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RESEARCH ARTICLE

CLINICO-INVESTIGATIVE PROFILE OF THROMBOCYTOPENIA IN THIRD TRIMESTER OF PREGNANCY

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Abstract

Background: Thrombocytopenia often occurs in pregnancy, ranking as the second most common hematologic abnormality following anemia. It affects approximately 6% to 10% of pregnant women.[1] This research aimed to explore the factors linked to thrombocytopenia among rural Indian women in their third trimester of pregnancy.

Methods: This prospective observational study was conducted at Dr.BalasahebVikhePatil Rural Medical College and Dr.VitthalraoVikhePatil'sPravara Rural Hospital in India. The study specifically targeted rural Indian women in their third trimester of pregnancy with a platelet count below 150,000 per cubic millimeter.

Results: In the present study, among the 86 cases examined, the largest proportion (44.2%) were diagnosed with Gestational Thrombocytopenia, followed by 27.9% diagnosed with hypertensive disorders of pregnancy and 16.3% with HELLP syndrome. Among the 39 cases of gestational thrombocytopenia, 41.01% were categorized as mild thrombocytopenia. Of the 38 cases of hypertensive disorders of pregnancy accompanied by thrombocytopenia, 63% were associated with pre-eclampsia and 36.8% with HELLP syndrome. Additionally, 61.6% of the babies were born with low birth weight, and 73.5% of these cases were linked to maternal platelet counts below 100,000 per cubic millimeter..

Conclusions: The research underscores gestational thrombocytopenia as the leading cause during the third trimester, followed by hypertensive disorders such as pre-eclampsia and HELLP syndrome. It emphasizes the need for careful monitoring, particularly for first-time mothers and those in their third trimester, due to increased risks. The link between maternal platelet count and neonatal outcomes, particularly low birth weight, highlights the complex relationship between maternal health and fetal well-being.

Introduction:-

Thrombocytopenia frequently manifests during pregnancy, ranking as the second most prevalent haematological anomaly after anaemia. Thrombocytopenia impacts between 6% and 10% of pregnant women.[2]

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The platelet count typically experiences a decline of approximately 6–7%, predominantly observed during the third trimester. This phenomenon can be explained by factors such as hemodilution, increased platelet consumption, and heightened platelet aggregation triggered by elevated thromboxane A2 levels.[3] Thrombocytopenia in pregnancy may exacerbate as gestation advances.[4]Moreover, thrombocytopenia in women nearing term may influence decisions regarding delivery methods and anaesthesia selection.

Identifying the precise underlying cause is crucial due to the significant variation in management approaches. Thus, gaining insight into the diverse causes, early detection, and targeted treatment implementation can potentially improve outcomes for both mothers and neonates. However, the existing literature predominantly focuses on specific causes, and there is limited data available on patients nearing term in the rural Indian population.

This study aimed to investigate thrombocytopenia among rural Indian women during the third trimester of pregnancy, with a specific focus on labor and delivery. Our study aims to explore the causes, severity, mode of delivery, encountered complications, need for transfusion, and maternal as well as fetal outcomes associated with thrombocytopenia in population of rural indian women.

Methods:-

This hospital-based prospective observational study was conducted at the Department of Obstetrics and Gynaecology of Dr.BalasahebVikhePatil Rural Medical College and Dr.VitthalraoVikhePatil'sPravara Rural Hospital, Loni. The study included pregnant women with a platelet count below 150,000 per cubic millimeter admitted during their third trimester (beyond 28 weeks) to the Department of Obstetrics and Gynaecology at Dr.VitthalraoVikhePatil'sPravara Rural Hospital, Loni, from November 2022 to March 2024. A total of 86 participants were selected based on the following criteria:

Inclusion criteria:

1. Primigravida or multigravida women.
2. Gestational age >28 completed weeks.
3. Platelets less than 1.5 lakh per cubic mm.

Exclusion criteria:

1. Women with known haematological disorders.
2. Women with gestational age less than 28 weeks.

Data pertaining to patients diagnosed with thrombocytopenia was periodically recorded using a structured proforma. At the time of enrollment, all participants underwent platelet count estimation using an automated blood count analyzer and manual platelet count as part of routine antenatal hematological assessment.Different tests including urine routine microscopy for albumin/sugar, complete blood count assessment (CBC), tests to assess liver (LFT) and renal(RFT)function, peripheral blood smear, coagulation profile, malaria detection (via malarial antigen or peripheral blood smear), and screening for dengue IgG and IgM antibodies were conducted as required. Gestational age was ascertainrd based on menstrual history and clinical examination, which was confirmed by ultrasound examination.Maternal outcome was monitored by mode of delivery, complications, need for blood and blood products transfusion, postpartum status and duration of stay in hospital. Labor progression was tracked using a labour care guide. Fetal outcome was assessed by their birth weight, Apgar scores,neonates requiring admission to NICU and any neonatal deaths.

Results:-

Demographic Profile:

A total of 86 patients with a platelet count below 150,000 per cubic millimeter were included in the study. The participants' ages ranged from 18 to 43 years, with a mean age of 23.5 ± 4.5 years. The majority of participants in this study were in the age group of 20-25 years (51.2%). The average gestational age was 36.50 ± 2.802 weeks.The mean platelet count is approximately 77767.44 ± 32798.7 /mm^3. Among the subjects , 44 cases (51.2%) had moderate thrombocytopenia (50,000-1,00,000/mm^3) followed by 23 cases (26.7%) had mild thrombocytopenia(1,00,000-1,50,000/mm^3) and least 19 cases(22.1%) had severe thrombocytopenia (<50,000 /mm^3).

Table 1:- Population Characteristics and Obstetric History.

PARAMETERS		Cases	%
Gestational age	**<34 weeks**	16	18.6
	34.1-37 weeks	33	38.4
	>37 weeks	37	43.02
Severity of thrombocytopenia (/cu.mm)	**Severe**	19	22.1
	Moderate	44	51.2
	Mild	23	26.7
Parity	**Primi**	45	52.3
	2nd gravida	25	29
	Multigravida	16	18.7

Etiology:

Out of the total 86 cases examined, the majority, accounting for 44.2% (38 cases), were diagnosed with Gestational Thrombocytopenia(GT).27.9% (24 cases) were linked to pre-eclampsia, while 16.3% (14 cases) were associated with HELLP syndrome.

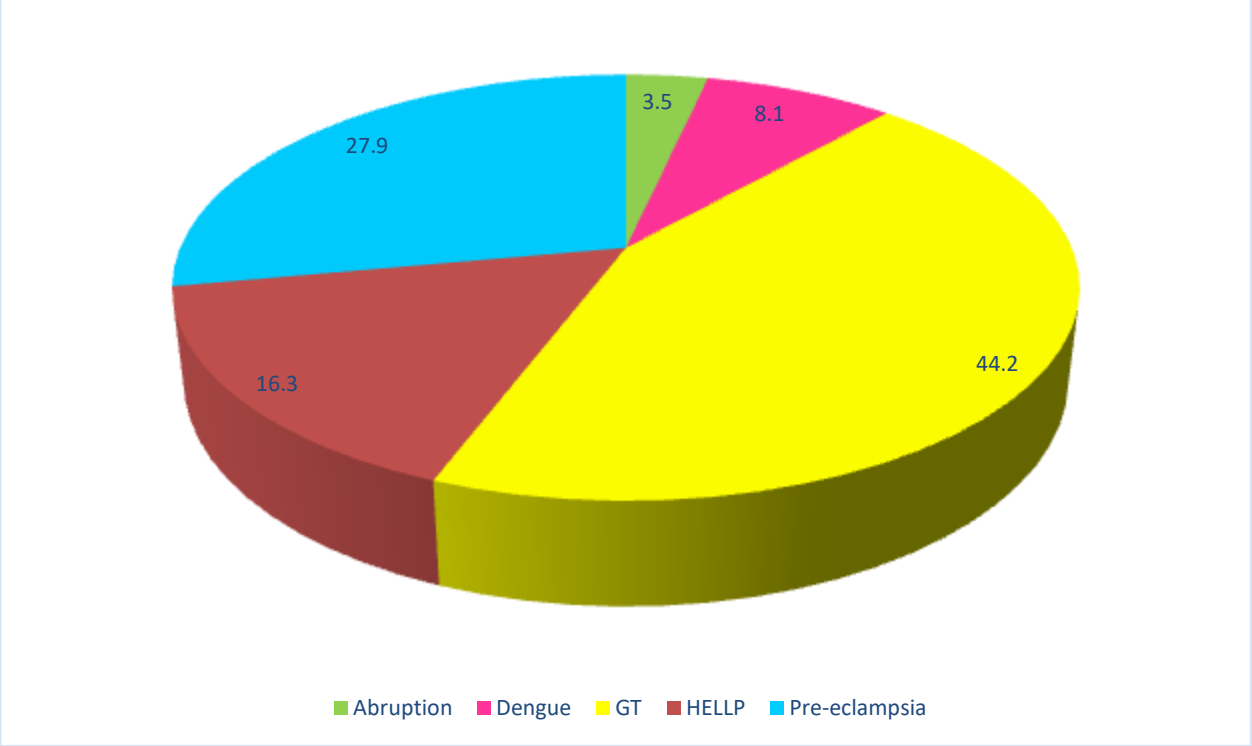

Figure 1:- Distribution according to etiology.

Table 2:- Etiology distribution.

ETIOLOGY	Cases	Percentage
Abruption	3	3.5
Dengue	7	8.1
GT	38	44.2
HELLP	14	16.3
Pre-eclampsia	24	27.9
Total	86	100.0

Extent Of Thrombocytopenia Based On Cause And Gestational Age:

Greater severity of thrombocytopenia was observed in cases involving pre-eclampsia and HELLP syndrome. 28.9% cases of pre eclampsia and HELLP(n=11) were associated with severe thrombocytopenia and 57.8% with moderate

thrombocytopenia(n=22) while 42.1% cases of gestational thrombocytopenia were associated with mild degree of thrombocytopenia.This can be statistically correlated as p-value is 0.04 which is significant.

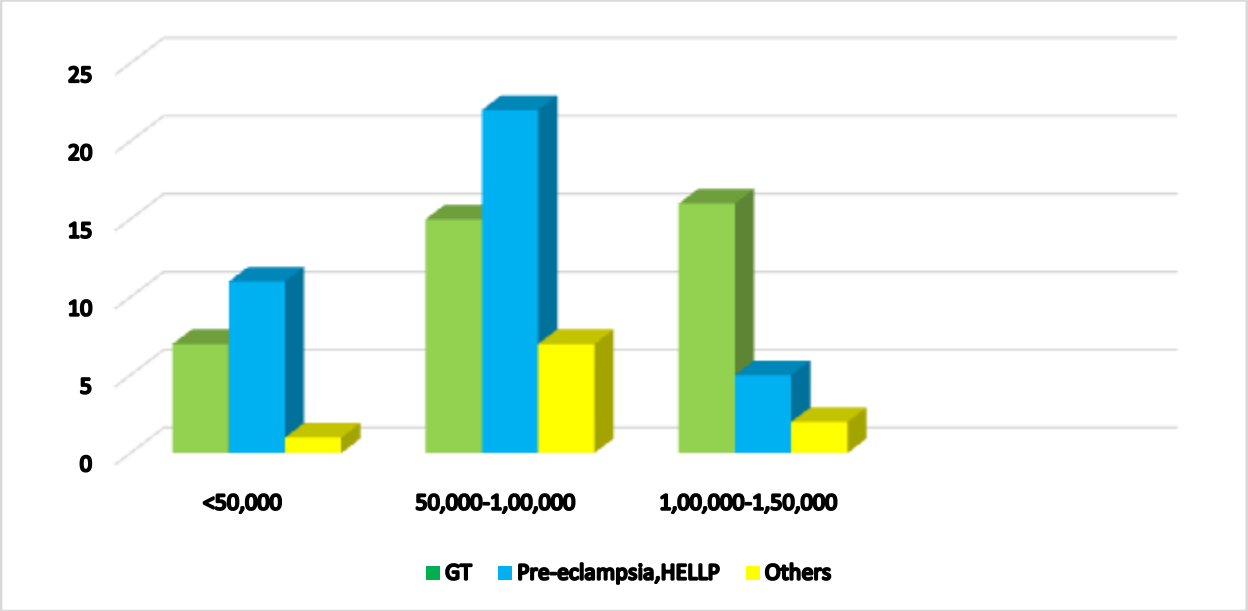

Figure 2:- Severity of thrombocytopenia and etiology distribution.

Table 3:- Severity of thrombocytopenia and etiology distribution.

Etiology	**Gestational Thrombocytopenia**		**Pre-eclampsia, HELLP**		**Others**	
Severity	**Cases**	**Percentage**	**Cases**	**Percentage**	**Cases**	**Percentage**
Severe	7	18.42	11	28.9	1	10
Moderate	15	39.47	22	57.8	7	70
Mild	16	42.1	5	13.1	2	20
Total	38	100	38	100	10	100

Extent Of Gestational Thrombocytopenia Based On Gestational Age:

Out of the 38 instances of gestational thrombocytopenia, 42.1% cases were associated with mild thrombocytopenia(n=16).Of them36.8% of cases presented beyond 37 weeks of gestational age(n=14).

Table 4:- Extent of thrombocytopenia in instances of gestational thrombocytopenia based on gestational age.

Gestational age	**Severity**					
	Severe		**Moderate**		**Mild**	
	Cases	**Percentage**	**Cases**	**Percentage**	**Cases**	**Percentage**
<34weeks	0	0	1	2.6	1	2.6
34-37weeks	2	5.26	5	13.1	1	2.6
>37weeks	5	13.1	9	23.6	14	36.8
Total	7	18.4	15	39.4	16	42.1

Extent Of Thrombocytopenia In Cases Of Pre-Eclampsia/Hellp Syndrome:

Out of 24 cases of pre-eclampsia,70.9% had moderate thrombocytopenia(n=17). Majority of the cases of HELLP syndrome i.e. 50% had severe thrombocytopenia(n=7) followed by moderate thrombocytopenia 35.7%(n=5).

Table 5:- Extent of thrombocytopenia in instances of pre-eclampsia/HELLP syndrome.

Platelet count(/mm$^{3)}$	**Pre-eclampsia**		**Hellp Syndrome**	
	Cases	**Percentage**	**Cases**	**Percentage**
Severe	4	16.6%	7	50%

Moderate	17	70.9%	5	35.7%
Mild	3	12.5%	2	14.2%

Of the 86 participants, 53.5% were delivered by lower segment cesarean section(n=46).Hysterotomy was done in 2.3% patients(n=2).44.2% of patients delivered vaginally(n=38). 89.5% patients did not have any bleeding manifestation(n=77) while 8.1% had hematuria(n=7).1.2% had DIC(n=1) and PPH (n=1) each.

62% newborn had a birthweight of <2.5kg(n=53).30% newborn had birthweight lying between 2.5-3kg(n=26). 8% newborn had birthweight >3kg(n=7).26% patients' newborns were admitted to NICU(n=22).12.8% patients had adverse neonatal outcome (n=11) out of which 3.5% patients had stillbirth(n=3), 2.3% had intra-uterine death(n=2) and 7% patients had death after NICU admission (n=6).

Newborn Weight And Severity Of Thrombocytopenia Distribution:
Among 86 patients, 61.6% babies had low birth weight babies (n=53).Out of 53 babies with low birth weight, 73.5% were associated with platelet count <1,00,000 /cu.mm (n=39) while 26.4% were associated with mild thrombocytopenia (n=14).Out of 33 babies with normal birth weight, 72.7% cases were associated with platelet count <1,00,000/cu.mm (n=24) and 27.2% were associated with mild thrombocytopenia (n=9).(Figure 3)(table 6)

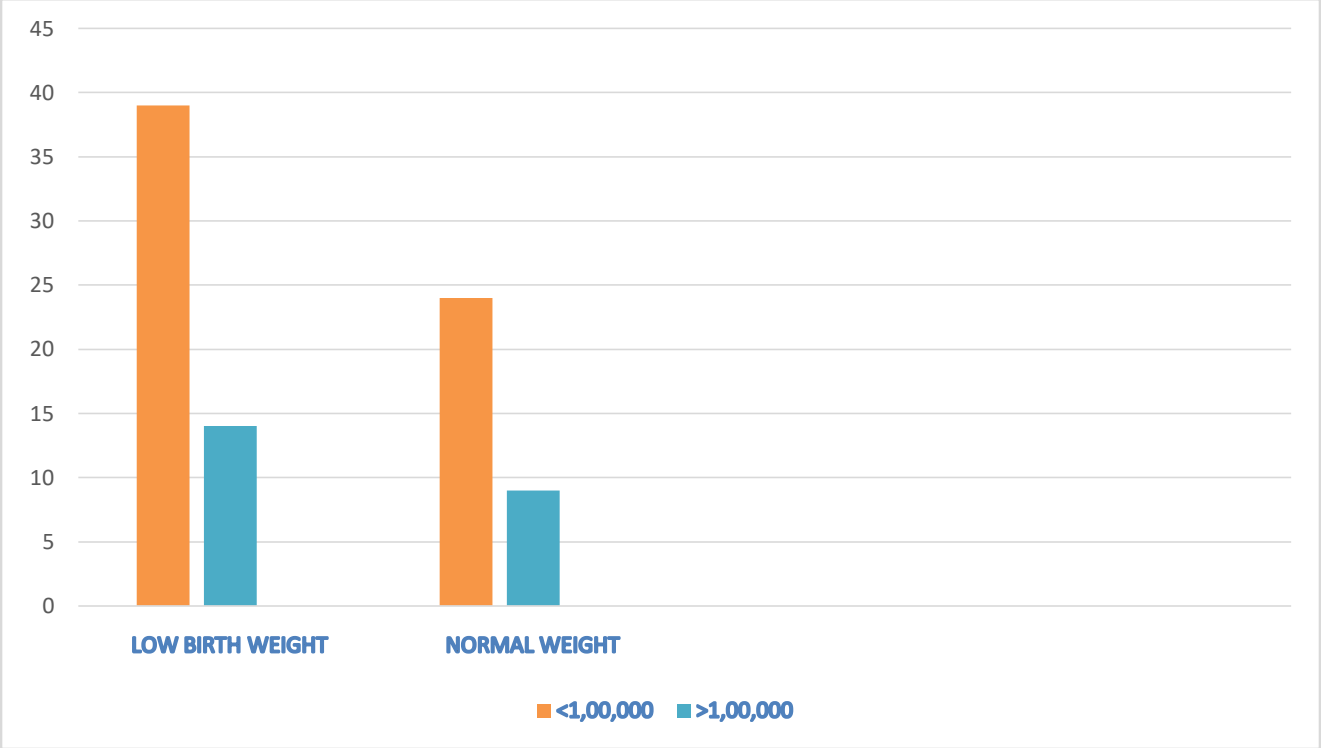

Figure 3:- Distribution of newborn weight and severity of thrombocytopenia.

Table 6:- Distribution of newborn weight and severity of thrombocytopenia.

Newborn weight	**Platelet count(/cu.mm)**			
	<1,00,000(severe)		**>1,00,000(moderate)**	
	Cases	**Percentage**	**Cases**	**Percentage**
Low birth weight	39	73.5	14	26.4
Normal weight	24	72.7	9	27.2
Total	63	73.2	23	26.7

Out of 86 participants, 43% were not given any treatment(n=37) followed by 39.5% participants who were started on anti-hypertensives(n=34).18.6% participants were given steroid therapy(n=16) while 12.7% patients were given magnesium sulphate(n=11).The duration of hospital stay for patients' ranges from 2-30 days with an average duration of 7.6 ± 5.0 days.There were 2 maternal deaths (2.3%).In terms of the platelet count among subjects with maternal death, there was a notable proportion of maternal deaths observed in the range of 100,000 to 150,000 platelet count, accounting for 2.3%. (n=2).No maternal deaths were observed in the other two categories.

Discussion:-

Thrombocytopenia during pregnancy encompasses a range of causes, from mild gestational thrombocytopenia to more critical conditions like immune thrombocytopenic purpura (ITP), preeclampsia, and HELLP syndrome.Managing thrombocytopenia in pregnancy requires careful monitoring, timely interventions, and a multidisciplinary approach to ensure the well-being of both mother and child.

The present study was conducted at a postgraduate teaching institute serving a substantial population, where approximately 10,000 deliveries take place annually. As both a tertiary facility and a pivotal referral center for surrounding villages and towns, this investigation aimed to assess the spectrum of patients presenting with thrombocytopenia in third trimester of pregnancy, the interventions employed, and the feto-maternal outcomes associated with these cases.In this study, participants' ages ranged from 18 to 43 years, with a mean age of 23.5±4.5 years. The majority of participants were in the age group of 20-25 years (51.2%), while those over 30 years were the smallest group (8%).This indicates early age of conception in rural population. In a study by Huparikar A et al. in Secunderabad, Telangana, spanning from 2012 to 2014 in 76 women with thrombocytopenia in pregnancy, 50 cases were present in the age of 20-25 years.The mean age was 30 ± 2 years.[5]This indicates early age of conception in rural population.Our research found that age does not affect the likelihood of developing thrombocytopenia.

Our present study focused on examining the factors leading to reduced platelet count and their impact on obstetric outcomes across different causes of thrombocytopenia. Out of the 86 cases investigated, the majority (44.2%) were identified as Gestational Thrombocytopenia, followed by 27.9% associated with hypertensive disorders of pregnancy(pre-eclampsia), and 16.3% linked to HELLP syndrome. Contributing to a smaller fraction were dengue (8.1%) and abruption (3.5%). The findings of our study closely match a study conducted by Ayisha Begam et al., the research identified various risk factors for thrombocytopenia in pregnancy where gestational thrombocytopenia accounted for 49% of cases, hypertensive disorders of pregnancy for 39.5%, and immune thrombocytopenia (ITP) for 10.4%.[5] Rare causes such as systemic lupus erythematosus (SLE), acute fatty liver of pregnancy (AFLP), dengue infection, hemolytic-uremic syndrome (HUS), and antiphospholipid antibody syndrome (APLA) were observed in their hospital.[6]

In a study conducted by Sainio et al. in 2001, gestational thrombocytopenia accounted for 81% of cases, while preeclampsia was observed in 16%, and ITP in 3%. This study specifically included term patients, which could explain the relatively higher incidence of preeclampsia observed in our own study.[7]

In a study conducted byParnas et al. of moderate to severe thrombocytopenia during pregnancy, comparison was made between 199 pregnant women with platelet counts below 100×10^9/l to 201 pregnant women without thrombocytopenia They observed that gestational thrombocytopenia was the primary cause in 59.3% of instances, trailed by immune thrombocytopenic purpura (11.05%), preeclampsia (10.05%), and HELLP syndrome (12.06%).Since the study focused solely on moderate and severe cases of thrombocytopenia, there was a higher incidence of HELLP syndrome and a lower incidence of gestational thrombocytopenia observed.[8]

In our study, 42.1% of the 38 cases of gestational thrombocytopenia were linked to mild thrombocytopenia. Of these, 36.8% presented beyond 37 weeks of gestational age.Furthermore, 39.4% of cases were related to moderate thrombocytopenia, while 18.4% were associated with severe thrombocytopenia. These findings strongly suggest that gestational thrombocytopenia generally manifests as a mild condition.

Boehlen et al. additionally noted that gestational thrombocytopenia typically presents as a mild condition.[9]

In a study conducted by Misra et al., 60.7% of patients showed mild thrombocytopenia, 39.3% displayed moderate thrombocytopenia, and there were no cases of severe thrombocytopenia reported in those with gestational thrombocytopenia.[10]

AyishaBegam et al. found that 95% of cases occurred in the third trimester, with gestational thrombocytopenia (46.5%) being the most prevalent cause during this period.[6]

In our study, among the 38 cases of hypertensive disorders of pregnancy with thrombocytopenia, 24 cases were diagnosed as pre-eclampsia and 14 as HELLP syndrome. Within the pre-eclampsia group, 70.9% exhibited moderate thrombocytopenia. Among those with HELLP syndrome, 50% had severe thrombocytopenia, while 35.7% had moderate thrombocytopenia.

These findings indicate that HELLP syndrome is associated with more severe thrombocytopenia compared to pre-eclampsia. Statistical analysis revealed a significant correlation with a p-value of 0.04.

According to Magann et al., their study on thrombocytopenia in pregnancy showed that severe thrombocytopenia was observed in 12% of HELLP syndrome cases, 30% of eclampsia cases, and 18% of severe preeclampsia cases.[11]

In Rupakala et al.'s research on thrombocytopenia within hypertensive disorders during pregnancy, they noted that severe thrombocytopenia occurred in 5.8% of cases, moderate thrombocytopenia in 35.5%, and mild thrombocytopenia in 58.7%. The study also reported an incidence of HELLP syndrome at 6.6%.[12]

In our present study, among 86 patients, 61.6% babies had low birth weight babies. Out of 53 babies with low birth weight, 73.5% were associated with maternal platelet count <1,00,000 /cu.mm while 26.4% were associated with mild thrombocytopenia in mothers. Out of 33 babies with normal birth weight, 72.7% cases were associated with maternal platelet count <1,00,000/cu.mm and 27.2% were associated with mild thrombocytopenia in mothers.

The mean newborn weight was 2.2 kg with standard deviation of 0.6. The maximum birthweight observed was 3.8kg and minimum was 800gm.

In a study by Varghese S et al., a higher prevalence of maternal anemia, oligohydramnios, and intrauterine growth restriction (IUGR) was observed among patients with moderate thrombocytopenia. The incidence of premature and low birth weight (LBW) babies was also higher in the presence of moderate to severe thrombocytopenia, findings that are comparable to our study..[13]

Several studies have documented a frequent correlation between maternal thrombocytopenia and premature delivery, as well as babies born with low birth weight.

Conclusion:-

This comprehensive study sheds light on the diverse spectrum of thrombocytopenia in pregnancy, revealing Gestational thrombocytopenia as the predominant cause of thrombocytopenia in the third trimester of pregnancy, followed by hypertensive disorders such as pre-eclampsia and HELLP syndrome.The findings underscore the significance of vigilant monitoring, especially in primigravida and those beyond 30 weeks of gestation, where the risk escalates. The correlation between maternal platelet count and neonatal outcomes, specifically concerning low birth weight, emphasizes the intricate interplay between maternal health and fetal well-being.Moreover, the occurrence of adverse neonatal outcomes and maternal mortality underscores the critical importance of early detection and appropriate management strategies in mitigating risks for both mother and baby. These insights contribute to enhancing clinical practices and highlight the imperative of multidisciplinary collaboration in optimizing outcomes in pregnancies complicated by thrombocytopenia.

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Declarations
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Conflict of interest:
None declared.

Ethical Approval:
This study was approved by Institutional Ethics Committee.

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