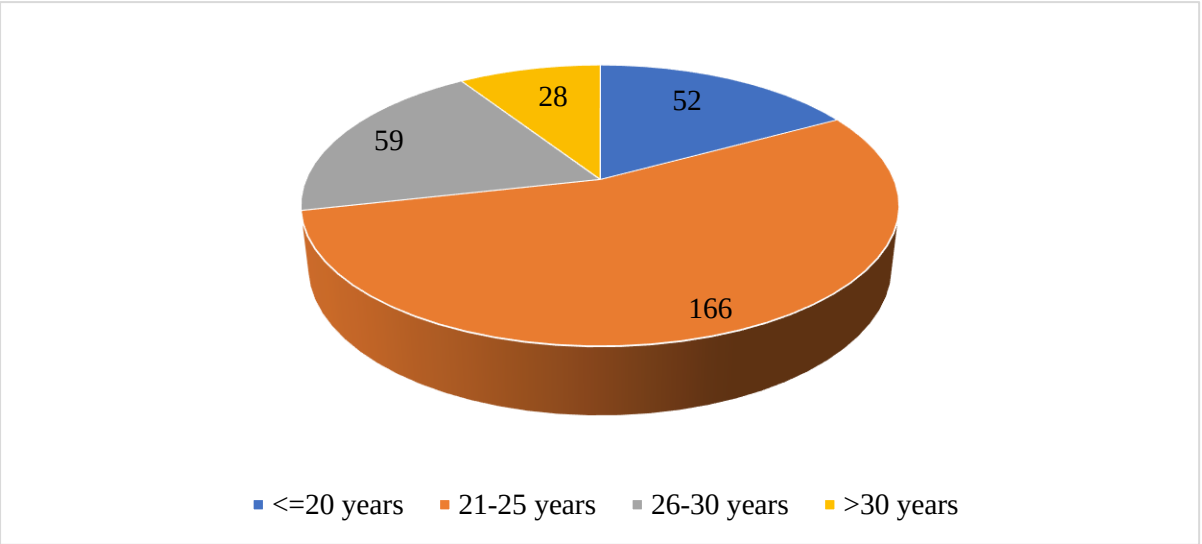
Age distribution

The mean age of the patients was 24 years (SD 3.9 years) with a range between 18 and 36 years. Most of the patients belonged to 21-25 years of age (n=166, 54.4%) (Table II, figure III).

Table II: Age distribution

Age	Frequency	Percentage (%)
<=20 years	52	17.05
21-25 years	166	54.43
26-30 years	59	19.34
>30 years	28	9.18

Figure III: Age distribution



Gestational age (GA) distribution

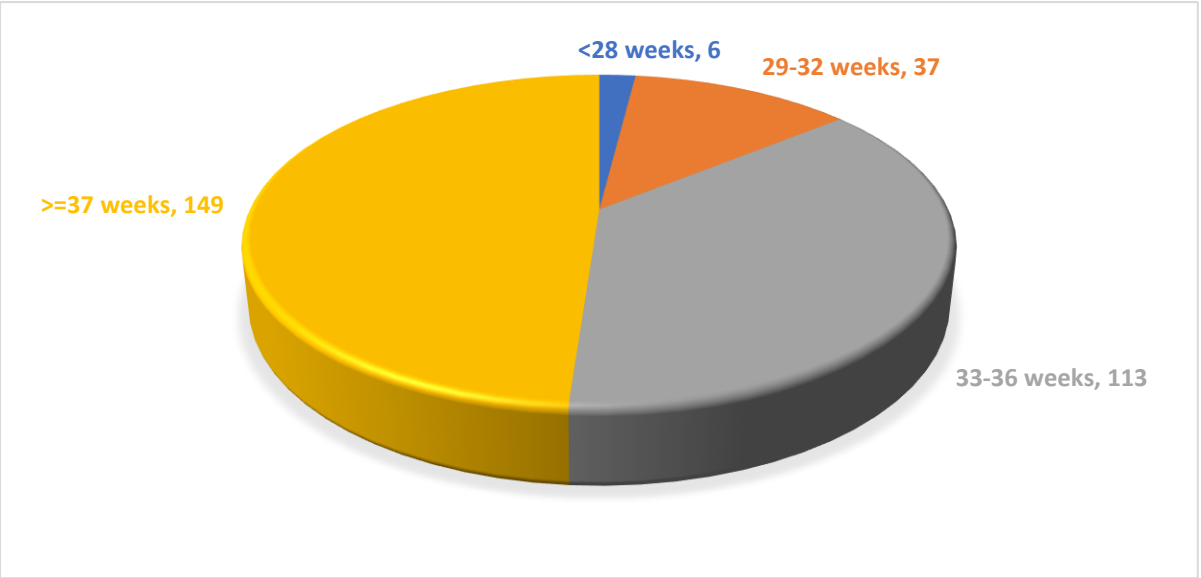
The mean GA of the patients was 35.5 weeks (SD 3.3 weeks) with a range between 23.6 weeks and 40.4 weeks.

Most of the patients (n=149, 48.9%) were in term pregnancy. This was followed by GA between 33 & 36 weeks (n=113, 37.1%) (Table III, figure IV).

Table III: Distribution of GA

GA	Frequency	Percentage (%)
<28 weeks	6	1.97
29-32 weeks	37	12.13
33-36 weeks	113	37.05
>=37 weeks	149	48.85

Figure IV : Distribution of GA



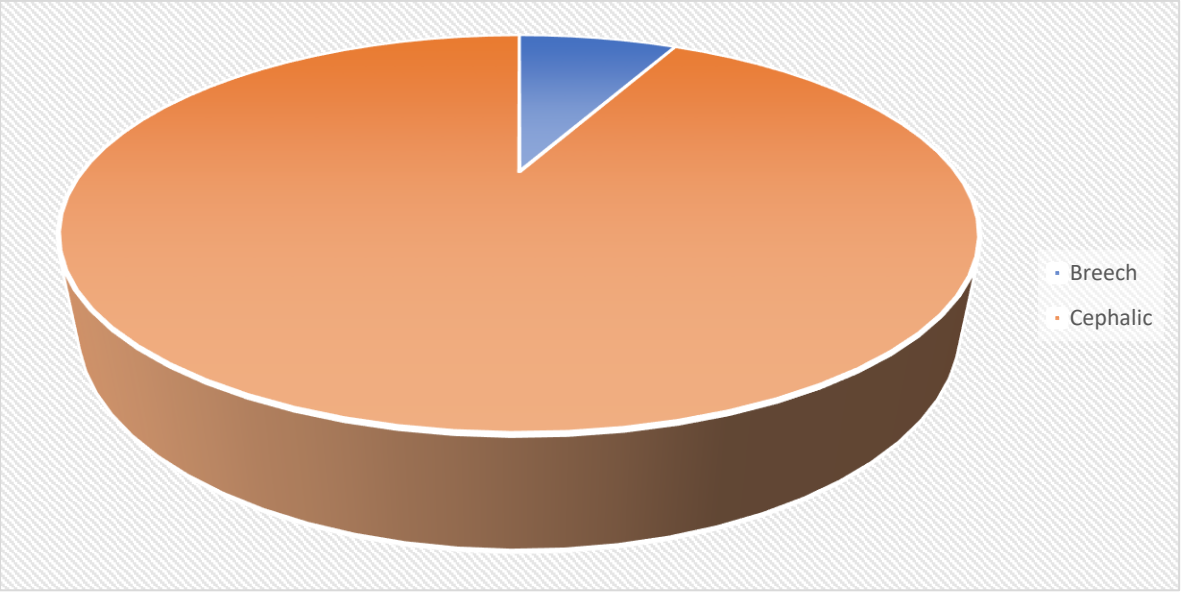
Foetal presentation

While majority (n=282, 92.5%) had a cephalic presentation, a few patients came in breech presentations (n=23, 7.5%) (Table IV, figure V)

Table IV: Foetal presentations

Presentation	Frequency	Percentage (%)
Breech	23	7.54
Cephalic	282	92.46

Figure V : Foetal presentation



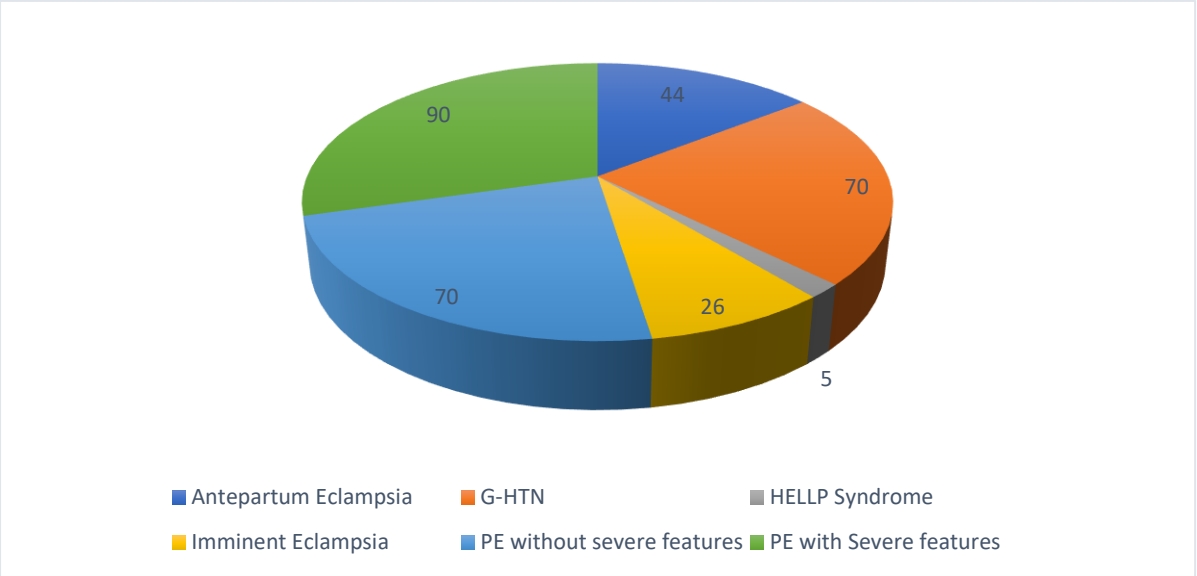
Diagnosis

Many patients presented with the following diagnosis- PE with severe features (n=90, 29.51%), gestational hypertension (n=70, 22.95%), and PE without severe features (n=70, 22.95%). Only 5 patients (1.64%) presented with HELLP syndrome (Table V, figure VI).

Table V: Diagnosis of the patients

Diagnosis	Frequency	Percentage (%)
Antepartum Eclampsia	44	14.43
G-HTN	70	22.95
HELLP Syndrome	5	1.64
Imminent Eclampsia	26	8.52
PE without severe features	70	22.95
PE with Severe features	90	29.51

Figure VI : Diagnosis of the patients



Laboratory tests

Platelet counts

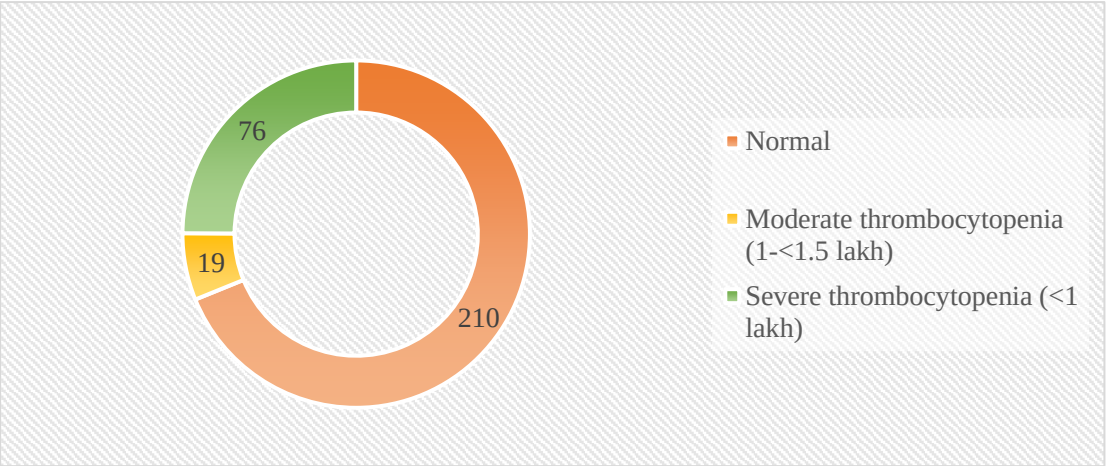
The median platelets count was 1,66,000 (IQR: 1,00,000 to 1,96,000).

Though platelet count was normal for 210 patients (68.85%), count was low for 95 patients (31.15%)

Table VI: Distribution of platelet counts

Platelets	Frequency	Percentage (%)
Normal (>=1.5 lakh)	210	68.85
Moderate thrombocytopenia (1 to <1.5 lakh)	19	6.23
Severe thrombocytopenia (<1 lakh)	76	24.92

Figure VII : Distribution of platelet counts



Prothrombin time (PT)

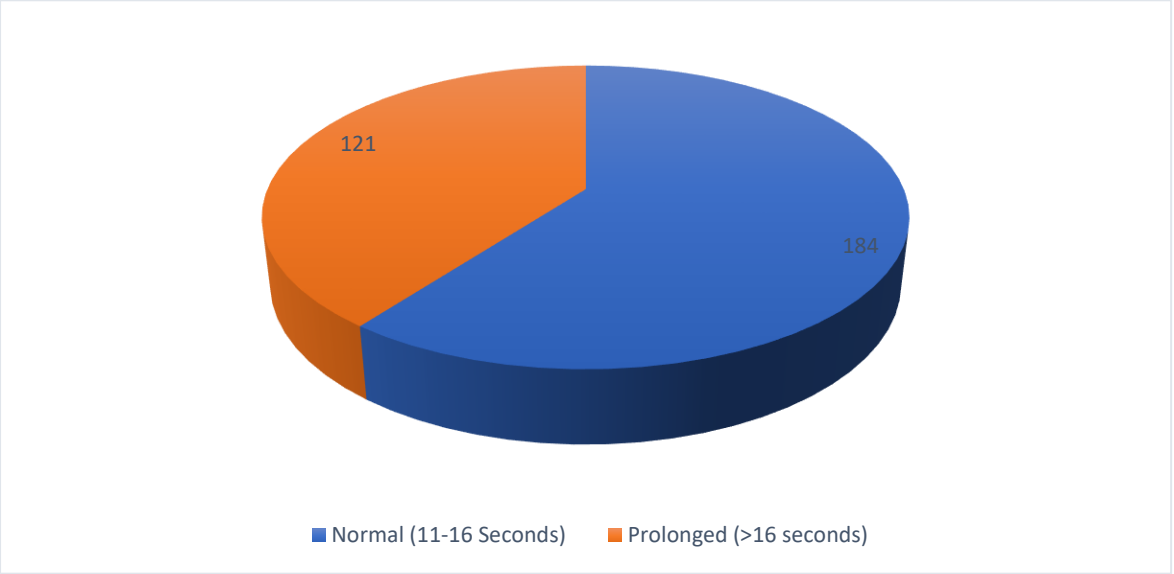
The median PT was 15.3 seconds (IQR: 13 to 16.3 seconds).

Though PT was normal for 184 patients (60.33%), count was low for 121 patients (39.67%) (table VII, Figure VIII)

Table VII : Distribution of Prothrombin time

Prothrombin time	Frequency	Percentage (%)
Normal (11-16 Seconds)	184	60.33
Prolonged (>16 seconds)	121	39.67

Figure VIII : Distribution of Prothrombin time



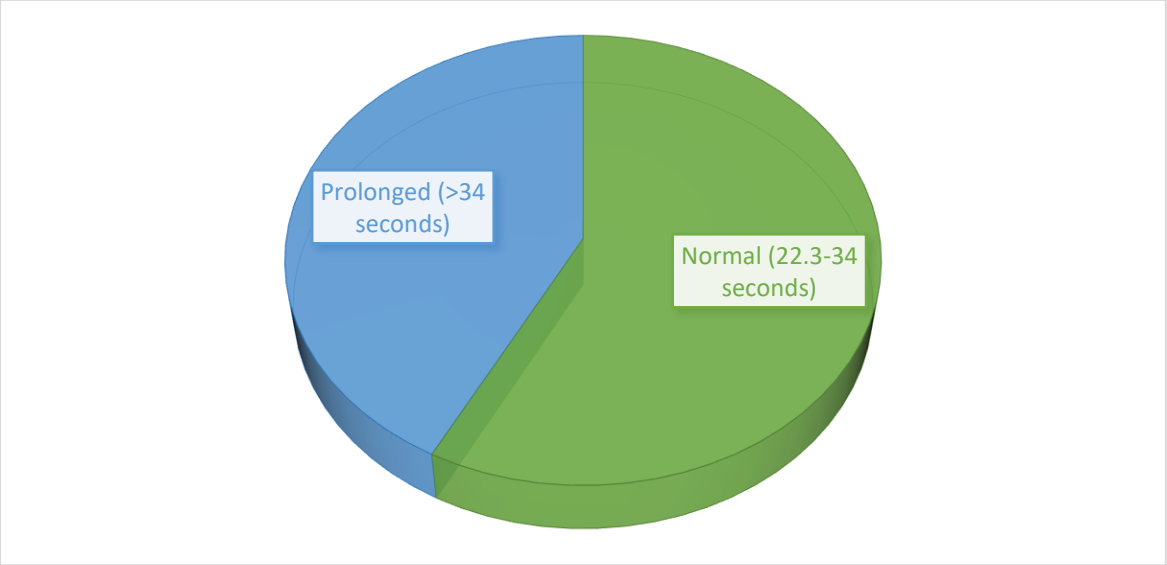
Activated partial thromboplastin time (aPTT)

The median aPTT was 32.1 seconds (IQR: 27 to 36.2 seconds). aPTT was normal for 176 (57.7%) patients and prolonged for 12 (42.3%) patients (Table VIII, figure IX).

Table VIII : Distribution of aPTT

aPTT	Frequency	Percentage (%)
Normal (22.3-34 seconds)	176	57.7
Prolonged (>34 seconds)	129	42.3

Figure IX : Distribution of aPTT



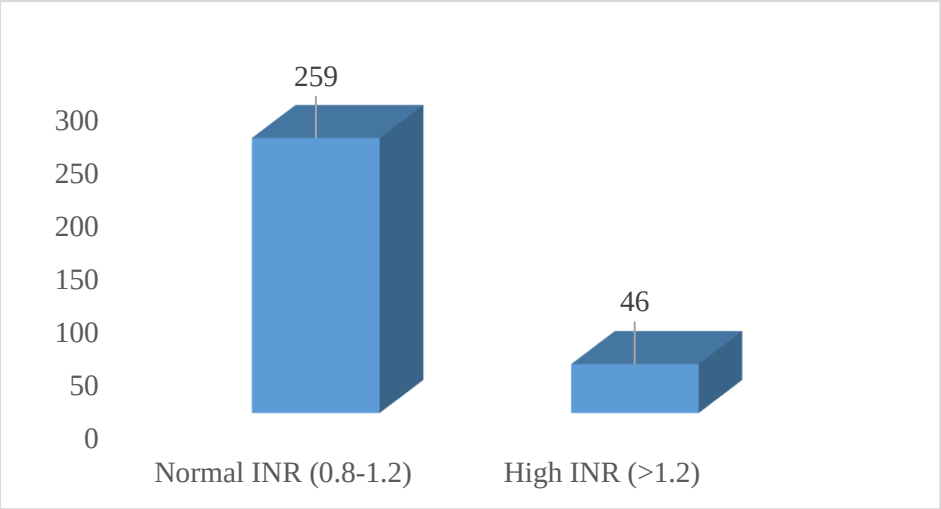
INR

The median INR was 0.94 (IQR 0.87 to 1.2). PT was normal for 259 (84.92%) patients and prolonged for 46 (15.08%) patients (Table IX, figure X).

Table IX : Distribution of INR

INR	Frequency	Percentage (%)
Normal INR (0.8-1.2)	259	84.92
High INR (>1.2)	46	15.08

Figure X : Distribution of INR



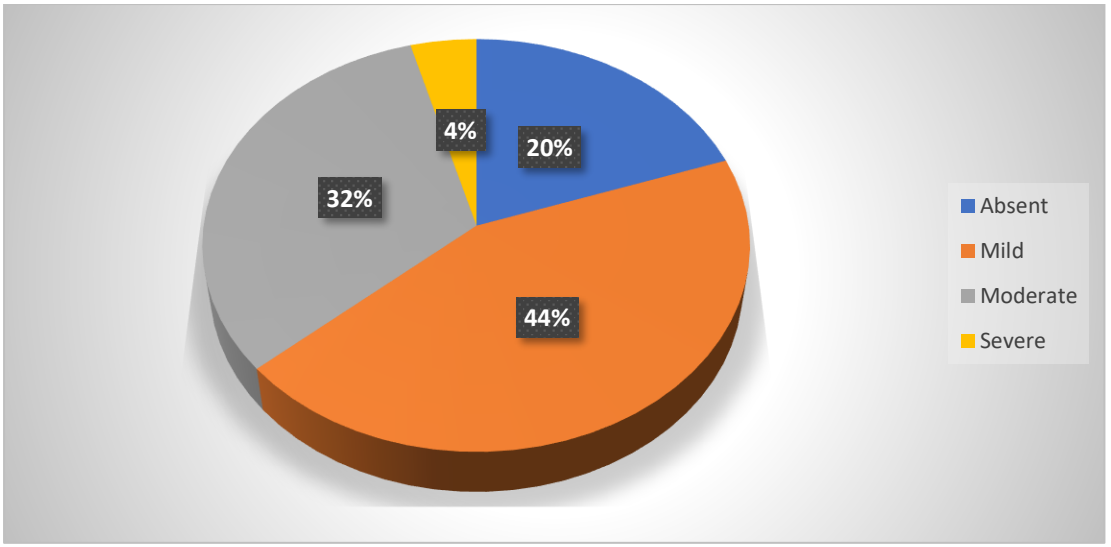
Haemoglobin (Hb)

The median Hb was 10gm/dL (IQR: 8.2 to 11 gm/dL). While 60 patients (19.67%) did not have any anaemia, mild form of anaemia was commonest (43.93%) followed by moderate (32.13%) and severe variety (4.26%) (Table X, figure XI).

Table X: Distribution of anaemia

Anaemia	Frequency	Percentage (%)
Absent (Hb>=12gm/dL)	60	19.67
Mild (Hb 9-11.9gm/dL)	134	43.93
Moderate (Hb (7-8.9gm/dL)	98	32.13
Severe (Hb <7gm/dL)	13	4.26

Figure XI : Distribution of anaemia



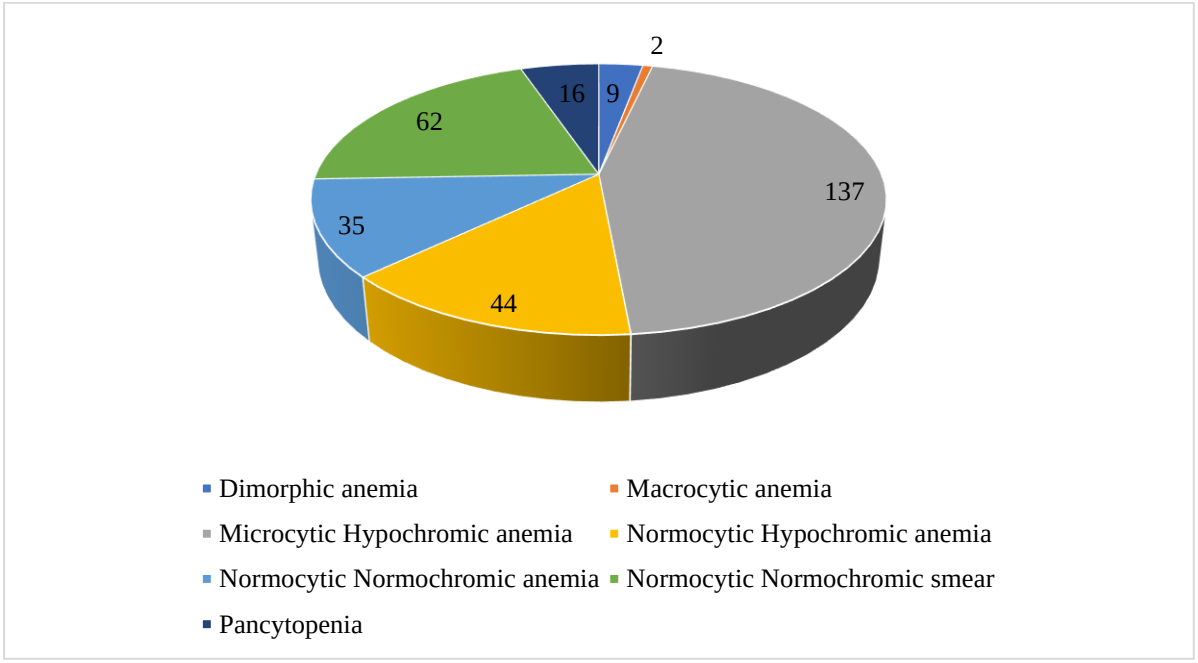
Peripheral smear

Microscopic hypochromic anaemia (MHA) was the most common (n=137, 44.92%) peripheral smear among the patients. Other common peripheral smears were- Normocytic Normochromic smear (NNS) (n=62, 20.33%), Normocytic Hypochromic anaemia (NHA) (n=44, 14.43%). While 16 patients (5.25%) patients had pancytopenia, 9 (2.95%) had dimorphic anaemia (Table XI, figure XII).

Table XI : Distribution of peripheral smears

Peripheral smear	Frequency	Percentage (%)
Dimorphic anaemia	9	2.95
Macrocytic anaemia	2	0.66
Microcytic Hypochromic anaemia	137	44.92
Normocytic Hypochromic anaemia	44	14.43
Normocytic Normochromic anaemia	35	11.48
Normocytic Normochromic smear	62	20.33
Pancytopenia	16	5.25

Figure XII : Distribution of peripheral smears



Distribution of laboratory tests in relation to diagnosis

Platelet counts and diagnosis:

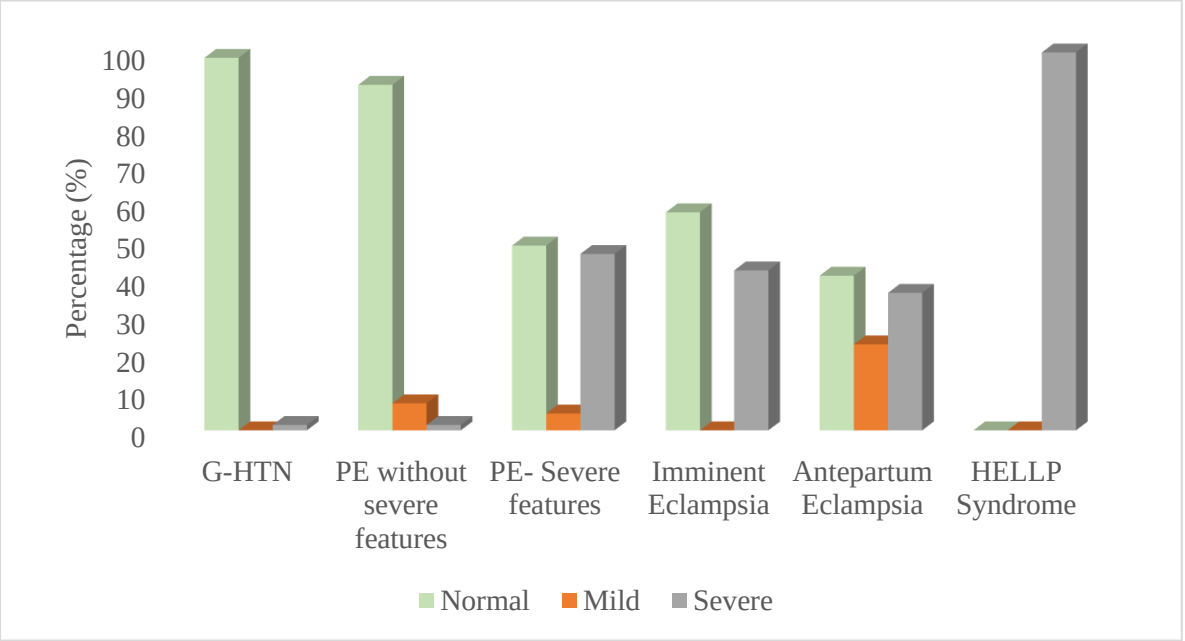
Platelet counts were considerably low for severe categories compared to the milder categories with a significant difference ($p<0.001$) (Table XII, figure XIII)

Table XII : Distribution of diagnosis according to platelet counts

Diagnosis	Platelet count			p-value
	Normal	Mild thrombocytopenia	Severe thrombocytopenia	
G-HTN	69 (98.57)	0 (0)	1 (1.43)	<0.001*
PE without severe features	64 (91.43)	5 (7.14)	1 (1.43)	
PE- Severe features	44 (48.89)	4 (4.44)	42 (46.67)	
Imminent Eclampsia	15 (57.69)	0 (0)	11 (42.31)	
Antepartum Eclampsia	18 (40.91)	10 (22.73)	16 (36.36)	
HELLP Syndrome	0 (0)	0 (0)	5 (100)	

*Statistically significant

Figure XIII : Distribution of diagnosis according to platelet counts



PT and diagnosis:

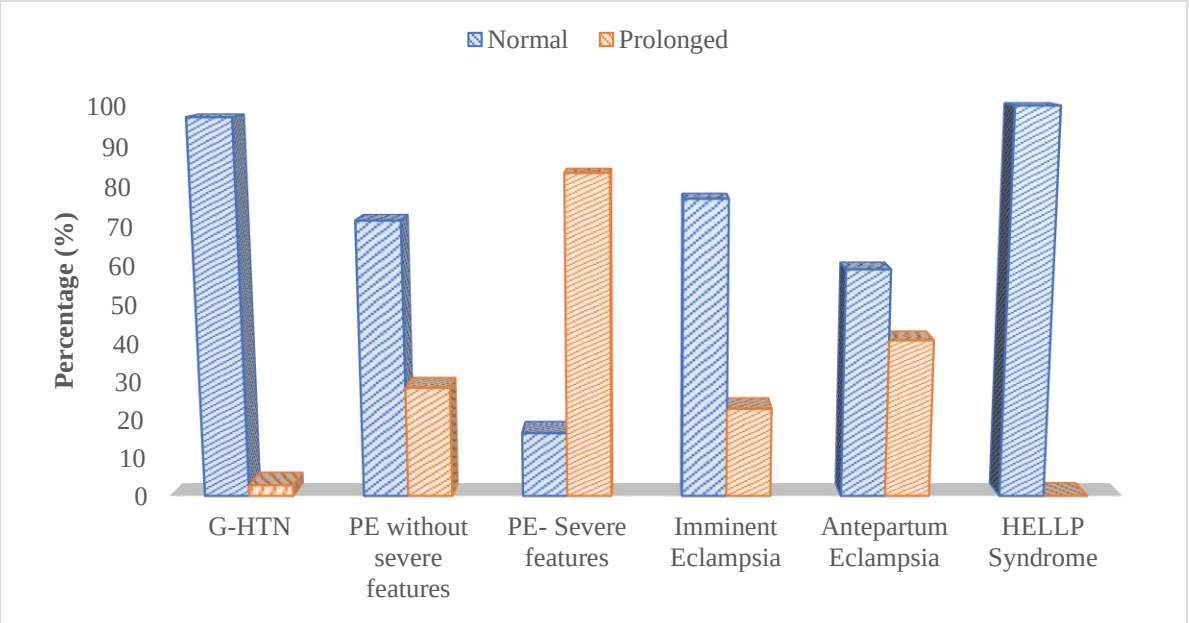
PT was mostly normal for gestational hypertension. However, a high proportion of pre-eclampsia patients (83.33%) with severe features had prolonged PT, followed by those who had antepartum eclampsia (40.91). Importantly, none of the HELLP syndrome patients had prolonged PT. The differences in PT between the various diagnosis was statistically significant. (Table XIII, Figure XIV)

Table XIII : Distribution of diagnosis according to PT

Diagnosis	PT, frequency (%)		p-value
	Normal	Prolonged	
G-HTN	68 (97.14)	2 (2.86)	
PE without severe features	50 (71.43)	20 (28.57)	
PE- Severe features	15 (16.67)	75 (83.33)	
Imminent Eclampsia	20 (76.92)	6 (23.08)	<0.001*
Antepartum Eclampsia	26 (59.09)	18 (40.91)	
HELLP Syndrome	5 (100)	0 (0)	
Total	184 (60.33)	121 (39.67)	

*Statistically significant

Figure XIV : Distribution of diagnosis according to PT



aPTT and diagnosis:

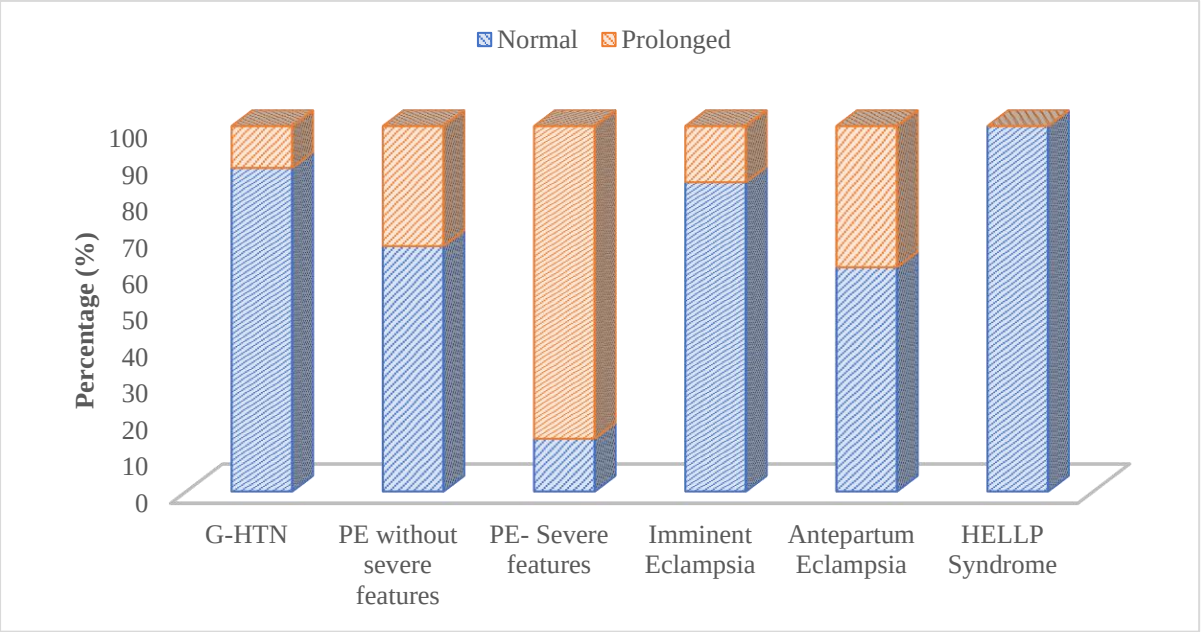
While gestational hypertension and imminent eclampsia had normal aPTT in most of the patients (88.57% and 84.62% respectively), pre-eclampsia with severe features had high proportion (85.56%) of prolonged aPTT. Notably, all the HELLP Syndrome patients had normal aPTT. The difference of PT in the various diagnosis group was significantly different (Table XIV, Figure XV).

Table XIV : Distribution of diagnosis according to aPTT

Diagnosis	Frequency (%)		p-value
	Normal	Prolonged	
G-HTN	62 (88.57)	8 (11.43)	
PE without severe features	47 (67.14)	23 (32.86)	
	13 (14.44)	77 (85.56)	
Imminent Eclampsia	22 (84.62)	4 (15.38)	<0.001*
Antepartum Eclampsia	27 (61.36)	17 (38.64)	
HELLP Syndrome	5 (100)	0 (0)	
Total	17 (57.7)	129 (42.3)	

*Statistically significant

Figure XV : Distribution of diagnosis according to aPTT



INR and diagnosis:

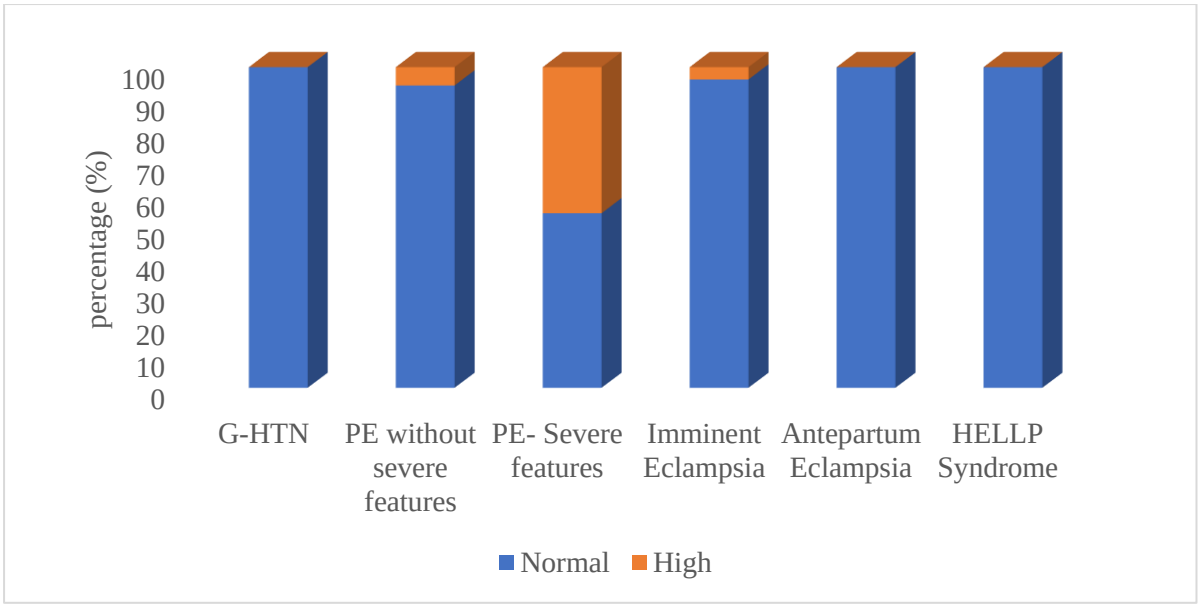
While INR was normal for most of the patients in different diagnosis groups, 45.56% of the patients in pre-eclampsia with severe features had a high INR. This difference was significantly different (Table XV, Figure XVI).

Table XV : Distribution of diagnosis according to INR

Diagnosis	INR, frequency (%)		p-value
	Normal	High	
G-HTN	70 (100)	0(0)	
PE without severe features	66 (94.29)	4 (5.71)	
PE- Severe features	49 (54.44)	41 (45.56)	
Imminent Eclampsia	25 (96.15)	1 (3.85)	<0.001*
Antepartum Eclampsia	44 (100)	0(0)	
HELLP Syndrome	5 (100)	0(0)	
Total	259 (84.92)	46 (15.08)	

*Statistically significant

Figure XVI : Distribution of diagnosis according to INR



Anaemia and diagnosis:

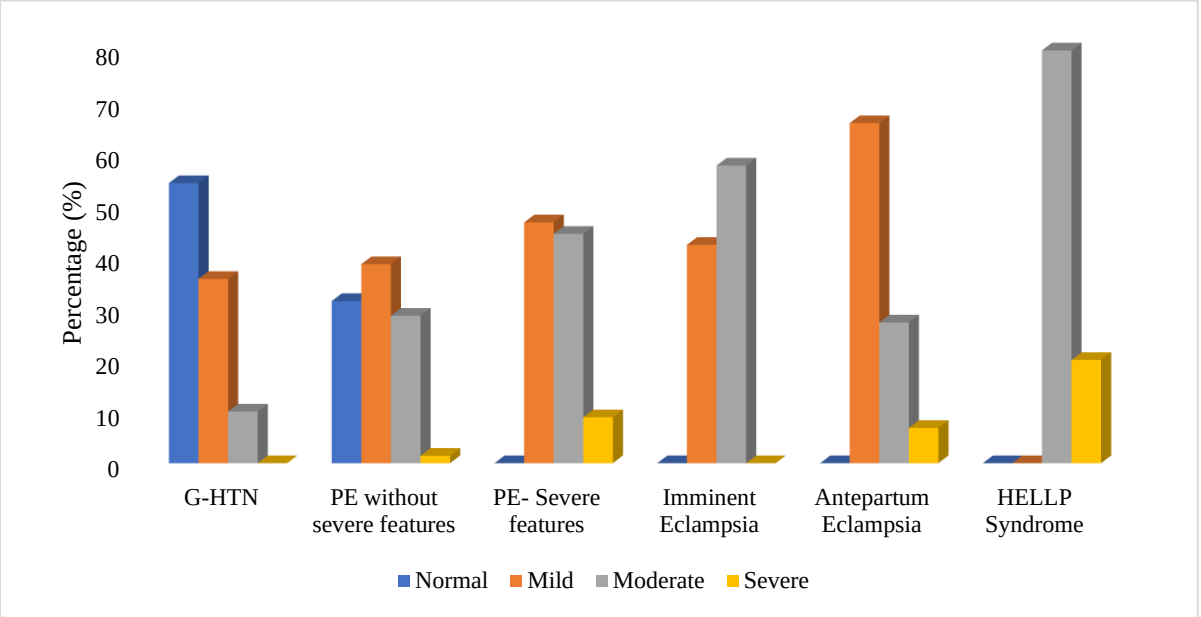
Anaemia was absent in 54.29% of gestational hypertension and 31.43% of pre-eclampsia patients without severe features. Mild anaemia was high (65.91%) in antepartum eclampsia patients. Moderate anaemia, on the other hand, was high in imminent eclampsia (57.69%), and pre-eclampsia with severe features (44.44%). The same two groups had a severe anaemia of 6.82% and 8.89%, respectively. For HELLP syndrome patients, anaemia severity was mostly moderate and severe. The groups were statistically different (Table XVI, figure XV).

Table XVI : Distribution of diagnosis according to anaemia

Diagnosis	**Type of anaemia, frequency (%)**				**p-value**
	Normal	**Mild**	**Moderate**	**Severe**	
G-HTN	38 (54.29)	25 (35.71)	7 (10)	0 (0)	<0.001*
PE without severe features	22 (31.43)	27 (38.57)	20 (28.57)	1 (1.43)	
PE- Severe features	0 (0)	42 (46.67)	40 (44.44)	8 (8.89)	
Imminent Eclampsia	0 (0)	11 (42.31)	15 (57.69)	0 (0)	
Antepartum Eclampsia	0 (0)	29 (65.91)	12 (27.27)	3 (6.82)	
HELLP Syndrome	0 (0)	0 (0)	4 (80)	1 (20)	
Total	60 (19.67)	134 (43.93)	98 (32.13)	13 (4.26)	

*Statistically significant

Figure XVII : Distribution of diagnosis according to anaemia



Peripheral smear and diagnosis:

Normochromic normocytic smear (NNS) was commonly noticed in gestational hypertension and pre-eclampsia.' This feature was absent in other diagnosis. Normochromic normocytic anaemia (NNA) was present only in gestational hypertension and pre-eclampsia without severe features (57.1% and 31.4% respectively). Microcytic hypochromic anaemia (MHA) was commonly associated with severe diagnosis like PE with severe features (44.4%), imminent eclampsia (57.7%) and antepartum eclampsia (86.4%). Dimorphic anaemia was associated with HELLP syndrome (60%) and imminent eclampsia (23.1%).

Peripheral smear	G-HTN	PE without severe features	PE- Severe features	Imminent Eclampsia	Antepartum Eclampsia	HELLP Syndrome
DA	0	0	0	6 (23.1)	0	3 (60)
MA	0	0	0	0	2 (4.55)	0
MHA	17 (24.3)	25 (35.7)	40 (44.4)	15 (57.7)	38 (86.4)	2 (40)
NHA	4 (5.7)	10 (14.3)	26 (28.9)	4 (15.4)	0	0
NNS	9 (12.9)	12 (17.1)	14 (15.6)	0	0	0
NNA	40 (57.1)	22 (31.4)	0	0	0	0
Pancytopenia	0	1 (1.4)	10 (11.1)	1 (3.9)	4 (9.1)	0

DISCUSSION

PIH causes significant morbidity and mortality in pregnancy and demands a timely diagnosis and management[1-4]. Hematological changes like thrombocytopenia can serve as an indicator of disease severity[5,6] . However, a complex pathophysiology makes the prediction of the disease and its severity even more complex, [7-12] and thus, various complications in the mothers and the foetus/newborn are unavoidable. [12] Blood smear examination and coagulation profile are cost-effective and promising methods to predict PIH and the severity[13-18] . Understanding the relationship between platelet count, peripheral smear findings, and coagulation parameters in PIH is important for guiding the management strategies. This study assessed the utility of platelet count and peripheral smear examination as prognostic indicators in PIH and to explore the associated changes in PT and aPTT, thereby contributing to improved maternal and fetal health.

Summary of the study findings

This study evaluated the role of platelet count and coagulation parameters in pregnancy-induced hypertension (PIH). A total of 305 primigravid women diagnosed with PIH were included. The mean age of participants was 24.2 years, with the majority (54.4%) between 21 and 25 years. The mean gestational age was 35.5 weeks, with nearly half of the participants in term pregnancy. The most common diagnosis was pre-eclampsia with severe features (29.5%), followed by gestational hypertension (22.9%) and pre-eclampsia without severe features (22.9%). Only five participants (1.6%) had HELLP syndrome. Laboratory findings revealed that 31.1% of patients had low platelet counts, with significantly lower counts in severe PIH cases ($p<0.001$). Prolonged prothrombin time (PT) was observed in 39.7% of patients, particularly in severe pre-eclampsia (83.3%), while all HELLP syndrome patients had normal PT, showing a statistically significant difference. Activated partial thromboplastin time (aPTT) was prolonged in 42.3% of cases, mostly in severe pre-eclampsia (85.6%), whereas all HELLP syndrome patients had normal aPTT, also

showing a significant difference. Peripheral smear examination revealed that 44.9% of patients had microscopic hypochromic anemia, followed by normocytic normochromic anemia (20.3%) and normocytic hypochromic anemia (14.4%). A few patients had pancytopenia (5.2%) or dimorphic anemia (2.9%). These findings suggest that platelet count, and coagulation parameters vary significantly with PIH severity, with lower platelet counts and prolonged PT and aPTT more common in severe cases. These parameters may serve as useful indicators for assessing disease severity and aiding in early diagnosis and management.

The prevalence of PIH in India is estimated to be 7-10%[18,19] . The major symptoms of PIH include persistent headaches, visual disturbances, epigastric or right upper quadrant pain, and sudden swelling of the face, hands, or feet[20-30]. Common signs are elevated blood pressure (≥140/90 mmHg), proteinuria, and in severe cases, signs of end-organ damage such as altered liver enzymes or reduced platelet count[31-39] . It is proposed that platelet count, and peripheral smear examination can serve as prognostic indicators in PIH[40,41].

Comparison with other studies

Our study found a significant reduction in platelet count among patients with Pregnancy-Induced Hypertension (PIH), with the most severe thrombocytopenia observed in cases of eclampsia and HELLP syndrome. This aligns with findings by Haldar et al.[42], who reported a substantial decrease in platelet count among preeclamptic and eclamptic patients compared to normotensive controls. Similarly, Bangera et al.[43] noted the lowest platelet counts in eclamptic patients, with a progressive decline as severity increased. These results suggest that platelet count can serve as an important early marker for disease severity in PIH, emphasizing the need for routine platelet monitoring to detect complications early.

Our findings also revealed a notable increase in Mean Platelet Volume (MPV) and Platelet Distribution Width (PDW) in patients with PIH, especially in severe cases. This is consistent with

studies by Manchanda et al.[46] and Salvi et al.[48], who found elevated MPV and PDW values in hypertensive pregnancies compared to normotensive controls. These findings suggest that platelet activation plays a key role in the pathophysiology of PIH. The increase in MPV and PDW may indicate ongoing platelet destruction and consumption, reinforcing the role of platelet indices as potential markers for predicting PIH severity.

In our study, Prothrombin Time (PT) and Activated Partial Thromboplastin Time (aPTT) were largely within normal ranges in patients with HELLP syndrome but were prolonged in severe preeclampsia. Chauhan et al. [45] similarly observed normal PT and aPTT values in hypertensive pregnancies but reported significantly prolonged Bleeding Time (BT), suggesting that platelet dysfunction rather than coagulation factor deficiency may be responsible for the bleeding tendencies in PIH. However, Boddapati et al.[44] and Haldar et al.[42] reported increased PT and aPTT levels, particularly in severe preeclampsia and eclampsia cases. These discrepancies may arise from differences in study populations and disease severity. Nonetheless, the findings support the notion that coagulation abnormalities become more pronounced as PIH severity progresses.

Our study confirms that platelet indices, including MPV, PDW, and platelet count, are reliable indicators of PIH severity. These findings are reinforced by the meta-analysis conducted by Woldeamanuel et al.[50], which established a strong association between platelet parameters and preeclampsia, demonstrating their predictive value. Additionally, studies from the Indian context, including those by Sameer et al.[47] and Tejaswini et al.[49], have shown that routine platelet assessments provide an inexpensive and accessible method for early diagnosis and monitoring of PIH. The implications of these findings highlight the need for regular hematological assessments in hypertensive pregnancies to enable early intervention and reduce maternal-fetal morbidity and mortality.

Overall, our study supports the growing body of evidence that platelet indices and coagulation parameters are valuable in assessing PIH severity. Given the consistency of findings across various studies, integrating these markers into routine prenatal care may improve clinical

outcomes by facilitating early detection and appropriate management of hypertensive disorders in pregnancy.

The study has also highlighted the cost-effectiveness of platelet count as a predictive tool for PIH compared to other coagulation parameters. They observed that thrombocytopenia was prevalent in severe preeclampsia and eclampsia, with strong associations with adverse maternal and foetal outcomes. These findings support our observation that declining platelet counts correlate with worsening disease severity. Salvi et al.[48] further reinforced this, demonstrating that severe preeclampsia cases exhibited more pronounced reductions in platelet count, along with increases in MPV and PDW. Their study concluded that these parameters could serve as biomarkers for early detection and severity assessment.

Priyanka et al [33] , Tejaswini et al.[49] and Woldeamanuel et al.[50] emphasized that thrombocytopenia is a frequent complication of hypertensive pregnancies, affecting maternal and fetal outcomes significantly. Tejaswini et al. observed thrombocytopenia in 42.1% of PIH cases, correlating with increased morbidity. Woldeamanuel et al. conducted a meta-analysis demonstrating that platelet count is a reliable marker for preeclampsia severity, even before clinical onset.

Our study corroborates these findings, highlighting that thrombocytopenia and alterations in platelet indices are significant markers of PIH severity. Additionally, the relatively normal PT and aPTT values in HELLP syndrome may indicate a distinct coagulation pathway involved in this condition. The discrepancies observed across studies could be attributed to sample size variations, differences in disease classification, and variations in laboratory methods. However, the consistent trend of decreasing platelet counts and increasing MPV/PDW in severe cases underscores the utility of these parameters in clinical monitoring and early intervention.

Clinical Implications

Our study highlights the significance of platelet count and coagulation parameters as prognostic indicators in PIH. The observed decline in platelet count with increasing severity of PIH

underscores the potential of thrombocytopenia as an early warning marker. This aligns with findings from Haldar et al.[42] and Bangera et al.[43], where lower platelet counts were consistently associated with severe preeclampsia and eclampsia. Given these results, platelet estimation should be an essential part of routine antenatal screening to identify high-risk cases early and initiate timely interventions.

Routine hematological screening, including platelet indices and coagulation parameters, could play a crucial role in early diagnosis and management of PIH. Our findings, in agreement with Manchanda et al.[46] and Sameer et al.[47], suggest that platelet indices such as MPV and PDW increase as PIH severity progresses, making them potential markers for risk stratification. In resource-limited settings, where advanced coagulation tests might not be available, simple platelet counts and MPV measurements could serve as cost-effective tools for early detection and prognosis assessment.

The need for close monitoring of coagulation parameters in severe PIH cases is emphasized by the significant prolongation of PT and aPTT in our study, particularly in severe preeclampsia and HELLP syndrome. This finding is consistent with Boddapati et al.[35] and Salvi et al.[48], who reported similar coagulation abnormalities in severe cases. Since these alterations indicate an increased risk of hemorrhagic complications, timely monitoring, and prompt management, including platelet transfusions or coagulation factor replacement, when necessary, could significantly reduce maternal and fetal morbidity and mortality.

Cost effectiveness[51]

The cost-effectiveness of using platelet count and coagulation parameters in detecting and managing pregnancy-induced hypertension (PIH) is a crucial consideration in Indian setting. Given that these tests are basic tests and can be availed at even the government hospitals at free of cost or at low cost, the cost of the tests is not a big concern. However, the clinicians must judge the effectiveness to decide on using these tests.

Benefits

1. Early detection: Regular monitoring of platelet counts and coagulation parameters can facilitate early detection of PIH, allowing for timely interventions and reducing the risk of complications.
2. Reduced morbidity and mortality: By identifying high-risk patients, healthcare providers can implement targeted interventions, reducing the risk of thromboembolic and haemorrhagic events.
3. Improved maternal and foetal outcomes: Early detection and management of PIH can improve maternal and foetal outcomes, reducing the need for costly interventions and improving quality of life.

Costs

1. Laboratory tests: The cost of laboratory tests, including platelet count and coagulation parameter assays, can vary depending on the location, laboratory, and testing frequency.
2. Monitoring and follow-up: Regular monitoring and follow-up appointments can increase healthcare utilization and costs.
3. Interventions and treatments: Targeted interventions, such as antiplatelet therapy or coagulation factor replacement, can add to the overall cost of care.

Potential Cost-Saving Strategies

1. Point-of-care testing: Implementing point-of-care testing for platelet count and coagulation parameters can reduce laboratory costs and improve testing efficiency.
2. Risk-based testing: Implementing risk-based testing strategies can reduce unnecessary testing and costs.
3. Integrated care models: Implementing integrated care models that incorporate platelet count and coagulation parameter monitoring into routine prenatal care can improve efficiency and reduce costs.

Management required to monitor platelet count and coagulation parameters, such as complete blood counts (CBC) and coagulation panels, are widely available in most healthcare settings. In fact, CBC is a routine test performed during pregnancy, making it easy to incorporate platelet count monitoring into standard prenatal care. Additionally, many laboratories offer coagulation panels as part of their routine testing services. With the advancement of point-of-care testing technologies, these tests can now be performed in outpatient settings, clinics, and even in some cases, at home. This widespread availability and ease of testing enable healthcare providers to closely monitor platelet count and coagulation parameters throughout pregnancy, facilitating early detection and management of potential complications.

Way Forward[31,40,41,50]

The association between platelet count, coagulation parameters, and pregnancy-induced hypertension (PIH), including preeclampsia, has been consistently demonstrated. These findings have significant implications for the early identification and management of PIH complications.

1. Serial Monitoring of Platelet Count and Coagulation Parameters

Regular monitoring of platelet count, prothrombin time (PT), activated partial thromboplastin time (aPTT), and international normalized ratio (INR) can help identify abnormalities in coagulation profiles and hematological parameters. This monitoring can facilitate timely interventions, reducing the risk of thromboembolic and hemorrhagic events.

2. Development of Predictive Models

Integrating platelet count, coagulation parameters, and other clinical variables can aid in the development of predictive models for PIH and preeclampsia. These models can enable healthcare providers to identify high-risk patients and implement targeted interventions.

3. Personalized Management Strategies

A better understanding of the complex interplay between platelet count, coagulation parameters,

and PIH can inform personalized management strategies. For instance, patients with thrombocytopenia or coagulopathy may require more aggressive monitoring and treatment.

4. Improved Diagnostic Criteria

The incorporation of platelet counts and coagulation parameters into diagnostic criteria for PIH and preeclampsia can enhance their accuracy and sensitivity. This refinement can facilitate earlier diagnosis and treatment, ultimately improving maternal and fetal outcomes.

5. Future Research Directions

1. Longitudinal studies: Investigate the temporal relationship between platelet count, coagulation parameters, and PIH.
2. Mechanistic studies: Elucidate the underlying mechanisms linking platelet count, coagulation parameters, and PIH.
3. Interventional studies: Evaluate the efficacy of targeted interventions, such as antiplatelet therapy or coagulation factor replacement, in improving outcomes for patients with PIH.

By advancing our understanding of the complex relationships between platelet count, coagulation parameters, and PIH, we can develop more effective strategies for predicting, preventing, and managing PIH complications, ultimately improving maternal and fetal health outcomes.

STRENGTHS AND LIMITATIONS

Strengths:

- **Prospective Study Design:** Ensures real-time data collection, reducing recall bias.
- **Adequate Sample Size:** Enhances the reliability and statistical power of the findings.
- **Standardized Hematological Assessments:** Improves data accuracy and reproducibility.
- **Comprehensive Analysis:** Evaluates both platelet indices and coagulation parameters for a holistic understanding of PIH-related hematological changes.

Limitations:

- **Single-Center Study:** Limits the generalizability of findings to broader populations.
- **Potential Selection Bias:** Participant recruitment may not fully represent all PIH cases.
- **Lack of Follow-Up Data:** No postnatal follow-up on maternal and fetal outcomes, restricting insight into long-term prognostic implications.
- **Exclusion of Other Confounding Factors:** Did not assess the influence of comorbid conditions like anemia or infections on hematological parameters.

SUMMARY

This study is a prospective study conducted from1st May 2023 to 31st December 2024. It explores the hematological and clotting parameters in pregnancy-induced hypertension (PIH), this condition affects approximately 5 to 8 percent of pregnancies in India and around 10 percent on a global scale. Study examines the significance of platelet counts, coagulation profiles and peripheral smear findings as prognostic indicators for PIH. Conducted prospectively on 305 primigravid women at ≥28 weeks gestation, the study found that pre-eclampsia with severe features was the most common diagnosis (29.51%), followed by gestational hypertension and pre-eclampsia without severe features (22.95% each). Thrombocytopenia was noted in 31.15% of cases, with prolonged PT and aPTT observed in 39.67% and 42.3% of participants, respectively. Microcytic hypochromic anemia was the most frequent peripheral smear finding. The study demonstrated that thrombocytopenia and coagulation abnormalities correlate with disease severity, highlighting the importance of routine hematological monitoring in improving maternal and fetal outcomes. Peripheral smear examination emerged as a valuable tool, especially in resource-limited settings, for early detection and timely intervention to mitigate PIH complications.

CONCLUSION AND FUTURE DIRECTIONS

- **Key Findings:**
    - Significant alterations in platelet count and coagulation parameters in PIH patients.
    - Thrombocytopenia, increased MPV and PDW, and prolonged PT and APTT are associated with PIH severity.
    - These hematological markers can serve as early prognostic indicators for disease progression.
- **Clinical Implications:**
    - Routine hematological assessments can aid in early detection and risk stratification.
    - Integrating platelet indices and coagulation parameters into standard prenatal care may improve maternal and fetal outcomes.
- **Future Directions:**
    - Conducting multicenter studies with larger sample sizes to validate findings across diverse populations.
    - Longitudinal research with postnatal follow-up to assess long-term maternal and neonatal outcomes.
    - Exploring targeted interventions such as prophylactic anticoagulation or platelet transfusion strategies in severe PIH cases.

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ANNEXURE - I

BLDE
(DEEMED TO BE UNIVERSITY)
Declared as Deemed to be University u/s 3 of UGC Act, 1956
Accredited with 'A' Grade by NAAC (Cycle-2)
The Constituent College
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU) IEC/ 936/2023-24 10/4/2023

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Saturday, 18th March, 2023 at 11.30 a.m. in the CAL Laboratory, Dept. of Pharmacology,** scrutinized the Synopsis/ Research Projects of Post Graduate Student / Under Graduate Student /Faculty members of this University /Ph.D. Student College from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNENCY INDUCED HYPERTENSION (PIH)".

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: DR. PRIYANKA P.V.N.L.N.

NAME OF THE GUIDE: DR.PRAKSH M. PATIL , PROFESSOR
DEPT. OF PATHOLOGY.

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA

Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University)
Vijayapura

Dr.Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA

MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103, Karnataka

Following documents were placed before Ethical Committee for Scrutinization.

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.
BLDE (DU): Phone: +918352-262770, Fax: +918352-263303, Website: www.bldedu.ac.in, E-mail:office@bldedu.ac.in
College: Phone: +918352-262770, Fax: +918352-263019, E-mail: bmpmc.principal@bldedu.ac.in

ANNEXURE – II

BLDEU's SHRI BM PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTER, VIJAYAPURA-586103

INFORMED CONSENT FOR PARTICIPATION IN DISSERTATION/RESEARCH

I, the undersigned,_____ , S/O D/O W/O _____, aged _years, ordinarily resident of _____ do hereby state/declare that Dr _____ of

_____ Hospital has examined me thoroughly on _____ at _____ (place) and it has been explained to me in my own language that I am suffering from

_____ disease (condition) and this disease/condition mimic following diseases . Further Doctor informed me that he/she is conducting dissertation/research titled **"STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION (PIH)"** under the guidance of Dr. PRAKASH M. PATIL requesting my participation in the study.

Doctor has also informed me that during conduct of this procedure adverse results may be encountered. Among the above complications most of them are treatable but are not anticipated hence there is chance of aggravation of my condition and in rare circumstances, it may prove fatal despite anticipated diagnosis and best treatment made available. Further Doctor has informed me that my participation in this study will help in evaluation of the results of the study which is useful reference to treatment of other similar cases in near future, and, I may be benefited in getting relieved of suffering or cure of the disease I am suffering. The Doctor has also informed me that information given by me, observations made/ photographs/ video graphs taken upon me by the investigator will be kept secret and not assessed by the person other than

me or my legal hirer except for academic purposes.

The Doctor did inform me that though my participation is purely voluntary, based on information given by me, I can ask any clarification during treatment / study related to diagnosis, procedure of treatment, result of treatment or prognosis. At the same time, I have been informed that I can withdraw from my participation in this study at any time if I want or the investigator can terminate me from the study at any time from the study but not the procedure of treatment and follow-up unless I request to be discharged.

After understanding the nature of dissertation or research, diagnosis made, mode of treatment, I the undersigned Shri/Smt _____ under my full conscious state of mind agree to participate in the said research/dissertation.

Signature of patient:

Signature of doctor:

Witness: 1.

2.

Date:

Time:

B.L.D.E (DEEMED TO BE UNIVERSITY) ಶ್ರೀ ಬಿ.ಎಂ.ಪಟ್ಟೀಲ್ ಮೆಡಿಕಲ್ ಕಾಲೇಜು,ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ವಿಜಯಪುರ-586103

ಪ್ರಬಂಧ/ಸಂಶೋಧನೆಯಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ಮಾಹಿತಿ ಪಡೆದ ಸಮ್ಮತಿ ನಾನು,

ಕೆಳಗಿನವರು_____ಸಹಿಯಿಟ್ಟವರು, ಮಗ/ಮಗಳು/ಪತ್ನಿಯ _____ ವಯಸ್ಸು

_____ವರ್ಷಗಳು, ಸಾಮಾನ್ಯವಾಗಿ ನಿವಾಸಿಸುವ ಸ್ಥಳದ ಹೆಸರು_____, ಇಲ್ಲಿ

ಹೇಳಿದ್ದೇನೆ/ಘೋಷಿಸುತ್ತೇನೆ ಡಾಕ್ಟರ್ ಹೆಸರು___Dr. PRIYANKA P.VN.L.N ಅವರು

ಆಸ್ಪತ್ರೆ ಹೆಸರು_ BLDE (Deemed to be University) Shri B.M. Patil Medical College, Hospital & Research Centre, Vijayapura, Karnataka 586103 ಅವರು ನನ್ನನ್ನು ಪೂರ್ಣವಾಗಿ ಪರೀಕ್ಷಿಸಿದರು

ದಿನಾಂಕದಲ್ಲಿ_____ ಸ್ಥಳ ಹೆಸರು_____ ಮತ್ತು ನನಗೆ ನನ್ನ ಭಾಷೆಯಲ್ಲಿ

ವಿವರಿಸಲಾಗಿದೆ ನಾನು ಒಂದು ರೋಗ (ಸ್ಥಿತಿ) ಅನುಭವಿಸುತ್ತಿದ್ದೇನೆ. ಮುಂದುವರಿದು ಡಾಕ್ಟರ್

ನನಗೆ ತಿಳಿಸಿದ್ದಾರೆ ಅವರು ಒಂದು ಪದ್ಧತಿ/ಸಂಶೋಧನೆ ನಡೆಸುತ್ತಿದ್ದಾರೆ

ಶೀರ್ಷಿಕೆಯುಳ್ಳ_**"STUDY OF HEMATOLOGICAL AND CLOTTING PARAMETERS IN PREGNANCY INDUCED HYPERTENSION (PIH)"** ಡಾಕ್ಟರ್_ Dr. PRAKASH M. PATIL ಮಾರ್ಗದರ್ಶನದಲ್ಲಿ ನನ್ನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯನ್ನು ಕೇಳಿದ್ದಾರೆ ಅಧ್ಯಯನದಲ್ಲಿ.

ಡಾಕ್ಟರ್ ನನಗೆ ಇದನ್ನು ಕೂಡಾ ತಿಳಿಸಿದ್ದಾರೆ ಈ ಕ್ರಮದ ನಡುವಲ್ಲಿ ಪ್ರತಿಕೂಲ ಫಲಿತಾಂಶಗಳನ್ನು ಎದುರಿಸಬಹುದು. ಮೇಲೆ ಹೇಳಿದ ಪ್ರಕಟಣೆಗಳಲ್ಲಿ, ಅಧಿಕಾಂಶವು ಚಿಕಿತ್ಸಿಸಬಹುದಾದರೂ ಅದನ್ನು ನಿರೀಕ್ಷಿಸಲಾಗುತ್ತಿಲ್ಲ ಆದ್ದರಿಂದ ನನ್ನ ಸ್ಥಿತಿಯ ಹಿರಿದಾಗುವ ಅವಕಾಶವಿದೆ ಮತ್ತು ಅಪರೂಪದ ಸಂದರ್ಭಗಳಲ್ಲಿ ಅದು ಮರಣಕಾರಕವಾಗಿ ಪರಿಣಮಿಸಬಹುದು ಹೊಂದಿದ ರೋಗನಿರ್ಧಾರ ಮತ್ತು ಯಥಾಶಕ್ತಿ ಚಿಕಿತ್ಸೆ ಮಾಡಲು

ಹೊಂದಿದರೂ, ಮುಂದುವರಿದು ಡಾಕ್ಟರ್ ನನಗೆ ತಿಳಿಸಿದ್ದಾರೆ ನನ್ನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆ ಈ ಅಧ್ಯಯನದ ಫಲಿತಾಂಶಗಳ ಮೌಲ್ಯಮಾಪನದಲ್ಲಿ ಸಹಾಯಕವಾಗುತ್ತದೆ ಇತರ ಸಮಾನ ಪ್ರಕರಣಗಳ ಚಿಕಿತ್ಸೆಗೆ ಉಪಯುಕ್ತ ಉಲ್ಲೇಖವಾಗಿದೆ, ಮತ್ತು ನಾನು ಅನುಭವಿಸುವ ರೋಗದಿಂದ ವಿಮುಕ್ತಿ ಅಥವಾ ಗುಣಮುಖಗೊಳ್ಳುವಲ್ಲಿ ನನಗೆ ಪ್ರಯೋಜನವಾಗಬಹುದು.

ಡಾಕ್ಟರ್ ನನಗೆ ಇದನ್ನು ಕೂಡಾ ತಿಳಿಸಿದ್ದಾರೆ ನನ್ನಿಂದ ನೀಡಿದ ಮಾಹಿತಿ, ಮಾಡಿದ ಪರಿಶೀಲನೆಗಳು / ಫೋಟೋಗ್ರಾಫ್‌ಗಳು / ವೀಡಿಯೋ ಗ್ರಾಫ್‌ಗಳು ನನ್ನ ಮೇಲೆ ತೆಗೆದುಕೊಳ್ಳಲಾಗುವ ಅನ್ವೇಷಕರು ರಹಸ್ಯವಾಗಿ ಇಡುವರು ಮತ್ತು ನಾನು ಅಥವಾ ನನಗೆ ಕಾನೂನು ದೃಷ್ಟಿಯಲ್ಲಿ ಸಂಬಂಧಿತರನ್ನು ಹೊರತುಪಡಿಸಿ ಇತರ ವ್ಯಕ್ತಿಯಿಂದ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ. ಡಾಕ್ಟರ್ ನನಗೆ ತಿಳಿಸಿದ್ದಾರೆ ನನ್ನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆ ಶುದ್ಧವಾಗಿ ಸ್ವೇಚ್ಛಾಯಿತ, ನನ್ನಿಂದ ನೀಡಿದ ಮಾಹಿತಿಯ ಆಧಾರದ ಮೇಲೆ, ಚಿಕಿತ್ಸೆ / ಅಧ್ಯಯನದ ಸಂಬಂಧದಲ್ಲಿ ರೋಗನಿರ್ಧಾರ, ಚಿಕಿತ್ಸೆಯ ವಿಧಾನ, ಚಿಕಿತ್ಸೆಯ ಫಲಿತಾಂಶ ಅಥವ ಭವಿಷ್ಯದ ಪ್ರವೃತ್ತಿಗಳು ಬಗ್ಗೆ ಯಾವುದೇ ಸ್ಪಷ್ಟತೆ ಕೇಳಬಹುದು. ಅದೇ ಸಮಯದಲ್ಲಿ ನನಗೆ ತಿಳಿಸಲಾಗಿದೆ ನಾನು ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನನ್ನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯನ್ನು ನಿಲ್ಲಿಸಬಹುದು ನಾನು ಬಯಸಿದರೆ ಅಥವಾ ಅನ್ವೇಷಕರು ಅಧ್ಯಯನದಿಂದ ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ನನ್ನನ್ನು ನಿಲ್ಲಿಸಬಹುದು. ಪ್ರಬಂಧ ಅಥವಾ ಸಂಶೋಧನೆಯ ಸ್ವಭಾವ, ಮಾಡಿದ ರೋಗನಿರ್ಧಾರ ಮತ್ತು ಚಿಕಿತ್ಸೆಯ ವಿಧಾನವನ್ನು ಅರ್ಥಮಾಡಿಕೊಂಡು, ನಾನು ಕೆಳಗಿನ ಶ್ರೀ / ಶ್ರೀಮತಿ_____ನನ್ನ ಪೂರ್ಣವಾದ ಪ್ರಜ್ಞೆಯ ಸ್ಥಿತಿಯಲ್ಲಿ ಹೇಳಿದ ಸಂಶೋಧನೆ / ಪ್ರಬಂಧದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ಒಪ್ಪುತ್ತೇನೆ. ರೋಗಿಯ ಸಹಿ

ಡಾಕ್ಟರನ ಸಹಿ

ಸಾಕ್ಷಿಗಳು

1)

2)

ANNEXURE – III

PROFORMA

NAME : CASE NO. :

AGE :

D.O.A :

ADDRESS :

D.O.STUDY :

OP/IP No :

OCCUPATION :

PRESENTING COMPLAINTS :

GESTATIONAL AGE :

HISTORY :

FAMILY HISTORY :

DIAGNOSIS :

VITALS

- PR :
- BP :

INVESTIGATIONS

HEMATOLOGY:-

PLATELET COUNT	**:**
INR	**:**
PT	**:**
aPTT	**:**
PERIPHERAL SMEAR	**:**

MASTER CHART

Serial No.	Age	Gravida	Weeks	Days	GA (Weeks)	Presentation	Diagnosis	Platelet count (lakh)	Prothrombin time	aPTT	INR	Hemoglobin	Peripheral smear
1	33	1	36	4	36.6	1	1	2.3	11	22	0.9	11	1
2	31	1	37	1	37.1	1	5	1.6	17	36	0.9	8.2	3
3	32	1	36	2	36.3	1	1	2.6	10	15	0.8	11	1
4	19	1	36	3	36.4	1	1	1.8	12	25	0.9	12	1
5	33	1	36	5	36.7	1	1	2.4	12	33	1	12	1
6	23	1	39	5	39.7	1	1	3.1	11	25	0.9	13	1
7	20	1	39	3	39.4	1	1	2.7	13	30	1.1	12	1
8	24	1	25	2	25.3	1	3	1	12	24	0.9	8.2	3
9	27	1	35	5	35.7	1	1	2.2	11	27	1	13	1
10	24	1	37	1	37.1	1	5	0.7	17	37	0.8	8.8	3
11	19	1	37	1	37.1	1	4	2.1	12	27	0.8	13	1
12	34	1	36	4	36.6	1	4	2.3	16	35	0.8	12	1
13	26	1	31	3	31.4	1	5	2	18	36	0.8	7.3	3
14	24	1	36	3	36.4	1	5	1.8	17	35	0.8	7.2	3
15	23	1	35	2	35.3	1	2	0.6	15	28	0.9	8.2	3
16	26	1	34	5	34.7	1	4	2	17	26	0.9	13	1
17	21	1	28	2	28.3	1	3	2.1	16	28	0.9	9.6	3
18	22	1	29	3	29.4	1	5	1.5	18	36	0.8	7.5	3
19	21	1	38	6	38.9	1	4	2.5	17	29	1.4	11	1
20	22	1	40	3	40.4	1	2	0.9	15	30	1.2	8.4	3
21	22	1	38	3	38.4	1	1	2.3	13	27	1.1	13	1
22	32	1	34	6	34.9	1	2	2	13	26	1.1	8	3
23	22	1	38	3	38.4	1	1	2.1	13	24	1.1	12	1
24	19	1	30	1	30.1	1	1	1.5	12	32	1	12	1
25	24	1	30	2	30.3	1	5	1.5	20	37	0.9	7.8	3
26	20	1	28	4	28.6	1	5	0.6	20	35	1	8.6	3
27	28	1	30	2	30.3	1	5	1.9	20	37	0.9	8.3	3
28	24	1	35	5	35.7	2	3	1.1	18	29	0.9	8	3
29	30	1	34	1	34.1	1	3	1.2	16	26	1	10	3
30	24	1	39	2	39.3	1	5	0.8	18	35	1.1	8	3
31	20	1	36	2	36.3	1	5	1.8	18	37	0.8	7.7	3
32	22	1	38	3	38.4	1	1	2.5	11	24	0.8	12	1
33	20	1	37	3	37.4	1	2	1.8	12	30	1	8.6	3
34	30	1	38	2	38.3	1	4	1.1	11	24	1	13	1

35	25	1	38		38.0	1	5	1.9	17	37	1.1	7.4	3
36	25	1	34		34.0	1	1	1.6	12	25	0.8	12	1
37	23	1	33	4	33.6	1	5	0.4	16	35	0.9	9.8	3
38	24	1	32	3	32.4	1	1	1.5	11	28	0.9	13	1
39	32	1	40	0	40.0	1	4	2.1	12	24	1	13	1
40	22	1	39	1	39.1	1	4	2.1	15	28	0.8	13	1
41	22	1	36		36.0	1	3	1.2	17	25	0.9	9	3
42	25	1	33	0	33.0	1	4	1.9	15	35	0.8	11	1
43	20	1	29	5	29.7	1	5	0.6	17	35	1.2	7.9	3
44	20	1	40	0	40.0	1	4	2.3	14	36	1.2	12	1
45	30	1	38	3	38.4	1	1	1.9	11	24	0.9	12	1
46	22	1	36	1	36.1	1	5	2.1	17	37	1.1	7.4	3
47	19	1	33	1	33.1	1	3	1	15	28	0.9	8.7	3
48	18	1	36	0	36.0	1	4	4.4	11	26	1	13	1
49	23	1	38	2	38.3	1	5	1.9	18	36	1.2	7.8	3
50	30	1	37	3	37.4	1	5	0.7	17	36	1.3	8	3
51	30	1	36	4	36.6	1	5	0.7	18	38	1.2	8.2	3
52	21	1	36	6	36.9	1	5	1.5	18	39	1	8.3	3
53	21	1	39	3	39.4	1	1	2.4	13	25	0.8	12	1
54	24	1	39	1	39.1	1	5	1	18	43	1.3	8.6	3
55	25	1	38	4	38.6	1	5	0.9	20	20	1.3	8	3
56	25	1	35	1	35.1	1	5	1.9	18	30	1.8	7.6	3
57	24	1	33	1	33.1	1	5	1.7	20	49	1.2	7.8	3
58	34	1	37		37.0	1	1	1.7	11	24	0.9	14	1
59	24	1	34	2	34.3	1	4	2.3	14	33	0.9	11	1
60	24	1	36	5	36.7	1	1	2.8	13	25	0.9	11	1
61	20	1	38	6	38.9	1	4	1.7	16	34	0.8	13	1
62	30	1	38		38.0	1	1	1.8	11	32	0.8	13	1
63	28	1	39	2	39.3	1	4	1.6	11	35	0.9	13	1
64	22	1	36	6	36.9	2	3	2	15	35	0.8	9.2	3
65	25	1	33	5	33.7	1	1	2.7	12	28	0.9	12	1
66	29	1	32	6	32.9	1	4	1.8	13	29	0.9	13	1
67	34	1	38	6	38.9	1	4	1.9	14	28	0.8	11	1
68	27	1	32	3	32.4	2	3	1	16	29	0.9	8.9	3
69	33	1	39	4	39.6	1	4	1.1	15	25	0.9	13	1
70	25	1	34	6	34.9	1	1	1.6	13	24	0.8	9.1	3
71	28	1	32	3	32.4	2	1	2.5	13	23	0.9	8.2	3
72	32	1	31	2	31.3	1	1	2.7	15	24	0.6	8.8	3
73	20	1	31	3	31.4	1	3	1.6	15	29	1	10	3
74	23	1	39	2	39.3	1	5	3	20	45	1.5	7.5	3
75	31	1	33	0	33.0	1	2	0.9	15	32	0.9	9.2	3
76	22	1	38	1	38.1	1	1	1.5	11	29	0.9	8.3	3
77	28	1	36	4	36.6	1	1	2.5	12	29	1.1	9.7	3
78	21	1	33	6	33.9	1	3	0.7	16	36	1	9.3	3

79	24	1	40	0	40.0	1	4	2.5	14	32	0.9	7.8	3
80	36	1	38	2	38.3	1	1	1.6	14	26	0.9	12	1
81	33	1	38	4	38.6	1	5	1	19	46	1.2	7	3
82	25	1	33	0	33.0	1	1	1.7	13	27	0.8	9.5	3
83	22	1	39	6	39.9	1	4	1.4	15	27	1.3	7	3
84	18	1	36	1	36.1	1	3	1.8	14	22	0.9	11	3
85	28	1	34	3	34.4	1	5	1.6	17	39	1.1	11	2
86	22	1	34	3	34.4	1	5	0.4	15	41	1.5	11	2
87	34	1	36	1	36.1	1	3	0.8	14	29	0.9	10	3
88	21	1	33	4	33.6	1	5	0.9	15	32	1.4	10	2
89	26	1	34	3	34.4	1	5	1.7	17	36	1.1	10	2
90	24	1	34	3	34.4	1	5	1.7	17	39	1.3	9.8	2
91	26	1	37	3	37.4	1	4	2.3	11	26	1	8.1	3
92	28	1	38	4	38.6	1	4	2.1	13	23	0.9	8.2	3
93	23	1	38	4	38.6	1	5	1.5	16	45	1.3	10	2
94	29	1	34	5	34.7	1	5	0.5	16	47	1.2	9.9	2
95	27	1	32	5	32.7	1	5	0.4	18	44	1.2	10	2
96	30	1	36	4	36.6	1	3	1	13	35	0.8	11	3
97	28	1	38	2	38.3	1	1	1.6	16	24	0.8	9.6	3
98	24	1	38	0	38.0	1	4	1.6	11	23	0.9	7.6	3
99	24	1	35	5	35.7	1	5	1.9	18	42	1.4	11	2
100	25	1	38	6	38.9	1	4	2.3	11	25	1	8.2	3
101	20	1	33	5	33.7	1	3	2	12	30	1.1	10	3
102	21	1	34	5	34.7	1	5	0.6	17	38	1.2	11	2
103	24	1	32	2	32.3	2	3	0.5	15	34	1	11	3
104	24	1	35	5	35.7	1	5	1.8	19	41	1.5	10	2
105	25	1	36	3	36.4	1	2	0.7	17	35	0.9	8.2	3
106	20	1	39	3	39.4	1	2	1.8	16	24	0.9	11	2
107	24	1	33	4	33.6	1	5	1.6	20	42	1.7	10	2
108	20	1	35	5	35.7	1	2	1.7	15	32	0.9	12	2
109	19	1	30	5	30.7	1	6	0.6	10	18	0.9	7.4	5
110	28	1	35	3	35.4	1	4	1.8	12	31	0.9	8.4	3
111	21	1	35	5	35.7	1	5	1.8	19	38	1.3	9.7	2
112	25	1	36	6	36.9	1	5	1.7	15	26	1.1	10	2
113	19	1	37	1	37.1	1	5	0.6	15	30	1.2	11	2
114	26	1	33	2	33.3	2	3	1.9	14	27	0.9	10	3
115	24	1	39	0	39.0	1	1	2.1	12	31	1	8.2	3
116	24	1	36	3	36.4	1	5	0.7	16	31	1.3	11	1
117	20	1	40	3	40.4	1	2	1.5	16	29	0.9	11	5
118	30	1	35	3	35.4	1	4	1.9	17	35	0.8	8	3
119	32	1	35	5	35.7	1	5	1.5	16	38	1.2	11	1
120	19	1	31	5	31.7	1	5	1.6	18	42	1.4	11	7
121	18	1	39	0	39.0	1	1	3.5	14	28	0.8	10	1
122	32	1	36	4	36.6	1	1	1.8	14	31	0.8	10	1

123	24	1	39	3	39.4	1	4	2.3	18	35	1	9	3
124	24	1	38	6	38.9	1	6	0.3	9.6	26	0.8	8.2	3
125	19	1	38	2	38.3	2	3	1.6	14	37	0.8	9.9	3
126	18	1	38	3	38.4	1	1	2	14	20	0.9	11	1
127	23	1	38	2	38.3	2	3	1.6	18	36	0.8	8.2	4
128	19	1	34	4	34.6	1	2	1.5	16	34	1.2	8	3
129	25	1	32	6	32.9	1	1	2.9	13	24	0.8	11	1
130	24	1	39	0	39.0	1	4	2.2	19	36	1.2	9.2	3
131	28	1	35	5	35.7	1	5	1.1	20	41	1.5	11	1
132	22	1	34	5	34.7	2	3	0.8	20	36	0.9	7.9	3
133	23	1	34	0	34.0	1	3	0.4	17	35	0.8	6.4	6
134	20	1	35	6	35.9	1	2	1	16	27	1	10	5
135	20	1	37	2	37.3	1	1	2.4	11	24	0.9	9.5	2
136	20	1	35	5	35.7	1	5	1.5	21	43	1.4	11	1
137	23	1	39	2	39.3	1	1	2.4	14	29	0.8	9	2
138	25	1	39	3	39.4	1	4	1.6	15	28	0.8	10	2
139	19	1	34	5	34.7	2	3	0.9	17	32	1	8	6
140	21	1	39	5	39.7	1	4	2.1	19	38	0.8	11	2
141	23	1	35	5	35.7	1	5	0.7	19	27	1.3	6.5	6
142	28	1	33	6	33.9	1	6	0.7	9.1	23	0.8	6.8	5
143	25	1	32	5	32.7	1	4	1.9	16	28	1.2	11	2
144	28	1	29	5	29.7	2	3	0.4	18	34	1.2	6.8	6
145	25	1	29	5	29.7	1	5	0.3	17	44	1.4	6.8	6
146	32	1	28	6	28.9	1	1	2.5	13	31	0.8	9.8	2
147	22	1	32	3	32.4	1	5	0.3	15	43	1.3	5.9	6
148	20	1	36	3	36.4	1	5	0.4	18	39	1.4	7.8	6
149	22	1	36	3	36.4	1	5	0.4	21	44	1.5	6	6
150	24	1	39	1	39.1	1	4	2.5	17	30	1.1	11	2
151	21	1	40	0	40.0	1	3	1.7	16	32	0.8	9	3
152	21	1	37	0	37.0	1	3	1	17	35	0.9	9.2	3
153	22	1	28	1	28.1	1	1	1.6	14	32	0.9	12	7
154	21	1	37	1	37.1	1	2	0.8	15	30	1.2	8.4	3
155	33	1	38	3	38.4	1	5	0.4	15	43	1.3	5.9	6
156	25	1	29	2	29.3	1	2	0.5	18	39	1.4	7.8	6
157	26	1	38	3	38.4	1	4	1.9	16	28	1.2	11	2
158	28	1	26	4	26.6	1	5	0.6	21	44	1.5	6	6
159	21	1	35	5	35.7	1	5	0.6	19	42	1.3	7.2	6
160	19	1	39	0	39.0	1	4	1.7	16	36	1	12	1
161	22	1	38	2	38.3	1	4	2	17	35	0.9	11	2
162	24	1	33	1	33.1	1	1	1.6	16	34	1	10	3
163	26	1	34	4	34.6	1	5	1.9	18	36	1.2	7.8	3
164	23	1	23	4	23.6	1	5	0.7	17	36	1.3	8	3
165	21	1	29	2	29.3	1	5	0.7	18	38	1.2	8.2	3
166	24	1	32	0	32.0	1	5	1.5	18	39	1	8.3	3

167	33	1	37	6	37.9	1	1	1.8	15	32	1	12	1
168	24	1	25	3	25.4	1	4	2.5	17	30	1.1	11	2
169	23	1	31	1	31.1	1	1	1.5	16	36	1	10	3
170	20	1	28	3	28.4	1	4	1.6	15	28	0.8	10	2
171	23	1	32	4	32.6	1	5	0.6	17	38	1.2	11	2
172	30	1	35	3	35.4	1	1	1.9	16	35	1	13	1
173	23	1	26	2	26.3	1	4	2.5	17	30	1.1	11	2
174	33	1	28	0	28.0	1	4	2.1	15	32	1.2	11	3
175	22	1	36	0	36.0	2	3	1	17	35	0.9	9.2	3
176	26	1	28	4	28.6	1	4	2.3	11	26	1	8.1	3
177	24	1	27	4	27.6	1	4	2.1	13	23	0.9	8.2	3
178	27	1	35	2	35.3	1	2	0.9	15	28	0.9	8.2	3
179	25	1	32	4	32.6	1	5	0.8	18	38	1.2	8.2	3
180	30	1	33	3	33.4	1	1	1.9	16	36	1	12	1
181	28	1	36	5	36.7	1	1	2	14	34	0.7	13	1
182	20	1	32	5	32.7	1	3	0.7	16	36	1	9.3	3
183	22	1	28	4	28.6	1	4	2	13	23	0.9	8.2	3
184	24	1	33	3	33.4	1	5	0.5	17	44	1.4	6.8	6
185	20	1	29	4	29.6	1	4	2.2	11	26	1	8.1	3
186	22	1	31	3	31.4	1	4	2.1	13	23	0.9	8.2	3
187	20	1	35	5	35.7	1	1	2.1	14	35	0.9	13	1
188	26	1	36	4	36.6	1	4	2	14	36	1	11	2
189	19	1	37	0	37.0	1	3	0.4	17	35	0.8	6.4	6
190	27	1	34	4	34.6	1	5	1.1	20	41	1.5	11	1
191	21	1	38	4	38.6	1	4	1.9	15	34	0.9	12	1
192	19	1	37	2	37.3	1	5	1.1	20	41	1.5	11	1
193	22	1	33	3	33.4	1	1	1.5	14	35	0.8	10	3
194	22	1	38	2	38.3	1	4	0.6	21	44	1.5	6	6
195	21	1	39	0	39.0	1	4	1.8	14	31	0.8	10	1
196	21	1	30	2	30.3	1	4	1.8	14	31	0.8	10	1
197	24	1	29	6	29.9	1	3	1.7	16	32	0.8	9	3
198	22	1	37	5	37.7	2	3	1	17	35	0.9	9.2	3
199	23	1	34	5	34.7	1	3	0.9	16	36	1	8.5	3
200	24	1	38	3	38.4	1	1	1.9	15	33	0.9	12	2
201	28	1	35	3	35.4	1	1	1.8	16	34	1	13	1
202	22	1	36	0	36.0	1	4	1.9	14	31	0.8	10	1
203	30	1	35	3	35.4	1	2	1.5	16	29	0.9	11	5
204	22	1	37	2	37.3	1	5	1	21	44	1.5	6	6
205	23	1	35	0	35.0	1	4	2	14	31	0.8	10	1
206	24	1	32	5	32.7	2	1	0.2	15	36	1	12	1
207	22	1	33	2	33.3	1	5	0.6	17	40	1.3	8.1	3
208	21	1	35	5	35.7	1	5	1.5	16	38	1.2	11	1
209	23	1	39	1	39.1	1	5	1	18	43	1.3	8.6	3
210	22	1	33	4	33.6	1	5	1.6	20	42	1.7	10	2

211	26	1	37	3	37.4	1	1	1.7	11	24	0.9	14	1
212	28	1	40	3	40.4	1	2	1.5	16	29	0.9	11	5
213	30	1	33	0	33.0	1	3	2	12	30	1.1	10	3
214	32	1	35	3	35.4	1	4	1.9	17	35	0.8	8	3
215	28	1	38	1	38.1	1	1	1.5	11	29	0.9	8.3	3
216	26	1	36	3	36.4	1	2	0.7	17	35	0.9	8.2	3
217	22	1	34	6	34.9	1	1	1.6	13	24	0.8	9.1	3
218	23	1	38	3	38.4	1	1	2.1	13	24	1.1	12	1
219	22	1	30	1	30.1	1	1	1.5	12	32	1	12	1
220	25	1	36	6	36.9	1	5	1.7	15	26	1.1	10	2
221	19	1	37	1	37.1	1	5	0.6	15	30	1.2	11	2
222	26	1	33	2	33.3	2	3	1.9	14	27	0.9	10	3
223	24	1	39	0	39.0	1	1	2.1	12	31	1	8.2	3
224	24	1	36	3	36.4	1	5	0.7	16	31	1.3	11	1
225	20	1	40	3	40.4	1	2	1.5	16	29	0.9	11	5
226	30	1	35	3	35.4	1	4	1.9	17	35	0.8	8	3
227	32	1	35	5	35.7	1	5	1.5	16	38	1.2	11	1
228	19	1	31	5	31.7	1	5	1.6	18	42	1.4	11	1
229	18	1	39	0	39.0	1	1	3.5	14	28	0.8	10	1
230	32	1	36	4	36.6	1	1	1.8	14	31	0.8	10	1
231	24	1	39	3	39.4	1	4	2.3	18	35	1	9	3
232	24	1	38	6	38.9	1	6	0.3	9.6	26	0.8	8.2	3
233	19	1	38	2	38.3	2	3	1.6	14	37	0.8	9.9	3
234	18	1	38	3	38.4	1	1	2	14	20	0.9	11	1
235	23	1	38	2	38.3	2	3	1.6	18	36	0.8	8.2	4
236	19	1	34	4	34.6	1	2	1.5	16	34	1.2	8	3
237	25	1	32	6	32.9	1	1	2.9	13	24	0.8	11	1
238	24	1	39	0	39.0	1	4	2.2	19	36	1.2	9.2	3
239	28	1	35	5	35.7	1	5	1.1	20	41	1.5	11	1
240	22	1	34	5	34.7	2	3	0.8	20	36	0.9	7.9	3
241	22	1	29	3	29.4	1	5	1.5	18	36	0.8	7.5	3
242	23	1	38	6	38.9	1	4	2.5	17	29	1.4	11	1
243	23	1	40	3	40.4	1	2	0.9	15	30	1.2	8.4	3
244	24	1	38	3	38.4	1	1	2.3	13	27	1.1	13	1
245	22	1	34	6	34.9	1	2	2	13	26	1.1	8	3
246	21	1	38	3	38.4	1	1	2.1	13	24	1.1	12	1
247	23	1	30	1	30.1	1	1	1.5	12	32	1	12	1
248	23	1	30	2	30.3	1	5	1.5	20	37	0.9	7.8	3
249	26	1	28	4	28.6	1	5	0.6	20	35	1	8.6	3
250	21	1	30	2	30.3	1	5	1.9	20	37	0.9	8.3	3
251	27	1	35	5	35.7	2	3	1.1	18	29	0.9	8	3
252	21	1	34	1	34.1	1	3	1.2	16	26	1	10	3
253	22	1	39	2	39.3	1	5	0.8	18	35	1.1	8	3
254	23	1	36	2	36.3	1	5	1.8	18	37	0.8	7.7	3

255	24	1	38	3	38.4	1	1	2.5	11	24	0.8	12	1
256	25	1	37	3	37.4	1	2	1.8	12	30	1	8.6	3
257	26	1	38	2	38.3	1	4	1.1	11	24	1	13	1
258	21	1	38	0	38.0	1	5	1.9	17	37	1.1	7.4	3
259	22	1	34	0	34.0	1	1	1.6	12	25	0.8	12	1
260	21	1	33	4	33.6	1	5	0.4	16	35	0.9	9.8	3
261	31	1	40	0	40.0	1	4	2.1	12	24	1	13	1
262	32	1	39	1	39.1	1	4	2.1	15	28	0.8	13	1
263	21	1	36	0	36.0	1	3	1.2	17	25	0.9	9	3
264	22	1	33	0	33.0	1	4	1.9	15	35	0.8	11	1
265	21	1	29	5	29.7	1	5	0.6	17	35	1.2	7.9	3
266	23	1	40	0	40.0	1	4	2.3	14	36	1.2	12	1
267	25	1	38	3	38.4	1	1	1.9	11	24	0.9	12	1
268	26	1	37	0	37.0	1	1	1.7	11	24	0.9	14	1
269	23	1	34	2	34.3	1	4	2.3	14	33	0.9	11	1
270	24	1	36	5	36.7	1	1	2.8	13	25	0.9	11	1
271	25	1	38	6	38.9	1	4	1.7	16	34	0.8	13	1
272	26	1	38	0	38.0	1	1	1.8	11	32	0.8	13	1
273	22	1	39	2	39.3	1	4	1.6	11	35	0.9	13	1
274	21	1	36	6	36.9	2	3	2	15	35	0.8	9.2	3
275	23	1	33	5	33.7	1	1	2.7	12	28	0.9	12	1
276	31	1	32	6	32.9	1	4	1.8	13	29	0.9	13	1
277	22	1	38	6	38.9	1	4	1.9	14	28	0.8	11	1
278	21	1	32	3	32.4	2	3	1	16	29	0.9	8.9	3
279	23	1	39	4	39.6	1	4	1.1	15	25	0.9	13	1
280	22	1	34	6	34.9	1	1	1.6	13	24	0.8	9.1	3
281	25	1	38	6	38.9	1	4	2.3	11	25	1	8.2	3
282	20	1	33	0	33.0	1	3	2	12	30	1.1	10	3
283	21	1	34	5	34.7	1	5	0.6	17	38	1.2	11	2
284	24	1	32	2	32.3	2	3	0.5	15	34	1	11	3
285	24	1	35	5	35.7	1	5	1.8	19	41	1.5	10	2
286	25	1	36	3	36.4	1	2	0.7	17	35	0.9	8.2	3
287	20	1	39	3	39.4	1	2	1.8	16	24	0.9	11	2
288	24	1	33	4	33.6	1	5	1.6	20	42	1.7	10	2
289	20	1	35	5	35.7	1	2	1.7	15	32	0.9	12	2
290	19	1	30	5	30.7	1	6	0.6	10	18	0.9	7.4	5
291	28	1	35	3	35.4	1	4	1.8	12	31	0.9	8.4	3
292	21	1	35	5	35.7	1	5	1.8	19	38	1.3	9.7	2
293	25	1	36	6	36.9	1	5	1.7	15	26	1.1	10	2
294	19	1	37	1	37.1	1	5	0.6	15	30	1.2	11	2
295	26	1	33	2	33.3	2	3	1.9	14	27	0.9	10	3
296	24	1	39	0	39.0	1	1	2.1	12	31	1	8.2	3
297	24	1	36	3	36.4	1	5	0.7	16	31	1.3	11	1
298	20	1	40	3	40.4	1	2	1.5	16	29	0.9	11	5

299	30	1	35	3	35.4	1	4	1.9	17	35	0.8	8	3
300	32	1	35	5	35.7	1	5	1.5	16	38	1.2	11	1
301	20	1	38	2	38.3	1	1	1.6	16	24	0.8	9.6	3
302	18	1	38	0	38.0	1	4	1.6	11	23	0.9	7.6	3
303	23	1	35	5	35.7	1	5	1.9	18	42	1.4	11	2
304	26	1	38	6	38.9	1	4	2.3	11	25	1	8.2	3
305	27	1	33	0	33.0	1	3	2	12	30	1.1	10	3

KEY TO MASTER CHART

Category	Options
Presentation	1. Cephalic
	2. Breech
Diagnosis	1. Gestational Hypertension (G-HTN)
	2. Imminent Eclampsia
	3. Antepartum Eclampsia
	4. Preeclampsia (PE) without severe features
	5. Preeclampsia (PE) with severe features
	6. HELLP Syndrome
Peripheral Smear	1. Normocytic Normochromic smear
	2. Microcytic Hypochromic anemia
	3. Normocytic Hypochromic anemia
	4. Macrocytic anemia
	5. Dimorphic anemia Macrocytic anemia
	6. Pancytopenia
	7. Normocytic Normochromic anemia

PRIYANKA

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