



PREVALENCE OF THROMBOCYTOPENIA, AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE AT HAWASSA UNIVERSITY TEACHING AND REFERRAL HOSPITAL.

Fanuel Belayneh^{1*}, Addis G/Mariam², Fithamlak Solomon³, Zeleke Geto⁴, Antene Amsalu⁵, Demiss Nigussie⁶ and Derese Daka⁷

¹ Wolaita Sodo University, School of Public Health, ² Hawassa University Teaching and Referral Hospital, ³ Wolaita Sodo University, School of Medicine, ⁴ Ethiopian Public Health Institute, Addis Ababa, Ethiopia, ^{5, 6, 7} Hawassa University, College of Medicine and Health Science

Abstract: Background: Thrombocytopenia, or low platelet count of less than $150 \times 10^9/l$, during pregnancy is the major risk factor associated with significant bleeding at the time of delivery. However, screening and follow up of pregnant woman during, their antenatal care visit is not yet practiced in resource limited countries.

Objectives: The aim of this study is to assess the prevalence of thrombocytopenia, and associated factors among pregnant women attending antenatal care at Hawassa University Teaching and Referral Hospital.

Method: Hospital based cross-sectional study was conducted from July 19 to sep 23, 2015 at Hawassa University Teaching and Referral Hospital. A total of 198 pregnant women included in the study using consecutive sampling technique. Data were entered and analyzed using SPSS version 20 software. Bivariate and multivariate logistic regressions were done to assess the predictors of thrombocytopenia. Variables which were significant in the bivariate analysis at p-value < 0.2 were entered to the multivariate analysis. P- Value of < 0.05 was considered to indicate statistical significance.

Result: A total of 193 women on ANC follow-up at the Hospital were participated in the study with a response rate of 97.47%. Thrombocytopenia was found among 26 women with a prevalence of 13.5%. The mean (\pm SD) platelet count was $249.9 \times 10^9/L$ (± 88.7). Hemoglobin level and educational status were identified to have association with thrombocytopenia with [AOR=9.8: 95% CI, 1.1-82.4] and [AOR=9.9: 95% CI, 1.2-82.8] respectively.

Conclusion and Recommendation: The prevalence of thrombocytopenia is 13.50%, dominantly with mild type. Thrombocytopenia is higher in pregnant women with anemia. Therefore, the pregnant women screening should include platelet count especially when the woman is anemic to avoid adverse outcomes.

Key words Thrombocytopenia, pregnancy, ANC

For Correspondence:

fanuelbelayneh@gmail.com

Received on: November 2015

Accepted after revision: December 2015

Downloaded from: www.johronline.com

1. Introduction:

Platelets are non-nucleated cells derived from megakaryocytes in the bone marrow and normally live in the peripheral circulation for about 10 days. These cells play a critical

initiation role in the haemostatic system by being involved in blood clotting [1].

Thrombocytopenia is a common hematological abnormality in which a platelet count is less than $150 \times 10^9/L$. Counts from 100 to $150 \times 10^9/L$ are considered mildly depressed, 50 to $100 \times 10^9/L$ are moderately depressed and less than $50 \times 10^9/L$ are severely depressed [2].

Thrombocytopenia is the second most common hematologic abnormality during pregnancy next to anemia. It is encountered in 7-8% of all pregnancies [3].

During pregnancy there is a general downward drift in platelet count, particularly during the last trimester. This results at term in a level that is approximately 10% less than the pre pregnancy level. The mechanisms for this are thought to be a combination of dilution effects and acceleration of platelet destruction across the placenta. Most women still have platelet counts within the normal range; however, if the starting count is at the lower end of the normal range, or there is a more severe drop, thrombocytopenia occurs [1].

In pregnancy, most thrombocytopenia cases are due to gestational thrombocytopenia, idiopathic thrombocytopenic purpura or preeclampsia [4]. Other causes include infections such as malaria, folate deficiency, and diseases such as leukaemia and aplastic anemia [5]. Gestational thrombocytopenia is considered to be the commonest cause and milder form of maternal thrombocytopenia with minimal fetomaternal complication accounting for 75% of cases [1].

It is known that pregnant women with thrombocytopenia have a higher risk of bleeding excessively during or after childbirth, particularly if they need to have a caesarean section or other surgical intervention during pregnancy, labor or in the puerperium. Such bleeding complications are more likely when the platelet count is less than $50 \times 10^9/L$ [3].

It is also associated with high fetomaternal complications. Pregnancy increases susceptibility to malaria and is associated with profound alterations in the fibrinolytic and coagulation systems. Both plasmodium falciparum and plasmodium vivax can cause

thrombocytopenia in pregnancy, and more chances with repeated infections. If these infections are treated appropriately, there are fewer chances of complications but complicated malaria is associated with poor fetomaternal outcomes [6].

Periodic platelet counts using automated complete blood count (CBC) instruments or blood film examination, is recommended either once a trimester or every month, depending on the level of thrombocytopenia. In addition, clotting screen (prothrombin time, activated partial thromboplastin time and fibrinogen) can also be done [7].

Despite the fact that thrombocytopenia is the most common hematologic abnormality during pregnancy and its significance burden, only few attempts has been done to assess its magnitude and risk factors specially in our country Ethiopia.

Therefore the aim of this study is to determine magnitude of thrombocytopenia and associated factors among pregnant women. The finding of the study will be expected to contribute in filling the gaps. Moreover, understanding factors associated with thrombocytopenia among these population group is important for designing appropriate health programs in order to reduce its magnitude.

2. Methods and Materials

2.1. Study Setting and Study Population

Hospital based cross-sectional study was conducted from July 19 to September 23, 2015 at Hawassa University Teaching and Referral Hospital. All women in the age range of 15-49 years who visit this hospital for ANC service during the study period were the source population

2.2. Data collection

Woman visiting ANC clinic at the hospital during the data collection period were consecutively included in the study. Pregnant women with bleeding disorders, women on non-steroidal anti-inflammatory drugs such as aspirin, women having splenomegaly, connective tissue disease such as systemic lupus erythematosus (SLE), hypertension and women

on ARV treatment were excluded from the study.

After obtaining informed written consent, socio-demographic and clinical data was collected from pregnant women using pretested structured questionnaire.

Three milliliters of blood was collected and dispensed into ethylenediamine tetra acetic acid (EDTA) anticoagulant tubes. The specimens were labeled with age and identification number of study subject. The EDTA samples were kept at room temperature until processed for a maximum of 4 hours after collection. Full blood count was performed by CELL DYN 1800 automated hematology analyzer.

2.3. Data processing and analysis

Data were entered and analyzed by SPSS version 20.0. Summary statistics such as frequencies and percentages were computed. Logistic regression was used to identify factors associated with thrombocytopenia. A 95% confidence interval and P- Value of < 0.05 were considered to decide statistical significance. Finally the results were presented in tables and figures.

2.4. Ethical Consideration

The study was carried out after getting approval letter from Hawassa university and permission from hospital administration. Each respondent was informed about the objective of the study and a written consent was obtained. Confidentiality was kept at each step of data collection and processing. In addition, abnormal test results of the study participants were communicated with their physician for farther investigation and better management of the clients.

3. RESULT

Socio-demographic characteristics of study participants

In this study a total of 193 women on ANC follow-up at the Hospital were participated with a response rate of 97.47%. One hundred ninety (61.7%) of them were age less than 30 years and 74 (39.3%) were greater than or equal to 30 years old. The mean (\pm SD) age of the participants was 28.9 (\pm 5.9) years. Regarding marital status of respondents, 175 (90.7%) of

them were married. Pertaining to the occupation of participants, 107(55.4%) was housewives (Table1).

Table 1. Socio-demographic characteristics of study participants at Hawassa University Teaching and Referral Hospital, Southern Ethiopia, 2015.

Variables	Frequency	Percent (%)
Age category		
15- 19	4	2.10
20- 24	42	21.80
25-29	73	37.80
30-34	32	16.60
35-39	30	15.50
40-44	10	5.20
45-49	2	1.00
Place of residence		
Urban	119	61.70
Rural	74	38.30
Job of the mother		
Housewife	107	55.40
Employed	53	27.50
Merchant	26	13.50
Daily labor	4	2.10
Other	3	1.50
Educational level		
Illiterate	53	27.50
Primary	38	19.70
Secondary	53	27.50
Tertiary	49	25.40
Marital status of the mother		
Married	175	90.70
Single	9	4.70
Divorced/ Widowed	9	4.70

Reproductive characteristics of study participants

Out of the total respondents, 79 (40.9%) of them were in the first trimester, whereas, 65(33.7%) and 49 (22.5%) were in the second and third trimester consecutively. The mean number of children was 1.4, with 23.3 % had only one child, and 20.2% had three and above children (Table 2).

Table 2. Reproductive characteristics of study participants at Hawassa University Teaching and Referral Hospital, Southern Ethiopia, 2015.

variables	Frequency	Percent (%)
Gestational age		
First trimester	79	40.90
Second trimester	65	33.70
Third trimester	49	25.40
Number of children		
No child	72	37.30
one	45	23.30
two	37	19.20
three	25	13.00
Four and more	14	7.20
Follow antenatal care previously		
Yes	86	44.60
No	107	55.40
Follow antenatal care for the current pregnancy		
Yes	158	81.90
No	35	18.10
History of inter-menstrual bleeding		
Yes	32	16.60
No	161	83.40
Take iron supplement the current pregnancy?		
Yes	82	42.50
No	111	57.50
Tested for HIV		
Yes	139	72.00
No	54	28.00
History of contraceptive use		
Oral	38	19.70
Depoprovera	137	65.80
Norplant	21	10.90
Other	2	1.00
No contraceptive use history	5	2.60

Hematological profiles of the study participants

The overall mean (\pm SD) hematological profiles for the study participants were as follows: PLT $249.94 \pm 88.74 \times 10^9/L$, WBC count $7.73 \pm 2.46 \times 10^9/L$, RBC count $4.62 \pm 3.17 \times 10^{12}/L$, Hb 12.77 ± 2.04 g/dL, HCT $38.96 \pm 6.43\%$,

MCV 91.88 ± 8.179 fL, MCH 30.69 ± 5.31 pg, and MCHC $32.55 \pm 2.26\%$ (Table 3).

Regarding hemoglobin level, 51 (26.4%) participants were having less than 12 g/dl Hgb level and the rest, 142 (72.6%) have greater than or equal to 12mg/dl Hgb level.

Table 3. Hematological parameters of study participants at Hawassa Referral Hospital, Southern Ethiopia, 2015.

Laboratory parameters	Mean	SD	Min	Max
PLT/L	249.94	88.74	3.40	589.00
MPV	9.76	2.01	0.00	17.70
PDW	16.47	2.05	0.00	33.90
RBC	4.62	3.17	1.80	39.80
HGB	12.77	2.04	4.63	16.40
HCT	38.96	6.43	4.90	49.70
MCV	91.88	8.17	35.00	116.40
MCH	30.69	5.31	10.20	90.60
MCHC	32.55	2.26	15.20	38.60
Total WBC	7.73	2.46	2.40	16.20
Neutrophil	60.63	12.63	6.60	88.50
Monocyt	10.40	9.58	1.80	96.00
Lymphocyt	29.15	10.01	1.40	52.70

Prevalence of Thrombocytopenia

The prevalence of thrombocytopenia in this study is 26 (13.5%), whereas the remaining 167(86.5%) has platelet count greater than $150 \times 10^9/L$. The mean (\pm SD) platelet count is $249.9 \times 10^9/L$ (± 88.7). Among the thrombocytopenic pregnant mothers in the present study, 73.07%

had mild thrombocytopenia, 15.38% had moderate thrombocytopenia and 11.54 of them had severe thrombocytopenia.

The prevalence of sever thrombocytopenia among pregnant women with bleeding problem is 3.5% and those who have mild anemia (7-10 g%) is 1.0%.

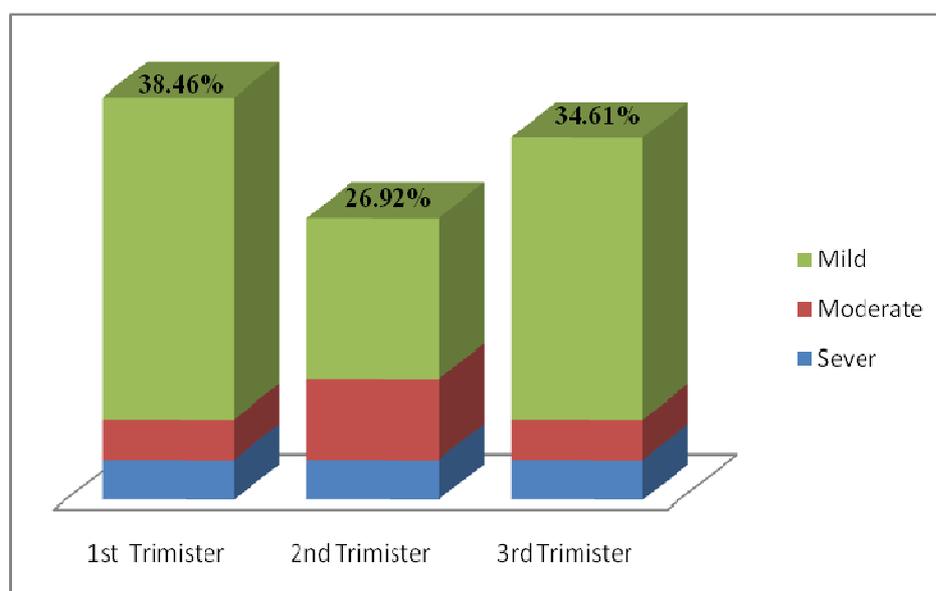


Figure 1: Distribution of thrombocytopenia in each trimester among pregnant woman visiting ANC clinic at Hawassa Referral Hospital, Southern Ethiopia, 2015.

Proportions of women with thrombocytopenia in each trimester were 38.46% in first; 26.92% in 2nd; and 34.61% in 3rd trimester.

Factors associated with thrombocytopenia

Bivariate and multivariate logistic regressions were done to assess the predictors of thrombocytopenia. Variables which were significant in the bivariate analysis at p-value < 0.2 were entered to the multivariate analysis. As a result, Hgb level and educational level were remained in the final model. Hence, the result of multivariate analysis showed that, women with

Hgb less than 12g/dl were about two times more likely to have thrombocytopenia as compared with those with Hgb level greater than or equal to 12g/dl [AOR=2.4: 95% CI, 1.0-6.0]. In addition woman's with no education and at secondary school level were about 10 times more likely to develop thrombocytopenia than woman's with educational level of above diploma; [AOR=9.8: 95% CI, 1.1-82.4] and [AOR=9.9: 95% CI, 1.2-82.8] respectively (Table 4).

Table 4. Factors associated with thrombocytopenia among pregnant woman attending ANC service at Hawassa Referral hospital, Southern Ethiopia, 2015.

Variables	Thrombocytopenia		COR (95% CI)	AOR (95% CI)
	Yes No (%)	No No (%)		
Educational level				
Illiterate	9(17.0)	44(83.0)	9.8(1.1-80.6)	9.8(1.1-82.4)*
Primary	6(15.8)	32(84.2)	19.0(1.0-78.3)	7.9(0.8-71.0)
Secondary	10(18.9)	43(81.1)	11.1(1.3-90.8)	9.9(1.2-82.8)*
Tertiary	1(2.0)	48(98.0)	1	1
Iron supplement				
Yes	15(80.7)	67(9.9)	2.0(0.8-4.7)	1.9(0.7-4.7)
No	11(18.3)	100(90.1)	1	1
Intermenstrual bleeding				
Yes	7(21.9)	25(11.8)	2.0(0.7-5.4)	1.5(0.5-4.5)
No	19()	142(88.2)	1	1
HGB level				
<12g/dl	14(53.8)	12(46.2)	2.8(1.2-6.5)	2.4(1.0-6.0)*
>=12g/dl	39(23.4)	128(76.6)	1	1

N.B*= significant at P-value 0.05

4. Discussion

In this study, the prevalence of thrombocytopenia among pregnant women is 13.5 %. This finding is in line with the studies conducted in Ghana (15.3%) and Nigeria (13.5%) [8, 9]. However, our result is higher than studies conducted in India (8.17%) and (8.8%), Iraq (8%), and by Ahmedabad (7.67%) [10, 11, 12, 13]. It is also higher than literature review conducted by Myers [14], which showed

that thrombocytopenia occurs in 8–10% of all pregnancies. The difference could be explained by the socio demographic differences of the study areas.

Among the thrombocytopenic pregnant mothers in the present study, 73.07% had mild thrombocytopenia, 15.38% had moderate thrombocytopenia and 11.54 of them had severe thrombocytopenia. These results are in line with the results from the study conducted in Lagos,

Nigeria which revealed, out of the pregnant women who were thrombocytopenic, most of them (78%) had mild thrombocytopenia, only 6% had severe thrombocytopenia [8]. These results also agree with studies conducted in Ghana, India, Nigeria, and by Ahmedabad, which showed the presence of high frequency of mild thrombocytopenia [8, 9, 10, 11]. In addition, it is also concurrent with the finding of Boehlen who reported that gestational thrombocytopenia is usually mild [15].

Our study also reported that the mean difference between the three trimesters was not statically significant ($P > 0.05$). Our finding is similar with study conducted by Ajibola *et al* [9], Akinbami *et al* [16] and James *et al* [17].

Generally, thrombocytopenia is a significant problem among pregnant women as it can be evidenced by 13.50% prevalence, and with dominant mild type. Thrombocytopenia was higher in pregnant women with anemia. Therefore, the pregnant women screening should include platelet count especially when the woman is anemic to avoid adverse outcomes.

Limitations of the study

The findings of our study should be interpreted in light of some limitations; the study was cross-sectional therefore, we could not establish temporality between thrombocytopenia and the independent factors. In addition, the study lacks control groups and screenings for parasitic infections were not done.

References

1. Verdy E, Bessous V, Dreyfus M, Kaplan C, Tcherna G, Uzan S. Longitudinal analysis of platelet count and volume in normal pregnancy. *Thromb Haemost* 1997;77:806–7.
2. Shehata N, Burrows R, Kelton JG. Gestational thrombocytopenia. *Pan African Medical Journal*. 1999;42:327–34.
3. Richard F and Alexandre H. Thrombocytopenia in pregnancy. *Medcape J* 2006. Available at www.emedicine.medscape.com/article. Accessed 15 Jan 2015.
4. Burrows RF, Kelton JG. Thrombocytopenia at delivery: A prospective survey of 6,715 deliveries. *J Perinat Med*. 1990;162:731–4.
5. McCrae KR. Thrombocytopenia in pregnancy: differential diagnosis, pathogenesis, and management. *Blood Rev*. 2003; 17(1): 7-14.
6. Briggs R, Chari RS, Mercer B, Sibai BM. Postoperative incision complications after cesarean section in patients with antepartum syndrome of hemolysis, elevated liver enzymes, and low platelets (HELLP): does delayed primary closure make a difference?. *Am J Obstet Gynecol*. 1996; 175:893
7. Silver R, Berkowitz R, Bussel J. Thrombocytopenia in pregnancy. Practice bulletin, No 6. Chicago: *American College of Obstetrics and Gynecology*, 1999.
8. Ajibola SO, Akinbami A, Rabi K, Adewunmi A, Dosunmu A, Adewumi A, et al. Gestational thrombocytopenia among pregnant women in Lagos, Nigeria. *Niger Med J* 2014; 55 (2):139-43.
9. Olayemi E, Akuffo FW. Gestational thrombocytopenia among pregnant Ghanaian women. *PanAf Med J*. 2012; 12:34.
10. Vyas R, Shah S, Yadav P, Patel U. Comparative study of mild versus moderate to severe thrombocytopenia in third trimester of pregnancy in a tertiary care hospital. *NHL Journal of Medical Sciences* 2014; 3(1):8-11.
11. Nisha S, Amita D, Uma S, Tripathi AK, Pushplata S. Prevalence and Characterization of Thrombocytopenia in Pregnancy in Indian Women. *Indian J Hematol Blood Transfus* (2012; 28(2):77–81.
12. Dwivedi P, Puri M, Nigam A, Agarwal K. Fetomaternal outcome in pregnancy with severe thrombocytopenia. *European Review for Medical and Pharmacological Sciences* 2012; 16: 1563-1566.
13. Shamoon RP, Muhammed NS, Jaff MS. Prevalence and etiological classification of thrombocytopenia among a group of

- pregnant women in Erbil City, Iraq. *Turk J Hematol* 2009; 26: 123-128.
14. Myers B. Thrombocytopenia in pregnancy. *The Obstetrician & Gynecologist* 2009; 11:177–183.
 15. Boehlen F, Hohlfeld P, Extermann P, PernegerTV, de Moerloose P. Platelet count at term pregnancy: a reappraisal of the threshold. *International journal of Obstet Gynecol* 2000; 95:29–33. doi:10.1016/S0029-7844(99)00537-2.
 16. Akinbami AA, Ajibola SO, Rabiou KA, Adewunmi AA, Dosunmu AO, Adediran A, et al. Hematological profile of normal pregnant women in Lagos, Nigeria. *International Journal of Women's Health* 2013; 5:227–232.
 17. James TR, Reid HL, Mullings AM. Are published standards for hematological indices in pregnancy applicable across populations: an evaluation in healthy pregnant Jamaican women. *BMC Pregnancy and Childbirth* 2008; 8 (8):1-4.