

Prevalence and risk factors of thrombocytopenia during the third trimester of pregnancy

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Abstract

Background and objective: Thrombocytopenia, described as a platelet count of less than 150,000 mm³, is a common diagnosis during the period of pregnancy, existing in 7–12% of pregnancies. Mild thrombocytopenia occurs if platelet counts are less than 100,000 mm³, while moderate thrombocytopenia is between 50,000 and 100,000 mm³, and severe thrombocytopenia occurs if platelet counts are less than 50,000 mm³. It could be connected to physiologic changes or pathological diseases; some of them have an impact on pregnancy and may offer a serious risk to both the mother and the unborn child. This study sought to estimate the proportions of the underlying causes as well as the prevalence of thrombocytopenia among pregnant women visiting the antenatal care center in Erbil.

Methods: A cross-sectional study was performed in a maternity teaching hospital in Erbil city, Kurdistan region, Iraq. A convenience sample of 600 pregnant women was used from 28 weeks to 40 weeks of gestation. Over a period of 1 year, starting in January 2021 and ending in December 2021.

Results: The prevalence of thrombocytopenia among the 600 cases was 24.8%, but the majority (75.2%) had a normal platelet count; the degrees of thrombocytopenia were severe in 1.8% of the cases, mild in 8.3%, and moderate in 14.7% of the cases.

Conclusion: A statistically significant association between preeclampsia and HELLP syndrome has been reported as a serious condition that leads to thrombocytopenia. High serum albumin levels in pregnant women related to hypertension had a major impact on the number of platelet counts and should be considered a severe disease.

Keywords: Thrombocytopenia; Platelets; HELLP syndrome; Preeclampsia.

Introduction

Thrombocytopenia is common during pregnancy and affects 7 to 12 percent of pregnancies. It might be due to physiologic changes or pathological diseases. Some of these diseases can have a major impact on pregnancy and pose a major risk to both the mother and the child.¹⁻³

Most thrombocytopenic pregnant women are healthy and were discovered by chance through blood examination.⁴ Increased risk of bleeding for vaginal delivery and for caesarean sections may also require platelet transfusions with IVIG in

emergency cases. DIC and heart attack, among other rare complications, reduce consumption or production.^{5,6} About 1–5% of newborns are born with thrombocytopenia < 20,000.^{7,8}

Pre-eclampsia, HELLP (hemolysis, raised liver enzymes, and low platelet count), and ITP place mother and child at risk for possibly fatal consequences.⁹

Gestational thrombocytopenia is the most prevalent cause of blood clotting problems during pregnancy. It can happen at any period of pregnancy, but it is most common during the second or third trimester.

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Etiology is the result of hemodilution and rapid platelet elimination.^{10, 11} Stable platelet counts greater than 100,000 mm³ in asymptomatic pregnancies caused by GT don't need additional testing or particular treatment beyond routine monitoring.¹² GT isn't connected to maternal or fetal risks and requires just regular blood count monitoring. The normal range of platelets in the first trimester is 250,000 mm³, which drops to 225,000 mm³ during the last trimester. Certain cases need a platelet count before epidural anesthesia.¹³

This research aimed to verify the occurrence of thrombocytopenia among pregnant women who attended an antenatal care center in Erbil and to evaluate underlying factors that might help control pregnancy issues associated with thrombocytopenia.

The objectives of this study are: Know the prevalence of gestational thrombocytopenia, which is a subset or type of thrombocytopenia. Determine the probable risk factors and correlate them with maternal variables and parameters. To evaluate how thrombocytopenia affects both mother and child health. Detecting the exact gestational age at which women start suffering from thrombocytopenia. Investigation of the relation between thrombocytopenia and women suffering from antepartum hemorrhage, preeclampsia, HELLP, infection, etc.

Methods

This study was a cross-sectional one, in which the researchers enrolled 600 patients from 28 weeks to 40 weeks of gestation who were selected randomly. Conveniently, both common and complex pregnancies were represented in the study group; however, mothers who had received blood within 10 days of the interview date were not taken into account. After receiving verbal agreement, pregnant women were questioned and examined; clinical information in addition to obstetrical history was recorded in a comprehensive

questionnaire form. The present study included information on age, education, parity, occupation, and obstetric history (prior medical and surgical history, in addition to past postpartum hemorrhage history) obtained from the mother by using a questionnaire. The study started in January 2021 and ended in December 2021.

Sample selected methods

All pregnant women suffering thrombocytopenia (platelet count below 150,000/ μ L) enrolled in this study for over one year. We categorized platelet count into three groups: mild (less than 150,000/ μ L, moderate (less than 100,000/ μ L and extreme (less than 50,000/ μ L).

Blood Sampling

Blood samples were collected from a radial vein after sterilizing the region with alcohol, and we used a sterile syringe of 5 ml and then divided the blood into two groups. The first group of 2.5 ml was kept in anti-coagulant tubes to measure blood parameters by Medtronic apparatus.

The second group (2.5 ml). Additional lab examinations, such as those for serum creatinine, blood urea level, protein in the urine, serum aspartate aminotransferase (AST), serum alanine aminotransferase (ALT), and alkaline phosphatase (ALP), were done by the Biolis 30i apparatus.

Data collection

The collection of samples had been done after the informed consent of a participant. Blood specimens had been withdrawn from the antecubital vein by using a dry, sterile disposable syringe and needle. 2 ml of blood was dispensed into the anticoagulant tube. The specimens were labeled with the subject's name, age, sex, and serial number and then sent to a laboratory for platelet count estimation. We categorized platelet count into groups of mild less than $150 \times 10^9/L$. moderate, less than $100 \times 10^9/L$...severe $< 50 \times 10^9/L$.

Inclusion criteria: All expecting mothers who have thrombocytopenia (a platelet count below 150,000 mm³) who were willing to participate in the study were

enrolled in our study. The age of the mother had to be more than 18 years, primi, multipara, in the third trimester, have any risk factors, and accept to participate. Baseline investigations like the fibrinogen, renal function test, and liver function test were done.

Exclusion criteria: the researchers excluded women with a known history of collagen disorders, tuberculosis, epilepsy, liver disease (hepatitis, liver cirrhosis, acute fatty liver), drug history intake, neuropathy, history of drug intake, and any patient who refused to participate either by asking them or having a medical report proving to have such diseases or a recent diagnosis based on investigations.

Ethical considerations

We gained approval to conduct this study from the College of Medicine's ethics committee at Hawler Medical University. The information will thereafter be kept private and will not be utilized in any way.

Statistical Analysis:

The Statistical Package for Social

Sciences was employed to investigate the data (SPSS, version 25). Microsoft Excel (version 2013) was used for making the pie chart. A chi-square test of association was employed to compare proportions. Fisher's exact test was used when the expected frequency of more than 20% of the cells of the table was less than 5. A *P*-value of ≤ 0.05 was regarded as statistically important.

Results

Six hundred expected mothers in their third trimester of pregnancy were included in the study. The mean age (SD) was 28.4 (6.2) years, and the median was 28 years. The age range was 18–44 years. Around one-third (31.3%) of the sample were aged less than 25 years, as presented in Table 1, which also shows that 75.7% of the women were living in urban areas, 78.3% were housewives, and the majority (70.8%) were of primary education (Table 1).

Table 1 Socio-demographic characteristics of the studied sample.

	No.	%
Age		
< 25	188	31.3
25-29	168	28.0
30-34	125	20.8
35-39	89	14.8
≥ 40	30	5.0
Residency		
Urban	454	75.7
Rural	146	24.3
Occupation		
Housewife	470	78.3
Employee	128	21.3
Student	2	0.3
Education		
Illiterate	55	9.2
Primary	425	70.8
Secondary	119	19.8
Higher education	1	0.2
Total	600	100.0

It is evident in Figure 1 that the prevalence rates of mild, moderate, and severe thrombocytopenia were 8.3%, 14.7%, and 1.8% respectively. The prevalence of thrombocytopenia was considerably higher among women with gestational ages of less than 37 weeks (34.4%) compared with 21.5% among women with gestational ages of

37–41 weeks ($P = 0.001$). No significant association was recognized with the other factors like age ($P = 0.315$), occupation ($P = 1.000$), and residency ($P = 0.782$). The highest prevalence was among women with blood group A+ (31.8%), and the lowest rates were among women with blood group B⁻ (7.1%) and AB+ (9.1%) as shown in Table 2

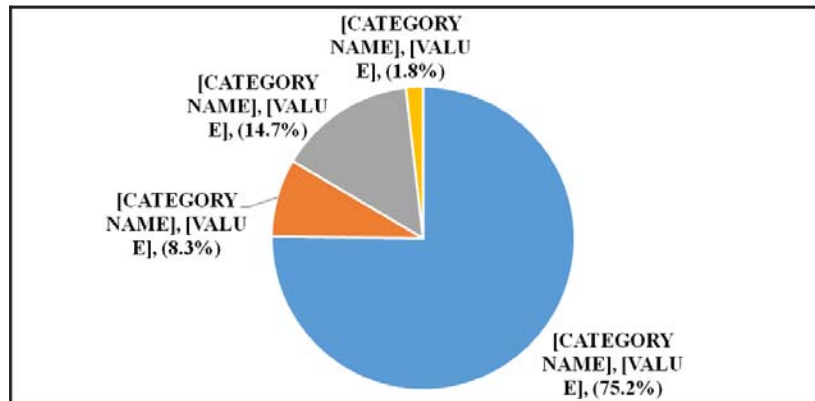


Figure 1 Prevalence of thrombocytopenia.

Table 2 Prevalence of thrombocytopenia by the basic characteristics of women.

	N	Normal	Thrombocytopenia	P value
Age				
< 25	188	149 (79.3)	39 (20.7)	
25-29	168	129 (76.8)	39 (23.2)	
30-34	125	90 (72.0)	35 (28.0)	
35-39	89	61 (68.5)	28 (31.5)	
≥ 40	30	22 (73.3)	8 (26.7)	0.315**
GA				
28-37	154	101 (65.6)	53 (34.4)	
38-40	446	350 (78.5)	96 (21.5)	0.001**
Occupation				
Housewife	470	353 (75.1)	117 (24.9)	
Employee	128	96 (75.0)	32 (25.0)	
Student	2	2 (100.0)	0 (0.0)	1.000*
Blood group				
A-	33	25 (75.8)	8 (24.2)	
A+	154	105 (68.2)	49 (31.8)	
B+	95	74 (77.9)	21 (22.1)	
B-	14	13 (92.9)	1 (7.1)	
AB-	9	7 (77.8)	2 (22.2)	
AB+	44	40 (90.9)	4 (9.1)	
O-	15	13 (86.7)	2 (13.3)	
O+	236	174 (73.7)	62 (26.3)	NA†
Residency				
Urban	454	340 (74.9)	114 (25.1)	
Rural	146	111 (76.0)	35 (24.0)	0.782**
Total	600	451 (75.2)	149 (24.8)	

*By Fisher's exact test. **By Chi square test. †The computer memory was not enough to calculate the P value.

Significantly higher rates of thrombocytopenia were detected among women with a history of bleeding placenta ($P < 0.001$), women with preeclampsia ($P = 0.008$), women with HELP ($P < 0.001$), women with infection ($P = 0.036$), and women with two or three pluses of

albumin in urine ($P < 0.001$). No significant associations were detected between thrombocytopenia with surgical history ($P = 0.345$), parity ($P = 0.428$), type of delivery ($p = 0.203$), diabetes ($P = 0.055$), DIC ($P = 0.248$), smoking ($P = 0.435$), and postpartum hemorrhage ($P = 0.259$).

Table 3 Prevalence of thrombocytopenia by the medical, surgical, and obstetric history.

	N	Normal	Thrombocytopenia	P value
History of bleeding placenta				
Yes	58	32 (55.2)	26 (44.8)	
No	542	419 (77.3)	123 (22.7)	< 0.001**
Surgical history				
Yes	175	127 (72.6)	48 (27.4)	
No	425	324 (76.2)	101 (23.8)	0.345**
Parity				
Nulliparous	165	130 (78.8)	35 (21.2)	
Multiparous	374	275 (73.5)	99 (26.5)	
Grand multiparous	61	46 (75.4)	15 (24.6)	0.428**
Type of delivery				
Normal VD	333	257 (77.2)	76 (22.8)	
CS	267	194 (72.7)	73 (27.3)	0.203**
Diabetes				
Yes	40	25 (62.5)	15 (37.5)	
No	560	426 (76.1)	134 (23.9)	0.055**
Preeclampsia				
Yes	62	38 (61.3)	24 (38.7)	
No	538	413 (76.8)	125 (23.2)	0.008**
HELP				
Yes	16	1 (6.3)	15 (93.8)	
No	584	450 (77.1)	134 (22.9)	< 0.001*
DIC				
Yes	1	0 (0.0)	1 (100.0)	
No	599	451 (75.3)	148 (24.7)	0.248*
Smoking				
Yes	2	1 (50.0)	1 (50.0)	
No	598	450 (73.3)	148 (24.7)	0.435*
Infection				
Yes	6	2 (33.3)	4 (66.7)	
No	594	449 (75.6)	145 (24.4)	0.036*
Postpartum hemorrhage				
Yes	4	2 (50.0)	2 (50.0)	
No	596	449 (75.3)	147 (24.7)	0.259*
Albumin in urine				
Nil	524	412 (78.6)	112 (21.4)	
+	1	1 (100.0)	0 (0.0)	
++	32	16 (50.0)	16 (50.0)	
+++	43	22 (51.2)	21 (48.8)	< 0.001*
Total	600	451 (75.2)	149 (24.8)	

*By Fisher's exact test. **By Chi square test.

Discussion

The current results have shown that the severity of thrombocytopenia was severe (1.8%, moderate (14.7%), and mild (8.3%), while that of those who did not have thrombocytopenia was 75.2%. Thrombocytopenia has been observed in various studies and reported to be an early marker in preeclampsia.¹⁴⁻¹⁷

According to our observations, we have concentrated on the education level and the quality of life. Our results indicated that there was a significant relationship between self-esteem and the quality of life of ITP pregnant women; the majority of ITP patients have low self-esteem and quality of life. The reduction in platelet count will lead to further consequences, such as low energy and activity levels. The percentage of women with thrombocytopenia who cannot read or write was 45.5%, that ratio has decreased with increasing education level. Likewise, in our study, Hemati et al. and Sestøl et al. determined that there was a significant relationship between self-esteem and the level of platelet number in ITP patients.^{18, 19}

We found that the percentage of pregnant women who had a positive history of bleeding or petechia was 44.8%, but they had no risk of postpartum hemorrhage or fetal bleeding, unlike in previous studies such as Levy and Murphy.²⁰

They found that pregnancies with gestational thrombocytopenia were not at risk for fetal thrombocytopenia, and no maternal bleeding complications have been reported. There was no statistical association between preeclampsia and thrombocytopenia in the study of Thalor et al. and Han et al. they compared the platelet counts between the two groups, with a slight reduction in the preeclampsia patients. Their findings regarding platelet counts were consistent with each other's, and they did not report a significant difference between normal, mild, and severe preeclampsia patients related to thrombocytopenia.^{14,18} Thus, the platelet count, though an important parameter in

preeclampsia, In contrast with our study, we showed that preeclampsia was a severe and frequent occurrence of thrombocytopenia, accounting for 32% of cases of pregnant women with thrombocytopenia.

Polak et al. revealed that severe preeclamptic women with platelet counts <100,000/mm³ are significantly considered hypocoagulable when compared to healthy pregnant women, mild preeclamptic women, and severe preeclamptic women with platelet counts ≥100,000/mm³. Beside others' findings, they could not detect the causes of thrombocytopenia from pregnancy-induced hypertension disorder. Since then, they have extended their explanation to one point, which might be related to abnormal vascular tone with resultant accelerated platelet destruction, platelet activation, and coagulation defects.²¹

In comparison with the study of Gernsheimer et al., they discovered that HELLP syndrome affects 10–20% of pregnant women. In contrast with our study, which has shown that HELLP syndrome affects 93% of pregnant women diagnosed with gestational thrombocytopenia.^{22, 23}

The analysis of the 600 pregnant women showed that 66.7% of patients were concerned with a frequency consistent with previous findings. Moreover, Mandelbrot et al. have shown that among 890 women, 29 were thrombocytopenic (3.2%), but other researchers' results determined that thrombocytopenia has a direct concern with human immunodeficiency.²⁴

Conclusion

The overall prevalence of thrombocytopenia in our study was 24.8%. The significant association that has been found in our study was the education level of the pregnant patients, considered one of the most important factors that had a significant role in thrombocytopenia. With a decrease in education level, the severity of thrombocytopenia increased.

A statistically significant association in our study regarding preeclampsia and HELLP syndrome has been reported.

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Competing interests

The authors declare that they have no competing interests.

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