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PREVALENCE AND FACTORS ASSOCIATED WITH THROMBOCYTOPENIA IN PREGNANCY AND ITS FETOMATERNAL OUTCOME IN A TERTIARY CARE CENTRE AT SOUTH INDIA

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Abstract

Background: Thrombocytopenia (TCP), characterized by low platelet counts, is a haematological abnormality that occurs in approximately 5-10% of pregnancies, posing potential risks for fetomaternal outcomes. It stands as the most frequent hematological abnormality after anemia. Studies have indicated that while many instances of thrombocytopenia are mild and resolve after delivery, significant cases can lead to severe complications such as maternal hemorrhage, preterm birth, and adverse neonatal outcomesDiagnosing TCP in pregnancy is a significant concern for gynecologists due to the potential for bleeding complications during delivery. Therefore, identifying the cause of TCP is crucial, especially in antenatal patients.

Aims and Objective: The study aims to estimate the prevalence of TCP besides studying the fetomaternal outcome in antenatal women attending OPD.

Materials and methods: This prospective study enrolled 641 pregnant women and monitored them until discharge after delivery. Women with pre-existing medical conditions such as chronic liver disease, renal disorders, cardiac diseases, or malignancies were excluded from the study. During their initial antenatal visit, all participants underwent standard hematological tests, including platelet count measurements, performed using an automated blood count analyzer. Women with platelet counts below 150,000/µL were identified and closely followed up. Additionally, those with normal platelet counts before 28 weeks of gestation had a repeat test in the third trimester to screen for gestational thrombocytopenia. All cases of thrombocytopenia were tracked throughout the antenatal period and up to 48 hours postpartum to assess outcomes.

Results: This prospective study consists of 641 antenatal mothers and the prevalence of TCP was 6.6%. The most common contribution was by gestational TCP, accounting for 71.4% of cases. 16.7% were due to obstetric causes, and medical causes for 12% of the cases. The incidence of still births in the TCP cases was 4.8%. NICU admission rate was 19.0%.

Conclusions: Gestational TCP is the most common etiology of TCP in pregnancy and is not typically associated with any adverse outcome both for the mother or the baby. Hypertensive disorders

constitute the second common etiology. ITP, SLE and APLA syndrome are rare causes of TCP in pregnancy. Although there is no risk of hemorrhagic complications in gestational thrombocytopenia as such, TCP caused by HELLP, ITP and APLA expose the mother and fetus to potentially fatal consequences which need supervision. Proper evaluation and appropriate management by both the obstetrician and hematologist place a significant role in preventing these complications.

Key words: Gestational thrombocytopenia, maternal complications, maternal outcome, fetal outcome,

Introduction

Thrombocytopenia (TCP)—defined as a platelet count <150,000/mm^3— is a frequent hematological abnormality in pregnancy, second only to anemia, and affects approximately 6–10% of pregnant women [1,2]. Platelet counts are, on average, about 10% lower in pregnancy than in the pre-pregnant state, and both physiological and pathological alterations in platelet number and function may raise clinical concerns during gestation [2].

The physiological fall in platelet count is multifactorial, attributable to hemodilution, increased peripheral consumption, and enhanced thromboxane A2–mediated platelet aggregation[3]. In addition, inherited qualitative and quantitative platelet disorders may first manifest or worsen in pregnancy, increasing bleeding risk [2].

TCP is commonly graded as mild (150,000–100,000/mm^3), moderate (100,000–50,000/mm^3), and severe (<50,000/mm^3). Severe TCP may present with petechiae, ecchymoses, epistaxis, gingival bleeding, hematuria, and—rarely—gastrointestinal bleeding or intracranial hemorrhage, whereas mild to moderate TCP is often asymptomatic. Etiologies span benign, physiologic states to life-threatening conditions [4]. Pregnancy-associated (gestational) TCP accounts for approximately 65–80% of cases, followed by immune thrombocytopenic purpura (ITP) and hypertensive disorders of pregnancy; less common causes include sepsis-related coagulopathy/disseminated intravascular coagulation, microangiopathic hemolytic anemia with thrombotic thrombocytopenic purpura, and kidney injury[5]. Additional contributors include TTP and hemolytic uremic syndrome; autoimmune disorders such as systemic lupus erythematosus, ITP, and antiphospholipid syndrome; infections (HIV, malaria, dengue, leptospirosis, sepsis); hypersplenism; primary bone-marrow disorders (e.g., leukemia, aplastic anemia), folate deficiency, and congenital thrombocytopenia [4]. Acquired platelet dysfunction is most often drug-induced (e.g., aspirin, indomethacin) or secondary to systemic disease [6].

Gestational TCP is the predominant etiology, explaining roughly 75% of pregnancy-associated cases, occurs most often in the third trimester, and remains a diagnosis of exclusion [7]. ITP is less common—affecting about 1 in 1,000 to 1 in 10,000 pregnancies—with one-third first recognized during the antenatal period; it may occur at any gestational age and often coexists with a history of immune dysregulation. Management in pregnancy primarily aims to prevent bleeding; only about 30% of antenatal ITP cases require treatment, though higher platelet thresholds and more aggressive therapy may be needed when neuraxial anesthesia is planned [8].

Thrombocytopenia complicates 17–50% of antenatal cases of preeclampsia and may precede the onset of hypertension. Platelets are increasingly recognized in the pathogenesis of preeclampsia and intrauterine growth restriction, and emerging evidence supports antiplatelet agents as effective first-line prophylaxis in at-risk women[9].

Against this background, the present study aims to estimate the prevalence of TCP in pregnancy, identify associated factors, and assess fetomaternal outcomes among antenatal women attending the outpatient department of a tertiary care center.

Methods

This longitudinal study was conducted over a one-year period following approval from the Institutional Ethics Committee. The study was carried out in the Department of Obstetrics & Gynecology at a tertiary care center, with the study population comprising all antenatal women

attending the outpatient department (OPD). A consecutive sampling method was employed, enrolling 641 eligible participants who provided informed consent. Critically ill patients and pregnant women with pre-existing medical conditions (e.g., chronic liver or renal impairment, cardiac diseases, malignancies) were excluded.

All enrolled participants underwent a standardized protocol. A detailed medical history was obtained, including symptoms such as petechiae, ecchymosis, or bleeding gums, as well as prior thrombocytopenia, drug use, or viral infections. Comprehensive clinical examinations (general physical, systemic, and obstetric) were performed to identify signs of thrombocytopenia. Routine antenatal hematological investigations, including platelet count (measured via automated analyzer), were conducted during the booking visit. Women with platelet counts <150,000/μL were classified into mild, moderate, or severe thrombocytopenia and underwent further diagnostic workup to determine etiology. Women with normal platelet counts before 28 weeks had repeat testing in the third trimester to screen for gestational thrombocytopenia.

Participants were monitored throughout pregnancy and delivery for thrombocytopenia-related complications, including antepartum or postpartum hemorrhage, placental abruption, and transfusion requirements. Neonatal outcomes were evaluated via cord blood platelet counts within 24–48 hours post-delivery, alongside assessments of birth weight, gestational age, Apgar scores, NICU admissions, and stillbirth/intrauterine death. This systematic approach ensured comprehensive evaluation of maternal and fetal outcomes associated with thrombocytopenia in pregnancy. Data were analysed using SPSS version 27. Association between categorical variables was seen by using Chi square/ Fischer's exact test. A p value of <.05 is taken for statistical significance.

Results

In pregnancy, TCP is a challenging task for obstetricians. The prevalence, various causes and the feto maternal outcome of thrombocytopenia were studied. This longitudinal study consists of 641 antenatal women who were followed up and 42 had varying degrees of TCP. The incidence of TCP comes out to be 6.6% and the95% CI was (4.87%-8.76%). Other findings were as follows.

Table 1 Socio demographic and clinical characteristics

		Thrombocytopenia				
		Present		Absent		
	.	No	%	No	%	p
Age	≤20	4	11.1	32	88.9	0.481
	21-25	14	7	186	93	
	26-30	13	5.2	238	94.8	
	31-35	9	8.7	94	91.3	
	>35	2	3.9	49	96.1	
SES	Lower middle class	3	2	144	97.8	0.016
	Upper lower	33	8.7	345	91.3	
	Lower class	6	5.2	110	94.8	
Residence	Rural	38	6.2	575	93.8	0.911
	Urban	4	14.3	24	85.7	
Gravida	Primi	28	10	253	90	0.019
	G2	11	4.1	259	95.9	
	≥G3	3	3.3	87	96.7	
Gestational age	<14 weeks	3	25	9	75	0.002
	14-28 weeks	10	12.5	70	87.5	
	>28 weeks	29	5.3	520	94.7	
Bleeding manifestation	Bleeding gums	10	100	0	0	
	Nil	32	5.1	599	94.9	
Type of delivery	Normal	30	6.3	447	93.7	0.791
	Instrumental	1	4.8	20	95.2	
	LSCS	11	7.7	132	92.3	

Gestational age at delivery	<32 weeks	2	20	8	80	0.099
	32 weeks-36+6days	11	8.9	113	91.1	
	≥37 weeks	29	5.7	478	94.3	
Birth weight (kg)	<2.5	8	5.7	133	94.3	0.633
	≥2.5	34	6.8	466	93.2	
Total		42	6.6	599	93.4	

The sociodemographic and clinical characteristics of the study participants, stratified by thrombocytopenia (TCP) status, are presented in Table 1. Among the 641 antenatal women included in the study, 42 (6.6%) were diagnosed with TCP, while 599 (93.4%) had normal platelet counts.

Age distribution showed no significant association with TCP ($p = 0.481$), though the highest proportion of cases (8.7%) was observed in women aged 31–35 years. Socioeconomic status (SES) demonstrated a significant relationship with TCP ($p = 0.016$), with the upper-lower class exhibiting the highest prevalence (8.7%). Residence did not significantly influence TCP rates ($p = 0.911$).

Obstetric factors revealed notable patterns. Primigravidae had a higher prevalence of TCP (10%) compared to multigravidae ($p = 0.019$). Gestational age at enrollment was significantly associated with TCP ($p = 0.002$), with the highest proportion of cases (25%) occurring in early pregnancy (<14 weeks), declining to 5.3% in the third trimester. Bleeding manifestations, particularly bleeding gums, were exclusively observed in women with TCP ($p < 0.001$).

Delivery outcomes showed no significant differences in mode of delivery ($p = 0.791$) or birth weight ($p = 0.633$) between groups. However, preterm delivery (<37 weeks) exhibited a trend toward higher TCP prevalence (20% at <32 weeks, $p = 0.099$). These findings highlight the importance of early screening and monitoring, particularly in high-risk groups such as primigravidae and women with lower SES, to mitigate adverse maternal and foetal outcomes associated with TCP.

Table 2 Clinical Characteristics of Thrombocytopenia cases

		No	%
Thrombocytopenia	Present	42	6.6
	Absent	599	93.4
Platelet count (lakh/mm^3)	1-1.49	32	76.2
	50,000-1	8	19
	<50,000	2	4.8
Causes of TCP	Gestational TCP	30	71.4
	Viral fever	2	4.8
	GHTN / PE	5	11.9
	HELLP	2	4.8
	ITP	1	2.4
	SLE/APLA	2	4.8
History of thrombocytopenia	Yes	2	4.8
	No	40	95.2
Family history of bleeding disorder	Yes	1	2.4
	No	41	97.6
Platelet count came back to normal	Yes	39	92.9
	No	3	7.1

The severity of TCP was categorized based on platelet counts: mild TCP (1–1.49 lakh/mm³) accounted for the majority of cases (76.2%), followed by moderate TCP (50,000–1 lakh/mm³; 19%), and severe TCP (<50,000/mm³; 4.8%).

The most common etiology of TCP was gestational thrombocytopenia (71.4%), while other causes included gestational hypertension/preeclampsia (11.9%), viral fever (4.8%), HELLP syndrome (4.8%), immune thrombocytopenia (ITP; 2.4%), and SLE/APLA syndrome (4.8%). Only a small

proportion of women had a prior history of thrombocytopenia (4.8%) or a family history of bleeding disorders (2.4%).

Postpartum follow-up revealed that 92.9% of TCP cases resolved spontaneously, with platelet counts returning to normal, while 7.1% remained unresolved. These findings suggest that gestational thrombocytopenia is the predominant cause of TCP in pregnancy, typically presenting as a mild and transient condition with favourable outcomes in most cases.

3. Maternal and Foetal outcome in Thrombocytopenia cases

		Severity of Thrombocytopenia				
		Mild		Moderate and severe		p
		No	**%**	**No**	%	
Maternal complication	Abruption	1	33.3	2	66.7	0.30
	PPH	2	50	2	50	
	Anemia	6	85.7	1	14.3	
	Hematoma	1	100	0	0	
	H/o miscarriage	2	66.7	1	33.3	
	No complications	20	83.3	4	16.7	
Gestational age at delivery	<32	1	50	1	50	0.07
	32 weeks-36 +6 days	6	54.5	5	45.5	
	≥37weeks	25	86.2	4	13.8	
Birth weight	<2.5	4	50	4	50	0.05
	≥2.5	28	82.4	6	17.6	
Foetal outcome	Foetal thrombocytopenia	2	66.7	1	33.3	0.18
	NICU admission	**7**	87.5	1	12.5	
	Apgar <7 at 1'	1	25	3	75	
	Intracranial hemorrhage	0	0	1	100	
	Still birth/Neonatal death	1	50	1	50	
	No complications	21	87.5	3	12.5	

The study evaluated maternal and foetal outcomes in pregnancies complicated by thrombocytopenia (TCP), comparing cases of mild TCP (platelet count 1–1.49 lakh/mm³) with moderate/severe TCP (platelet count <1 lakh/mm³). Maternal complications such as placental abruption (33.3% mild vs. 66.7% moderate/severe) and postpartum hemorrhage (50% in each group) showed no statistically significant differences (p=0.3). However, anemia was more prevalent in mild TCP cases (85.7%), while no complications were reported in 83.3% of mild cases compared to 16.7% of moderate/severe cases. Gestational age at delivery revealed a trend toward higher preterm birth rates in moderate/severe TCP (45.5% at 32–36+6 weeks vs. 13.8% at ≥37 weeks in mild TCP, p=0.07), with low birth weight (<2.5 kg) significantly more common in moderate/severe TCP (50% vs. 17.6%, p=0.05). Foetal outcomes demonstrated that while foetal thrombocytopenia (66.7% mild vs. 33.3% moderate/severe) and NICU admissions (87.5% mild vs. 12.5% moderate/severe) were numerically higher in mild TCP, this difference was not statistically significant (p=0.18). Severe adverse outcomes, including low Apgar scores (<7 at 1 minute), intracranial hemorrhage, and stillbirth/neonatal death, were more frequently observed in moderate/severe TCP cases. Notably, 87.5% of mild TCP cases had no foetal complications compared to 12.5% in the moderate/severe group. These findings underscore that while mild TCP generally correlates with favourable outcomes, moderate/severe TCP is associated with increased risks of preterm delivery, low birth weight, and adverse neonatal outcomes,

emphasizing the need for vigilant monitoring and tailored management in these higher-risk pregnancies.

Discussion

Thrombocytopenia during pregnancy is a significant clinical condition that presents both challenges and considerations for maternal and fetal health. This study investigated the prevalence of thrombocytopenia among 641 antenatal women, giving an incidence of 6.6% and 95% CI was (4.87-8.76). Research indicates that the prevalence of thrombocytopenia among pregnant women in India ranges from approximately 6% to 10.5% [10, 11, 12]. For instance, a study by Nisha et al. reported an incidence of 8.8% [10,] , which aligns with data from other studies that suggest similar rates [13, 14]. Furthermore, thrombocytopenia is frequently classified by severity, with mild cases constituting the majority of occurrences, while moderate or severe thrombocytopenia is less common [10, 15] . Most cases of thrombocytopenia during pregnancy are asymptomatic and do not pose a significant risk to maternal or fetal health; however, complications can arise, particularly with moderate to severe forms, necessitating careful monitoring and management [16, 12]. The multifactorial nature of thrombocytopenia includes factors such as immune-mediated conditions, gestational thrombocytopenia, and underlying pregnancy-related disorders, emphasizing the importance of comprehensive clinical awareness in prenatal care settings [17, 18].

The severity of thrombocytopenia in this study ranged from mild to severe, with 76.2% of cases classified as mild (platelet counts between 100,000/mm³ to 149,999/mm³), 19% as moderate (50,000/mm³ to 100,000/mm³), and 4.8% as severe (platelet count <50,000/mm³). The existing literature suggests that mild gestational thrombocytopenia typically does not lead to adverse bleeding complications for either the mother or the foetus [19, 20.] In contrast, severe forms of thrombocytopenia are associated with an increased risk of haemorrhagic complications, particularly during delivery [21, 22.]

Analysis of demographic data indicated that most cases of thrombocytopenia were found among women aged 21 to 30 years, which aligns with studies where the incidence of thrombocytopenia has been linked to being in the prime reproductive age group [23, 24]. Additionally, the majority of women in this study belonged to socio-economic classes defined as upper-lower to lower-middle, suggesting that socio-economic variables can influence health outcomes, including thrombocytopenia during pregnancy [25].

Analysing gestational age, most thrombocytopenic cases occurred in the third trimester (>28 weeks), which correlates with the understanding that thrombocytopenia predominantly manifests later in pregnancy due to physiological changes inherent to gestation [26, 27]. This trend is important as it directly influences the type of monitoring and interventions required to manage potential complications during labour.

Interestingly, maternal complications appeared to be more prevalent in women with a history of hypertensive disorders during pregnancy, suggesting a pathophysiological link between hypertension and the manifestation of thrombocytopenia [20, 28]. While this study found that a significant number of women had no complications during pregnancy, the presence of anemia (16.7%) was noted as a common issue, especially among those with mild thrombocytopenia. Mild thrombocytopenia typically does not require intervention unless it is accompanied by other complicating factors, such as anemia [22, 29].

It is noteworthy that maternal outcomes appear affected by the severity of thrombocytopenia. Severe thrombocytopenia was correlated with a higher incidence of serious complications like postpartum hemorrhage (PPH) and, in some cases, led to prolonged hospitalization in neonates requiring NICU admissions [30]. This raises critical considerations for managing women with extreme forms of thrombocytopenia, underscoring the need for careful monitoring and possibly early interventions for those presenting with these complications [31].

This study adds to the understanding of the prevalence and implications of thrombocytopenia (TCP) in antenatal care, underlining the necessity for personalized management strategies that consider

factors such as platelet count, maternal history, and gestational age. Future research should explore the correlation between socio-economic factors and pregnancy-related complications while simultaneously enhancing awareness of TCP management within clinical practice. Furthermore, this study underscores the significant influence of TCP severity on both maternal and fetal outcomes; it reveals that mild TCP (with platelet counts between 100,000 and 149,000/mm³) is typically linked to a lower incidence of complications and better outcomes. In contrast, moderate to severe TCP (with platelet counts below 100,000/mm³) is associated with notably increased risks, including higher rates of preterm delivery, low birth weight, and adverse neonatal outcomes such as fetal thrombocytopenia, NICU admissions, and, in rare but serious cases, complications like intracranial hemorrhage or stillbirth. While maternal complications, including placental abruption and postpartum hemorrhage, were noted across all severity categories, these were not statistically significant. Mild TCP cases exhibited a higher prevalence of anemia. The findings emphasize the critical importance of early detection, ongoing monitoring, and customized management approaches for pregnancies complicated by moderate or severe TCP to reduce risks and improve outcomes for both mother and child. Overall, the study reaffirms that the severity of TCP is a crucial determinant of pregnancy outcomes, with mild cases usually resolving without significant issues, whereas moderate or severe cases necessitate enhanced clinical attention.

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