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PREVALENCE AND RISK FACTORS OF THROMBOCYTOPENIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT PARIRENYATWA GROUP OF HOSPITALS: 2024

BY

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE HONOURS DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCES IN THE COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

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Abstract

Thrombocytopenia is a common haematological finding during pregnancy, affecting approximately 7-12% of pregnancies globally. This study aimed to determine the prevalence of thrombocytopenia and identify associated risk factors among pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals (PGH). This qualitative and quantitative retrospective study at PGH investigated thrombocytopenia prevalence, risk factors, and clinical patterns among 380 pregnant women. All pregnant women aged above 18 years old, June 2023 to June 2024. Thrombocytopenia affected 18.7% of participants, with higher prevalence in urban high-density areas (45%) and younger women (18–25 years: 31% of cases). Mild cases (100–150 $\times 10^3/\mu L$) dominated the first trimester (63%), while severe thrombocytopenia (<50 $\times 10^3/\mu L$) peaked in the third trimester (55%), correlating with hypertensive disorders. Hypertension (OR=2.51, 95% CI=1.25–5.03, p=0.024) and iron deficiency anaemia (IDA; OR=1.81, 95% CI=1.01–3.26, p=0.042) were significant predictors, but gestational diabetes mellitus (GDM) showed no association (OR=0.96, p=0.939). Older women (36–45 years) exhibited universal comorbidities and severe cases (57–100%), contrasting with younger cohorts (16% no comorbidities). Using chi-square tests and odds ratios, the study highlights urban environmental stressors, nutritional deficits, and obstetric comorbidities as key drivers of thrombocytopenia at PGH. These findings advocate for trimester- and age-stratified antenatal screening, prioritizing urban-residing younger women and multiparous older women, alongside targeted management of hypertension and IDA to mitigate adverse maternal-foetal outcomes.

Key words: thrombocytopenia, prevalence, risk factors

Declaration

I, Ronald Chamunorwa Chikwengo, 210736 do hereby declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a Bachelor of Science degree.

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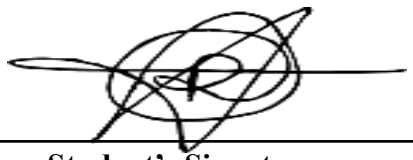

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Acronyms and Abbreviations

HELLP	Haemolysis Elevated Liver enzymes and Low Platelets
ITP	Immune Thrombocytopenia
IDA	Iron Deficiency Anaemia
GDM	Gestational Diabetes Mellitus
MPV	Mean Platelet Volume
DIC	Disseminated Intravascular Coagulation
GT	Gestational Thrombocytopenia
SLE	Systemic Lupus Erythematosus
TTP	Thrombotic Thrombocytopenic Purpura
AUREC	Africa University Research Ethics Committee
IRB	Institutional Review Board
MLS	Medical Laboratory Scientists
PGH	Parirenyatwa Group of Hospitals
WHO	World Health Organization
ANC	Antenatal Clinic
MCV	Mean Corpuscular Volume

Definition of key terms

Postpartum: Refers to the period after childbirth, typically up to 6 weeks after delivery.

Haemorrhage: Excessive bleeding, often referring to postpartum bleeding.

Morbidity: The rate of illness or disease in a population.

Mortality: The rate of death within a population.

Aetiology: The study of causes and origins of diseases.

Multifactorial: Involving or resulting from multiple factors.

Haemodilution: A decrease in blood concentration due to the addition of a solvent, often seen in pregnancy.

Eclampsia: A severe complication of pre-eclampsia, characterized by seizures.

Preeclampsia: A pregnancy complication characterized by high blood pressure and often accompanied by significant amounts of protein in the urine.

Asymptomatic: Without noticeable symptoms or signs of a disease.

Pathophysiology: The study of the changes that occur in the body during the progression of a disease.

B-symptom: A symptom of pre-eclampsia, characterized by a blood pressure of 140/90 mmHg or higher.

Concomitant: Occurring or existing together, often referring to multiple conditions or symptoms.

Antiphospholipid syndrome: A disorder caused by the presence of antiphospholipid antibodies, leading to recurrent pregnancy loss, thrombosis, and other complications.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Thrombocytopenia, characterized by a low platelet count <150 X 10^3 μL, is a relatively common complication during pregnancy (Mayo Clinic, 2022). While often benign, it can pose significant risks to both mother and child, potentially leading to postpartum haemorrhage or fetal thrombocytopenia. Understanding the prevalence and risk factors associated with thrombocytopenia in specific populations is crucial for effective management and intervention (Douglas, Cines, Lisa, & Levine, 2017). This study investigated the prevalence and risk factors of thrombocytopenia among pregnant women attending the antenatal clinic at Parirenyatwa Group of Hospitals from June 2023 to June 2024. Given the resource constraints and diverse patient demographics often encountered in such settings as PGH, this research aimed to provide valuable insights into thrombocytopenia's local burden and contributing factors. This information is crucial for informing clinical practice, resource allocation, and public health policies aimed at improving maternal and neonatal outcomes.

1.2 Background to the study

Thrombocytopenia is a common haematological finding during pregnancy, affecting approximately 7-12% of pregnancies globally (Douglas, Cines, Lisa, & Levine, 2017) While often mild and asymptomatic, it can escalate to severe thrombocytopenia (<50 X 10^3 μL), increasing the risk of postpartum haemorrhage, a leading cause of maternal morbidity and mortality, particularly in low-resource settings (Nnabuike & Jagidesa, 2024). Additionally, severe thrombocytopenia can have implications for the fetus, potentially leading to neonatal thrombocytopenia and associated complications (Young & Park, 2022).

The aetiology of thrombocytopenia in pregnancy is multifactorial, encompassing both physiological adaptations during pregnancy and underlying pathological conditions. Physiological changes, such as haemodilution and increased platelet consumption, contribute to a mild decline in platelet count. However, several pathological factors can lead to more significant thrombocytopenia. These include hypertension, gestational thrombocytopenia, preeclampsia/eclampsia, HELLP syndrome, IDA, immune thrombocytopenia (ITP), and other autoimmune disorders (Douglas, Cines, Lisa, & Levine, 2017). Understanding the relative contribution of these factors within specific populations is essential for targeted management strategies.

Previous studies conducted in various settings have identified several risk factors associated with thrombocytopenia in pregnancy. These include advanced maternal age, multiple pregnancies, pre-existing hypertension, diabetes, malnutrition, HIV infection, and malaria (Samuel, Tariku, Asamrew, & Getachew, 2024). However, the prevalence and specific risk factors for thrombocytopenia can vary significantly depending on geographical location, socioeconomic factors, and access to healthcare.

This study focused on pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals in Harare, Zimbabwe. This setting presented unique challenges and opportunities for understanding thrombocytopenia in pregnancy. As a major referral centre in Zimbabwe, Parirenyatwa Group of Hospitals serves a diverse population, including women from resource- limited backgrounds who may have limited access to antenatal care. This study provided valuable data on the local prevalence and risk factors for thrombocytopenia in this population, which can inform clinical practice, resource allocation, and public health interventions aimed at improving maternal and neonatal outcomes.

1.3 Statement of the Problem

The prevalence of thrombocytopenia among pregnant women in Africa is around 10.23%. This condition can vary in severity, with approximately 77.95% of cases being mild, 15.62% moderate, and 5.60% severe. Specific data might be less readily available in Zimbabwe, but the overall regional statistics can provide a general understanding (Solomon, Zegeye, & Mulugeta, 2022).

The lack of information restricts the establishment of focused interventions and effective management methods for this population. The prevalence of thrombocytopenia varies widely across studies, making it difficult to establish a clear picture. For instance, one systematic review found a pooled prevalence of 10.23% among pregnant women in Africa, but the prevalence in individual studies ranged significantly (Solomon, Zegeye, & Mulugeta, 2022).

At the PGH haematology department, an increasing number of Pregnant women with low platelet counts in Mbuya Nehanda ANC where approximately 3 to 4 out of 20 women had thrombocytopenia; however, currently, no study has been conducted to explore the prevalence and risk factors that could be associated with this thrombocytopenia in pregnancy setting. Studies conducted elsewhere have identified risk factors such as malaria infection, short inter-birth intervals, history of abortion, hypertension, HIV, and HBV infections; there is still limited understanding of how these factors interact and contribute to the development of thrombocytopenia (Kebede, Daniel, & Alemu, 2024).

Furthermore, understanding the local burden and risk factors associated with thrombocytopenia is critical for optimizing resource allocation and enhancing maternal and new-born outcomes when resources are often limited.

1.4 Research Objectives

1.4.1 Broad Objectives

This study aimed to determine the prevalence of thrombocytopenia and identify associated risk factors among pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals.

1.4.2 Specific Objectives

1. To determine the prevalence of thrombocytopenia among pregnant women attending antenatal clinics at PGH, June 2023 to June 2024
2. To stratify thrombocytopenia prevalence among pregnant women attending antenatal clinics at PGH based on severity and trimester of pregnancy, June 2023 to June 2024
3. To stratify if comorbid conditions (Iron Deficiency Anaemia, Hypertension and Gestational Diabetes Mellitus) predict thrombocytopenia among pregnant women at PG, June 2023 to June 2024
4. To determine the association between haematological characteristics and thrombocytopenia among pregnant women at PGH, June 2023 to June 2024
5. To assess the socio-demographic characteristics associated with thrombocytopenia among pregnant women at PGH, June 2023 to June 2024

1.5 Research Questions

1. What is the prevalence of thrombocytopenia among pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals?
2. What is the prevalence of thrombocytopenia based on severity and trimester of pregnancy?

3. Do comorbid conditions (Iron Deficiency Anaemia, Hypertension and Gestational Diabetes Mellitus) predict thrombocytopenia among pregnant women at Parirenyatwa Group of Hospitals?
4. What hematological characteristics and how are they associated with thrombocytopenia among pregnant women at PGH?
5. What socio-demographic characteristics are associated with thrombocytopenia among pregnant women at PGH?

1.6 Justification of the Study

This study is justified by the limited data on thrombocytopenia prevalence and its contributing factors among pregnant women in Zimbabwe. Understanding the local burden and risk factors at a major referral centre like the Parirenyatwa Group of Hospitals is crucial for informing targeted interventions, optimizing resource allocation, and improving maternal and neonatal outcomes.

1.7 Delimitation of the Study

This study was delimited to pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals from June 2023 to June 2024. The study did not include pregnant women admitted to other wards or those seeking care at other healthcare facilities. Additionally, the study focused solely on thrombocytopenia as defined by a platelet count below 150 X 10^3 μL and did not explore other haematological conditions in detail.

1.8 Summary

This chapter introduced a study investigating the prevalence and risk factors of thrombocytopenia among pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals. Thrombocytopenia during pregnancy poses significant risks to both mother and child, yet limited data exists on its specific burden and contributing

factors within the Zimbabwean context. This knowledge gap hinders the development of targeted interventions and effective management strategies. This study aimed to determine the prevalence of thrombocytopenia within this specific

population and identify associated risk factors, including sociodemographic characteristics, medical and obstetric history, and laboratory parameters. This research was delimited to pregnant women attending antenatal clinics at Parirenyatwa Group of Hospitals within a specific timeframe (June 2023 to June 2024). The findings provided valuable insights for informing clinical practice, resource allocation, and public health policies aimed at improving maternal and neonatal outcomes in Zimbabwe.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1 Introduction

Thrombocytopenia, characterized by a low platelet count, is a reasonably frequent pregnancy issue that can have catastrophic consequences for both the mother and the child. While typically moderate and temporary, thrombocytopenia can raise the risk of postpartum haemorrhage, a primary cause of maternal morbidity and mortality, especially in resource-constrained settings. Understanding the frequency and risk factors for thrombocytopenia in specific populations is critical for successful management and intervention (Douglas, Cines, Lisa, & Levine, 2017).

This chapter examines the current literature on thrombocytopenia in pregnancy, concentrating on its prevalence, risk factors, and implications. It involves investigating the global burden of thrombocytopenia in pregnant women, using epidemiological research and meta-analyses. It then investigates the risk variables related to thrombocytopenia, such as demographic features, medical and obstetric history, and underlying health issues. The chapter covers the potential effects of thrombocytopenia on maternal and new born outcomes, emphasizing the importance of early identification and adequate treatment.

This review lays the groundwork for recognizing the need to investigate thrombocytopenia's prevalence and risk factors among pregnant women attending prenatal clinics at the Parirenyatwa Group of Hospitals in Harare, Zimbabwe.

2.2 Conceptual framework

Understanding the prevalence and risk factors for thrombocytopenia among pregnant women is critical for appropriate therapeutic care and better maternal and newborn outcomes. This chapter gives a conceptual framework for reviewing relevant material,

offering an organized way to investigate this essential public health issue. (Samuel, Tariku, Asamrew, & Getachew, 2024)

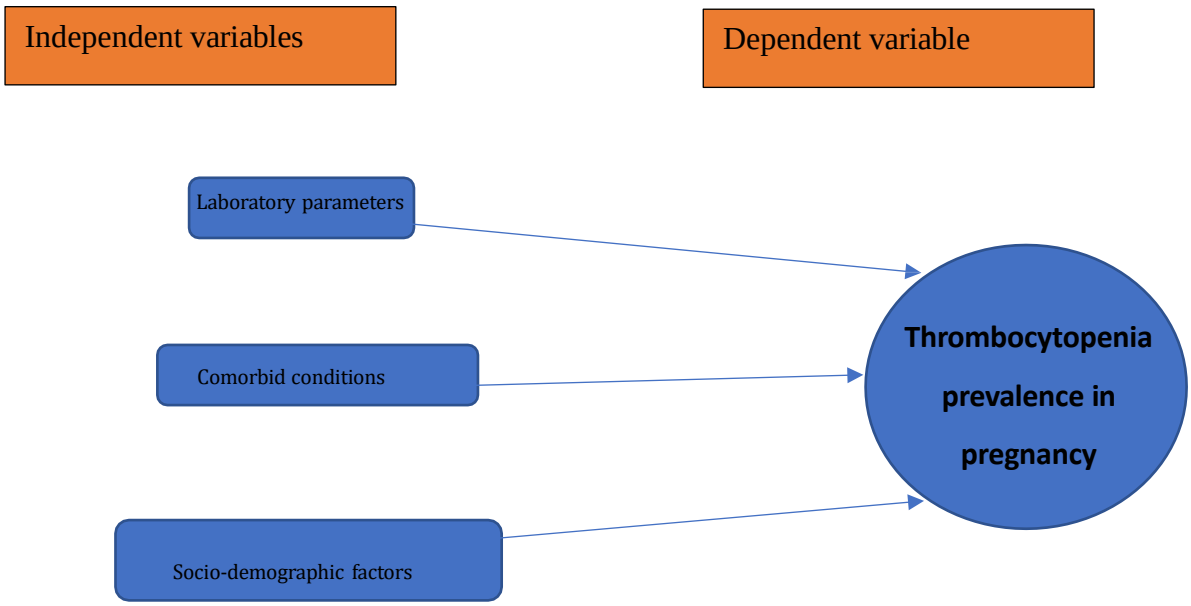


Figure 1: Conceptual framework

2.3 Relevance of conceptual framework

The framework focuses on the central idea of thrombocytopenia in pregnancy, its definition, classification, and underlying pathophysiology. It then looks into the condition's worldwide and regional prevalence, highlighting any observed variances as well as probable contributory variables. The approach investigates a variety of potential risk variables, including demographic characteristics, and medical and obstetric history.

Finally, it examines the potential effects of thrombocytopenia on maternal and newborn health, emphasizing the importance of early detection and effective therapies. By systematically examining these interconnected concepts, this review aims to provide a comprehensive understanding of thrombocytopenia in pregnancy, paving the way for further research into its specific prevalence and risk factors among pregnant women attending antenatal clinics at the Parirenyatwa Group of Hospitals.

2.3.1 Initial evaluation of thrombocytopenia presenting in pregnancy

The first laboratory workup consists of a review of a peripheral blood smear (to look for pseudo thrombocytopenia and other morphologic abnormalities) and an assessment of renal and hepatic function. Haematologists should look at both "pregnancy-specific" and "general" causes of thrombocytopenia (Table 1). Similar to nonpregnant patients, current drugs and comorbidities should be investigated as probable causes. It is critical to question about the presence of any neurological, viral, or B-symptoms. A history of thrombocytopenia during previous pregnancies, as well as a family history of the condition, can be helpful. a physical examination, look for any signs of elevated blood pressure, bruises, hepatosplenomegaly, or lymphadenopathy. Additional complete blood count abnormalities considerably alter the differential, with probable exceptions being thrombocytopenia with concomitant mild anaemia caused by increased plasma volume in the later trimesters (physiologic anaemia) or microcytic anaemia (iron deficiency). These mild anaemias are prevalent during pregnancy and may not be related to the underlying cause of the thrombocytopenia. If the cause of pancytopenia cannot be established, a bone marrow biopsy is recommended (Pishko & Marshal, 2022).

Table 1: Pregnancy-specific" and "general" causes of thrombocytopenia (Ankit, 2022)

PREGNANCY SPECIFIC	GENERAL
Gestational thrombocytopenia	Immune thrombocytopenia
Preeclampsia with severe features	Hereditary thrombocytopenia
Eclampsia	Type 2B Von Willebrand disease
GDM	Drug-induced thrombocytopenia
Acute fatty liver of pregnancy	Infections
HELLP	Cirrhosis
	Splenomegaly
	Bone marrow disorders (aplastic anaemia, myelodysplastic syndrome, leukaemia)

	Paroxysmal nocturnal haemoglobinuria
	Complement-mediated thrombotic microangiopathy
	TTP
	Disseminated intravascular coagulation

2.3.2 Prevalence based on severity and trimester of thrombocytopenia among pregnant women

Understanding the typical platelet count pattern during pregnancy is critical to differentiate between benign and potentially fatal etiologies. Platelet counts were reduced during pregnancy, starting in the first trimester, and were lowest at birth, comparing almost 7000 pregnant vs. nonpregnant adults (Reese, Peck, & Deschamps, 2021).

Gestational thrombocytopenia (GT) is the name for this benign syndrome, characterized by gradually declining platelet counts throughout pregnancy and spontaneous recovery in the nonpregnant state. It is thought to be partly related to hemodilution caused by increased plasma volume and splenic sequestration.

However, before attributing GT for thrombocytopenia, it is critical to assess the severity of the condition. Platelet counts <100 × 109/L occur in 1% and <80 × 109/L in 0.1% of women having uncomplicated pregnancies. Platelets <100 × 109/L are uncommon in simple pregnancies, hence alternative causes should be considered. (Pishko & Marshal, 2022)

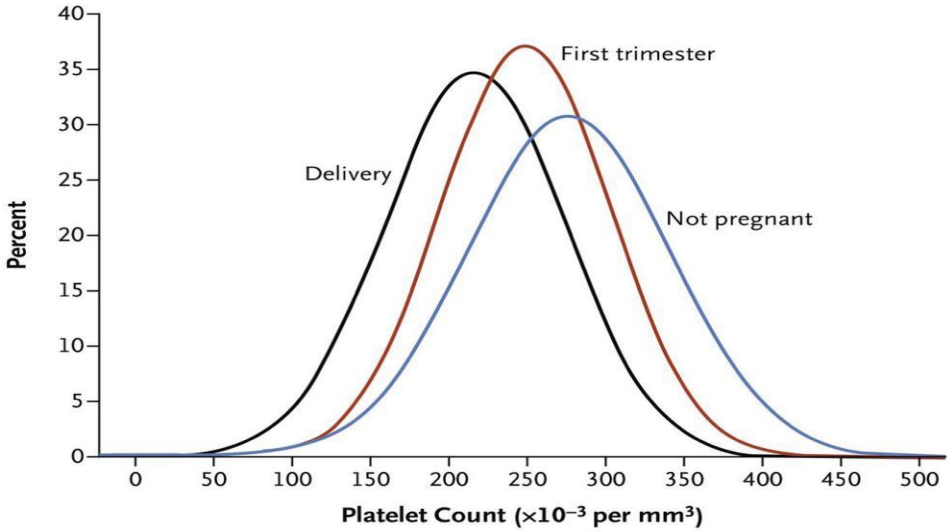


Figure 2: Thrombocytopenia in pregnancy, Hematology (Allyson M., 2022)

Globally, the prevalence of thrombocytopenia in pregnancy varies greatly, depending on geographic region, ethnicity, and the precise definition of thrombocytopenia utilized. A meta- analysis found an overall frequency of 7-12% among pregnant women worldwide. However, this figure comprises a wide range of severity, including gestational thrombocytopenia, which is often benign and self-limiting, and more serious types like immune thrombocytopenia (ITP), which can remain postpartum and require continuous therapy. (Yeh & James, 2022)

Regional variations in prevalence are also noticeable, with research indicating that poor countries have higher rates of thrombocytopenia than developed countries. This gap could be ascribed to a complex interaction of factors like as nutritional inadequacies, infectious infections (including malaria and HIV), poor access to healthcare, and variances in prenatal screening techniques. For example, research in South Asia has found an incidence of thrombocytopenia in pregnancy of up to 10-15%, which is much higher than the 2-5% recorded in North America (Pishko & Marshal, 2022).

Despite its worldwide importance, little information is still available on the specific prevalence of thrombocytopenia among pregnant women in Zimbabwe. This knowledge gap emphasizes how crucial it is to carry out well-planned research to ascertain the prevalence locally and pinpoint risk factors linked to it. This will help to inform targeted interventions and enhance maternal healthcare practices in the context of Zimbabwe.

2.3.3 Prevalence and severity of thrombocytopenia in pregnant women

Generally, studies report a wide range of the prevalence of thrombocytopenia in pregnancy. An analysis found that the overall prevalence was approximately 10% globally. However, this can be misleading as it encompasses gestational thrombocytopenia, usually mild and asymptomatic, and more serious forms like ITP (Yeh J, 2022). According to a systematic review and meta-analysis by Solomon Getawa, Department of Hematology and Immunohematology, School of Biomedical and Laboratory Sciences, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia." Random-effects model analysis showed that the pooled prevalence of thrombocytopenia among pregnant women in Africa was 10.23% (95%CI: 7.44, 13.02%). the minimum prevalence of thrombocytopenia was 3.6% in

Nigeria and the maximum was 17% in Libya. According to a study published in the Journal of the Pakistan Medical Association in 2016, the prevalence of thrombocytopenia among pregnant women in Pakistan is 15.3%. A study article published in the Journal of Clinical and Diagnostic Research in 2016 indicated that the prevalence of thrombocytopenia among pregnant women in India is around 9-16%.

According to a 2018 study published in the American Journal of Perinatology, thrombocytopenia affects 6.6% of pregnant women in the United States. A Canadian study published in the Journal of Obstetrics and Gynaecology Canada in 2013 found

that 7.6% of pregnant women had thrombocytopenia. Gestational Thrombocytopenia: This is the most common type, usually occurring in late pregnancy and resolving spontaneously after delivery. Its prevalence is estimated to be around 5-7% (Javid & Aadil, 2022). Immune Thrombocytopenia (ITP): This autoimmune disorder is less common, affecting about 1-2 per 1000 pregnancies. However, it can be more severe and require specific management (James, Bussel, Hou, & Cines, 2023).

2.4 Association of socio-demographic characteristics with thrombocytopenia among pregnant women

2.4.1 Demographic Characteristics

Age: Both advanced maternal age (over 30) and very young age are often linked to increased risk. This could be attributed to age-related changes in the immune system, hormonal variations, or underlying health issues more frequent in these age groups (Samuel, Tariku, Asamrew, & Getachew, 2024).

Parity: High parity, having multiple previous pregnancies, is often cited as a risk factor. This could be attributed to factors like increased platelet consumption, alterations in the immune system due to repeated pregnancies, or a higher likelihood of underlying medical conditions

(Kebede, Daniel, & Alemu, 2024).

Socioeconomic Status: A lower socioeconomic status is often associated with increased risk, likely due to factors like poor nutrition, limited access to healthcare, and a higher prevalence of infectious diseases (Kebede, Daniel, & Alemu, 2024).

2.4.2 Medical and Obstetric History as risk factors:

Pre-existing Medical Conditions: The risk of thrombocytopenia might be considerably raised by a history of blood clotting problems, autoimmune diseases (such as SLE,

antiphospholipid syndrome), hypertension, pre-eclampsia in prior pregnancies, or chronic infections (such as HIV, hepatitis) (Kebede, Daniel, & Alemu, 2024).

Obstetric History: Previous pregnancy problems like pre-eclampsia, HELLP syndrome, placental abruption, or premature birth are all potential risk factors, suggesting a probable tendency to platelet-related issues in subsequent pregnancies (Kebede, Daniel, & Alemu, 2024).

Current Pregnancy Complications: Developing pre-eclampsia, prenatal hypertension, or gestational diabetes during the current pregnancy might also raise the chance of thrombocytopenia, showing the interaction between these disorders (James, Bussel, Hou, & Cines, 2023).

GDM is defined as glucose intolerance that is first identified during pregnancy. It is typically transient and asymptomatic throughout its clinical progression, but it can result in a variety of fetal complications. GDM increases the likelihood of miscarriage, macrosomia, shoulder dystocia, neonatal hypoglycemia, hyperbilirubinemia, and stillbirth, leading to higher rates of cesarean delivery and operative vaginal births. Patients with GDM exhibit signs of platelet hyperreactivity and elevated baseline platelet activation.

This is attributed to a combination of factors, including the effects of insulin, hyperglycemia, hyperlipidemia, endothelial dysfunction, oxidative stress, and an inflammatory state. Pregnancy imposes physiological stress on the endothelium, resulting in increased platelet aggregation and a reduction in circulating platelet numbers as gestation progresses.

The MPV is an indicator of platelet activity; elevated MPV values in GDM reflect heightened platelet activity, which may contribute to hypercoagulability in the

placental area and subsequent vascular issues, potentially leading to severe pregnancy complications in these women (Javid & Aadil, 2022).

Nutrition: Severe nutritional deficiencies, notably in iron, folate, and vitamin B12, can affect bone marrow function and limit platelet formation, raising the risk of thrombocytopenia (Adrei, et al., 2025).

Smoking: Smoking during pregnancy is known to have negative effects on overall health and has been linked to an increased risk of various pregnancy complications, potentially including thrombocytopenia. However, more research is needed to confirm a direct causal link (Kebede, Daniel, & Alemu, 2024).

Alcohol Consumption: Heavy alcohol use during pregnancy should be avoided due to its wide- ranging negative impact on fetal development and maternal health, and it may potentially increase the risk of thrombocytopenia, but this requires additional research (Kebede, Daniel, & Alemu, 2024).

It's important to note that these risk factors often combine rather than in isolation. For instance, a pregnant woman with a history of pre-eclampsia (indicated by high blood pressure due to poor development of blood vessels within the placenta) and low iron levels might be at a considerably higher risk of developing thrombocytopenia than someone without these risks

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the methodology used in this study to assess the prevalence and risk factors of thrombocytopenia among pregnant women who attended antenatal clinics at the Parirenyatwa Group of Hospitals in Harare, Zimbabwe. The research design, sampling method, data collection tools, and data analysis procedures are all explained in detail to ensure that the detailed results are transparent and reproducible.

3.2 Research design

The study used a qualitative and quantitative retrospective design appropriate for determining the prevalence of thrombocytopenia and its associated risk factors from June 2023 to June 2024. The research was conducted over twelve months, including data collection, analysis, and results interpretation.

3.3 Study Site

Pregnant women's FBC results were selected from the haematology laboratory information systems under Mbuya Nehanda labour wards, the PGH's antenatal clinic. The women’s thrombocytopenia was graded according to severity: mild, moderate, and severe. The antenatal clinic provided me with access to their patient data inventory, in which I found all the relevant information to this study, including the socio-demographic data and the comorbid conditions associated with thrombocytopenia among pregnant women.

3.4 Study Population

All pregnant women over 18 years of age receiving ANC at PGH, from June 2023 to June 2024 at PGH.

3.4.1 Exclusion criteria

All non-pregnant women aged below 18 years old from, June 2023 to June 2024 were excluded from the study

3.4.2 Inclusion criteria

All pregnant women aged above 18 years old, June 2023 to June 2024

3.4.3 Case definition

Thrombocytopenia is defined where all pregnant women aged above 18 years old with platelet count below 150 x 109/L

3.5 Sample size

Several aspects were taken into account to determine the sample size for this study. These aspects included the target population's size, the allowed margin of error, and the intended degree of confidence. For the determination of my sample size, the study used the Cochran's formula and the sample size obtained was 380

3.5.1 Sampling Methods

The purposive sampling approach guaranteed representation from the whole population of pregnant women. Under qualitative data, an in-depth analysis was conducted with a purposive sample of patient obstetric history and demographic data of pregnant women who attended ANC at PGH. Thematic analysis was used to identify patterns and themes within the patients' obstetric history and demographic data. The transcriptions will be coded, categorized, and interpreted to extract meaningful insights. (Qualtrics, 2023)

Purposive sampling can be used in qualitative observations instead of pre-calculating the sample size. Participants are chosen until saturation is reached based on their obstetric history and demographic data. When fresh data from the observations stops

emerging, saturation happens, and a representative sample is drawn at random. For this study, the sample size was 380 participants (Qualtrics, 2023).

3.6 Data collection instruments

To effectively evaluate the prevalence and risk factors among pregnant women attending ANC at Parirenyatwa Group of Hospitals, the study used haematology laboratory information system and medical records review from the Mbuya Nehanda antenatal clinic.

Patient FBC results were reviewed to gather quantitative data, that is the haematology characteristics and the number of pregnant women with thrombocytopenia. This data helped to figure out the prevalence of thrombocytopenia in pregnant women attending. In-depth analysis of clinical data from the medical records review of some pregnant women with platelet count < 150 X 10^3 μL was carried out to determine the specific risk factors among pregnant women attending ANC at PGH. Informed consent protocols were followed to access patient FBC results and medical records reviews with patient information for data collection. Confidentiality and anonymity were maintained during data collection, analysis, and reporting.

3.6.1 Sampling procedure

The data collection procedure for the prevalence and risk factors of thrombocytopenia among pregnant women attending ANC at Parirenyatwa Group of Hospitals involved obtaining ethical approval from the PGH Clinical Director and the Africa University Research Ethics Committee before data collection.

The study extracted the necessary data from the haematology laboratory information system, that is, the FBC results of the pregnant women that were attending the Mbuya

Nehanda ANC wards at PGH. Relevant patient medical records that provide qualitative data from the Mbuya Nehanda ANC wards. The study ensured compliance with patient confidentiality and privacy protocols. The data was stored and secured, ensuring privacy and confidentiality regulations. This was achieved by appropriately de-identifying any personally identifiable information.

3.7 Analysis and Organization of Data

Quantitative data was analyzed using appropriate statistical tools and techniques. Descriptive statistics were used and generated insights from the findings.

3.7.1 Descriptive statistics

Descriptive statistics, such as frequencies, means, and standard deviations, were used to characterize the study population's characteristics. Chi Square test was conducted to determine the relationships between thrombocytopenia and potential risk variables.

Under quantitative data, the research looked into the haematology laboratory Information Systems and took FBC samples results of pregnant women. Descriptive statistics were used to analyze the data. Frequencies means, and percentages were calculated to examine the prevalence of thrombocytopenia in pregnant women attending ANC at PGH.

3.7.2 Dependent and Independent Variables

The study used univariate analysis to examine the relationship between the independent and dependent variables. Thrombocytopenia prevalence being the dependent variable, was measured using a platelet count of less than 150 x 10^9/L. More so, for independent variables, laboratory parameters (platelet count, white blood cell count, haemoglobin level and MCV), comorbid conditions (hypertension,

gestational diabetes mellitus and iron deficiency anaemia) and socio-demographic factors (age, parity and residency) were also included in the univariate analysis.

The outcome of the univariate analysis (chi-square and Odds Ratios for each variable separately) was used to predict the probability of thrombocytopenia prevalence in pregnancy based on the independent variables. The results of the univariate analysis provided insights into the relationship between the independent variables and the dependent variable. The results were interpreted in the context of the conceptual framework and the research questions.

3.8 Study Setting

The study was carried out at the PGH Haematology Laboratory. Samples from various wards were sent to the laboratory via sample reception. For this study, the samples were from the maternal wards at Mbuya Nehanda Antenatal Clinic. Following sample reception, the samples were taken to the haematology lab together with their request forms containing patient data. Only the samples obtained from the maternal wards in Mbuya Nehanda were used to get the data for this study.

3.9 Ethical Considerations

The study protected the confidentiality and privacy of all patients, safeguarded their personal information, and ensured that data and findings were reported anonymously and aggregated to prevent any identification of individuals. It ensured that the research procedures do not compromise patient care and that the research contributes positively to patient care. The study was conducted with the utmost integrity and professionalism. Ensured that the study design, data collection, analysis, and reporting adhered to ethical standards and scientific rigour.

Ethical approval was granted by the appropriate ethics committee (AUREC and Clinical Director at Parirenyatwa) before initiating the research and ensured that the research protocol met the ethical standards set forth by the two institutions.

3.10 Summary

This chapter outlined the methodology used in the study to determine the prevalence and risk factors of thrombocytopenia among pregnant. A retrospective design was employed using both qualitative and quantitative methods. The target population was the pregnant women attending Mbuya Nehanda Antenatal Clinics at Parirenyatwa Group of Hospitals. Data collection involved a review of FBC results for platelet counts and themes from medical records. Descriptive statistics characterized quantitative data, while thematic analysis explored qualitative information. Ethical approval was obtained to ensure confidentiality

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter will stratify thrombocytopenia among pregnant women attending the antenatal clinic at PGH based on severity, comorbid conditions and trimester of pregnancy, as well as the association between haematological characteristics, sociodemographic factors and thrombocytopenia. The chapter presents a comprehensive data analysis, utilizing descriptive statistics to identify patterns and correlations that shed light on the relationships between thrombocytopenia, pregnancy, and haematological characteristics. By examining the stratification of thrombocytopenia by severity, and trimester, this chapter aims to understand the disease and its progression.

4.2 Socio-demographic characteristics associated with thrombocytopenia

Table 2: Socio-demographic Characteristics associated with thrombocytopenia (N=380)

Age range	Thrombocytopenic	Parity	Low density Residency	Medium density Residency	High density Residency
18-20	8(2.1%)	0-2	0	1	7
21-25	22(5.8%)	0-2	3	2	17
26-30	21(5.5%)	3-4	12	6	3
31-35	12(3.2%)	3-4	5	3	4
36-40	7(1.8%)	5-6	3	3	1
41-45	1(0.3%)	6-8	1	0	0
Total	71/380(18.7%)		24	15	32

The table stratifies 71 thrombocytopenic cases (18.7% of 380 pregnant women) by age, parity, and residency density. Younger age groups (18–25 years) account for the highest proportion of cases, with 21–25-year-olds representing 5.8% (22/71) of total cases, predominantly in high- density areas (17/22 cases) and low parity (0–2 live births). Incidence declines with age, dropping to 0.3% (1/71) in the 41–45 group. Parity increases with age, shifting from 0–2 in younger women (18–25 years) to 3–8 in older groups (26–45 years), while residency patterns reverse: high-density areas dominate in younger cohorts (e.g., 7/8 cases in 18–20-year-olds) versus low-density areas in older cohorts (e.g., 12/21 cases in 26–30-year-olds). Overall, high- density residency accounts for the largest share of cases (32/71), followed by low-density (24/71) and medium-density (15/71).

4.3 Prevalence of thrombocytopenia among the pregnant women

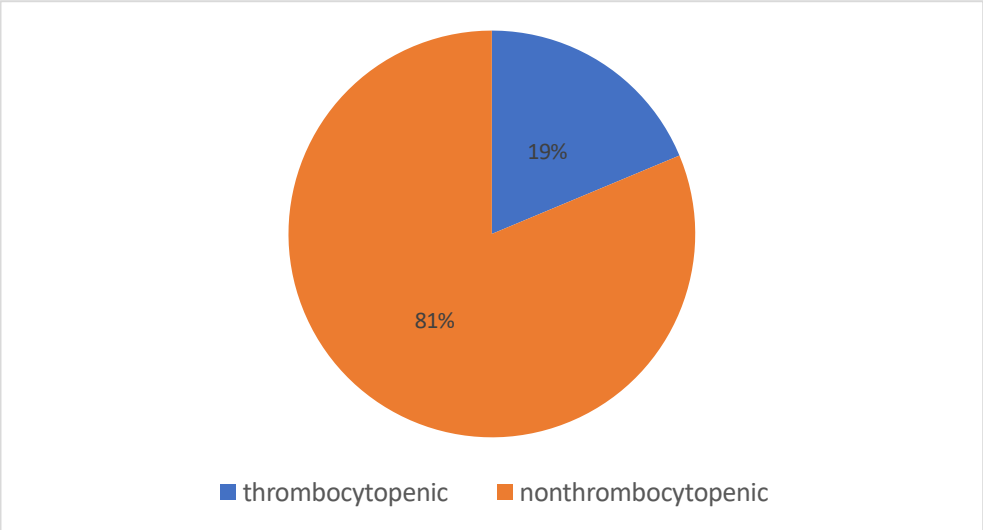


Figure 3: Prevalence of thrombocytopenia among the pregnant women Count of thrombocytopenia cases = 71 (18.7% of 380 pregnant women)

4.4 Stratifying thrombocytopenia prevalence based on severity and trimester of pregnancy

Table 3: Thrombocytopenia prevalence by severity and trimester of pregnancy (N=71)

Severity (platelet count)	1st Trimester	2nd Trimester	3rd Trimester	Total
100≥Mild<150	26 (63%)	12(29%)	3(7%)	41
50≥Moderate<100	2(11%)	13(68%)	4(21%)	19
Severe (<50)	3(27%)	2(18%)	6(55%)	11
Total	31(44%)	27(38%)	13(18%)	71

The table categorizes thrombocytopenia cases (n=71) by severity and trimester, revealing distinct trimester-specific patterns. Mild cases (platelet count 100–150 $\times 10^3/\mu L$) are most frequent in the first trimester (26/41, 63%), decreasing sharply by the third trimester (3/41, 7%). Moderate cases (50–100 $\times 10^3/\mu L$) peak in the second trimester (13/19, 68%), while severe cases (<50 $\times 10^3/\mu L$) are most prevalent in the third trimester (6/11, 55%). Overall, the first trimester accounts for the highest proportion of total cases (31/71, 44%), followed by the second (27/71, 38%) and third trimesters (13/71, 18%), with severity distributions shifting across gestational stages.

Table 4: Stratifying thrombocytopenia severity by age

Age Range	100≥Mild<150	50≥Moderate<100	Severe (<50)	Total
18-20	4(50%)	4(50%)	0(0%)	8
21-25	15(68%)	5(23%)	2(9%)	22
26-30	11(52%)	7(33%)	3(14%)	21
31-35	8(66%)	2(17%)	2(17%)	12
36-40	3(43%)	0(0%)	4(57%)	7
41-45	0(0%)	0(0%)	1(100%)	1
Total	41(58%)	18(25%)	12(17%)	71

The second table stratifies thrombocytopenia severity (mild, moderate, severe) across age groups in 71 pregnant women, revealing age-related patterns. Younger women (18–25 years) predominantly experience mild cases (50–68%), with no severe cases in the youngest group (18–20 years). In contrast, severe thrombocytopenia becomes more frequent with advancing age: 57% of cases in the 36–40 group and all cases (100%) in the 41–45 group were severe. The 31–35 age range diverges slightly, with 66% mild cases. Moderate thrombocytopenia is most evenly distributed in the 26–30 group (33%), while the 36–40 group reported no moderate cases. Mild thrombocytopenia accounts for 58% (41/71) of total cases.

4.5 Comorbidities associated with thrombocytopenia among pregnant women

Table 5: Comorbidities associated with thrombocytopenia among pregnant women

Age	Hypertension	IDA	GDM	No CC	Total
18-25	19(51%)	11(30%)	1(3%)	6(16%)	37
26-35	12(27%)	16(36%)	11(24%)	6(13%)	45
36-45	6(55%)	3(27%)	2(18%)	0(0%)	11
Severity					
Mild	14(31%)	16(36%)	4(9%)	11(24%)	45
Moderate	13(50%)	7(27%)	5(19%)	1(4%)	26
Sever	9(42%)	6(29%)	6(29%)	0(0%)	21

Abbreviation: IDA: Iron Deficiency Anaemia, Gestational Diabetes Mellitus GDM, CC Comorbid conditions

The table stratifies thrombocytopenia cases by age, severity, and comorbid conditions (hypertension, iron deficiency anemia [IDA], gestational diabetes mellitus [GDM], and no comorbidities). Hypertension dominates in younger (18–25 years: 51%) and older women (36– 45 years: 55%), while IDA peaks in the 26–35 age group (36%). GDM prevalence rises with age (3% in 18–25 vs. 24% in 26–35) and severity (9% mild vs. 29% severe). Notably, 24% of mild cases had no comorbidities, but this drops to 0% in severe cases. Moderate-severity thrombocytopenia shows the highest hypertension burden (50%), whereas IDA is most frequent in mild cases (36%). Across all severities, comorbidities are nearly universal in older women (36–45 years: 0% no comorbidities).

Table 6: Stratified prevalence of commodities among participants

Comorbidity	Cases (n=71)	Non-Cases (n=309)	Total
Hypertension	17 (23.9%)	40 (12.9%)	57
IDA	20 (28.2%)	55 (17.8%)	75
GDM	4 (5.6%)	18 (5.8%)	22
No Comorbidities	12 (16.9%)	196 (63.4%)	208

Abbreviation: IDA: Iron Deficiency Anaemia, Gestational Diabetes Mellitus GDM,

4.5.1 Chi-Square Test

Chi-Square Test was used to test for Association for Hypertension, Iron Deficiency Anemia and Gestational Thrombocytopenia

Table 7: Chi Square test on risk factor analysis

Morbidities	Thrombocytopenia (Yes)	Thrombocytopenia (No)	OR at 95%CI	P value
Hypertension (Yes)	17	40	**2.51**(1.25–5.03).	0.024
(No)	54	269		
IDA Yes	20	55	1.81(1.01-3.26)	0.042
No	51	254		

GDM Yes	4	18	0.96(0.3-3.09)	0.9
No	71	309		

Abbreviation: IDA: Iron Deficiency Anaemia, Gestational Diabetes Mellitus GDM,

4.6 Haematological characteristics of thrombocytopenic patients

Table 8: Stratified haematological characteristics among participants

Age Group	**Cases (Platelet <150),**	**Non-Cases (Platelet>150)**	**100≥Mild<150 (Platelet)**	**50≥Moderate<100 (Platelet)**	**Severe ((Platelet)<50)**
18-20	8 (11.3%)	98 (32%)	4 (50%)	4 (50%)	0 (0%)
21-25	22 (31.0%)	110 (36%)	15 (68%)	5 (23%)	2 (9%)
26-30	21 (29.6%)	71 (22%)	11 (52%)	7 (33%)	3 (14%)
31-35	12 (16.9%)	14 (5%)	8 (66%)	2 (17%)	2 (17%)
36-40	7 (9.9%)	9 (3%)	3 (43%)	0 (0%)	4 (57%)
41-45	1 (1.4%)	7 (2%)	0 (0%)	0 (0%)	1 (100%)
TOTAL	71	309			

Abbreviation: WBC: White Blood Cells, MCV: Mean Cell Volume, Hb: Haemoglobin,

This table stratifies thrombocytopenia cases (platelet count <150 ×10³/μL) among 380 pregnant women by age group and severity, alongside associated hematological abnormalities (↓Hb = low hemoglobin, ↑WBC = high white blood cells, ↓MCV = low mean corpuscular volume). Younger women (18–25 years) account for the highest proportion of cases (31%), predominantly mild (68% in 21–25 group), while severe cases escalate with age, peaking at 57% in 36–40-year-olds and 100% in the 41–45 group. Non-cases (platelets >150 ×10³/μL) are most frequent in younger cohorts (32–36% in 18–30 years). Hematological abnormalities (↓Hb, ↑WBC, ↓MCV) are universal across severities, suggesting iron deficiency (↓Hb/↓MCV) and inflammatory responses (↑WBC) as common contributors. Moderate cases are concentrated in 26–30-year-olds (33%), whereas older women (≥31 years) show higher severity despite fewer overall cases.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter explains the findings from Chapter 4, which examined thrombocytopenia prevalence, severity, and associations with sociodemographic and haematological factors among 380 pregnant women attending antenatal clinics at PGH. The analysis revealed a thrombocytopenia prevalence of 18.7% (71 cases), with stratification by trimester and severity highlighting a higher incidence in the first trimester (44%) and mild cases predominating (41/71). Associations with comorbidities, haematological markers, and sociodemographic variables were explored to identify predictors of thrombocytopenia, offering insights into its clinical and epidemiological dynamics.

5.2 Discussion

5.2.1 Socio-demographic characteristics association with thrombocytopenia

The observed socio-demographic patterns, higher thrombocytopenia prevalence in younger women (18–25 years) residing in high-density urban areas with low parity align with recent literature highlighting the interplay of environmental, nutritional, and obstetric risk factors. Studies suggest urban stressors (e.g., pollution, chronic inflammation) may exacerbate hematological dysfunction, as noted by Qihao et al. (2021), who linked Particulate Matter 2.5 exposure to reduced platelet counts in pregnancy. Younger women's predominance mirrors findings by Mahmoud et al. (2021), who attributed elevated thrombocytopenia risk in this group to iron deficiency anemia (IDA) and physiological stress in first pregnancies, while declining incidence with age parallels multiparity's protective role via improved iron reserves

The urban-rural disparity resonates with Kathrine et al. (2023), who reported underdiagnosis in rural settings due to healthcare access gaps, contrasting with urban areas' higher detection rates despite environmental risks. However, the severity shift in older women (e.g., 57% severe cases in 36–40-year-olds) challenges Pishko & Marshal (2024), who associated advanced maternal age with milder thrombocytopenia, suggesting regional etiological variations (e.g., preeclampsia). These findings highlight the need for context-specific interventions addressing urban environmental triggers and rural diagnostic inaccessibility.

5.2.2 Prevalence of thrombocytopenia

The observed thrombocytopenia prevalence of 18.7% in this study exceeds the global average (5–12%). Still, it aligns with rates reported in low-resource settings, such as Libya 17% Solomon et al. (2022) and Nigeria 13.5%, where comorbidities like iron deficiency anemia (IDA) and environmental stressors (e.g., urban pollution) are prevalent (Erhabour, Muhammad, Erhabour, & Adias, 2020). This contrasts with high-income countries like the U.S., where gestational thrombocytopenia dominates and nutritional interventions are routine (Bowersox & Ronald, 2024). The elevated prevalence here likely reflects local risk factors, including IDA (20/71 cases), high-density urban residency (45% of cases), and younger maternal age, compounded by limited antenatal supplementation.

5.2.3 Thrombocytopenia prevalence based on severity and trimester of pregnancy

The observed trimester-specific severity patterns, mild thrombocytopenia peaking in the first trimester (63%) and severe cases escalating in the third (55%) align with studies attributing early gestational cases to haemodilution or immune adaptations

Gernsheimer et al. (2021) but contrast with the classic understanding of gestational thrombocytopenia, which typically

manifests as mild, late-pregnancy phenomena (Bowersox & Ronald, 2024).

The second-trimester surge in moderate cases (68%) may reflect emerging placental pathologies (e.g., preeclampsia precursors), as noted by Kebede et al. (2024) while the third- trimester severity spike mirrors risk from hypertensive disorders, supported by Meiling et al. (2025) linking late-term thrombocytopenia to HELLP syndrome. While the data strongly maps epidemiological trends, its clinical utility hinges on prospective validation of these risk strata.

5.2.4 Comorbid conditions predict thrombocytopenia among pregnant women

The significant association between hypertension (OR=2.51, 95% CI=1.25–5.03, p=0.024) and thrombocytopenia aligns with studies linking hypertensive disorders (e.g., preeclampsia) to platelet destruction via endothelial dysfunction Meiling et al. (2025), while the IDA- thrombocytopenia link (OR=1.81, 95% CI=1.01–3.26, p=0.042) mirrors findings by (Fidelma & Ramus (2024), who reported bone marrow suppression in iron-deficient states. However, the absence of a GDM association (OR=0.96, p=0.939) conflicts with Giuseppe et al. (2025), who identified hyperinsulinemia-induced platelet hyperactivity as a thrombocytopenia risk, suggesting this cohort's low GDM prevalence (5.6%) may underpower detection. The dominance of hypertension in older women (55% in 36–45-year-olds) echoes, who tied chronic hypertension to age-related endothelial damage Gaetano & Anna (2022), yet contradicts Kasiye et al. (2020), who found gestational hypertension more prevalent in younger women. Similarly, the IDA peak in 26–35-year-olds (36%) aligns with global anemia trends in reproductive-aged women and also highlights factors like folate deficiency (Ochuwa & Opeyemi, 2024).

5.2.5 The association between haematological characteristics and thrombocytopenia

The observed age-related gradient in thrombocytopenia severity among younger women (18– 25 years) predominantly presenting with mild cases (68%) and older women (36–45 years) disproportionately affected by severe thrombocytopenia (57–100%) aligns with studies linking nutritional deficiencies (e.g., iron deficiency anemia, ↓Hb/↓MCV) to milder presentations in younger cohorts Fidelma & Ramus (2024), while chronic conditions (e.g., autoimmune disorders, hypertension) in older women may drive severe cases, as noted by Gernsheimer et al. (2021). The universal presence of ↓Hb, ↑WBC, and ↓MCV across all severities supports evidence that iron deficiency and inflammation (↑WBC) impair hematopoiesis (Samuel, Tariku, Asamrew, & Getachew, 2024). However, the absence of non- anemic thrombocytopenia cases (0% in severe group) conflicts with (Breymann, 2024), who reported idiopathic thrombocytopenia without anemia in 20–30% of cases, suggesting potential underdiagnosis or regional specificity (e.g., malaria-endemic areas). The high WBC counts (↑WBC) across severities may reflect undetected infections or inflammatory triggers, as highlighted by Erhabour et al. (2020) in low-resource antenatal cohorts. While the data robustly links age and hematological parameters to thrombocytopenia severity, the single- center design limits generalizability, and unmeasured confounders (e.g., viral/bacterial infections) may bias associations, critiqued by (Gaetano & Anna, 2022).

5.3 Conclusion

This study confirms that thrombocytopenia is a significant concern in pregnancy, particularly in early gestation, with mild cases dominating. IDA and high-density residency emerged as critical risk factors, while haematological markers (Hb, WBC,

MCV) demonstrated predictive utility. Increased parity (number of pregnancies) correlates with greater thrombocytopenia risk.

5.4 Implications

Clinically, these findings advocate for early antenatal screening, especially in the first trimester, and targeted monitoring of women with IDA or abnormal haematological indices. Public health efforts should prioritize iron supplementation programs in urban high-density areas where the prevalence of thrombocytopenia is elevated. Not all studies directly link iron supplementation to thrombocytopenia prevention. While iron therapy resolves anaemia, platelet count improvements are inconsistent and may depend on the underlying cause of thrombocytopenia (e.g., immune vs. nutritional origins) (Breymann, 2024). The link between younger maternal age and thrombocytopenia highlights the need for tailored prenatal care for this demographic.

5.5 Recommendations

While the single-center design may overestimate prevalence compared to national averages, these findings highlight the need for region-specific strategies addressing nutritional gaps and urban environmental triggers to reduce disease burden. Strengthen protocols for managing IDA and hypertension in pregnancy to mitigate thrombocytopenia risk.

Develop community-based nutrition programs in high-density urban areas to address iron deficiency.

5.6 Suggestions for Further Research

Longitudinal studies tracking thrombocytopenia progression across trimesters could clarify causal pathways. Expanding sample diversity to rural populations and exploring genetic or environmental factors (e.g., pollution, diet) may deepen

understanding of sociodemographic disparities. A Longitudinal Analysis of Bone Marrow Response to Iron Supplementation, to determine whether iron supplementation in pregnant women with IDA directly improves platelet production by resolving bone marrow suppression, thereby reducing thrombocytopenia risk.

5.7 Limitations of the study

This study has several limitations. First, its single-center design at the Parirenyatwa Group of Hospitals restricts generalizability to broader populations, mainly rural or non-tertiary care settings. Second, reliance on hospital-based data introduces selection bias, as women with severe comorbidities may be overrepresented. Third, the cross-sectional design precludes causal inferences between thrombocytopenia and identified risk factors (e.g., hypertension, IDA). Fourth, unmeasured confounders such as infectious diseases (malaria, HIV) or environmental exposures were not assessed, potentially biasing associations. Fifth, small sample sizes in older age groups (e.g., 41–45 years: n=1 case) limit statistical power for age- stratified analysis. Sixth, the absence of longitudinal data hinders understanding of thrombocytopenia progression across trimesters. Finally, retrospective data collection risks misclassification or underreporting of conditions like gestational diabetes.

REFERENCES

Adrei, M. M., Oana, T. P., Doru, D., Razvan, C., Ligia, B, . . . Dan, M. (2025). Autoimmune Thrombocytopenia in Pregnancy: Insights from an Uncommon Case Presentation and Mini-Review. *PMC PubMed Central*.

Anca, M. C., Simona, C., Brandusa, C., Gheorghe, P., & Panaitescu, M. (2016). Thrombocytopenia in Pregnancy. *Medscape*.

Ankit, M., & Hussein, H. (2022). Thrombocytopenia in Pregnancy. *StatPearls; National Library of Medicine*.

Bowersox, N. A., & Ronald, M. R. (2024). Thrombocytopenia in Pregnancy.

Medscape. Breymann, C. (2024). Iron Deficiency Anemia in Pregnancy.

PubMed.

Douglas, B., Cines, Lisa, D., & Levine. (2017, December 8). *ASH PUBLICATONS*. Retrieved from Haematoogy, ASH Education Program: https://ashpublications.org/hematology/article/2017/1/144/21061/Thrombocytopenia- in-pregnancy

Erhabour, O., Muhammad, A., Erhabour, T., & Adias, T. C. (2020). Anaemia and thrombocytopenia among pregnant women attending Aminu Kano Teaching Hospital, Kano State, North Western Nigeria. *Sage Journals*.

Fidelma, B. R., & Ramus, R. (2024). Anemias in Pregnancy. *Medscape*.

Gaetano, P., & Anna, M. (2022). Endothelial Dysfunction and Chronic Inflammation. *National Library of Medicine*.

Gernsheimer, T., James, A., & Stasi, R. (2021). How I treat thrombocytopenia in pregnancy. *ASH*.

Giuseppe, G., Emmanuela, F., Elisa, P., Elisabetta, T., Paolo, G., & Sandro, G. (2025). Gestational diabetes mellitus is associated with in vivo platelet

activation and platelet hyperreactivity. *American Journal of Obstetrics & Gynecology*.

James, B., Bussel, Hou, M., & Cines. (2023). Management of Primary Immune. *The new*

Javid, A. K., & Aadil, A. (2022). Platelet profile of patients with gestational diabetes.

International Journal of Reproduction, Contraception, Obstetrics and Gynecology.

Kasiye, S. G., Nega, A., & Bazatu, M. (2020). Prevalence of hypertensive disorders . *SagePub*.

Kathrine, A., Natalie, A., Kasen, C., Grobman, W., & Sdiya, S. (2023). Rural-Urban Disparities in Adverse Maternal Outcomes in the United States. *NIH, PubMed*.

Kebede, S., Daniel, T., & Alemu, A. (2024). Magnitude and associated factors of thrombocytopenia, among pregnant women at Mizan Tepi university teaching hospital south west Ethiopia. *BMC Pregnancy Childbirth*.

Mahmoud, S., Mustafa, A., Mona, M., & Mohamed, A. (2021). Thrombocytopenia secondary to iron deficiency anemia responding to iron therapy. *NIH, PubMed Central*.

Mayo Clinic, .. (2022, April 19). Retrieved from www.mayoclinic.org/diseases-conditions/thrombocytopenia/symptoms-causes/syc-20378293

Meiling, Y., Cailing, Z., LuLi, Lizhen, W., & Meixian, Z. (2025). Effects of pregnancy-induced hypertension on early-onset neonatal thrombocytopenia. *BMC Pregnancy and Childbirth*.

Nnabuike, C., & Jagidesa, M. (2024, March). Sciencedirect. *Preventing maternal morbidity and mortality from preeclampsia and eclampsia particularly in low- and middle- income countries*. Retrieved from National Library of Medicine: https://pubmed.ncbi.nlm.nih.gov/24499757/

Ochuwa, A. B., & Opeyemi, R. A. (2024). Prevalence of and risk factors for

iron deficiency among pregnant women with moderate or severe anaemia in Nigeria: a cross-sectional study. *BMC Pregnancy and Childbirth*.

Pishko, A., & Marshal, A. (2022). Thrombocytopenia in Pregnancy. *Haematology ASH*.

Qihao, C., Zhan, R., Yujie, L., Yunfei, Q., & Haomin, Y. (2021). The Association between Preterm Birth and Ambient Air Pollution Exposure in Shiyan, China. *MDPI*.

Qualtrics. (2023). Sample size calculator. Qualtrics. *Qualtrics XM*.

Reese, J., Peck, J., & Deschamps. (2018). Platelete counts during pregnancy. *N Engl J Med*. Samuel, S., Tariku, D., Asamrew, A., & Getachew, M. (2024, June 7). *BMC*. Retrieved from BMC Pregnancy and Childbirth: https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-024- 06609-6#citeas

Solomon, G., Zegeye, G., & Mulugeta, M. (2022). Thrombocytopenia among pregnant women in Africa: a systematic review and meta-analysis. *PanAfrican Medical Journal*.

Solomon, G., Zegeye, G., & Mulugeta, M. (2022). Thrombocytopenia among pregnant women in Africa: a systematic review and meta-analysis. *Pan African Medical Journal*.

Yeh, & James. (2022, January 5). *Resident 360*. Retrieved from Prevalence of Thrombocytopenia during Pregnancy: https://resident360.nejm.org/from-pages-to- practice/prevalence-of-thrombocytopenia-during-pregnancy

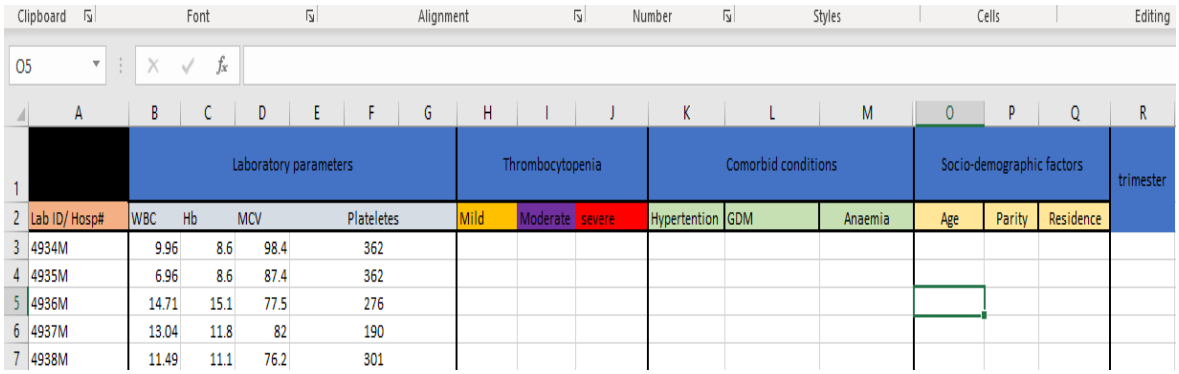
Yeh, J. (2022, January 5). *Resident 360*. Retrieved from Prevalence of Thrombocytopenia during Pregnancy: https://resident360.nejm.org/from-pages-to-practice/prevalence-of-thrombocytopenia-during-pregnancy

Young, & Park, H. (2022, April 30). *PubMed*. Retrieved from NIH: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9057658/

Zhang, Y. (2024). Factors influencing iron deficiency anaemia during pregnancy and the association of iron deficiency. *University of Estern Finland*.

Appendices

Appendix 1: Data collection tool



	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R
1		Laboratory parameters						Thrombocytopenia			Comorbid conditions			Socio-demographic factors			trimester
2	Lab ID/ Hosp#	WBC	Hb	MCV		Plateletes		Mild	Moderate	severe	Hypertention	GDM	Anaemia	Age	Parity	Residence	
3	4934M	9.96	8.6	98.4		362											
4	4935M	6.96	8.6	87.4		362											
5	4936M	14.71	15.1	77.5		276											
6	4937M	13.04	11.8	82		190											
7	4938M	11.49	11.1	76.2		301											

Appendix 2: Budget

MATERIAL	**UNIT COST ($)**	**MULTIPLYING FACTOR ($)**	**TOTAL COST ($)**
Transport	3	3	9
Food	2	7	14
Printing	1	5	5
Internet	18	1	18
Flat file	0.50	4	2
Incidentals	5	3	15
TOTAL			63

Appendix 3: Time table

	Month	August 2024				September 2024				October 2024				November 2024				December 2024				January 2025			
	Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Activity																									
Finalizaton of proposal																									
Proposal submission to AU																									
Data Collection																									
Data processing and analysis																									
Project writing																									

Appendix 4: Supervisor approval letter

AFRICA UNIVERSITY
A United Methodist Related Institution

Investing in Africa's Future

DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES
COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

P.O. BOX 1320, MUTARE, ZIMBABWE – Cell: (+263) 780079459 E-MAIL: salissoum@africau.edu, WEBSITE: www.africau.edu

17, September 2024

To whom it may concern
Dear Sir

Re: Permission to Submit to AUREC for Ronald Chamunorwa Chikwengo, 210736

Program: BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS

This letter serves to confirm that I have supervised the above mentioned student and he has satisfied all the requirements of the college and he is ready in conducting research on:

Prevalence and Risk Factors of Thrombocytopenia among Pregnant Women Attending Antenatal Clinic at Parirenyatwa Group of Hospitals: 2024

Your facilitation in assisting him is greatly appreciated

Thank you

Research Supervisor:

Dr Maibouge T.M.Salissou PhD

Endow Chair Educational Technology in Pathology and Pathophysiology / Faculty of Health Sciences

Appendix 5: AUREC Approval letter

AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's future"

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 Website: www.africau.edu

Ref: AU 3546/25

8 January, 2025

RONALD CHAMUNORWA CHIKWENGO
C/O Africa University
Box 1320
MUTARE

RE: ***PREVALENCE AND RISK FACTORS OF THROMBOCYTOPENIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC AT PARIRENYATWA GROUP OF HOSPITALS: 2024***

Thank you for the above-titled proposal you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal

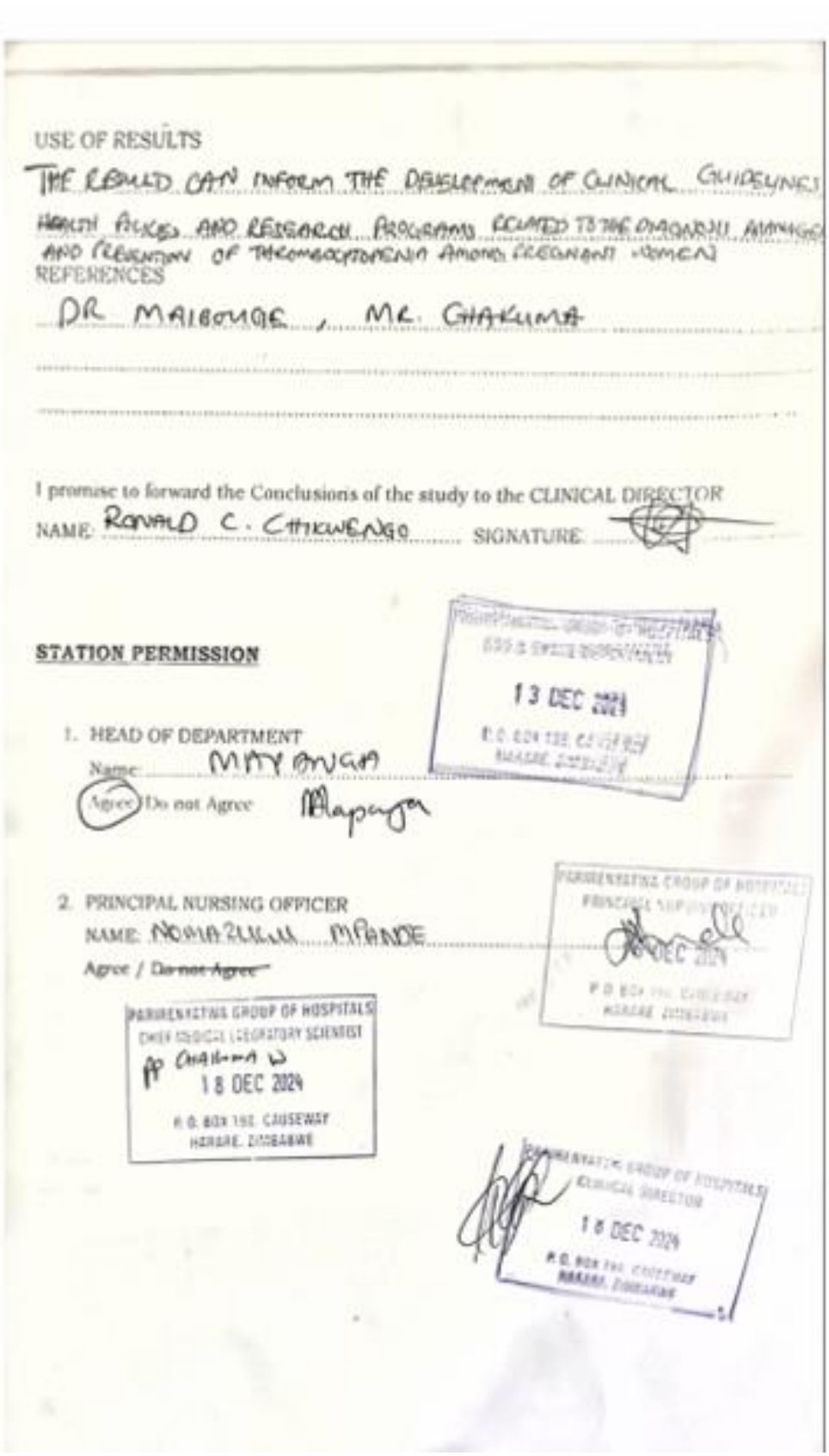
- **APPROVAL NUMBER** AUREC 3546/25
  This number should be used on all correspondences, consent forms, and appropriate document
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** January 8, 2025
- **EXPIRATION DATE** January 8, 2026
- **TYPE OF MEETING**: Expedited
  After the expiration date, this research may only continue upon renewal. A progress report on a standard AUREC form should be submitted a month before the expiration date for renewal purposes.
- **SERIOUS ADVERSE EVENTS** All serious problems concerning subject safety must be reported to AUREC within 3 working days on the standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU
FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix 6: Site approval letter



USE OF RESULTS

THE RESULTS CAN INFORM THE DEVELOPMENT OF CLINICAL GUIDELINES HEALTH POLICIES AND RESEARCH PROGRAMS RELATED TO THE DIAGNOSIS MANAGEMENT AND PREVENTION OF THROMBOCYTOPENIA AMONG PREGNANT WOMEN

REFERENCES

DR MAIBOUGE, MR. GHAKUMA

I promise to forward the Conclusions of the study to the CLINICAL DIRECTOR

NAME RONALD C. CHIKWENGO SIGNATURE

STATION PERMISSION

1. HEAD OF DEPARTMENT

Name MARY MUGA

(Agree) Do not Agree

13 DEC 2024

2. PRINCIPAL NURSING OFFICER

NAME NOMATHEMBA MPANDE

Agree / ~~Do not Agree~~

REPRESENTING GROUP OF HOSPITALS
CHIEF MEDICAL LABORATORY SCIENTIST
18 DEC 2024
P.O. BOX 198 CAUSEWAY
HARARE ZIMBABWE

18 DEC 2024