

Original research article

## STUDY OF THROMBOCYTOPENIA IN PREGNANCY

<sup>1</sup>Dr. Katherashala Aparna, <sup>2</sup>Dr. Goli Mahalakshmi, <sup>3</sup>Dr. Sripathi Anusha, <sup>4</sup>Dr. Vamsheepriya P

<sup>1</sup>Senior resident, Department of Obstetrics and Gynaecology, Bhupalpally Government Hospital, Telangana, India

<sup>2</sup>Professor, Department of Obstetrics & Gynaecology, Gandhi Medical College and Hospital, Secunderabad, Telangana, India

<sup>3</sup>Post Graduate, Department of Obstetrics and Gynaecology, Gandhi Medical College, Secunderabad, Telangana, India

<sup>4</sup>Assistant Professor, Department of Obstetrics and Gynaecology, Gandhi Medical College, Secunderabad, Telangana, India

**Corresponding Author:**

Dr. Vamsheepriya P

### Abstract

**Background:** Thrombocytopenia is defined as platelet count < 1.5 lakhs/ml. Thrombocytopenia can be classified into.

- 1. Pregnancy specific:** Gestational thrombocytopenia (70-80%) Severe pre-eclampsia (15-20%), AFLP (<1%)
- 2. Non Pregnancy specific:** ITP (1-4%), rarer causes like TTP (0.5%)/HUS, SLE, APLA syndrome (0.5%), DIC (5%) viral infections, malaria, drug induced, bone marrow disorders.

**Subjects and Methodology:** This is an observational study conducted at Gandhi hospital from 2019 to 2022 during which 200 antenatal women with Thrombocytopenia (<1.5 lh/ml) were enrolled at first visit, irrespective of gestational age and evaluated.

**Results:** Out of 200 cases, 80 cases (44%) had PIH which is considered as the most common etiology followed by gestational thrombocytopenia. 60% (120) of cases were of age group of 21-25 years. 34% (68) of the cases received blood transfusions. 48% (96) of the cases were Primigravida, 83% (96) of cases delivered at >37 weeks gestation. 52% (104) of cases had moderate thrombocytopenia, 24% (48) had severe thrombocytopenia. 22% (44) of cases had gestational Diabetes Mellitus, 21% (42) of the cases had anemia and 11.5% (23) had hypothyroidism. About 57% (114) of cases had a vaginal delivery. Out of 200 cases, no maternal deaths were reported. Complications like abruption in 6% (12), PPH in 4%, (8) Blood transfusions in 34% (68). Perinatal complications - 30% (60) of cases had babies with Birth weight <2.5 kg. 93% (186) of cases had babies with APGAR >7 at 5 minutes. 4.5% (9) of cases had babies with IUGR, 3.5% (7) of the babies had neonatal thrombocytopenia.

**Conclusion:** The common cause is PIH 44% (88) followed by gestational thrombocytopenia 30% (60) and ITP 14% (28). Patients with Gestational

thrombocytopenia have favorable outcomes, while preeclampsia and HELLP syndrome are associated with adverse perinatal outcomes like IUGR (30%) and IUD. The rarer and severe cases of DIC, dengue fever and SLE are associated with adverse outcomes like PPH, blood transfusions, MICU admissions.

**Keywords:** PIH, thrombocytopenia, APGAR score, PPH, MICU

### **Introduction**

Platelets are non-nucleated cellular fragments of megakaryocytes, they play a key role in hemostasis. Thrombocytopenia is defined as a platelet count less than 1.5 lakhs/ml. Thrombocytopenia is the second most common hematologic abnormality encountered during pregnancy<sup>[1]</sup>, which is characterized principally by bleeding from small vessels. The normal reference range of platelets is 1.5 lakhs/ml. Due to hemodilution of plasma volume, platelet count may decrease by approximately 6% to 7% during third trimester though absolute platelet count remains within normal reference range in most patients. Change in platelet count is due to hemodilution, increased platelet consumption, and increased platelet aggregation driven by increased levels of thromboxane A<sub>2</sub>. Thrombocytopenia can be classified as.

- Mild -1.5 lakhs to 1 lakh /ml.
- Moderate- 50,000 to 1 lakh/ml.
- Severe- $\leq$  50,000/ML<sup>[2]</sup>.

**Pregnancy specific:** Gestational thrombocytopenia (70 to 80%), severe preeclampsia (15-20%), AFLP (<1%).

**Non Pregnancy specific:** ITP (1-4%), rarer causes like TTP (0.5%) / HUS, SLE, APLA syndrome (0.5%), DIC (5%) viral infections, malaria, drug induced, bone marrow disorders<sup>[3]</sup>.

In pregnancy Gestational thrombocytopenia is the most common cause followed by pregnancy induced hypertension and idiopathic thrombocytopenic purpura. Other causes include acute fatty liver, antiphospholipid antibodies, disseminated intravascular coagulation, drugs, infection etc.

### **Thrombocytopenia which need to be investigated are the following:**

Thrombocytopenia known before pregnancy, thrombocytopenia occurring during the 1<sup>st</sup> and 2<sup>nd</sup> trimester.

### **Materials and Methods**

#### **Sources of data**

From the records of pregnant women admitted in the department of obstetrics and gynecology, Gandhi hospital, Secunderabad.

#### **Methodology**

In this study 200 antenatal women were enrolled in the study at first visit, irrespective of gestational age. Details were entered in the proforma regarding the detailed history of period of gestation, high risk factors, past history, complications during present and past pregnancy, like pregnancy induced hypertension, diabetes mellitus, APLA, intrauterine death, abruption, hepatitis. History of petechiae, bruising, drug usage, viral

infection, thrombocytopenia in previous pregnancy was taken. General, systemic and obstetric examination was done. All women had platelet count estimation at the time of enrolment. All women were subjected to blood test for hemoglobin count, TLC, DLC, bleeding time, clotting time, RFT, Direct smear for platelets, Serum electrolytes, lactate dehydrogenase, LFT, HBsAg & HIV. Women with fever were tested for Dengue IgM, NS1. Coagulation tests (PT, INR, APTT, FDP and fibrinogen) were done in those with signs or symptoms of DIC. Imaging studies like ultrasound abdomen and pelvis, Antenatal scan with fetal Dopplerv and Non stress test for IUGR cases.

Women with normal platelet count before 28 weeks had a repeat platelet count in the third trimester to detect gestational thrombocytopenia. All the thrombocytopenic cases were followed up throughout the antenatal period till delivery to record any complications that developed due to low platelet count. Maternal outcome regarding mode of delivery, complications occurring during delivery, postpartum period are observed. Fetal outcome regarding birth weight, IUGR, NICU admission, APGAR at 5 min, early neonatal thrombocytopenia at day3 of life, NICU admission outcome and were followed up for any complications.

### **Sample collection**

3 ml of blood sample taken. The specimens were labeled with subject's age, sex and identification number and processed in 4 hrs.

### **Laboratory analysis**

Platelet count was performed using manual method and automated hematology method.

### **Inclusion criteria**

Thrombocytopenic antenatal women who gave consent for the study.

### **Exclusion criteria**

Antenatal women with HIV status, Antenatal women with pancytopenia.

### **Study area**

All pregnant women who comes to OPD for regular antenatal check up at the department of obstetrics and gynecology, Gandhi hospital.

### **Study design**

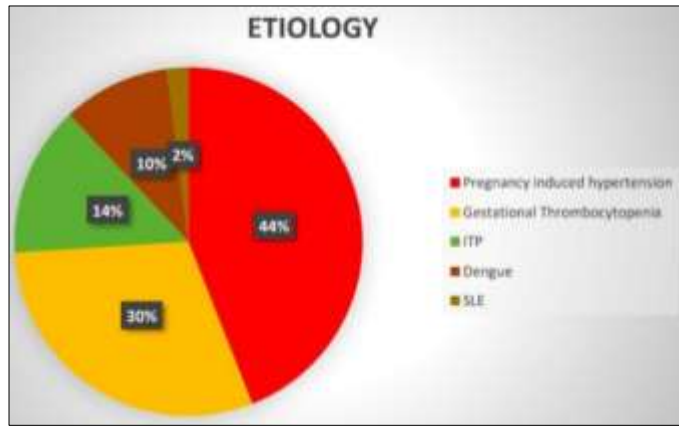
Hospital based and Prospective observational study.

**Study duration:** April 2022 - March 2023.

**Sample size:** 200.

### **Results and Analysis**

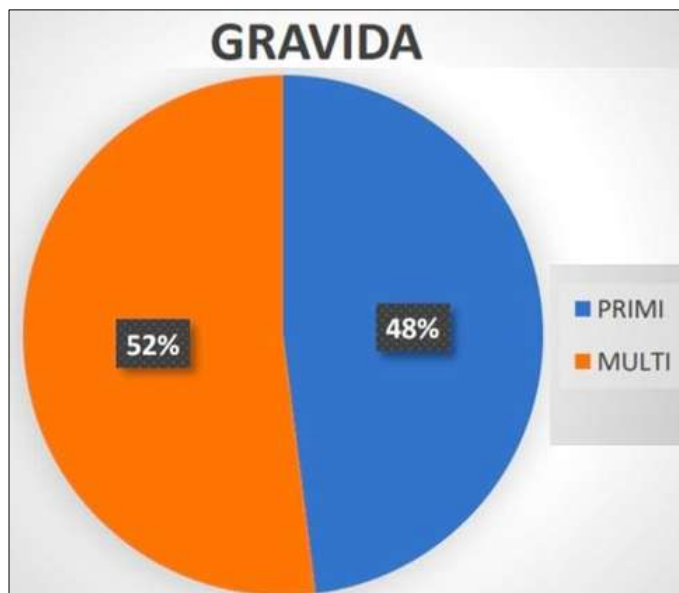
**Etiology:** As shown in the Figure 1 out of 200 cases, 44% (88) cases belong to pregnancy induced hypertension disorder which is considered as the most common etiology, followed by gestational thrombocytopenia.



**Fig 1:** Showing the distribution of etiologies of thrombocytopenia in pregnancy

**Obstetric formula**

As shown in the figure 2 out of 200 cases, prevalence of thrombocytopenia is almost equal in PRIMI 52% (104) and MULTI 48% (96) Gravida.



**Fig 2:** Showing distribution of parity among women with thrombocytopenia in pregnancy

**Age group**

As shown in figure 3, out of 200 cases 16% (32), 60% (120) and 24% (48) belong to age groups 15-20, 21-25, 26-30 years respectively.

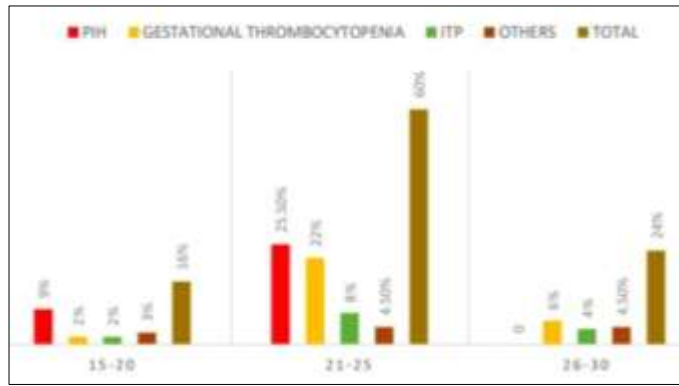


Fig 3: showing distribution of age among the cases

**Blood transfusions**

As shown in figure 4, out of 200 cases 34% (68) cases received blood transfusions of which 20% (40) received Platelet Transfusion, 11.5% (23) received Packed Cell and 2.5% (5) received FFP.

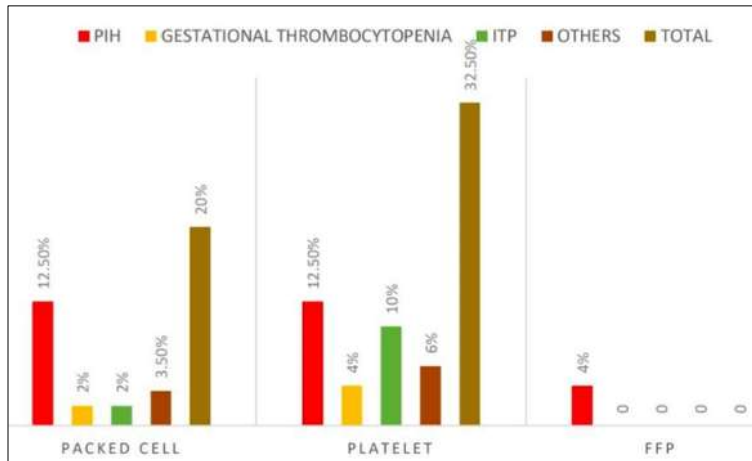


Fig 4: Showing distribution of need for blood and blood products among the cases

**Gestational age at time of delivery**

As shown in figure 5, in the present study, 83% (166) of the cases were delivered at >37 weeks of gestation and 17% (34) of the cases got delivered at <37 weeks of gestation.

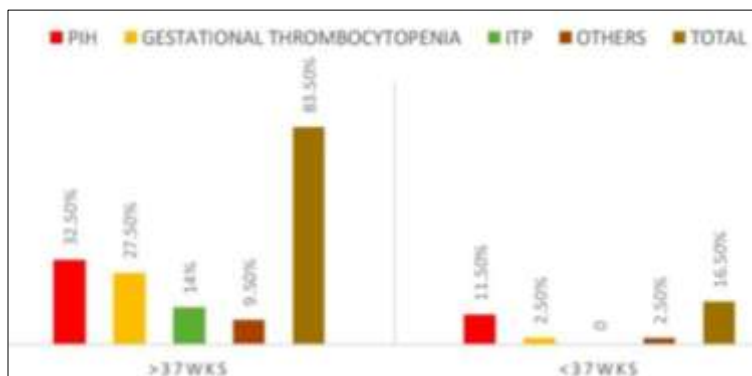
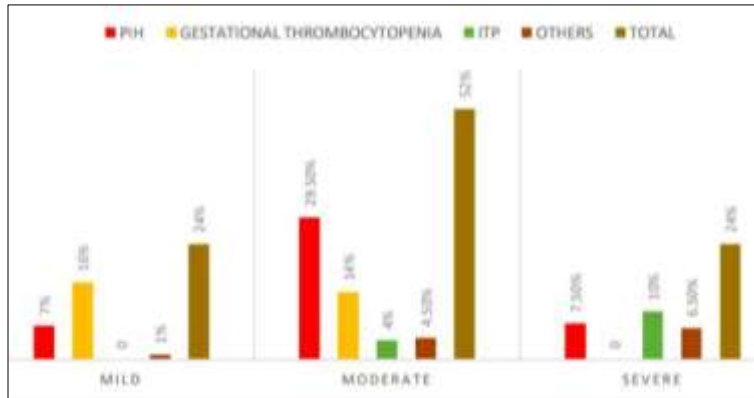


Fig 5: Showing distribution of gestational age at the time of delivery among the cases

**Degree of thrombocytopenia**

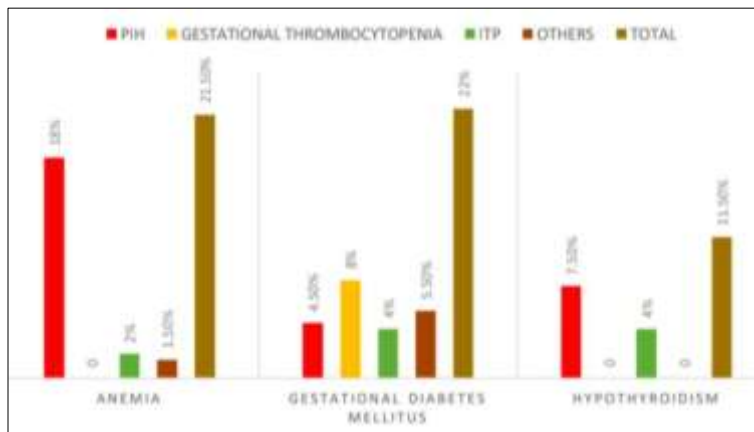
As shown in figure 6 out of 200 cases of thrombocytopenia 52% (104) subjects had moderate, 24% (48) subjects had mild and 24% (48) subjects had severe thrombocytopenia.



**Fig 6:** Showing distribution of degree of thrombocytopenia among the cases

**Comorbidities**

As shown in figure 7, out of 200 cases, 55% of the cases i.e. 110 cases have associated comorbidities like anemia (39%), Gestational diabetes mellitus (40%) and Hypothyroidism (21%).



**Fig 7:** Showing distribution of co-morbidities among the cases

**Mode of delivery**

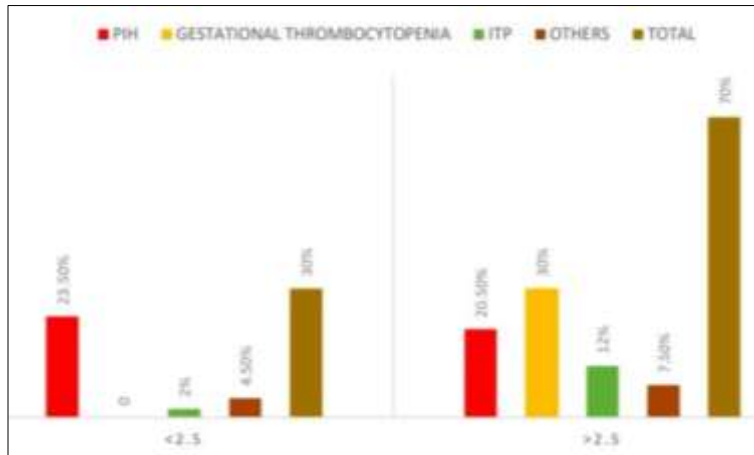
As shown in figure 8, out of 200 cases 57% of the cases were delivered vaginally and 43% were delivered by cesarean section.



**Fig 8:** Showing distribution of mode of delivery among the cases

**Birth weight distribution**

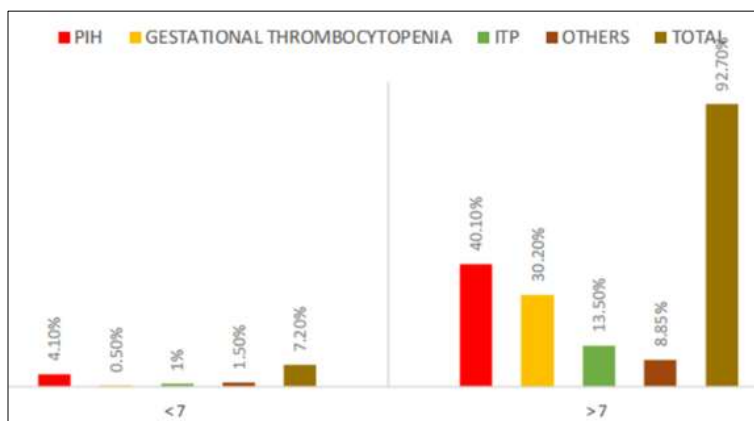
As shown in figure 9, in the present study, 70% of the delivered neonates had birth weight > 2.5 kg and 30% had birth weight < 2.5 kg.



**Fig 9:** Showing distribution of birth weights among the cases

**APGAR score**

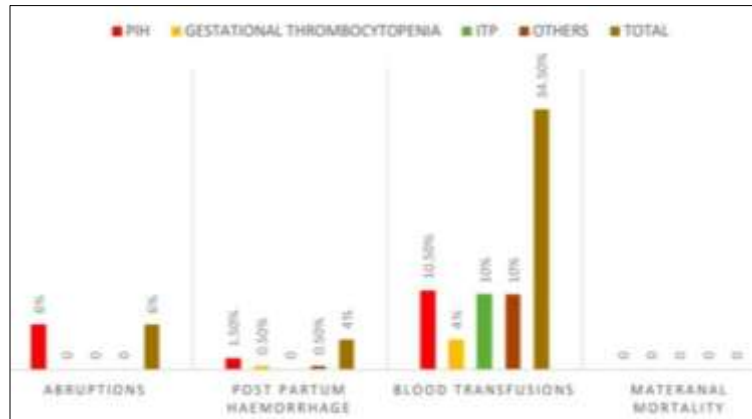
As shown in figure 10, 93% (186) of neonates had APGAR of >7 at 5 minutes and 7% (14) of neonates had APGAR of <7 at 5 minutes.



**Fig 10:** Showing distribution of babies 5 minute APGAR scores among the cases

**Maternal complications**

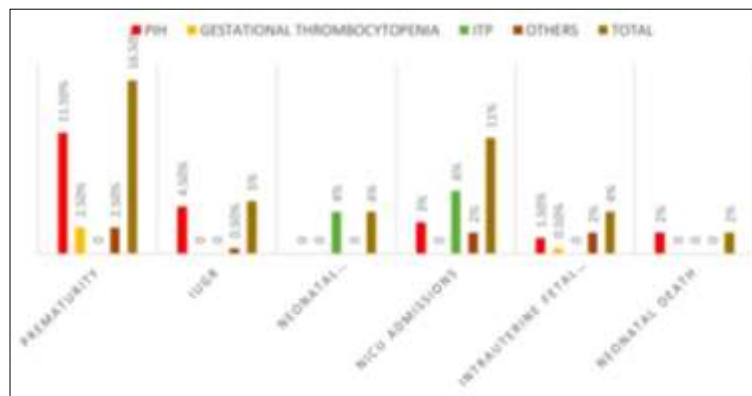
As shown in figure 11, out of 200 cases, in 89 cases i.e. 44.5% of cases, gestational thrombocytopenia led to maternal complications like blood transfusions in 34.5% (69), abruptions in 2.6% (12) and postpartum hemorrhage in 3.4%(8) of the cases.



**Fig 11:** Showing distribution of the maternal complications among the cases

**Perinatal complications**

As shown in figure 12, out of 200 cases, 86 cases i.e. 43% had perinatal complications.



**Fig 12:** Showing distribution of the perinatal complications among the cases

**Out of these 86 cases**

1. 16% (32) had prematurity.
2. 10.5% (21) had NICU admissions.
3. 3.4.5% (9) had IUGR.
4. 3.5% (7) had intrauterine fetal death.
5. 3.5% (7) had Neonatal Thrombocytopenia.
6. 1.5% (3) had neonatal death.

**Discussion**

The present study provides information about the comorbidities, etiology of thrombocytopenia, maternal and fetal outcome in the obstetric unit of Gandhi medical college and hospital. The following data are used to compare our data with those earlier



studies and observations.

### Degree of thrombocytopenia

According to the table 1, the present study 24% (48) of cases belong to mild thrombocytopenia, 52% (104) of cases belong to moderate thrombocytopenia, 24% (48) cases belong to severe thrombocytopenia.

**Table 1:** showing comparison of degree of thrombocytopenia in pregnancy among various studies and the present study

Degree of thrombocytopenia	Nish S <i>et al.</i> <sup>[4]</sup> (%)	Varghese S <i>et al.</i> <sup>[5]</sup> (%)	Present study (%)
Mild	74.7	43.7	24
Moderate	17.9	50	52
Severe	7.4	6.25	24

### Etiology

Since this study was conducted in tertiary care hospital where many cases of hypertensive disorders and ITP are referred; this could explain the higher rate of hypertensive disorders and ITP causing thrombocytopenia in pregnancy as shown in the table 2. Women with dengue fever (9%) were commonly seen during the monsoons, they presented with fever, myalgia and joint pains. Two of them had epistaxis due to severe thrombocytopenia.

**Table 2:** showing comparison of etiologies of thrombocytopenia in pregnancy among various studies and the present study

Studies	PIH	Gestational Thrombocytopenia	ITP
Varghese S <i>et al.</i> <sup>[5]</sup> (%)	20.3%	76.6%	3.1%
Parnas M <i>et al.</i> <sup>[6]</sup> (%)	22.1%	59.3%	11.05%
McCae <i>et al.</i> <sup>[7]</sup> (%)	-	75%	5%
This study	44%	30%	14%

### Comorbidities

Current study showed higher incidence of associated, anemia, hypothyroidism and gestational Diabetes compared with Parnas <sup>[8]</sup> study group as shown in the table 3.

**Table 3:** Showing comparison of co-morbidities in women with thrombocytopenia in pregnancy among various studies and the present study

Comorbidity	Varghese S <i>et al.</i> <sup>[5]</sup> (%)	Parnas M <i>et al.</i> <sup>[6]</sup> (%)	Present study
Anemia	23.43	3	21.5%
Gestational Diabetes	3	8	22%
Hypothyroidism	-	-	11.5%

**Medical complications**

Incidence of placental abruption was significantly high 6%<sup>[12]</sup>. The maternal and neonatal complications were significantly lower in gestational thrombocytopenia compared with other etiologies in this study as well. It is known that gestational thrombocytopenia is not associated with an increased incidence of pregnancy-related complications or with the delivery of thrombocytopenic offspring<sup>[11]</sup>. Bleeding requiring blood and blood products transfusion occurred in some patients. These women either had DIC or ITP with severe thrombocytopenia. However 21 (10.5%) women with hypertensive disorders received blood or blood products. This result is similar to a study by M. Parnas *et al.*<sup>[8]</sup> as shown in table 4.

**Table 4:** showing comparison of medical complications in women with thrombocytopenia in pregnancy among various studies and the present study

Complications	Parnas M <i>et al.</i> <sup>[6]</sup> (%)	Nisha S <i>et al.</i> <sup>[4]</sup> (%)	Vyas R <i>et al.</i> <sup>[9]</sup> (%)	Present study
Placental abruption	8.5	1.11%	4.23%	6%
PPH	-	9.89%	2.11%	4%
DIC	2%	-	-	4%
Maternal Mortality	0	5.26%	-	0
Blood transfusion	16.6%	-	-	34.5%

**Blood transfusions**

34.5% received blood transfusions, out of which, PIH induced thrombocytopenia had higher incidence of transfusions (10%) compared to gestational thrombocytopenia (4%) as shown in table 5.

**Table 5:** Comparison of need for transfusions of blood and blood products in pregnancy with thrombocytopenia amongst various studies and the present study

Etiology	Parnas M <i>et al.</i> <sup>[6]</sup> (%)	Present study
PIH	11%	10.5%
Gestational Thrombocytopenia	9%	4%
ITP	1%	10%
Dengue, SLE	0	10%

**Maternal age**

The majority of patients in our study group belong to the age group of 20 to 25 years, which is similar to the Boehlen Francoise *et al.* study conducted in 2000.

**Gravida**

48% of cases in our study were primigravida, which is similar to Genovese study (2012) which had 38% primigravida.

**Mode of delivery**

According to the present study 57% (114) of cases delivered vaginally and 43% (86) of cases delivered by cesarean section. Among them 21% (48) of gestational thrombocytopenia delivered by cesarean section previous cesarean section may be the confounder.

**Gestational age at delivery**

According to present study, out of 200 cases 83% (166) cases delivered after 37 weeks, 17% (34) cases delivered before 37 weeks of gestation. Higher rates of preterm deliveries were observed among pregnancy induced hypertension cases 12% (24), gestational thrombocytopenia cases 2.5% (5), dengue and systemic lupus erythematosus 2.5% (5). Whereas by Nisha *et al.* <sup>[10]</sup> 48 (31.9%) preterm deliveries were seen.

**Neonatal complications**

**Prematurity**

As shown in Table 6, higher rates of preterm deliveries were observed among women with hypertensive disorders (n=23, 11.5%), ITP (n=0) and other rarer causes (2.5%) compared to the gestational thrombocytopenia group (2.5%). Since the management of hypertensive disorders includes early delivery of fetus, early labour induction could be a confounder for this association.

**Table 6:** Showing comparison of premature births in women with thrombocytopenia in pregnancy among various studies and the present study

Gestational Age	Parnas M <i>et al.</i> <sup>[6]</sup> (%)	Varghese S <i>et al.</i> <sup>[5]</sup> (%)	Present study (%)
Preterm	25.6%	29.6%	16.5%

**APGAR scores**

Newborn with APGAR score < 7 at 1 minute and 5 minutes were defined having birth asphyxia. In a study by Vyas R *et al.* [11] (8.99%) birth asphyxia was noted. In the present study it was 7.2% at 5 min as shown in the table 7.

**Table 7:** Showing comparison of 5 minute APGAR scores of babies born to women with thrombocytopenia in pregnancy among various studies and the present study

Characteristic	Parnas M <i>et al.</i> [6] (%)	Varghese S <i>et al.</i> [5] (%)	Present study (%)
APGAR at 5 times	8.7	3.1	7.2

**IUGR**

We noticed IUGR (5%) in this study. As shown in the table- 8 most of it was in hypertensive disorders group 4.5% [9] and others contributed to 0.5%. McCrae *et al.* [12] concluded that hypertensive disorders are associated with more severe cases of IUGR. Likewise; Aslan *et al.* [7] found a significant difference in the incidence of IUGR in pregnant women with HELLP syndrome compared with women without HELLP syndrome.

**Table 8:** showing comparison of presence of IUGR in women with thrombocytopenia in pregnancy among various studies and the present study

Characteristic	Parnas M <i>et al.</i> [6] (%)	Varghese S <i>et al.</i> [5] (%)	Vyas R <i>et al.</i> [9] (%)	Present study
IUGR	20.5%	31.25%	11.64%	5%

**Neonatal thrombocytopenia**

In Burrows *et al.* study of women with thrombocytopenia, 216 had preeclampsia and HELLP and 4 gave birth to infants with severe thrombocytopenia [2] As reported by McCrae [12] and Cook *et al.* [13] thrombocytopenia in the neonate was rare and treated promptly without any bleeding complications. In the present study a total of 4% neonates were thrombocytopenic, eight each were born to mothers with ITP. There was no major bleeding although 8 neonates born to mothers with ITP had thrombocytopenia as shown in table 9.

**Table 9:** Showing comparison of presence of thrombocytopenia in neonates born to women with thrombocytopenia in pregnancy among various studies and the present study

Characteristic	Parnas M <i>et al.</i> [6] (%)	Varghese S <i>et al.</i> [5] (%)	Present study (%)
Neonatal Thrmboctopenia	7	1.5	4%

### Perinatal complications

In a study by Donimath KV *et al.* [14] total of 100 women with hypertensive disorders were evaluated they found that Intrauterine deaths (12%), intrauterine growth restriction (10%), prematurity and perinatal asphyxia are common complications in the baby born to mother of hypertensive disorders. Adverse perinatal outcome was mostly associated with hypertensive disorder, especially HELLP syndrome and the group of rarer causes including DIC, SLE as shown in table 10.

**Table 10:** Showing comparison of the perinatal outcomes in neonates born to women with thrombocytopenia in pregnancy among various studies and the present study

Perinatal Mortality	Parnas M <i>et al.</i> [6]	Vyas R <i>et al.</i> [9]	Present study
IUFD	6.5%	2.91%	4%
Neonatal deaths	1.5%	-	2%

### Summary

The common cause of thrombocytopenia was pregnancy induced hypertensive disorders 44% (88) followed by gestational thrombocytopenia 30% (60) and idiopathic thrombocytopenic purpura 14% (28) Majority of women had moderate thrombocytopenia 52% (104) at the time of delivery, 24% (48) had severe thrombocytopenia and 24% (48) had mild thrombocytopenia. The mean age group in which thrombocytopenia was seen is between 21 to 25 years. Among the maternal risk factors studied gestational diabetes 22% (44) is the most common comorbidity followed by anemia 21% (42).

In this study there was 48% (96) nulliparous and 52% (104) multiparous women were noted. Women with hypertensive disorders with thrombocytopenia had higher rates of IUGR 4.5% (9) and preterm deliveries 11.5% (23) compared with gestational thrombocytopenia and ITP. Also 70% (30) of women with gestational diabetes mellitus (n=60) most of them had a previous cesarean section, 37.5% (33) of women with hypertensive disorders (n=88) had cesarean delivery. Most of these patients were booked outside, and were referred to us for ICU care in labour. Most of these women either had DIC, ITP, Dengue.

In this study, 34.5% women with thrombocytopenia received blood and blood products. Women with hypertensive disorders 32.9% (29), ITP 71.5 (20) gestational thrombocytopenia 13.3% (8), dengue 40% (8) systemic lupus erythematosus.100% (4) received blood and blood products transfusion. The maternal and neonatal complications were significantly lower in gestational thrombocytopenia compared with other etiologies in this study. The adverse outcome is specifically attributed to hypertensive disorder, and rare causes including dengue.

### Conclusion

The common cause of thrombocytopenia in pregnancy in this study is mainly hypertensive disorders 44% (88), followed by gestational thrombocytopenia 30% (60) and ITP 14% (28) patients with Gestational thrombocytopenia had favorable maternal and perinatal outcomes. On the other hand, preeclampsia and HELLP syndrome were associated with adverse perinatal outcomes like IUGR (30%) and intrauterine fetal

death. The rarer and more serious group of causes of thrombocytopenia, including, DIC, Dengue fever and SLE are associated with adverse outcomes like PPH, blood transfusions, MICU admissions.

**Conflict of Interest:** None.

**Funding Support:** Nil.

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