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Research Article

Severity Patterns and Determinants of Thrombocytopenia among Women Delivering at Kampala International University Teaching Hospital, Western Uganda

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- Thrombocytopenia in pregnancy
- Haematological disorders of pregnancy

Abstract

We established the severity patterns and determinants of thrombocytopenia among women delivering at Kampala International University Teaching Hospital (KIUTH), to guide us on future interventions. This was a three months cross-sectional study conducted in the months of May 2019 to August 2019 at KIUTH. A total of 386 participants were consecutively enrolled. Interviewer administered questionnaires and laboratory result forms were used to collect data. Binary logistic regression was conducted to identify the determinants of thrombocytopenia. All data analyses were conducted using STATA version 14.2. Majority of the women had mild thrombocytopenia 34 (55.7%), followed by moderate thrombocytopenia 23 (37.7%), and then severe thrombocytopenia 4 (6.6%). The determinants of thrombocytopenia at this hospital were hypertension in pregnancy (aOR: 18.9, 95% CI: 8.8-43.13, $p < 0.001$), HIV positive status (aOR: 21.2 95% CI: 5.15-87.56, $p < 0.001$), young age (aOR: 4.3, 95% CI: 1.17-15.94, $p = 0.028$) and anaemia in pregnancy (aOR: 4.48, 95% CI: 1.3-15.5, $p = 0.018$). Majority of the women who deliver at KIUTH have mild-to-moderate thrombocytopenia. Early recognition and treatment of the above determinants could go a long way towards preventing thrombocytopenia at this facility.

INTRODUCTION

Thrombocytopenia is the second most common haematological disorder after anaemia worldwide [1,2], affecting 7-10% of all pregnancies [3]. The prevalence is slightly higher at 15.3% in the sub-Saharan Africa [4]. The condition is responsible for up to 10% cases of postpartum haemorrhage in the developing countries with maternal mortality of 5.26% [1]. In Uganda, one of the commonest haematological pathology for pregnant women admitted in intensive care unit is undiagnosed thrombocytopenia [5]. At KIUTH, whereas haematological studies such as complete blood count are routine for all pregnant women attending their first antenatal care, there is no follow up on these studies except for haemoglobin levels especially during the last trimester, labour and delivery. Consequently, we are not able to diagnose

thrombocytopenia in pregnancy until complications ensue. This study aimed to identify the severity patterns and determinants of thrombocytopenia among women delivering at KIUTH so as to guide us on future interventions.

MATERIALS AND METHODS

This was a cross-sectional study conducted over a period of three months of May 2019 and August 2019. The study was conducted in the maternity unit of Obstetrics and Gynecology department of KIUTH located in Ishaka-Bushenyi district, in south-western Uganda about 370 kilometers from the center of Kampala city. This unit has a bed capacity of 85 and conducts approximately 200 deliveries per month. Sample size was determined using Keish and Leslie formula (1965), using an

estimated prevalence of 50% at 95% confidence interval and a maximum accepted error of 5% giving a minimum sample size of 386. This study was conducted in accordance with the Declaration of Helsinki. Voluntary recruitment of all the study participants was done. Informed consent from the participants was obtained after fully explaining the details of the study in both the local languages (Runyankore), and the national official language (English), for those who did not understand the local language, or who were comfortable using English. An informed consent document both in Runyankore and English approved by the research ethics committee of Kampala International University was signed by every participant, the investigator and a witness. Participants were not forced to enroll if they did not want to. The participant was free to withdraw from the study at any time she wished, without coercion or compromise of care that she was entitled to. Questionnaires and laboratory request forms were used to collect the data. The data was collected on social demographic characteristic as well as the obstetric and medical determinant factors of thrombocytopenia. All the collected data were entered into Microsoft excel version 2010 and then imported into STATA version 14.2. These were summarized as means, medians, standard deviations and interquartile range (for continuous variables). Proportions, percentages and frequencies were used for categorical variables. Both bivariate and multivariate logistic regression analysis was carried out. The variables in the final multivariate model were significant when $p < 0.05$. The measure of association was reported as odds ratios with corresponding 95% confidence interval and p -value. All statistical analyses were carried out in STATA version 14.2.

RESULTS

Of the 386 mothers enrolled in the study, 61 (15.8%), had thrombocytopenia. Of these, 34 (55.7%), had mild thrombocytopenia, 23 (37.7%), had moderate thrombocytopenia and 4 (6.6%), had severe thrombocytopenia. This is shown in Table 1. Bivariate analysis for the determinant factors of thrombocytopenia among women delivering at KIUTH showed that lower age of 17 years and below, pregnant women with hypertension, women with history of bleeding easily, prior history

Table 1: Overall prevalence and severity patterns of thrombocytopenia among women who delivered at KIU-TH.

Variable	Frequency (%)
Overall prevalence	61 (15.8)
Severity of the thrombocytopenia	
Mild thrombocytopenia	34 (55.7)
Moderate thrombocytopenia	23 (37.7)
Severe thrombocytopenia	4 (6.6)

of multiple blood transfusions, history of any chronic disease, HIV positive status and women with haemoglobin level below 11g/dl were significantly associated with thrombocytopenia in pregnancy. This is shown in Table 2. On multivariate analysis, the odds of having thrombocytopenia was 4.3 times higher among mothers aged below 17 years as compared to those aged 25-35 years (aOR: 4.3, 95% CI: 1.17-15.94, $p=0.028$). The odds of having thrombocytopenia was 18.9 times higher among women diagnosed with hypertension in pregnancy compared to those that did not have hypertension in pregnancy (aOR: 18.9, 95%CI: 8.18-43.13, $p < 0.001$), women who were HIV positive were more than 21 times likely to have thrombocytopenia compared to women who were HIV negative (aOR: 21.2, 95% CI: 5.15-87.56, $p < 0.001$). The odds of having thrombocytopenia was 4.48 higher among women with haemoglobin below 11g/dl compared to those who had haemoglobin above 11g/dl (aOR: 4.48, 95% CI: 1.3-15.5, $p=0.018$). This is shown in Table 3.

DISCUSSION

Majority of our study participants had mild thrombocytopenia (55.7%), followed by moderate thrombocytopenia (37.7%), and then severe thrombocytopenia (6.6%). This was similar to studies done in India [1], Ghana [4], and Ethiopia [6], which showed a high frequency of mild thrombocytopenia followed by moderate thrombocytopenia and the minimum frequency with severe thrombocytopenia. The odd of having thrombocytopenia was higher in women of young age. The fact that majority of the low aged women are primigravida who are more susceptible

Table 2: Bivariate analysis for determinant factors of thrombocytopenia among women delivering at KIUTH.

Variable	Thrombocytopenia		cOR(95%CI)	p
	No n=325 (%)	Yes n=61 (%)		
Age categories				
≤17	19 (70.4)	8 (29.6)	3.9 (1.44 - 10.45)	0.007
18-24	91 (80.5)	22 (19.5)	2.2 (1.08 - 4.58)	0.030
25-34	129 (90.2)	14 (9.18)	1.0	
≥35	86 (83.5)	17 (16.5)	1.8 (0.85 - 3.89)	0.121
Marital status				
Married	319 (84.84)	57 (15.16)	1.0	
Not married	6 (60)	4 (40)	3.7 (1.02 – 13.64)	0.046
History of easy bleeding	6 (60)	4 (40)	3.73 (1.02 – 13.60)	0.046
Multiple transfusion	17 (68)	8 (32)	3.73 (1.02 – 13.6)	0.046
History of chronic illness	5 (26.67)	11 (73.33)	2.72 (1.12 – 6.63)	0.027
HIV (positive) status	10 (25)	30 (75)	17.6 (5.3 – 57.4)	<0.001
Hypertension in pregnancy	14 (35)	26 (65)	16.5 (7.9 – 34.5)	<0.001
HB <11g/dl	28 (60.87)	18 (39.13)	5.3 (1.9 – 15.176)	0.002

Table 3: Multivariate analysis for determinant factors of thrombocytopenia among women delivering at KIUTH.

Variable	aOR(95% CI)	p
Age category		
15-17	4.3 (1.17 – 15.94)	0.028
18-24	2.9 (1.19 – 7.31)	0.020
25-34	1.0	
35-49	2.1 (0.84 – 5.45)	0.110
Hypertension in pregnancy	18.9 (8.18 – 43.13)	<0.001
HIV positive	21.24 (5.15 – 87.56)	<0.001
HB <11g/dl	4.48 (1.3 – 15.5)	0.018

to different complications of pregnancy including medical disorders such as pre-eclampsia and anaemia which *per se* have been associated with thrombocytopenia in pregnancy could probably explain the high incidence in this particular age group [7]. We however noted discrepancy of our result with a study done by Parnas and colleagues which had a higher percentage of women with thrombocytopenia among age 35 and above [8]. This could have been contributed to by a high pregnancy induced hypertension in his study which was more common in this age group.

Women who had hypertension in pregnancy were more likely to get thrombocytopenia than women who did not have hypertension in pregnancy. This was consistent with Mundkur et al. [9], in India, Wang et al. [6], in China, Muspah [10], in Libya, Sultana et al. [11], in Dhaka and Zahid et al. [12], in Pakistan. In a study by Arola et al. [13], thrombocytopenia due to Preeclampsia and HELLP (Haemolysis, Elevated Liver enzymes and Low platelet) syndrome accounted for 24%. Accelerated platelet destruction and abnormal platelet activation seen in hypertensive disorders of pregnancy probably explains this [11]. Also, HIV infection was strongly associated with thrombocytopenia in this study. We noted similar observation with previous researchers such as Muspah [10], in Libya and Sebitloane et al. [14], in South Africa. Platelet involvement in immune response, cytopathic effect of antiretroviral regimens and antigen mimicry are probably responsible [15]. HIV is known to cause chronic thrombocytopenia due to accelerated peripheral platelets destruction and ineffective production of platelets from infected megakaryocytes and increased catecholamine's reducing bone marrow cell proliferation [15]. Conversely, a study done in China showed no association between HIV infection and thrombocytopenia [7]. The comparatively low prevalence of HIV infection in pregnancy in China and the good care for the HIV infected mothers including home follow ups [16], probably explains this observation and discrepancy.

Anaemia in pregnancy was strongly associated with thrombocytopenia in this study. This was similar to a study done in Cameroon where a strong association of anaemia with thrombocytopenia was observed [17]. Generally, recurrent thrombocytopenia has been documented in iron deficiency anaemia which is common in pregnancy. The postulated theory on the cause of thrombocytopenia in iron deficiency anaemia is the diphasic response of the platelets to erythropoietin and the dual function of iron in platelets production; iron is required for the production of integral portion of the platelet [18].

CONCLUSION

Hypertension in pregnancy, HIV positive status, being young and anaemia in pregnancy were the major factors associated with thrombocytopenia in women delivering at KIUTH.

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ETHICAL APPROVAL

This study was approved by the Research Ethics Committee of Kampala International University.

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