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The Prevalence of Thrombocytopenia and the Associated Factors among Pregnant Women in Hoima Regional Referral Hospital, Western Uganda.

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ABSTRACT

Thrombocytopenia is a common problem during pregnancy that is frequently not detected, and it is often inappropriately managed. The obvious concern with thrombocytopenia during pregnancy is the risk of excessive bleeding during delivery. So the aim of this study was to determine the prevalence and risk factors of thrombocytopenia in pregnant women reporting at Hoima Regional referral hospital by using the laboratory parameters of complete blood count. It was a prospective descriptive study conducted for a period of 2 months from 1st September 2022 to 31st October 2022. All patients whose blood works results were available and who consented were included in our study. Of the 220 cases of pregnant mothers who presented to the antenatal and Obstetrics department at Hoima Regional referral hospital, 78(35.5) % were thrombocytopenic, 74.4% (Mild thrombocytopenia), 15.4% (Moderate) and 10.2% (severe). 3(3.85%) had petechia. 9(12%) were below 20 weeks of gestation. 11(14%) were between 20-28 weeks of gestation, 25(32.1%) between 29-36 weeks, 33(42.1%) were 37 weeks and above. 4(5.13%) had pre-eclampsia, 2(2.7%) had eclampsia, 2(2.7%) had pre/eclampsia with HELLP syndrome, 2(2.7%) had ITP. 6.8% had one or a combination of other conditions like malaria, DIC, and PPH. 19(24.3%) were anemic with a low hemoglobin as well and 7(8.97%) had pallor and 6(7.7%) with a low MCV, 13(16.7%) with a low MCH. 5(6.4%) had splenomegaly, 3(3.84%)had hepatomegaly. 26(33.3%) from rural areas. 52(66.7) from urban Centre, 50(64.1%) were HIV negative, 28(35.9%) were HIV positive status. 2(2.6%) had elevated creatinine, 1(1.3%) elevated urea. 46(58%) had normal liver enzymes with 6(7.7%) elevated ALT and 8(10.3%) elevated AST. 32(41.2%) were not reported. The frequency of thrombocytopenia in this study was higher than that reported in developed parts of the world. This could probably be due to undetected malaria infection in our patients. The most common risk factors for thrombocytopenia in pregnancy at Hoima regional referral hospital were hypertensive disorders; pre-eclampsia, eclampsia, pre/eclampsia with/without HELLP syndrome followed by factors like malaria, consumption thrombocytopenia (PPH), DIC and Immuno-thrombocytopenia (ITP).

Keywords: Thrombocytopenia, Pregnant women, Excessive bleeding, HIV negative and HIV positive, Malaria.

INTRODUCTION

Thrombocytopenia is defined as a platelet count below 150,000/ul or platelet counts below the 2.5th percentile for pregnant patients (116, 000/ul) [1]. The normal range of platelets in non-pregnant women is 150,000-400,000/uL. In pregnancy, the average platelet Count decreases (213,000/uL vs. 250,000/uL) [2]. Platelets are non-nucleated cells derived from megakaryocytes in the bone marrow and normally live in the peripheral circulation for about 10 days [3]. They play a critical role in the initiation of the hemostatic system during endothelial disruption. Women are more commonly diagnosed with platelet disorders during pregnancy [4]. Thrombocytopenia can result from a wider range of conditions with several of them being pregnancy-related [5]. Thrombocytopenia complicates 10% of all pregnancies and may result from a number of causes. The most common causes of thrombocytopenia in

pregnancy are; Gestational thrombocytopenia, pre-eclampsia and immune thrombocytopenic purpura, respectively.[6]Others include: Immune thrombocytopenic purpura, System lupus erythematosus, Connective tissue disorders, Drug-induced, HIV-related, Viral infections e.g (Epstein Barr Virus), Lymphoma, Pre/eclampsia/, HELLP syndrome, Thrombotic thrombocytopenic purpura, Hemolytic uremic syndrome, Acute fatty liver of pregnancy, Heparin–induced thrombocytopenia, Vascular malformations, Hypersplenism, Decreased platelet production may also be noted, and includes vitamin B-12 and folate deficiency, Drug induce, Aplastic anaemia, Paroxysmal nocturnal hemoglobinuria, infection, Bone Marrow infiltration, hematologic malignancy, non-hematologic malignancy). [7] Gestation thrombocytopenia is the most common of all the known causes of thrombocytopenia in pregnancy [8] It is usually observed in 6 to 15% of pregnant women at the end of the pregnancy and is usually moderate. [9] In normal pregnancies, 7.6% of women present with mild thrombocytopenia during pregnancy, and 65% of them will not be associated with any pathology [5]. Any pregnant patient with a platelet count of less than 100,000/uL should undergo further clinical and laboratory assessment. [10] In a study conducted by Shin et al on 61 patients with aplastic anaemia, obstetric and disease complications were more prevalent in those with severe thrombocytopenia than in those with non-severe thrombocytopenia. It was also found that in with women severe thrombocytopenia, the incidence of transfusion during pregnancy or postpartum period (72.7% and 45%, respectively) was greater than in those with non-severe (15.4% and 2.7%, respectively) [10]. It also indicated that 25% of women with severe thrombocytopenia underwent bone marrow transplants after delivery. [11]. In [4] large study, 576 of 1027 who were thrombocytopenic (73.6 %) had gestational thrombocytopenia. Only 1 infant had a platelet count <50,000/ul and this infant had a trisomy 21 and a congenital bone marrow dysfunction. Burrow concluded that gestational thrombocytopenia is the most common type of thrombocytopenia and poses no apparent risk to either the mother or the infant at delivery. [12] and [9].

Statement of Problem

Globally, Thrombocytopenia affects 6% to 10% of all pregnant women globally and other than anemia, is the most common hematologic disorder in pregnancy. [11] Some studies showed that thrombocytopenia is seen in 8%-10% of pregnancies globally. [7]. According to the WHO Report 2015, showed maternal mortality was 216 per 100,000 live births in 2015 [13], with the highest contributor being postpartum haemorrhage [14]. Thrombocytopenia causes 9.89% of postpartum haemorrhages in developing countries, with a maternal mortality rate of 5.26% [15]. In East Africa, a study done in Ethiopia on the Magnitude and Associated Factors of Thrombocytopenia among Pregnant Women Attending Antenatal Care Clinics at Dessie Comprehensive Specialized Hospital, Northeast Ethiopia by [16], showed the prevalence of thrombocytopenia was 9.9% and the mild type of thrombocytopenia (72.4%) was higher than the other type of thrombocytopenia among pregnant women. A study done on maternal near misses in Mulago and Jinja Hospitals indicated that the most common laboratory criteria for admission to the intensive care unit and high dependency unit were thrombocytopenia, which was predictive of maternal death. [17]. Thrombocytopenia in pregnancy has complications in both maternal and fetal lives; it is, therefore, a life-threatening condition and must be looked at with great care. There is no latest study done as of yet highlighting how big of a concern thrombocytopenia in pregnancy could be in Uganda. Thus, this study was done to reflect on pregnancy-related thrombocytopenia in our settings. This would then raise the awareness of medical care providers, which may reduce thrombocytopenia-related mortalities and morbidities and thereby promoting good health within the population.

Aim

To assess the prevalence of thrombocytopenia and associated factors among pregnant women consulting for antenatal care and maternity ward at Hoima regional referral hospital.

Specific objectives

i. To determine the prevalence of thrombocytopenia in pregnancy.
ii. To determine the associated factors of thrombocytopenia during pregnancy.
iii. To assess the clinical findings and laboratory parameters.

Research question

- What were the prevalence of thrombocytopenia and associated factors in pregnant women at Hoima regional referral hospital?
- How can the prevalence of thrombocytopenia in pregnancy be determined?
- How can the clinical findings and laboratory parameters be assessed?

METHODOLOGY

Area of Study

This study was conducted in the Department of Obstetrics and Gynecology, both antenatal and maternity wards of the Hoima regional referral hospital, Hoima City, western Uganda. The hospital serves the whole of Bunyoro region

and neighbouring areas with approximately a population of 2 million people [18] the districts include Home, Masindi, Kakadu, Kibale, kakuro, Tulisa, kyangwali, kyakwanzi and Iboga districts. Hoima City, Hoima district is located in western Uganda 230 kilometres (km) northwest of Kampala the Capital city of Uganda. Hoima district is bordered by Buliisa District to the north, Masindi District to the northeast, Kyankwanzi in the east, Kibaale District to the south, Ntoroko District to the southwest and the Democratic Republic of Congo across Lake Albert to the west. Hoima Regional Referral Hospital is approximately 198 kilometres by road Northwest of Mulago National Referral Hospital along Kijungu Road in Hoima district.

Study design

This study was a prospective study covering two months: it consisted of determining the prevalence and risk factors of thrombocytopenia in pregnant women who consulted at Hoima regional referral hospital between the 1st of September and to 31st of October 2022.

Target population

All pregnant women consulting for antenatal care and or eventually admitted to the maternity ward of Hoima regional referral hospital were sampled until the required sample size was reached and done between 1st September and 30th September 2022.

Inclusion criteria

All pregnant women consulted for antenatal care at the time of study and consented to the study.

Exclusion criteria

All those with thrombocytopenia even before pregnancy.
Patients who could not consent.

Sample size

This was determined using the formula according to Brown, (2004)

$$N=\frac{4p(1-p)}{e^2}$$

Where, n=sample size
e=allowable error and in this case 5%(0.05) was taken
4=is a constant derived from the formula
P=prevalence of thrombocytopenia in Uganda which was estimated at 15.8% (0.158)
Therefore;

$$N=\frac{4x0.158\ (1-0.158)}{(0.05)^2}$$

$$N=\frac{O.626314}{0.0025}$$

N=220

The sample size of our study was composed of all pregnant women who consulted for antenatal care and were sampled for the study between 1st September and 31st October 2022.

Data Collection, entry and Analysis

A standardized questionnaire to collect information was used. The data was collected directly from the patients and their laboratory workup was used to obtain the needed laboratory parameters. The medical files were used for more details. A pre-established data collection form was filled with the appropriate data that was needed. The data entry and the validation were done using Microsoft Office Excel 2007 and then analyzed using SPSS for frequency distributions and chi-square. Graphs were drawn using Microsoft office excel 2007 and the text was written using Microsoft office word 2007.

Ethical consideration

A letter of introduction was acquired from the faculty of clinical medicine and dentistry and was presented to the HRRH administrator to grant permission to conduct the study. Respondents were requested for their verbal consent and ascend prior to the interview and confidentiality was maintained throughout the research process. Respondents were given equal chances, treatment and rights at all times of the study.

Table 1: Time Framework

Activity	Period
Data Collection	1st Sept. to 31th October 2022
Data processing and analysis	1ST November 2022
Redaction of the Research Report	November 2022
Communication of Research results	November 2022

RESULTS

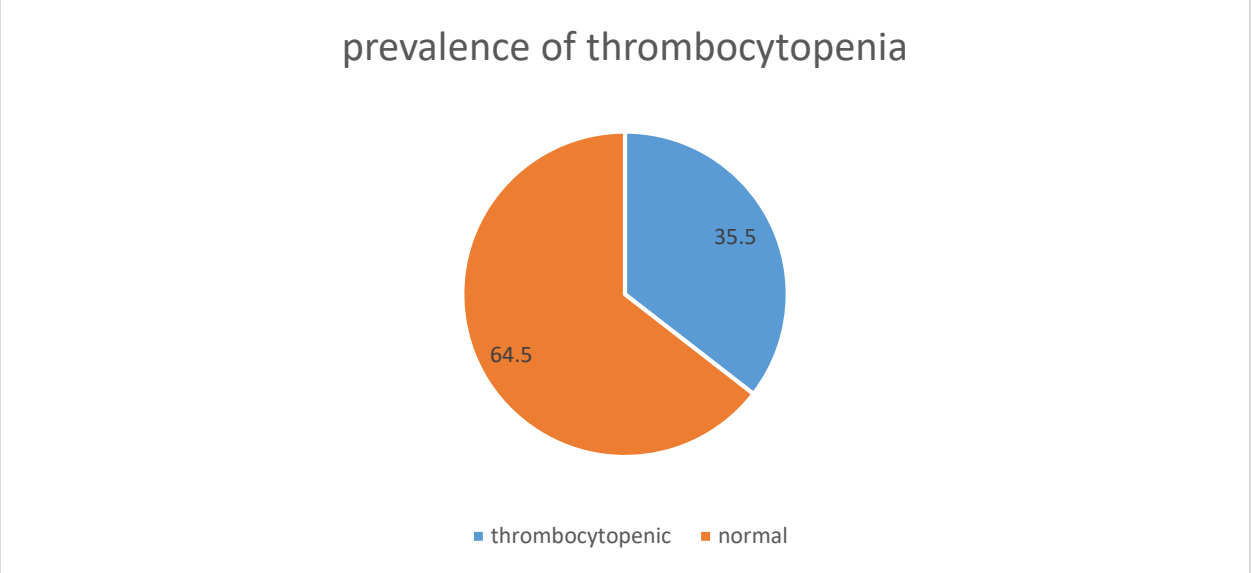
The prevalence of Thrombocytopenia in pregnancy

This study was done from 1st September to 31st October 2022, and out of sampled 220 cases, 78 (35.5%) of which were thrombocytopenic in pregnancy at different gestation ages. In this project, it was founded that some medical factors contributed to thrombocytopenia during pregnancy. The most common being Hypertensive Disorders Followed by Malaria, Pph, Dic, then ITP.

Table 2

variables	Frequency	Percentage
Thrombocytopenia	78	35.5%
Normal	142	64.5%

Figure 1: Prevalence of thrombocytopenia



Of the total 220 mothers enrolled on the study, 35.5 % (78) had Thrombocytopenia and 64.5% (142) had Normal platelets.

Classification of Thrombocytopenia

Table 3: Classification according to the level of Thrombocytopenia

Level	Number	Frequency
Mild	58	74.4 %
Moderate	12	15.4 %
Severe	8	10.2%

Mild thrombocytopenia appeared the most common with 74.4%, occupying ¾ of the whole thrombocytopenic population. However, some 12(15.4%) were seen with moderate levels and only 8 patients (10.2%) had severely low levels as depicted in Table 1. above.

Conditions associated with and relevant to thrombocytopenia.

Table 4: Shows conditions found to be associated with and relevant to thrombocytopenia

Relevant Condition	Number	% Involvement
Pre-eclampsia	16	5.13 %
Eclampsia	8	2.7 %
Pre/eclampsia with HELLP syndrome	8	2.7 %
ITP	8	2.7 %
Malaria	7	2.39 %
DIC	6	2.13 %
PPH	6	2.26 %

Hypertensive disorders appeared to be more commonly associated with thrombocytopenia, predominantly pre-eclampsia although other conditions like MALARIA were also significantly present as shown in Table 2 above.

Relevant physical findings present

Table 5: Relevant physical findings that were present.

Finding	Number	% Frequency
Pallor	7	8.97 %
Petechia	3	3.85 %
Splenomegaly	5	6.4 %
Hepatomegaly	3	3.84

Hepatosplenomegaly was remarkably found at a frequency of 8 (10.24%) with significant pallor at 8.97% while petechia was as frequent as 3.85% (only in 3 patients).

Relevant laboratory parameters were diagnostic of thrombocytopenia.

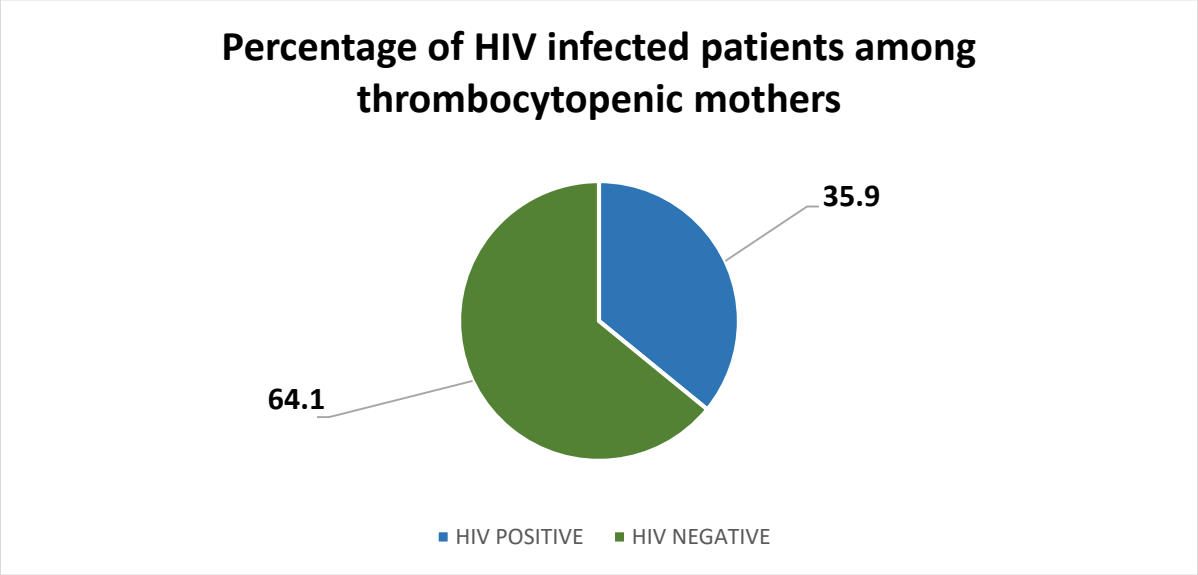
Table 6: Laboratory parameters

Laboratory Parameter	Number	Frequency
Low Hemoglobin	19	24.3 %
Elevated White blood cells	6	7.7 %
Low platelets	20	25.6 %
Low MCV	6	7.7 %
Low MCH	13	16.7 %
Elevated Aspartate Aminotransferase	8	10.3 %
Elevated Alanine Aminotransferase	6	7.7 %
High Creatinine	2	2.6 %
High Urea	1	1.3 %

Serrostatus of the mothers

50(64.1%) had a negative HIV status, 28(35.9%) were HIV positive status **as shown below.**

Figure 2. Percentage of HIV infection in thrombocytopenic mothers.



Maternal sociodemographic factors

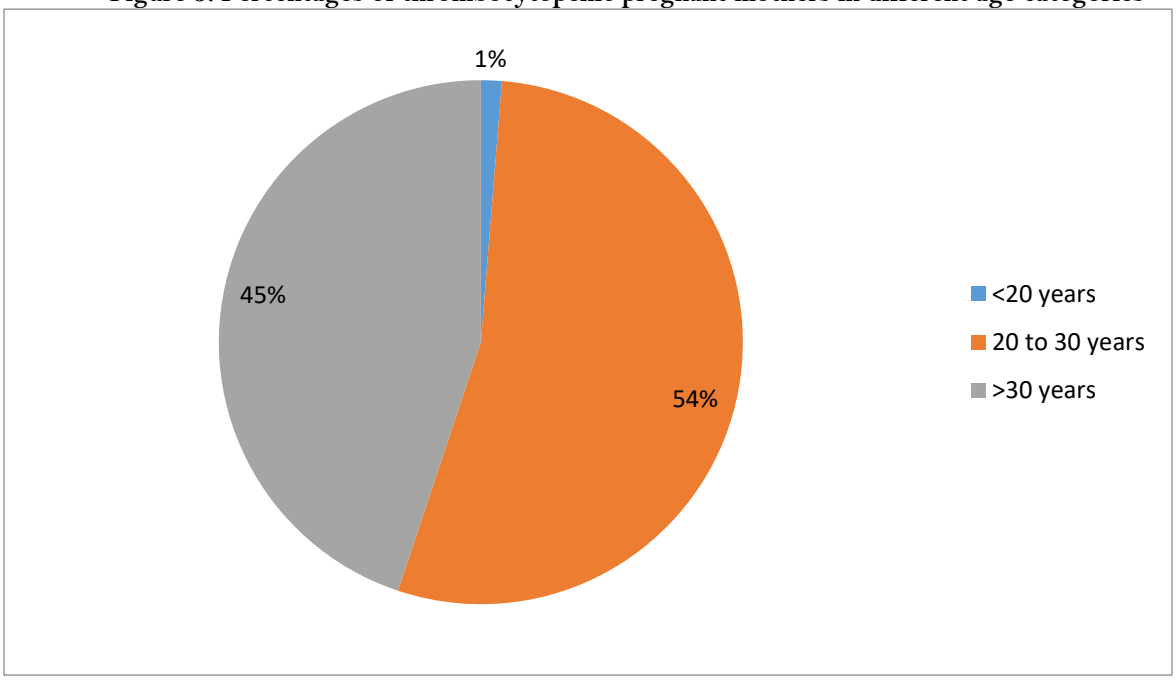
Table 7: Maternal sociodemographic factors

Variables		Frequency	Percentage
Age	15-20years	1	1%
	20-30years	42	54%
	>30years	35	45%
Residence	Urban area	52	66.7%
	Rural area	26	33.3%
Education Status	Not gone to school	23	29.5%
	Primary	19	24.4%
	Secondary	22	28.2%
	Tertiary	14	18.0%
Occupation	Civil servant	10	12.8%
	Peasant	32	41.1%
	Housewife	8	10.3%
	Businesswoman	28	35.9%
Marital Status	Single	21	26.9%
	Married	45	57.7%
	Divorced	12	15.4%

Thrombocytopenia was more common in young adult pregnant mothers 20-30 with 54%, followed by those older than 30 years of age with 45% and less common in patients below 20 years of age with 1%. also was highest among those in urban areas 52(66.7%) compared to those from rural 26(33.3%), married with their husbands had the highest percentage 57.7%(45), single mothers 35.9%(21), while the least were divorced with 14.4%(12). peasant mothers had

the highest percentage 41.1%(32), business women at 35.9%(28), civil servants were 12.8%(10), and least housewives which was 10.3% (8). all these are depicted in Table 5. Above.

Figure 3. Percentages of thrombocytopenic pregnant mothers in different age categories



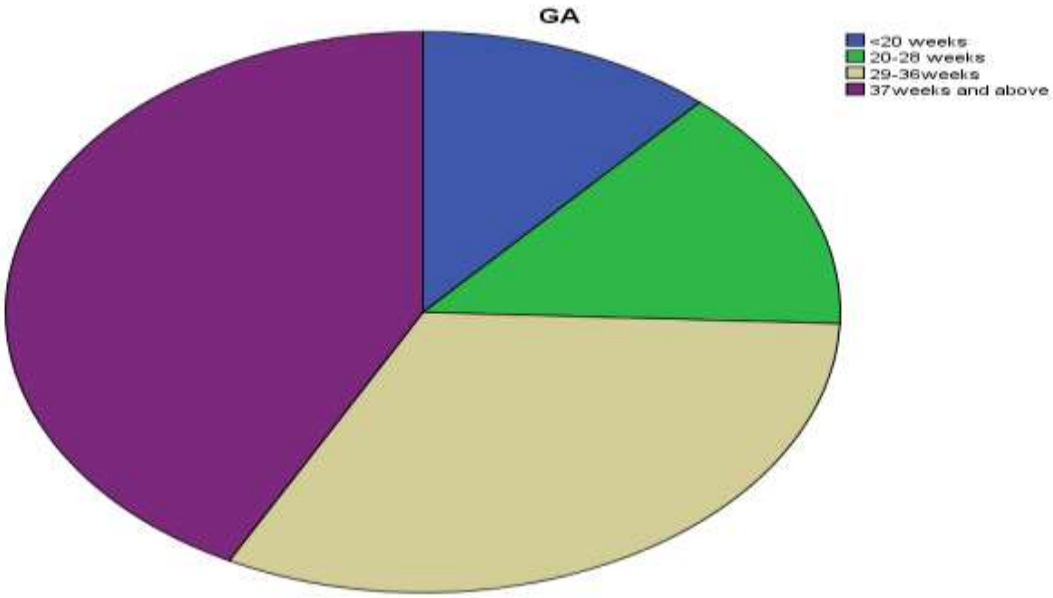
Obstetric factors associated with thrombocytopenia in pregnancy

Of all the 78 thrombocytopenic pregnant mothers, 9 (12%) were <20 weeks of gestation, 11(14.1%) were between 20-28 weeks, 25(32.1%) between 29-36 weeks, and 33 (42.1%) were > 37 weeks of gestation, those who had one child previously, had the highest percentage 38.5% compared to others with those greater than 3 having the least percentage 3.8%. however, those who had a birth interval of zero (primigravida) were the most with a percentage of 35.9% compared to others as shown in Table 6. below.

Table 7: Thrombocytopenic pregnant Mothers obstetric factors

Variables		Frequency	Percentage
A number of children had	Non	28	35.9%
	One	30	38.5%
	Two	12	15.4%
	Three	5	6.4%
	>three	3	3.8%
Birth interval	Zero	28	35.9%
	One	15	19.2%
	Two	22	28.2%
	>Two	13	16.7%
Gestational age (weeks)	<20	9	12%
	20-28	11	14.1%
	29-36	25	32.1%
	>36	33	42.1%

Figure 4: Percentage of thrombocytopenic pregnant mother's gestational ages.



Of all the 78 thrombocytopenic pregnant mothers, 9 (12%) were <20 weeks of gestation, 11(14.1%) were between 20-28 weeks, 25(32.1%) between 29-36 weeks, and 33 (42.1%) were > 37 weeks of gestation as shown in figure 4 above.

DISCUSSION

Prevalence and medical associated factors of thrombocytopenia in pregnancy

In the 220 patients in this study, 35.5% had low platelets, the most common risk factors of thrombocytopenia were hypertensive disorders with/out HELLP syndrome accounting for 10.53%, conditions like malaria, PPH, DIC with 6.8% and then 2.7% ITP. This was higher than the cross-sectional study conducted in Lagos Nigeria in 03-04/2014 on thrombocytopenia in pregnancy, with a patient number of 274, 13.5% were thrombocytopenic. 78% with mild thrombocytopenia and 6% severely thrombocytopenic. [19]. A study conducted at Nottingham university hospital in the United Kingdom, department of Gynecology and Obstetrics in 2009, showed thrombocytopenia in 8-10% of pregnancies. 75% of these were due to benign gestational thrombocytopenia. 15-20% attributed hypertensive disorders. 3-4% to an immune process. 1-2% was made up of rare constitutional thrombocytopenia; like infections and haematological malignancies [4], [10]. In comparing this study with ours, the one from Lagos and that done in Nottingham, the overall prevalence of thrombocytopenia could range from 8-20%. 75-76% are mild cases and 4-6% were severe. This Ghanaian study did not also look into different risk factors of thrombocytopenia in pregnancy but provided an insight into the prevalence and the severity just like the study done. Again, our study showed a predominance of hypertensive disorders with/without HELLP syndrome accounting for 10.53%, comparing this to the UK study revealed hypertensive disorders as being predominant as well, but they did not acknowledge the influence of other causes like malaria, postpartum haemorrhage, disseminated intravascular coagulation, etc. This is probably because of the scarcity of cases like malaria and postpartum haemorrhage in their settings. However, despite acknowledging the presence of the disease, this study did not show the number of patients upon which they conducted their study. As ours did, this study also reflected on the prevalence and the commonness of different risk factors of thrombocytopenia in pregnancy [1].

Maternal socio-demographic and obstetric factors

In this study, the peak age was 20-30 years with 54% (42), the least age bracket was those less than 20 years of age with 1% (1), then those greater than 30 years were 45% (35). Which compares the study done in Dr. Kamakshi Memorial Hospital, Chennai, India on a prospective study of thrombocytopenia in pregnancy showed that the peak maternal age incidence was between 20-24 yrs (55.9%) with also gestational thrombocytopenia being the leading cause [20-26]. From the study findings, 66.7% of these thrombocytopenic pregnant mothers were from urban while

33.3% were from rural. This compares to the study by Asrie and colleagues, which found that Mothers who lived in urban areas had the highest percentage of thrombocytopenia, 99.1% compared to women who lived in rural areas [27-32]. in this study which had two hundred and seventeen participants, the majority were above 30 years of age and most of them were from urban areas. This could be related to the feeding habits in urban areas compared to the free available food nutrient supplementation in rural areas. This study's findings showed that the highest percentage of thrombocytopenia occurred in the mothers in their third trimester (74.2%), mainly > 37 weeks of gestation (42.1%), while the second trimester followed by 14.1% and the least being 1st trimester with 12%. this compares to the recent study done in KEM Hospital, Mumbai, Maharashtra, India About the characterization of thrombocytopenia among pregnant women by Joshi S et al, 2022, the results showed that the majority of the conditions were diagnosed in the third trimester (63.6%) and the first trimester was the least with 9.9%. this is possible because of increased maternal physiological demands impairing the hemopoietic process of platelet formation. This study found that out of the 78 thrombocytopenic pregnant mothers, 35.9% were HIV positive, this showed that HIV infection also had some association with thrombocytopenia compared to the study findings done in both Libya and South Africa which too showed a significant association between HIV and thrombocytopenia [22].

CONCLUSION

i. The prevalence of thrombocytopenia among pregnant women attending antenatal and maternity wards of Hoima regional referral hospital was high in this study (35.5%), this then indicates a high risk of postpartum haemorrhage among this mother and also other associated complications, thus there was the need for the stakeholders to take it serious so as to reduce maternal death.
ii. Maternal underlying medical conditions like hypertension, HIV infection, malaria and others had an impact on the study outcomes.
iii. The frequency of thrombocytopenia in this study was higher than that reported from more developed parts of the world. This may be due to undetected malaria infection in our patients. Pregnant women should be routinely screened for thrombocytopenia. Those found to be thrombocytopenic should have both thick and thin blood films done to exclude the presence of malaria parasites.

RECOMMENDATIONS

i. All pregnant women should be screened for thrombocytopenia to prevent excessive bleeding during and after birth.
ii. Thorough sensitization on the pregnancy-related dangers of thrombocytopenia; will help to increase the number of pregnant women coming for screening hence increasing their safety.
iii. Healthcare providers should be trained to discuss with the patients the risk factors and preventive measures of some of those risk factors for thrombocytopenia.
iv. Encourage frequent antenatal visits in the third trimester and second since they are associated with high percentages of thrombocytopenia.
v. Pregnant mothers staying in urban areas should be educated on the causes and prevention of thrombocytopenia.

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