

A Cross-Sectional Study to Determine the Prevalence of Gestational Thrombocytopenia and Anemia among Pregnant Women

Poonam Singh¹, Sweta Singh², Bindu Sinha³

¹Senior Resident, Department of Obstetrics and Gynecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

²Senior Resident, Department of Obstetrics and Gynecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

³Professor and HOD, Department of Obstetrics and Gynecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

Received: 10-12-2023 / Revised: 15-01-2024 / Accepted: 22-02-2024

Corresponding Author: Dr. Sweta Singh

Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to determine the prevalence of gestational thrombocytopenia and anemia among pregnant women.

Methods: This was a cross-sectional study from 100 pregnant women attending the outpatient department and wards of Department of Obstetrics and Gynaecology Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India.

Results: In this study, the maximum number of pregnant women belonged to age 31-40 years. The mean age of the study participants were 25.55 (± 3.67) years. Most of the study subjects lived in a rural residence. Among the study subjects, maximum were housewives and illiterates. Most of the women came for first antenatal check-up in 2nd trimester. The prevalence of anaemia in this study was found in 65 (65%) pregnant women, the remaining 35 (35%) women had Hb level in the normal range. Among the 65 anaemic pregnant women in this study the prevalence of anaemia was mild in 33 patients, 22 moderate, and 10 severe anaemia. The prevalence of thrombocytopenia in this study was found in 20 women (20%), the remaining 80 (80%) women had a platelet count in the normal range. Among the 20 thrombocytopenic pregnant women in this study 12 women was mild, 5 were moderate, and 3 were severe. Women of age group 31-40 years had higher prevalence of anaemia and thrombocytopenia than other age groups; whereas, women with employment had lower prevalence anemia and thrombocytopenia but the difference was not statistically significant.

Conclusion: Thrombocytopenia and anemia are the crucial problems among pregnant women. The pregnant women in the present study were from a rural residence and illiterates and housewives. Hence Thrombocytopenia and anemia are a serious alarm for both mother and the baby and needs to be dealt on priority basis.

Keywords: Anemia; Thrombocytopenia; Pregnancy; platelet and haemoglobin

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Platelets are nonnucleated blood cells formed by cellular fragments of megakaryocytes, and they have a critical role in maintaining hemostasis. [1] Thrombocytopenia is suspected when a patient's platelet count is $<150,000 \times 10^3/\text{mm}^3$. The normal reference range for platelet count in a nonpregnant woman is $150,000-400,000 \times 10^3/\text{mm}^3$. Due to hemodilution secondary to expansion of plasma volume, platelet count in normal pregnancies may be decreased by $\sim 10\%$; most of the decrease in platelet count occurs during the third trimester of pregnancy, [2-5] although the absolute platelet count remains within normal reference range in most patients. [3,6] During pregnancy, most cases of low platelet count

are due to gestational thrombocytopenia (GT), idiopathic thrombocytopenic purpura (ITP) or preeclampsia. [7]

Anemia is a common disorder in pregnancy having a varied incidence, etiology, and degree of severity in different populations, being more common in the developing countries. [8] Anemia is defined as a qualitative or quantitative deficiency of Hb or red blood cells (RBC) in circulation resulting in reduced oxygen carrying capacity of the blood to organs and tissues, thereby reducing their capacity to function. [9]

During pregnancy, a hemoglobin concentration <11 g/dl is defined as anemia. With greater expansion in plasma volume, the hemoglobin level decreases to 11 g% in pregnancy. The WHO has estimated the prevalence of anemia in pregnant women as around 58% in India. [10] According to NFHS4 (2015–2016) data, the prevalence of anemia in pregnant women in Sikkim is 23.6%. [11] The etiology of anemia in pregnancy is multifactorial and varies by geographic region. [12] Iron deficiency is the main cause of anemia in the antenatal group globally. [13]

Other causes of anemia in pregnancy are heavy blood loss, parasitic infections, and conditions such as malaria and HIV and micronutrient deficiencies. [14] Decreased intake along with poor bioavailability of iron especially during the adolescent period and pregnancy remains risk factors for anemia. [15]

The aim of the present study was to determine the prevalence of gestational thrombocytopenia and anemia among pregnant women.

Materials and Methods

This was a cross-sectional study from 100 pregnant women attending the outpatient department and wards of Department of Obstetrics and Gynecology Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India for one year duly signed Informed consent forms were collected from all the participants during the study.

A detailed history and physical examination were carried out for every subject who entered in the study as per a pre- designed proforma. Pregnant women with the following conditions were excluded from the study: Bleeding disorders, Women on non-

steroidal anti-inflammatory drugs such as aspirin, Splenomegaly, Connective tissue disease such as SLE, Hypertension, HIV and hepatitis B infection. Information such as drug history, presence of splenomegaly and HIV / hepatitis B status were extracted from the clinical notes.

Specimen: A total of 3 ml of blood sample (random) was taken from each pregnant woman for peripheral blood film and complete blood count. Complete blood count was determined using a BeneSphera H33s automated haematology analyzer. Haemoglobin in the blood was estimated by the method of Drabkin and Austin (1932). Quality control was determined on a daily basis by analysis of three different manufacturer-provided samples with known cell counts. A pregnant woman was considered anaemic if haemoglobin was <11 g/dl. Severity of anaemia was measured as follows: mild if Hb was 9.0–10.9 g/dl; moderate if Hb was 7.0–8.9 g/dl; and severe if Hb was <7.0 g/dl. Thrombocytopenia is said to be present when the platelet count of the pregnant women is less than $150 \times 10^9 / L$. The platelet counts from 100 to $150 \times 10^9/L$ is considered mild thrombocytopenia, levels ranging from 50 to $100 \times 10^9/L$ are considered as moderate thrombocytopenia and levels less than $50 \times 10^9/L$ are considered as severe thrombocytopenia

Statistical analysis: Data analysis was done by using SPSS Package version. Simple proportions, mean, standard deviation and Student “t” test and Chi-square test was used to find out the association between two groups. P value of less than 0.05 is considered as statistically significant.

Results

Table 1: Sociodemographic characteristics of pregnant women

Variables		Thrombocytopenia	Anaemic
Age group (years)	21– 30	16	19
	31–40	74	70
	≥ 40	10	11
Occupation	Housewife	65	60
	Employed	35	40
Educational status	Illiterate	56	52
	Literate	44	48
Residence	Rural	60	54
	Urban	40	46
Trimester	1st trimester	40	38
	2nd trimester	42	42
	3rd trimester	18	20

In this study, the maximum number of pregnant women belonged to age 31-40 years. The mean age of the study participants were 25.55 (± 3.67) years. Most of the study subjects lived in a rural residence. Among the study subjects, maximum were housewives and illiterates. Most of the women came for first antenatal check-up in 2nd trimester.

Table 2: Prevalence of Anaemia and Thrombocytopenia among Pregnant Women

Prevalence of anemia (n=65)	N
Mild	33
Moderate	22
Severe	10
Prevalence of Thrombocytopenia (n=20)	
Mild	12
Moderate	5
Severe	3

The prevalence of anaemia in this study was found in 65 (65%) pregnant women, the remaining 35 (35%) women had Hb level in the normal range. Among the 65 anaemic pregnant women in this study the prevalence of anaemia was mild in 33 patients, 22 moderate, and 10 severe anaemia. The

prevalence of thrombocytopenia in this study was found in 20 women (20%), the remaining 80 (80%) women had a platelet count in the normal range. Among the 20 thrombocytopenic pregnant women in this study 12 women was mild, 5 were moderate, and 3 were severe.

Table 3: Sociodemographic factors associated with Thrombocytopenia and anaemia in pregnancy

Variables		Thrombocytopenia	Anaemic
Age group (years)	21– 30	3	12
	31–40	15	48
	≥ 40	2	5
Occupation	Housewife	14	48
	Employed	6	17
Educational status	Illiterate	13	50
	Literate	7	15
Residence	Rural	8	58
	Urban	12	7
Trimester	1st trimester	14	54
	2nd trimester	4	11
	3rd trimester	2	6 (8)

Women of age group 31-40 years had higher prevalence of anaemia and thrombocytopenia than other age groups; whereas, women with employment had lower prevalence anaemia and thrombocytopenia but the difference was not statistically significant.

Discussion

Platelets are non-nucleated cells derived from megakaryocytes in the bone marrow and normally live in the peripheral circulation for as long as 10 days. Platelets play a critical initiating role in the haemostatic system. [16] It is well documented that, in pregnancy, one of the important hematologic abnormalities second to anaemia is thrombocytopenia. The diversity of factors causing thrombocytopenia includes gestational thrombocytopenia, idiopathic thrombocytopenic purpura or preeclampsia. [17] Other causes include infection, such as malaria or folate deficiency, and diseases, such as leukemia and aplastic anemia which may leads to considerable morbidity and mortality. [18] Gestational thrombocytopenia is considered to be simply a modest exaggeration of

the normal drop in blood platelets that commonly occurs in pregnancy.

In this study, the prevalence of thrombocytopenia and anemia among pregnant women was 20% and 65% respectively which was almost comparable to the results of studies conducted by earlier studies. [7,9] In developing countries, the cause of anemia during pregnancy is multifactorial and includes nutritional deficiencies of iron, folate, and vitamin B12 and also parasitic diseases, such as malaria and intestinal parasitic infections. [19,20] In this study, the maximum number of pregnant woman belonged to age 31-40 years. The mean age of the study participants were 25.55 (± 3.67) years. Most of the study subjects lived in a rural residence. Among the study subjects, maximum were housewives and illiterates. Education has been reported to reduce the risk of being anaemic in several studies. Women who had education were less likely to be anaemic compared to their counterparts. Educated pregnant women have better income and eat nutritious food and hence do not get nutritional anaemia. [21] Among the study subjects, 58% were illiterates. These results are in accordance with earlier study,

reported that higher prevalence of anaemia among pregnant women who had no education. [20,22] Secondary and higher education had been associated with several other good maternal and child outcomes. This study showed a significant association between anemia and rural residence, which is consistent with previous reports.

The gestational age of the woman showed in 2nd trimester. The prevalence of anaemia in this study was found in 65 (65%) pregnant women, the remaining 35 (35%) women had Hb level in the normal range. Among the 65 anaemic pregnant women in this study the prevalence of anaemia was mild in 33 patients, 22 moderate, and 10 severe anaemia. The prevalence of thrombocytopenia in this study was found in 20 women (20%), the remaining 80 (80%) women had a platelet count in the normal range. Among the 20 thrombocytopenic pregnant women in this study 12 women was mild, 5 were moderate, and 3 were severe. Women of age group 31-40 years had higher prevalence of anaemia and thrombocytopenia than other age groups; whereas, women with employment had lower prevalence of anemia and thrombocytopenia but the difference was not statistically significant.

Conclusion

Thrombocytopenia and anemia are the crucial problems among pregnant women. The pregnant women in the present study were from a rural residence and illiterates and housewives, hence screening of pregnant women for platelet and haemoglobin count, and health educations, nutrition assessment, are needed during antenatal care. Hence Thrombocytopenia and anemia are a serious alarm for both mother and the baby and needs to be dealt on priority basis.

References

- Katke RD, Gohil DP. Thrombocytopenia during pregnancy: an institutional based study. *Int J Reprod Contracept Obstet Gynecol.* 2014; 3(4):947-951. [Google Scholar]
- Sainio S, Kekomaki R, Riikonon S, Teramo K. Maternal thrombocytopenia at term: a population-based study. *Acta Obstet Gynecol Scand.*2000;79(9):744-749. [PubMed] [Googl e Scholar]
- Boehlen F, Hohlfeld P, Extermann P, Perneger TV, de Moerloose P. Platelet count at term pregnancy: a reappraisal of the threshold. *Obstet Gynecol.* 2000;95(1):29-33.
- McCrae KR. Thrombocytopenia in pregnancy: differential diagnosis, pathogenesis, and management. *Blood Rev.* 2003;17(1):7-14.
- Ballem PJ. Hematological problems of pregnancy. *Can Fam Physician.* 1988;34:25 31-2537.
- Boehlen F. Thrombocytopenia during pregnancy: importance, diagnosis and management. *Hamostaseologie.* 2006;26(1):72-74.
- Burrows RF, Kelton JG. Fetal thrombocytopenia and its relation to maternal thrombocytopenia. *N Engl J Med.* 1993;329 (20):1463-1466.
- Diejomaeoh FM, Abdulaziz A, Adekile AD. Anemia in pregnancy. *Int J Obstet Gynaecol* 1999;65:299-301.
- ACOG. Practice bulletin: Anaemia in pregnancy. *Obstetr Gynecol* 2008;112:201-7.
- World Health Organization. *Micronutrient Deficiency: Battling Iron Deficiency Anaemia: The Challenge;* 2004.
- IIPS. *National Family Health Survey 2015-16 (NFHS-4).*
- Van den Broek N. Anaemia in pregnancy in developing countries. *Br J Obstet Gynaecol* 1998;105:385-90.
- World Health Organization. *The World Health Report 2002: Reducing Risks, Promoting Healthy Life.* Geneva: World Health Organization; 2002.
- Cusick SE, Mei Z, Freedman DS, Looker AC, Ogden CL, Gunter E, et al. Unexplained decline in the prevalence of anemia among US children and women between 1988-1994 and 1999-2002. *Am J Clin Nutr* 2008;88:1611-7.
- Toteja GS, Singh P. Micronutrient profile of Indian children and women: Summary of available data for iron and vitamin A. *Indian Pediatr* 2003;40:477-9.
- Katke RD, Gohil DP. Thrombocytopenia during pregnancy: an institutional based study. *Int J Reprod Contracept Obstet Gynecol.* 20 14 ;3(4):947-51.
- Cines DB, Levine LD. Thrombocytopenia in pregnancy. *Hematology 2014, the American Society of Hematology Education Program Book.* 2017 Dec 8;2017(1):144-51.
- Gauer R, Braun MM. Thrombocytopenia. *American family physician.* 2012 Mar 15;85 (6):612-22.
- Pandey A, Singh R. Thrombocytopenia during pregnancy: an institutional based prospective study of one year. *International Journal of Research in Medical Sciences.* 2017 Aug;5(8): 3502.
- Asrie F, Enawgaw B, Getaneh Z. Prevalence of thrombocytopenia among pregnant women attending antenatal care service at Gondar University Teaching Hospital in 2014, northwest Ethiopia. *Journal of blood medicine.* 2017;8:61.
- Melku M, Addis Z, Alem M, Enawgaw B. Prevalence and predictors of maternal anemia during pregnancy in Gondar, Northwest Ethiopia: an institutional based cross-sectional study. *Anemia.* 2014 Oct;2014.
- Adam I, Khamis AH, Elbashir MI. Prevalence and risk factors for anaemia in pregnant women of eastern Sudan. *Transactions of the Royal Society of Tropical Medicine and Hygiene.* 2005 Oct 1;99(10):739-43.