MANAGING PRE-ECLAMPSIA AND MATERNAL HEALTH OUTCOMES IN DR. BATA MILITARY HOSPITAL, NSAMIZI ENTEBBE, WAKISO DISTRICT, UGANDA

BY

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DECLARATION

I Nakajooga Grace, declare that this proposal titled, "managing pre-eclampsia and maternal health outcomes in Dr. Bata Military Hospital, Nsamizi Entebbe, Wakiso district, Uganda" is my original work and a result of my own effort and investigation. It is original and has not been submitted to any other Institution or University for academic award

Signed: ..... Date: 15th-10-2026.....

Nakajooga Grace.

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APPROVAL

This research proposal titled "managing pre-eclampsia and maternal health outcomes in Dr. Bata Military Hospital, Nsamizi Entebbe, Wakiso district, Uganda" has been prepared under supervision by the university supervisor. It is now ready for submission to the academic board of the university approval.

Signed: ..... Date: 15/10/2026.

Dr. Moses Nsaire Kirigwajjo

[Supervisor]

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DEDICATION

This work is dedicated to my dear mother Margaret Samula, and family for the constant prayers, support and encouragement throughout this academic journey.

ACKNOWLEDGEMENT

First and foremost, I thank Almighty God for granting me life, wisdom, strength, and guidance throughout the process of developing this proposal. His grace has enabled me to reach this milestone.

I would like to express my sincere and heartfelt gratitude to my supervisor for the continuous guidance, constructive criticism, patience, and encouragement offered during the preparation of this proposal. His support and professional advice greatly contributed to the success of this work.

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Finally, I wish to thank my family and friends for their unwavering support, prayers, and understanding during the course of studies.

May God bless you all abundantly.

Abbreviations

ANC- Antenatal Care

APGAR- Appearance Pulse Grimace Activity Respiration

BP – Blood Pressure

CVI- Content Validity Index

CME- Continuous Medical Education

DV- Dependent Variable

DIC – Disseminated Intravascular Coagulation

ELCS – Elective Cesarean Section
EMCS – Emergency Cesarean Section

GDM- Gestational Diabetes Mellitus

GWG- Gestational Weight Gain

HBM- Health Belief Model

IV- Independent Variable

LMICs- Low- and Middle-Income Countries

MoH – Ministry of Health

HBM- Health Belief Model

NICU – Neonatal Intensive Care Unit

PPH – Postpartum Haemorrhage
RDS – respiratory distress syndrome
SMBP- Self-Monitoring of Blood Pressure
SPSS – Statistical Package for Social Sciences

SCT- Social Cognitive Theory

SVD – Spontaneous Vaginal Delivery

UPCR – Urine Protein/Creatinine Ratio

WHO- World Health Organization

Key terms /Definitions

Managing pre-eclampsia refers to the coordinated clinical and patient-centered approaches employed to prevent, monitor and control the progression of pre-eclampsia during pregnancy.

Maternal health outcomes refer to the health status of women during pregnancy, childbirth and the postpartum period.

Health Belief Model (HBM), developed by Rosenstock et al. (1950), which explains health-related behaviors based on individuals' perceptions of susceptibility, severity, benefits and barriers.

Social Cognitive Theory (SCT), developed by Bandura (1986), explains behavior as a dynamic interaction between personal, environmental and behavioral factors.

The pathophysiological theory of pre-eclampsia explains the condition as arising from abnormal placental development and impaired maternal vascular adaptation.

Retrospective: A study design that looks backward in time, examining existing data (like medical records) or asking participants to recall past events to find links between exposures and current outcomes.

Cross-sectional design: An "observational snapshot" that analyzes data from a population at a single point in time to determine the prevalence of a condition or describe a specific status.

Pre-eclampsia: A serious pregnancy complication characterized by high blood pressure and signs of damage to another organ system (often the liver or kidneys), usually occurring after 20 weeks of pregnancy.

Quantitative: Research focused on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon through statistical analysis.

Qualitative: Research focused on understanding human behavior, experiences, and social processes through non-numerical data like interviews, focus groups, or observations.

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ABSTRACT

Background: Pre-eclampsia and eclampsia remain important causes of maternal and perinatal complications, especially when severe disease occurs. This study assessed the clinical characteristics, management, pregnancy outcomes, and factors associated with outcomes among women diagnosed with pre-eclampsia/eclampsia at Dr Bata Military Hospital, Entebbe, Uganda.

Methods: A retrospective cross-sectional analytical study using chart review was conducted at Dr Bata Military Hospital from 2024 to 2025. Records of 231 women with pre-eclampsia or eclampsia were reviewed. Descriptive statistics summarized participant characteristics, clinical presentation, management, and pregnancy outcomes. Chi-square and Fisher's exact tests assessed associations between selected factors, disease severity, and pregnancy outcomes, with statistical significance set at $p<0.05p < 0.05p<0.05$. Retrospective chart reviews use existing patient records to investigate clinical questions and may use a cross-sectional observational design.pmc.ncbi.nlm.nih+1

Results: The mean maternal age was 30.4 years, and 41.0% of participants were active military personnel. Most women were booked for antenatal care (91.6%), while 86.7% presented with severe pre-eclampsia or eclampsia. Magnesium sulfate was administered to 90.4% of participants, and combination antihypertensive therapy was the standard management approach. ICU admission was required for 8.1% of women, and 47.6% received blood transfusion. Most pregnancies resulted in live births (96.4%). Severity of pre-eclampsia was not significantly associated with pregnancy outcome ($p=0.901p = 0.901p=0.901$) or ICU admission ($p=0.072p = 0.072p=0.072$). Magnesium sulfate administration was not significantly associated with pregnancy outcome ($p=0.824p = 0.824p=0.824$), and chronic hypertension before pregnancy was not associated with severity of pre-eclampsia ($p=0.845p = 0.845p=0.845$). However, antenatal booking status was significantly associated with pregnancy outcome ($p<0.001p < 0.001p<0.001$), with booked women experiencing more favourable outcomes.

Conclusion: Severe pre-eclampsia/eclampsia was highly prevalent among women managed at Dr Bata Military Hospital, although favourable pregnancy outcomes were achieved for most women. Antenatal booking was the only studied factor significantly associated with pregnancy outcome, emphasizing the importance of early and regular antenatal care in improving maternal and fetal outcomes.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter presents the background to the study, statement of the problem, general objective, specific objectives, research questions and hypotheses of the study, scope of the study, the significance of the study, justification of the study, operational definitions of terms and the concepts.

The study was about the effects of managing pre-eclampsia and maternal health outcomes in Dr. Bata Military Hospital in Nsamizi Entebbe, Wakiso District.

1.1 Background to the study

This section presents the conceptual perspective, theoretical perspective, historical perspective and contextual perspective.

1.1.1 Historical perspective

Globally, maternal health outcomes have evolved significantly over the past century due to advances in medical technology, public health policies and access to skilled care. In the early to mid-20th century, maternal mortality remained extremely high, particularly in low- and middle-income countries, with rates exceeding 400 deaths per 100,000 live births in many regions (UNICEF, 2024).

Limited access to skilled birth attendants, poor hygiene during delivery and inadequate prenatal care contributed to these adverse outcomes. Over the last two decades, concerted international efforts such as the Millennium Development Goals and Sustainable Development Goals have contributed to substantial reductions in maternal deaths, with global maternal mortality declining from approximately 342,000 in 2000 to 211,000 in 2017 (WHO, 2022).

Countries such as Sweden and Japan have demonstrated near-universal access to antenatal care, advanced emergency obstetric services and maternal health monitoring systems, achieving maternal mortality rates below 10 deaths per 100,000 live births, reflecting sustained improvements in global maternal health outcomes (Rahman & Li, 2023).

In Africa, maternal health outcomes have historically lagged behind global averages due to challenges including weak health infrastructure, limited human resources and sociocultural barriers (Kamanzi et al., 2022). In the 1980s and 1990s, many African countries reported maternal mortality ratios exceeding 800 deaths per 100,000 live births.

However, gradual improvements have occurred, largely due to initiatives such as the African Union's Campaign for Accelerated Reduction of Maternal Mortality and the expansion of community health programs (Owusu & Agyeman, 2023). Practical examples include Morocco, which reduced its maternal mortality ratio from 332 per 100,000 live births in 1990 to 112 in 2019 through improved prenatal care coverage and emergency obstetric services and Rwanda, where government-led health insurance schemes and training of community health workers significantly reduced maternal deaths over the past decade (Mugabo & Nkurunziza, 2024).

In the East African region, maternal health outcomes have similarly shown gradual improvement, albeit with ongoing challenges. Countries such as Kenya, Tanzania and Uganda historically experienced high maternal mortality rates exceeding 600 deaths per 100,000 live births in the 1990s, often driven by hemorrhage, hypertensive disorders and sepsis (Munyaneza et al., 2023).

Recent years have seen improvements due to policy interventions promoting facility-based deliveries, skilled birth attendance and maternal health financing programs (Kiplagat & Chepkemoi, 2024). Kenya, for instance, has reduced maternal mortality from 590 per 100,000 live births in 1990 to 342 in 2020 through the expansion of emergency obstetric care and national referral systems, while Tanzania improved antenatal care coverage and midwifery training to achieve a reduction from 870 to 556 deaths per 100,000 live births over the same period.

In Uganda, maternal health outcomes have improved over the past three decades but remain a significant public health concern. In the 1990s, Uganda recorded maternal mortality ratios above 600 deaths per 100,000 live births, largely due to limited access to skilled birth attendants, inadequate referral systems and high prevalence of hypertensive disorders and infections (Musoke & Namara, 2024).

Interventions such as the expansion of Health Centre IV facilities, implementation of maternal waiting homes and promotion of institutional deliveries have contributed to a reduction in maternal mortality to approximately 336 deaths per 100,000 live births by 2020. Practical

examples include the success of the Uganda National Maternal and Neonatal Health Program in increasing skilled birth attendance in districts like Wakiso and Mbarara, demonstrating measurable improvements in maternal survival and health outcomes (Nalwadda & Kateregga, 2025). Despite these gains, challenges persist in rural and underserved areas, indicating the need for continued investment in maternal health infrastructure, education and community-based care.

1.1.2 Conceptual perspective

In this study, the independent variable is managing pre-eclampsia while the dependent variable is maternal health outcomes.

Managing pre-eclampsia refers to the coordinated clinical and patient-centered approaches employed to prevent, monitor and control the progression of pre-eclampsia during pregnancy (Adeoye & Obeng, 2022). This management encompasses early identification of risk factors, continuous monitoring of blood pressure and proteinuria, timely pharmacological interventions and implementation of protocols designed to protect both maternal and fetal health (Nnadi et al., 2023).

It is a multidimensional process that integrates clinical judgment, evidence-based practices and patient engagement to reduce the likelihood of complications such as eclampsia, placental abruption, preterm birth and maternal or neonatal mortality. Researchers argue that effective management of pre-eclampsia not only stabilizes maternal health but also improves long-term outcomes for new-borns by reducing morbidity and adverse perinatal events (Kamanzi & Odongo, 2024).

The operational measurement of managing pre-eclampsia will be in form of lifestyle management, supportive management and patient education. Lifestyle management which focuses on promoting healthy behaviours that mitigate hypertension and enhance maternal well-being. This includes counselling on balanced nutrition, appropriate physical activity, stress management and avoidance of alcohol or tobacco (Mugisha & Kintu, 2023).

Supportive management involves the clinical and emotional assistance provided by healthcare teams, including routine blood pressure monitoring, administration of antihypertensive medications, management of oedema and proteinuria and psychological support to reduce maternal anxiety and stress (Nkosi & Dlamini, 2022). Patient education ensures that pregnant

women are informed about the signs and symptoms of pre-eclampsia, understand the importance of adhering to treatment and follow-up schedules and can make informed decisions regarding their care (Tchouassi & Kone, 2025).

Maternal health outcomes refer to the health status of women during pregnancy, childbirth and the postpartum period (Acheampong & Lartey, 2022). They capture both positive and negative results of care, including the occurrence of complications, recovery after delivery and the ability to maintain normal functioning. These outcomes are used to assess the effectiveness of clinical management, public health interventions and patient-centered care in reducing risks such as preterm birth, hemorrhage, infections and maternal mortality (Dlamini & Khumalo, 2023). Monitoring maternal health outcomes provides insights into the quality of care and the broader impact of health interventions, allowing systems to improve safety and long-term maternal well-being (Otieno et al., 2024).

Maternal health outcomes can be measured through physical health, emotional health and quality of life. Physical health reflects clinical status, including absence of complications such as hypertension, anemia and pre-eclampsia-related organ damage, assessed using clinical records and lab results (Kamara & Sesay, 2022). Emotional health captures psychological well-being, including stress, anxiety, or depression, measured using validated questionnaires or interviews (Tadesse & Abebe, 2023). Quality of life refers to overall functioning, including ability to care for self and newborn, maintain relationships and participate in daily activities, measured with standardized tools (Bello & Ibrahim, 2025).

1.1.3 Theoretical perspective

The study is anchored on the Health Belief Model (HBM), developed by Rosenstock et al. (1950), which explains health-related behaviors based on individuals' perceptions of risk and the benefits of action (Adeyemi & Okafor, 2023). The model suggests that individuals are more likely to adopt preventive behaviors if they perceive susceptibility to a condition, recognize its seriousness, believe in the effectiveness of interventions and face minimal barriers (Mensah & Owusu, 2022).

In managing pre-eclampsia, the HBM helps explain pregnant women's adherence to antenatal care, medication and lifestyle adjustments. It also highlights the role of cues to action, such as healthcare guidance and family support, alongside self-efficacy in sustaining behavior change

(Ndlovu & Sibanda, 2024). This framework guides interventions aimed at improving maternal health outcomes (Tetteh & Kofi, 2025).

The study is anchored on the pathophysiological theory of pre-eclampsia, which explains the condition as a disorder originating from abnormal placental development and impaired maternal vascular adaptation. The theory posits that inadequate trophoblastic invasion of the uterine spiral arteries leads to reduced placental perfusion, triggering endothelial dysfunction, inflammation and systemic vasoconstriction (Roberts & Hubel, 2009). These processes result in hypertension, proteinuria and multi-organ complications characteristic of pre-eclampsia.

In clinical management, the theory provides a basis for monitoring biomarkers, blood pressure and organ function to prevent adverse outcomes (Redman & Sargent, 2010). It also informs interventions such as timely diagnosis, pharmacological management and delivery planning. This framework supports understanding disease progression and guides strategies aimed at improving maternal and neonatal health outcomes (Rana et al., 2019).

The study is further informed by the metabolic theory of pre-eclampsia, which links the condition to underlying metabolic disturbances such as insulin resistance, obesity and dyslipidemia. The theory suggests that metabolic imbalances contribute to oxidative stress and endothelial dysfunction, increasing the risk of developing pre-eclampsia (Spracklen et al., 2014). Women with pre-existing metabolic conditions are therefore more susceptible to complications during pregnancy.

In managing pre-eclampsia, this perspective emphasizes the importance of nutritional interventions, weight management and monitoring metabolic indicators throughout pregnancy (Catov et al., 2017). It also highlights preventive strategies such as early screening and lifestyle modifications to reduce risk. By focusing on metabolic health, this framework enhances understanding of disease susceptibility and supports interventions aimed at improving maternal health outcomes (Aung et al., 2022).

The study also draws on the Social Cognitive Theory (SCT), developed by Bandura (1986), which explains behavior as a result of interactions between personal factors, environmental influences and behavioral patterns. The theory emphasizes observational learning, self-efficacy and outcome expectations as key determinants of health behavior (Bandura, 2004). In the context of pre-eclampsia management, SCT helps explain how pregnant women adopt recommended

practices such as attending antenatal care, adhering to medication and maintaining healthy lifestyles (Glanz et al., 2015).

Social support from healthcare providers and family members plays a critical role in reinforcing positive behaviors. Additionally, confidence in one's ability to follow medical advice influences adherence and consistency. This framework guides the design of education and support interventions that enhance maternal engagement and improve health outcomes (Kwasnicka et al., 2016).

1.1.4 Contextual perspective

At Dr. Bata Military Hospital, Nsamizi, managing pre-eclampsia involves clinical assessment, continuous monitoring and provision of both medical and supportive care to pregnant women at risk. Pregnant women attending antenatal care at the facility are screened for high blood pressure and proteinuria and those identified with risk factors are monitored through regular blood pressure checks, laboratory tests and risk stratification protocols (Tumusiime & Kisekka, 2022).

The hospital's obstetrics unit uses standardized clinical pathways for hypertensive disorders, including administration of antihypertensive medications and magnesium sulfate where indicated, to prevent progression to eclampsia. These practices are consistent with national clinical guidelines and aim to reduce severe complications. The hospital also collaborates with specialist consultants for complicated cases, reflecting an integrated approach to pre-eclampsia management that aligns with best practices in tertiary maternal care (Waiswa & Kabonesa, 2023).

Despite the structured clinical procedures, significant gaps exist in managing pre-eclampsia at Nsamizi. One major gap is limited access to continuous laboratory diagnostics during nights and weekends, which delays identification of organ dysfunction, a critical aspect of severe pre-eclampsia management (Nabukenya & Ssali, 2024).

There are also shortages of essential monitoring equipment, such as fetal heart rate monitors and calibrated blood pressure devices, which compromises the ability to track fetal and maternal well-being efficiently. Human resource challenges, including a shortage of specialized obstetrics nurses and intermittent training opportunities, diminish the consistency of care provided to women with pre-eclampsia. These gaps have been documented to contribute to delayed

interventions and increased risk of adverse maternal outcomes, including higher rates of emergency cesarean sections and longer hospital stays (Kiyaga & Opio, 2023).

The Uganda Ministry of Health (MoH) has implemented several initiatives aimed at strengthening pre-eclampsia management across health facilities, including Dr. Bata Military Hospital, Nsamizi. Key interventions have included supply of essential drugs, distribution of clinical management protocols and periodic in-service training on hypertensive disorders of pregnancy for healthcare providers (Mugume & Sekandi, 2022).

Furthermore, the MoH incorporated targeted maternal health modules into national continuing medical education programs and provided mentorship support through district health teams to improve adherence to updated clinical standards. These efforts were intended to enhance early detection, timely referral and appropriate clinical management of pre-eclampsia at various levels of care.

Despite these initiatives, challenges have limited their effectiveness, resulting in incomplete implementation at the hospital level. Weak health system coordination has led to inconsistent distribution of supplies and uneven training coverage among staff, especially at rural or off-shift hours. The planned mentorship visits have often been delayed due to logistical constraints and competing priorities within the district health offices (Atukunda & Lule, 2023).

These implementation gaps have reduced the potential impact of MoH interventions, leading to continued variability in clinical practice and suboptimal adherence to pre-eclampsia management guidelines. As a result, the anticipated improvements in early identification and effective clinical response have not been fully realized in routine care at Nsamizi, hampering progress toward better maternal health outcomes.

The cumulative effect of these contextual factors on maternal health outcomes is significant. Women with pre-eclampsia who experience delayed diagnosis, insufficient monitoring, or inconsistent clinical management are at increased risk of progression to eclampsia, preterm delivery, organ dysfunction and perinatal complications such as low birth weight (Ochola & Namutebi, 2025).

These adverse outcomes not only increase the burden on the hospital's maternal ward but also have lasting implications for women's health beyond childbirth, including prolonged recovery

periods and increased likelihood of chronic hypertension. The persistence of these challenges has reinforced the critical need for sustained health system strengthening, targeted resource allocation and continuous capacity building to ensure that pre-eclampsia is managed effectively at all points of care within the facility.

1.1.2 Statement of the problem

Effective management of pre-eclampsia is crucial to prevent life-threatening complications for both mother and child (World Health Organization, 2023). Despite targeted interventions such as standardized antenatal protocols and multidisciplinary care teams, maternal and neonatal outcomes remain poor in many healthcare settings in sub-Saharan Africa (Chirwa & Banda, 2024).

For physical health, routine facility data and regional health reports indicate that the incidence of severe maternal complications related to hypertensive disorders, including pre-eclampsia and its sequelae, increased from an estimated 8.2% in 2023 to 11.5% in 2025 among women attending antenatal and delivery services (Uganda Ministry of Health Annual Health Sector Performance Report, 2025).

Emotional health outcomes similarly declined, with documented symptoms of antenatal anxiety and depressive features rising from 21% of attendees in 2023 to 29% in 2025, reflecting unmet psychosocial support needs during pregnancy (Uganda Reproductive Health and Well-Being Survey, 2025).

Quality of life measures, integrating functional status, perceived health and daily activity limitations, also demonstrate deterioration, with satisfactory quality-of-life scores among pregnant women dropping from 67% in 2023 to 52% in 2025, according to regional reproductive health surveys (Uganda Maternal Health Quality Monitoring Report, 2025).

Despite the documented decline in maternal health outcomes, there is a lack of empirical research investigating the effect of pre-eclampsia management on physical health, emotional well-being and quality of life among pregnant women at Dr. Bata Military Hospital, Nsamizi, representing a significant gap in the literature. If the poor health-related outcomes among pregnant mothers at Dr. Bata Military Hospital Nsamizi remain unaddressed, it could lead to

increased maternal and neonatal morbidity and mortality, long-term physical and psychological complications and a further decline in overall maternal quality of life.

1.3 Purpose of the study

To evaluate the management of pre-eclampsia and its effect on maternal health outcomes at Dr. Bata Military Hospital, Nsamizi Entebbe, Wakiso District, Uganda.

1.4 Specific objectives

1. To determine the prevalence and socio-demographic profile of pregnant women diagnosed with pre-eclampsia at Dr. Bata Military Hospital.
2. To assess the management practices and protocols for treatment of pre-eclampsia at the hospital.
3. To identify the factors affecting management of pre-elampsia among pregnant mothers attending maternal health services at Dr. Bata Military Hospital.

1.5. Research Questions

1. What is the prevalence of pre-eclampsia among pregnant women admitted to Dr. Bata Military Hospital, and what are their prevailing socio-demographic characteristics?
2. What are the specific clinical management practices utilized for pre-eclampsia at Dr. Bata Military Hospital, and to what extent do these practices align with standard treatment protocols/guidelines?
3. What are the patient-related, healthcare provider-related, and health system-related factors that facilitate the effective management of pre-eclampsia at Dr. Bata Military Hospital?

1.5.2. Hypothesis

1. H_1: Inadequate availability of essential drugs (specifically Magnesium Sulfate and Antihypertensives) is significantly associated with poor adherence to standard pre-eclampsia management protocols at Dr. Bata Military Hospital.

   H_0: There is no significant association between the availability of essential drugs and adherence to standard pre-eclampsia management protocols.

2. H_1): Late initiation of antenatal care (booking after 20 weeks of gestation) is significantly associated with delayed diagnosis and poor management outcomes of pre-eclampsia.
   H_0): The timing of antenatal care booking has no significant effect on the management outcomes of pre-eclampsia.
3. H_1): Primigravidity and advanced maternal age (≥ 35 years) are significantly associated with a higher likelihood of experiencing severe pre-eclampsia management challenges
   H_0): Parity and maternal age are not significantly associated with the severity of pre-eclampsia management challenges.

1.6 Scope of the study

1.6.1 **Geographical scope**

Entebbe is a municipality geographically located within and governed by Wakiso District. Wakiso is a massive, rapidly urbanizing district in central Uganda that surrounds the capital city, Kampala.

The hospital is situated in Nsamizi, which is a specific area/zone within the municipality of Entebbe. Entebbe is a peninsular town located on the northern shores of Lake Victoria. This places the study in an urban/peri-urban geographical setting, which influences the types of medical infrastructure, patient referrals, and accessibility to care available to the study subjects.

This study will be geographically delimited to the maternity and labor wards of Dr. Bata Military Hospital, Nsamizi, Entebbe, in Wakiso District, Uganda.

1.6.2 Content scope

The study will focus strictly on the clinical management of pre-eclampsia, the resulting maternal health outcomes (mortality and morbidity), and the health system/patient factors influencing this management, excluding other non-pre-eclamptic hypertensive disorders and primary perinatal outcomes. It will be carried out to determine the effect of managing pre-eclampsia on maternal health outcomes.

1.6.3 Time scope

The study will utilize a retrospective cross-sectional design, reviewing patient records from January 2024- December 2025, with primary data collection taking place between January 2024 –December 2025.The study will focus on two years' data at Dr. Bata Military Hospital.

1.7 Justification of the study

The study is justified by the limited empirical evidence on how the management of pre-eclampsia directly influences maternal health outcomes in Uganda and specifically at Dr. Bata Military Hospital, Nsamizi (Katerega & Ssembatya, 2023).

While previous research has documented the prevalence of hypertensive disorders in pregnancy and general maternal health trends, there is a notable scarcity of studies linking specific management practices such as lifestyle interventions, clinical monitoring and patient education to improvements in physical health, emotional well-being and quality of life among pregnant women (Lubwama & Kanyesigye, 2024).

This gap restricts the ability of healthcare providers and policymakers to develop evidence-based strategies tailored to high-risk populations within military and regional health facilities. Understanding the relationship between pre-eclampsia management and maternal outcomes can inform targeted interventions, enhance clinical guidelines and contribute to reducing maternal morbidity and mortality, thereby addressing both a practical and scholarly knowledge gap (Twesigye & Nalubega, 2025).

1.8 Significance of the study

Pregnant women attending Dr. Bata Military Hospital, Nsamizi: These are the primary beneficiaries, as the study will generate evidence on effective management strategies for pre-eclampsia. Improved understanding of lifestyle management, supportive care and patient education will help reduce complications, enhance physical and emotional well-being and improve overall maternal quality of life.

Healthcare providers (obstetricians, nurses, midwives and clinical officers): The study will provide insights into which management practices are most effective, enabling providers to refine clinical care protocols, improve early detection and monitoring of pre-eclampsia and

deliver targeted patient education. This can enhance clinical decision-making and job performance outcomes.

Hospital management and administrators at Dr. Bata Military Hospital: Administrators can use the findings to optimize resource allocation, ensure consistent availability of essential drugs and equipment and implement targeted staff training programs. This can lead to improved service delivery, reduced maternal complications and better hospital performance indicators.

Uganda Ministry of Health (MoH) and policymakers: The study will generate evidence on the effectiveness of current interventions and identify gaps in pre-eclampsia management. MoH can use this evidence to refine maternal health policies, strengthen clinical guidelines and develop programs to reduce maternal mortality and improve nationwide maternal health outcomes.

Researchers and academicians: By addressing an identified academic gap, the study will contribute to the scholarly literature on pre-eclampsia management in Uganda and East Africa. It will provide a foundation for future research, comparative studies and evidence-based interventions targeting maternal health.

Non-governmental organizations (NGOs) and development partners in maternal health: NGOs working in maternal health can use the study's findings to design community programs, educational campaigns and intervention strategies tailored to high-risk populations. This ensures resources are directed efficiently to interventions that have the greatest impact on maternal health outcomes.

Families and communities of pregnant women: Improved maternal health outcomes resulting from effective pre-eclampsia management reduce the risk of maternal and neonatal morbidity, which in turn benefits families by decreasing emotional stress, economic burdens and caregiving challenges associated with complications of pregnancy.

1.9 Conceptual Framework

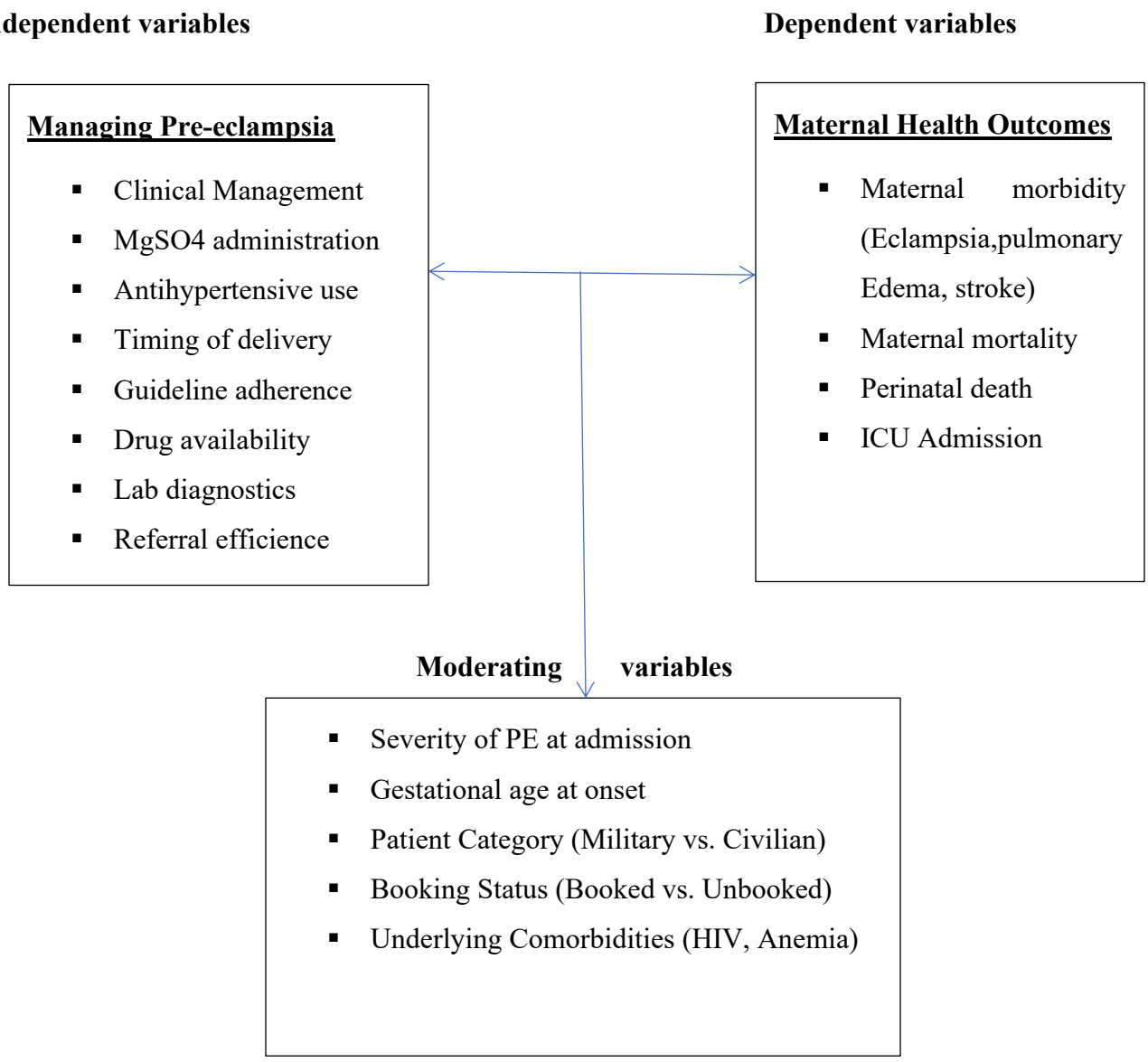


Figure 1 Conceptual framework 1

This conceptual framework postulates that the maternal health outcomes (DV) of patients with pre-eclampsia at Dr. Bata Military Hospital are directly influenced by the clinical management practices, provider competence, and health system capacities (IV). However, this relationship is not isolated; it is conditioned by moderating variables.

For instance, the effectiveness of timely Magnesium Sulfate administration (IV) in preventing eclamptic seizures (DV) is moderated by the severity of the patient's condition upon arrival and whether the patient is a military dependent or a civilian (MV), which may affect the speed of care escalation within a military facility. The retrospective chart review will quantify the IVs and DVs, while the Key Informant Interviews will explore the nuances of the moderating variables within the hospital's unique operational environment

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter reviews existing literature on the management of pre-eclampsia and its influence on maternal health outcomes. The review aims to examine findings from previous studies related to this topic and to identify gaps that the current study seeks to address. Sources considered include journal articles, academic dissertations and relevant scholarly books.

2.1 Theoretical framework

2.1.1 Health Belief Model

The study is anchored on the Health Belief Model (HBM), developed by Rosenstock et al. (1950), which explains health-related behaviors based on individuals' perceptions of susceptibility, severity, benefits and barriers. The model is important to this study as it helps explain how pregnant women perceive the risks associated with pre-eclampsia and their willingness to engage in preventive and management practices. In practice, HBM guides interventions such as health education, counseling and awareness campaigns that encourage adherence to antenatal care, medication and recommended lifestyle changes. It also incorporates cues to action, such as reminders from healthcare providers and self-efficacy, which enhances confidence in managing health behaviors (Mensah & Owusu, 2022; Ndlovu & Sibanda, 2024). This makes the model highly relevant in promoting positive maternal health outcomes.

However, the Health Belief Model has both strengths and limitations in its application. A key strength is its focus on individual perceptions, which allows healthcare providers to design targeted interventions that address specific beliefs and misconceptions about pre-eclampsia. It is also practical in improving adherence to treatment and preventive measures (Adeyemi & Okafor, 2023). On the other hand, the model is limited by its emphasis on individual decision-making, often neglecting social, cultural and economic factors that may influence behavior. Additionally, it assumes that individuals act rationally based on perceived risks and benefits, which may not always be the case in real-life settings (Tetteh & Kofi, 2025). Therefore, while HBM is useful in understanding health behaviors, it should be complemented with other theories for a more comprehensive analysis.

2.1.2 Pathophysiological theory of pre-eclampsia

The pathophysiological theory of pre-eclampsia explains the condition as arising from abnormal placental development and impaired maternal vascular adaptation. It posits that insufficient trophoblastic invasion of uterine spiral arteries leads to reduced placental perfusion, which triggers endothelial dysfunction, inflammation and systemic vasoconstriction (Roberts & Hubel, 2009).

This cascade contributes to the clinical manifestations of hypertension, proteinuria and multi-organ complications. The theory is important to the study as it provides a biomedical foundation for understanding the progression and severity of pre-eclampsia. In practice, it guides clinical monitoring of blood pressure, renal function and fetal well-being, supporting timely diagnosis and intervention. Its application is particularly relevant in hospital settings, where healthcare providers rely on physiological indicators to inform management decisions and improve maternal health outcomes (Redman & Sargent, 2010).

Despite its relevance, the pathophysiological theory has both strengths and limitations in this study. A major strength lies in its strong empirical basis, which enables precise clinical assessment and evidence-based management of pre-eclampsia. It also supports the development of targeted interventions such as antihypertensive therapy and planned delivery to reduce complications (Rana et al., 2019).

However, the theory is limited by its primary focus on biological mechanisms, often overlooking behavioral, social and environmental factors that influence maternal health outcomes. This makes it less comprehensive when used alone in explaining patient adherence and healthcare utilization. Therefore, while it is highly applicable in clinical practice, its integration with behavioral theories is necessary to provide a more holistic understanding of managing pre-eclampsia.

2.1.3 Metabolic theory of pre-eclampsia

The metabolic theory of pre-eclampsia links the condition to metabolic disturbances such as insulin resistance, obesity and dyslipidemia, which contribute to oxidative stress and endothelial dysfunction (Spracklen et al., 2014). The theory is important to the study because it highlights predisposing risk factors that can be identified and managed early in pregnancy. It provides a

practical framework for preventive care by emphasizing nutritional counseling, weight management and routine metabolic screening.

In clinical settings, this perspective supports interventions aimed at reducing modifiable risk factors and improving maternal health outcomes. It is particularly relevant in understanding variations in susceptibility among pregnant women and informs strategies for early detection and continuous monitoring throughout pregnancy (Catov et al., 2017).

However, the metabolic theory also presents notable strengths and limitations. Its strength lies in its preventive orientation, as it promotes early identification of at-risk individuals and encourages lifestyle modifications that can reduce the incidence of pre-eclampsia (Aung et al., 2022).

It also broadens the scope of management beyond treatment to include risk reduction. On the other hand, the theory may not fully explain cases of pre-eclampsia that occur in women without identifiable metabolic risk factors, limiting its generalizability. Additionally, its effectiveness depends on access to screening tools and patient adherence to lifestyle changes, which may be constrained in resource-limited settings. Thus, while it is valuable for prevention, it should be complemented with other approaches for comprehensive management.

2.1.4 The Social Cognitive Theory

The Social Cognitive Theory (SCT), developed by Bandura (1986), explains behavior as a dynamic interaction between personal, environmental and behavioral factors. It emphasizes constructs such as self-efficacy, observational learning and outcome expectations in shaping health behaviors (Bandura, 2004).

The theory is important to this study as it provides insight into how pregnant women adopt and maintain behaviors related to managing pre-eclampsia, such as attending antenatal care, adhering to medication and implementing lifestyle changes. In practice, SCT supports the design of educational and support interventions that enhance women's confidence and motivation to follow clinical advice. It also highlights the role of social support systems, including healthcare providers and family members, in reinforcing positive health behaviors and improving maternal outcomes (Glanz et al., 2015).

Nevertheless, the Social Cognitive Theory has strengths and limitations in its application to this study. A key strength is its comprehensive approach, which incorporates both individual and

environmental factors influencing behavior, making it highly relevant in understanding patient engagement and adherence. It also provides practical strategies for intervention through education, modeling and reinforcement (Kwasnicka et al., 2016). However, the theory may be limited by its reliance on cognitive processes, which can be difficult to measure and may vary across individuals. Additionally, it may not fully account for structural barriers such as limited healthcare access or economic constraints. Therefore, while SCT is valuable for explaining behavioral aspects of pre-eclampsia management, it should be used alongside biomedical perspectives for a more complete analysis.

2.2 Review of related literature

2.2.1 Prevalence and socio-demographic profile

Lifestyle management through antenatal diet and physical activity interventions has a well-documented impact on reducing excessive gestational weight gain (GWG) and improving maternal and neonatal outcomes. A comprehensive meta-analysis of 117 randomized clinical trials involving over 34,000 women found that lifestyle interventions reduced GWG by an average of 1.15 kg and lowered risks of gestational diabetes mellitus (GDM), hypertensive disorders, cesarean section, preterm delivery, and adverse neonatal outcomes compared to routine care (Teede et al., 2021).

Diet-based interventions showed the greatest effect in reducing GWG and risks of GDM, preterm delivery, large-for-gestational-age neonates, and neonatal intensive care admissions, while physical activity was particularly effective in lowering hypertensive disorders and cesarean rates (Teede et al., 2021).

Preconception lifestyle modifications are critical for optimizing maternal health before pregnancy, including weight management, nutrition optimization, cessation of harmful substances, and mental health support. These interventions have been shown to improve perinatal outcomes but face challenges with patient compliance due to multifactorial barriers such as lack of awareness or access to care (Kartchner et al., 2025).

Emerging programs combining dietitian consultations, health coaching, and digital tools aim to enhance adherence and effectiveness in women planning pregnancy with overweight or obesity

(Mitchell et al., 2025). Such pre-pregnancy interventions hold promise for improving pregnancy outcomes but require further evidence from ongoing randomized controlled trials.

Targeted lifestyle interventions for women at high risk of GDM demonstrate significant benefits. A randomized controlled trial showed that dietary guidance, health education, and weight management reduced the incidence of GDM by nearly 47% and pregnancy-induced hypertension by 74% compared to standard care (Xu et al., 2023).

These findings emphasize the importance of early screening and tailored lifestyle counseling to prevent metabolic complications during pregnancy. However, no significant differences were observed in macrosomia or cesarean section rates in this study, indicating that some outcomes may require longer or more intensive intervention.

In low-resource settings such as Nigeria, maternal obesity a modifiable risk factor influenced by lifestyle was associated with doubled odds of adverse pregnancy outcomes including macrosomia, cesarean section, birth asphyxia, and GDM (Adeoye et al., 2025).

Regular physical activity was linked to decreased odds of obesity during pregnancy, highlighting the global relevance of lifestyle management for improving maternal health across diverse populations. This underscores the need for culturally appropriate interventions promoting healthy diet and exercise in resource-limited contexts.

Lifestyle modification also affects inflammatory pathways relevant to maternal-fetal health. A secondary analysis from the PEARS trial found that a low-glycemic index diet combined with physical activity reduced the dietary inflammatory index during pregnancy by 10%, which may influence cardiometabolic risk phenotypes differently depending on fetal sex (Killeen et al., 2021). While early pregnancy inflammatory potential was not broadly associated with maternal or child outcomes, increased adverse cardiometabolic risk was noted among women delivering male infants. These findings suggest complex biological interactions warranting further investigation.

Exercise-based antenatal interventions have demonstrated particular efficacy in reducing hypertensive disorders among overweight or obese pregnant women. Meta-analyses indicate that exercise alone significantly lowers the odds of hypertensive complications (OR ~0.52), while combined behavioral therapy supporting diet and exercise adherence reduces maternal weight

gain modestly but meaningfully (Behnam et al., 2022). Higher frequencies of physical activity correlate with better outcomes; however, heterogeneity in intervention design limits definitive conclusions about optimal intensity or components.

The intensity of antenatal healthy lifestyle services may influence effectiveness but remains uncertain. A retrospective cohort study comparing low versus enhanced midwife-led services found no significant difference in mean GWG overall; however, multiparous women receiving enhanced support had lower odds of excessive weight gain and small-for-gestational-age infants (Fair & Soltani, 2024). No clear benefits were observed for nulliparous women or other maternal/neonatal outcomes. This suggests that intervention tailoring by parity or obesity class may be necessary to optimize results.

Beyond weight-related measures, lifestyle modification improves thyroid function, blood pressure control, and glycemic parameters during pregnancy. A quasi-experimental study reported significant reductions in thyroid-stimulating hormone levels (from 3.2 to 2.1 mIU/L), systolic/diastolic blood pressure (by 12/10 mmHg), random blood glucose (by 15 mg/dL), and proteinuria prevalence following a structured program including diet changes, supervised exercise, and stress reduction over 35–60 days (Choudhary & Singh, 2025). These improvements highlight the potential for non-pharmacological strategies integrated into routine antenatal care to enhance diverse aspects of maternal health.

Gestational diabetes remains a major concern due to its short- and long-term impacts on mother and child. Lifestyle modification is currently the primary recommended approach for prevention and management given limited safe pharmacological options during pregnancy (Nakshine & Jogdand, 2023). Although oral agents like metformin show promise, safety concerns persist. The literature calls for multidisciplinary research to refine individualized lifestyle strategies addressing diet quality and physical activity tailored to risk profiles. Overall evidence supports lifestyle management as essential for reducing GDM incidence and improving maternal-fetal outcomes but highlights gaps requiring further investigation.

Extensive research demonstrates that lifestyle management before and during pregnancy positively influences maternal health by reducing excessive GWG; lowering risks of GDM, hypertensive disorders; decreasing cesarean rates; improving metabolic parameters; and enhancing neonatal outcomes globally across diverse populations (Teede *et al.,* 2021).

Challenges remain regarding intervention intensity optimization, patient adherence especially preconceptionally, cultural adaptation in low-resource settings, and understanding mechanistic pathways such as inflammation modulation (Killeen *et al.,* 2021).

Additional research highlights that combining behavioral therapy with diet and exercise may better prevent adverse effects related to maternal obesity than single-component interventions alone. A systematic review found that behavioral therapy-supported combined interventions significantly reduced maternal weight gain and neonatal birthweight compared to controls; higher frequencies of physical activity improved these results further (Behnam *et al.,* 2022). However, high heterogeneity among studies due to differing intervention designs limits definitive conclusions about optimal approaches.

Furthermore, challenges remain regarding patient adherence especially in preconception periods where motivation may vary widely. Multifactorial barriers such as socioeconomic status, cultural beliefs, healthcare access limitations, and psychological factors affect compliance with recommended lifestyle changes (Kartchner *et al.,* 2025).

Addressing these barriers through personalized counseling approaches incorporating digital health tools shows promise but requires rigorous evaluation through well-designed trials like the ongoing BEGIN BETTER study targeting overweight/obese women planning conception (Mitchell et al., 2025).

2.2.2 Management practices and protocols for treatment of pre-eclampsia at the hospital.

The management of pre-eclampsia at Dr. Bata Military Hospital is fundamentally guided by the Uganda Ministry of Health (MoH) Clinical Guidelines and the World Health Organization (WHO) recommendations tailored for low- and middle-income countries (WHO, 2011; MoH, 2016).

The primary protocol begins with rigorous screening and accurate diagnosis, defined by sustained hypertension (blood pressure ≥140/90 mmHg) accompanied by proteinuria after 20 weeks of gestation. At this military facility, standard practice dictates that once a diagnosis is suspected, continuous maternal and fetal monitoring is initiated to assess the severity of the condition. This includes regular vital sign checks, assessment of deep tendon reflexes, and fetal

heart rate monitoring to detect early signs of placental insufficiency or impending eclampsia (Duley et al., 2019).

For women presenting with mild to moderate pre-eclampsia, the hospital's protocol emphasizes conservative management aimed at prolonging the pregnancy to achieve fetal viability, provided maternal conditions remain stable. The cornerstone of this outpatient or inpatient stabilization is antihypertensive therapy to prevent the progression to severe hypertension and reduce the risk of cerebrovascular accidents.

First-line oral antihypertensives utilized at the facility typically include Methyldopa, Labetalol, or Nifedipine, aligning with national protocols that prioritize drugs with proven safety profiles for both the mother and the fetus (Muganyizi & Kidanto, 2013). Patients are closely monitored for any progression to severe features, with the clinical team balancing the threshold for intervention against the risks of iatrogenic prematurity (MoH, 2016).

When a patient's condition escalates to severe pre-eclampsia—characterized by blood pressure ≥160/110 mmHg, severe headaches, visual disturbances, or end-organ dysfunction—the management protocol shifts to acute stabilization and seizure prophylaxis. Dr. Bata Military Hospital adheres strictly to the WHO recommendation of using Magnesium Sulfate as the first-line drug for the prevention and treatment of eclamptic seizures, recognizing its superior efficacy over diazepam or phenytoin (Altman et al., 2002).

The standard Pritchard or Zuspan loading and maintenance regimens are administered under close surveillance, monitoring for signs of Magnesium toxicity such as loss of patellar reflexes or respiratory depression. Concurrently, acute severe hypertension is managed using intravenous antihypertensive, such as Hydralazine or Labetalol, to rapidly lower blood pressure to safe levels (below 160/110 mmHg) while preparing for expedited delivery (Duley et al., 2019).

The definitive treatment for pre-eclampsia at the hospital, irrespective of gestational age in severe cases, is the delivery of the fetus and placenta. The timing and mode of delivery are dictated by gestational age, fetal status, cervical favorability, and the severity of maternal symptoms. For pregnancies beyond 34 weeks with severe pre-eclampsia, or if maternal or fetal distress is evident at any gestational age, the protocol mandates prompt delivery, often via cesarean section if vaginal birth is not imminent (MoH, 2016).

For pregnancies between 28 and 34 weeks, the medical team may administer corticosteroids (such as Dexamethasone) to accelerate fetal lung maturity, delaying delivery by a recommended 48 hours only if maternal conditions strictly permit (Magee et al., 2014). Postpartum, the protocol requires continued monitoring of blood pressure and seizure risk for at least 72 hours, as pre-eclampsia can persist or present de novo after delivery.

Despite adherence to standardized protocols, the practical management of pre-eclampsia at Dr. Bata Military Hospital is inevitably influenced by the unique logistical and systemic realities of a regional facility in Wakiso District.

While military hospitals in Uganda generally benefit from more structured supply chains compared to standard civilian public health centers, challenges such as intermittent shortages of essential drugs like Magnesium Sulfate, or delays in obtaining critical laboratory results (such as liver enzymes and platelet counts for HELLP syndrome), can occasionally hinder optimal protocol execution (Kawooya et al., 2016).

Furthermore, for cases of severe multi-organ dysfunction that exceed the facility's intensive care capacity, the efficacy of the management protocol relies heavily on the existence of functional referral pathways to higher-level national referral hospitals, such as Mulago or Entebbe Regional Referral Hospital (Nabudere et al., 2020).Supportive management in pre-eclampsia encompasses a range of interventions including pharmacological treatments, psychological support, and close physiological monitoring aimed at reducing disease severity and improving maternal and neonatal outcomes (Dong et al., 2021).

Psychological distress, including anxiety and depression, is notably higher in women with pre-eclampsia compared to controls, correlating with adverse maternal and neonatal outcomes like preterm birth and NICU admissions (Pittara et al., 2021). The neurobiological mechanisms linking psychological distress to pre-eclampsia involve sympathetic nervous system hyperactivity, hypothalamic-pituitary-adrenal axis dysregulation, and elevated pro-inflammatory cytokines, suggesting that integrating psychological support into management could positively influence disease progression and outcomes (Matovu, 2025). This underscores the importance of addressing mental health as part of supportive care to improve both maternal well-being and pregnancy results.

Long-term maternal health consequences following pre-eclampsia include increased risks for cardiovascular diseases, cerebrovascular events, diabetes, dyslipidemia, and mortality. An umbrella review found robust evidence linking pre-eclampsia to these chronic conditions, emphasizing the need for ongoing surveillance and supportive interventions beyond pregnancy to reduce long-term morbidity (Pittara *et al.,* 2021). These findings suggest that supportive management should extend into postpartum care to monitor and manage emerging health risks effectively.

Short-term maternal complications associated with pre-eclampsia include eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes, low platelets), acute kidney injury, and increased cesarean delivery rates (Dong *et al.,* 2021).

Neonatal complications often involve preterm birth, low birth weight, respiratory distress, and NICU admission. A retrospective observational study demonstrated that women receiving comprehensive supportive care had better biochemical marker profiles (lower proteinuria) and fewer severe complications compared to those without such management (Socol et al., 2024). This indicates that early detection combined with tailored supportive strategies can mitigate immediate adverse outcomes.

Early-onset severe pre-eclampsia (before 34 weeks gestation) presents heightened risks for both mother and fetus due to its aggressive course. A prospective cross-sectional study reported high rates of maternal organ dysfunctions such as anemia and coagulation abnormalities alongside significant fetal mortality (Yeh *et al.,* 2022).

Treatment protocols involving magnesium sulfate for seizure prophylaxis and antihypertensive drugs were critical components of supportive management aimed at stabilizing patients until delivery was safe (Rai *et al*., 2025). Vigilant monitoring with individualized care plans is essential in this subgroup to optimize survival chances.

Comparing expectant (supportive) versus interventional management in severe pre-eclampsia remote from term (28–34 weeks) reveals that expectant management prolongs pregnancy safely without increasing maternal complications. This approach resulted in higher gestational age at delivery, greater birth weights, improved Apgar scores, and fewer neonatal complications compared to immediate delivery (Trivedi et al., 2023). Intensive monitoring during expectant management is key to balancing maternal safety while enhancing fetal maturity.

Self-monitoring of blood pressure (SMBP) during pregnancy has emerged as a supportive tool allowing pregnant women autonomy in managing hypertensive disorders including pre-eclampsia. Systematic review evidence suggests SMBP is feasible, acceptable, and yields maternal and neonatal outcomes comparable to clinic-based monitoring without increasing adverse events. Additionally, SMBP may reduce anxiety by empowering patients but requires further research in resource-limited settings (Yeh et al., 2022). Incorporating SMBP into supportive management could enhance early detection of worsening hypertension.

Despite promising findings on various aspects of supportive management for pre-eclampsia, limitations exist including small sample sizes, lack of randomized controlled trials for some interventions, and heterogeneity in outcome measures across studies (Matovu, 2025).

More rigorous research is needed to establish standardized protocols integrating pharmacological treatment with psychological support and self-monitoring tools. Such comprehensive approaches hold potential not only for improving immediate pregnancy outcomes but also for reducing long-term health risks associated with pre-eclampsia (Trivedi et al., 2023).

Supportive management strategies combining active obstetric care with psychological interventions and patient empowerment through self-monitoring demonstrate beneficial effects on both maternal health outcomes during pregnancy and long-term morbidity reduction (Dong et al., 2021). Early identification of risk factors followed by individualized care plans can decrease the severity of recurrent pre-eclampsia episodes while improving neonatal survival rates. Future research should focus on validating these approaches through large-scale trials to optimize guidelines for managing this complex condition effectively (Matovu, 2025).

Supportive management in pre-eclampsia not only focuses on immediate pregnancy outcomes but also plays a critical role in mitigating long-term maternal health risks. Women with a history of pre-eclampsia face significantly increased risks of cardiovascular diseases, cerebrovascular events, diabetes, and dyslipidemia later in life. An umbrella review synthesizing multiple meta-analyses found robust evidence linking pre-eclampsia to these chronic conditions, underscoring the importance of ongoing surveillance and supportive interventions beyond the perinatal period to improve long-term maternal health (Pittara et al., 2021). This highlights that supportive management should extend into postpartum care with strategies aimed at early detection and prevention of chronic diseases.

The integration of psychological support within the management framework is emerging as a vital component due to the high prevalence of anxiety and depression among women with pre-eclampsia. Psychological distress has been associated with adverse maternal and neonatal outcomes, potentially mediated by neurobiological pathways such as sympathetic nervous system hyperactivity and elevated inflammatory cytokines. Addressing mental health through counseling or stress reduction techniques may therefore improve physiological responses and pregnancy outcomes, suggesting that comprehensive supportive care must include mental health assessment and intervention (Matovu, 2025).

Expectant management, a form of supportive care involving close monitoring rather than immediate delivery in cases of severe pre-eclampsia remote from term, has demonstrated benefits for both mother and fetus. Studies show that prolonging pregnancy under intensive surveillance reduces neonatal complications by allowing greater fetal maturity without increasing maternal morbidity. This approach requires careful balancing of risks but supports the notion that supportive management can optimize timing of delivery to improve overall outcomes (Trivedi et al., 2023). Such findings advocate for individualized care plans tailored to disease severity and gestational age.

Self-monitoring of blood pressure (SMBP) during pregnancy represents an innovative supportive strategy empowering women to actively participate in their care. Evidence indicates SMBP is feasible, acceptable, and yields comparable maternal and neonatal outcomes to clinic-based monitoring without increasing adverse events. By facilitating earlier detection of hypertensive deterioration, SMBP may reduce emergency visits and anxiety related to uncertainty about blood pressure control. Incorporating SMBP into supportive management protocols could enhance patient engagement and timely intervention, especially in resource-limited settings where frequent clinic visits are challenging (Dickerson et al., 2025).

2.2.3 Patient-related, healthcare provider-related, and health system-related factors that facilitate the effective management of pre-eclampsia

The effective management of pre-eclampsia is not solely a clinical endeavor; it requires a complex, synergistic interplay of patient-related, healthcare provider-related, and health system-related factors. When these three pillars align, the progression of pre-eclampsia to severe morbidity or maternal mortality can be successfully averted. Understanding the specific factors that facilitate this effectiveness is critical, particularly in resource-limited settings where systemic vulnerabilities often exacerbate clinical risks (Kruk et al., 2018).

At the patient level, health literacy and timely health-seeking behavior are primary facilitators for effective management. Women who understand the physiological changes of pregnancy and recognize the danger signs of pre-eclampsia such as severe headaches, visual disturbances, epigastric pain, and sudden facial or hand swelling are significantly more likely to present to a health facility early (Soubeiga et al., 2014).

This early presentation allows for prompt diagnosis and intervention before the condition escalates to severe pre-eclampsia or eclampsia. Furthermore, a patient’s adherence to prescribed antihypertensive regimens and their active engagement in birth preparedness and complication readiness (BPCR) facilitate care. When patients have pre-arranged transport, emergency funds, and a clear understanding of when to seek help, the "first delay" in accessing care is substantially reduced (Sialubanje et al., 2015).

Healthcare provider-related factors are equally critical, with clinical competence and strict adherence to evidence-based protocols standing out as major facilitators. Providers who are proficient in accurately measuring blood pressure, correctly quantifying proteinuria, and recognizing the subtle early signs of end-organ dysfunction can initiate life-saving interventions promptly. The timely administration of Magnesium Sulfate for seizure prophylaxis and the appropriate use of intravenous antihypertensives require a high level of clinical confidence and protocol adherence. When providers operate with a high index of suspicion rather than dismissing early symptoms as normal pregnancy discomfort and follow standardized national guidelines, the quality and safety of pre-eclampsia management improve drastically (Ameh et al., 2019).

Beyond technical clinical skills, the attitudes and communication styles of healthcare providers significantly facilitate effective management. A culture of respectful maternity care encourages open communication, making patients more willing to attend antenatal visits and report worsening symptoms without fear of stigma or neglect (Afulani et al., 2018).

Additionally, effective interdisciplinary teamwork and clear communication among midwives, obstetricians, anesthetists, and laboratory technicians streamline the coordination of emergency care. When a cohesive team dynamic exists—characterized by mutual respect and shared decision-making—clinical interventions, such as the timing of induction of labor or the execution of an emergency cesarean section, are executed rapidly and efficiently (Tilley et al., 2018).

At the health system level, the consistent availability of essential resources is perhaps the most fundamental facilitator of effective care. A facility that is reliably stocked with critical medications such as Magnesium Sulfate, oral and intravenous antihypertensives, and corticosteroids for fetal lung maturity removes the primary barrier to acute stabilization (Engel et al., 2019).

Furthermore, the presence of functional diagnostic equipment, including calibrated blood pressure monitors, continuous fetal heart rate monitors, and reliable laboratory capabilities to run rapid tests for liver enzymes, creatinine, and platelet counts, empowers providers to make swift, accurate clinical classifications of disease severity. High-quality health systems recognize that without these physical resources consistently at hand, even the most skilled providers are hindered in their ability to manage the condition effectively (Kruk et al., 2018).

Finally, robust health system policies and functional referral networks act as structural facilitators that bridge gaps in care. Facilities that prioritize continuous medical education (CME) and conduct regular skills drills (such as simulation training for obstetric emergencies) ensure that provider knowledge remains current and team responses are rehearsed (Harper et al., 2015).

Moreover, a well-coordinated referral system, supported by reliable emergency transport and effective communication networks between lower-level clinics and higher-level hospitals, guarantees that patients who exceed a facility's clinical capacity—such as those requiring intensive care or advanced dialysis—are safely and rapidly transferred. This systemic safety net ensures that the management of pre-eclampsia is seamless, continuous, and comprehensive from the community level to the highest level of care (Onyango & Omondi, 2020).

Patient management plays a crucial role in shaping maternal health outcomes in pre-eclampsia, a hypertensive disorder of pregnancy associated with significant morbidity and mortality. Active management strategies, including low-dose aspirin administration combined with psychological and physiological interventions, have demonstrated effectiveness in reducing the incidence and severity of recurrent pre-eclampsia.

A prospective study showed that women with previous pre-eclampsia who received such active management had fewer severe recurrences and improved neonatal outcomes, including reduced stillbirths and small-for-gestational-age infants, although the study's small sample size and lack of controls warrant cautious interpretation (Dong et al., 2021). This highlights the potential of targeted interventions to mitigate risks in high-risk populations.

Low-dose aspirin is widely recognized as a preventive measure for pre-eclampsia in high-risk pregnant women. Retrospective analyses indicate that aspirin significantly lowers the incidence of pre-eclampsia without increasing postpartum hemorrhage risk, supporting its safety profile (Zhang & Wang, 2024).

The timing and dosage remain areas for further research to optimize benefits. These findings align with international guidelines recommending aspirin use between 12 and 28 weeks gestation for prevention (Dickerson et al., 2025). Thus, pharmacologic prophylaxis is a cornerstone of patient management that positively influences maternal outcomes by preventing disease onset or progression.

Expectant versus interventional management strategies for severe pre-eclampsia remote from term (28–34 weeks) reveal important trade-offs. A prospective study comparing these approaches found that expectant management with intensive monitoring safely prolonged pregnancy by an average of 11 days without increasing maternal complications, resulting in

better fetal outcomes such as higher birth weight and improved APGAR scores (Trivedi et al., 2023).

This suggests that carefully selected expectant management can improve neonatal health while maintaining maternal safety, emphasizing individualized care plans based on gestational age and disease severity.

Planned delivery between 34 and 36 weeks gestation in late preterm pre-eclampsia has been shown to reduce severe maternal hypertension and stillbirth rates without increasing neonatal morbidity or mortality.

A large randomized controlled trial conducted in low- and middle-income countries demonstrated that planned delivery decreased maternal morbidity while maintaining non-inferior perinatal outcomes compared to expectant management (Beardmore-Gray et al., 2023). This evidence supports timely delivery as an effective intervention to balance maternal risks against fetal maturity considerations, particularly in resource-limited settings where prolonged monitoring may be challenging.

Early detection through enhanced healthcare provider education is vital for improving maternal outcomes. Systematic reviews highlight gaps in midwives' knowledge regarding early signs and risk factors of pre-eclampsia, which can delay diagnosis and treatment (Emilda et al., 2023).

Regular blood pressure monitoring and adherence to evidence-based guidelines are essential components of early intervention strategies. Community health workers also play a key role in raising awareness among pregnant women about symptom recognition, facilitating timely healthcare seeking behavior. Strengthening education at multiple levels can thus improve patient management efficacy.

In low- and middle-income countries (LMICs), socio-economic, cultural, and systemic barriers complicate effective pre-eclampsia management. Many LMICs lack standardized guidelines or consensus on prevention, diagnosis, and treatment protocols (Soundararajan et al., 2024). Adapting international recommendations to local contexts through cost-effective strategies is critical to reducing maternal mortality related to hypertensive disorders. Government investment in public health initiatives targeting pre-eclampsia education, early diagnosis, and treatment infrastructure is necessary to overcome these challenges.

Severe early-onset pre-eclampsia (before 34 weeks) presents heightened risks for both mother and fetus due to its unpredictable progression. Studies report high rates of maternal complications such as multi-organ dysfunction, anemia, coagulation abnormalities, and significant fetal mortality including intrauterine death (Rai et al., 2025).

Management typically involves magnesium sulfate administration for seizure prophylaxis alongside antihypertensive therapy. Vigilant monitoring and individualized care plans are essential to improve survival rates; however, this subgroup remains particularly vulnerable despite advances in patient management. Current clinical guidelines emphasize uniform departmental protocols for managing hypertensive disorders during pregnancy but acknowledge that the underlying causes of pre-eclampsia remain unclear (Magee et al., 2021).

They recommend offering affected women opportunities to participate in research studies to advance understanding of pathophysiology and optimize clinical care. This approach underscores the importance of integrating evidence-based practice with ongoing investigation to refine patient management strategies continually.

Emerging therapies targeting molecular pathways implicated in pre-eclampsia pathogenesis—such as antiangiogenic agents, hypoxia-inducible factor inhibitors, statins, and supplements like CoQ10 offer promising adjuncts to traditional management focused on blood pressure control and timely delivery (Dickerson et al., 2025). Addressing health disparities is also critical; for example, Black women face disproportionately higher risks due to genetic factors compounded by systemic inequities. Comprehensive patient management must therefore incorporate both biomedical innovations and social determinants of health to improve maternal outcomes globally.

Effective patient management encompassing pharmacologic prevention (low-dose aspirin), tailored timing of delivery based on disease severity and gestational age, enhanced provider education for early detection, context-specific adaptations especially in LMICs (Magee et al., 2021).

Vigilant care for early-onset cases, adherence to standardized protocols with research integration, and emerging therapeutic approaches collectively contribute to improved maternal health outcomes in pre-eclampsia (Dong et al., 2021). Despite progress, challenges remain including

knowledge gaps among providers, resource limitations in LMICs, unclear etiology necessitating further research, and persistent health disparities requiring multifaceted solutions.

Patient management of pre-eclampsia extends beyond clinical interventions to include comprehensive monitoring and follow-up care, which are essential for mitigating both immediate and long-term maternal health risks. Women with a history of pre-eclampsia face increased incidences of chronic hypertension, cardiovascular disease, kidney dysfunction, diabetes, and mental health disorders later in life (Socol et al., 2024).

Effective patient management must therefore incorporate postpartum surveillance and lifestyle counseling to address these risks proactively. This holistic approach can improve long-term maternal health outcomes by facilitating early detection and treatment of chronic conditions that may arise after pregnancy complicated by pre-eclampsia.

The role of healthcare provider education and system-level protocols is critical in optimizing patient management and improving maternal outcomes. Uniform departmental guidelines and regular audits of maternal and fetal outcomes help standardize care quality and identify areas for improvement (Magee et al., 2021).

However, knowledge gaps among midwives and other frontline providers regarding early signs and risk factors for pre-eclampsia remain a significant barrier to timely diagnosis and intervention (Emilda et al., 2023). Strengthening training programs, promoting adherence to evidence-based guidelines, and fostering multidisciplinary collaboration are necessary steps to enhance early detection capabilities and ensure consistent application of best practices.

In low- and middle-income countries (LMICs), socio-economic challenges, limited healthcare infrastructure, and lack of consensus on management protocols complicate effective patient care for pre-eclampsia. Adaptation of international guidelines to local contexts is crucial for improving outcomes in these settings (Soundararajan et al., 2024).

Cost-effective strategies such as community health worker involvement in education, early screening programs, and government-supported public health initiatives can bridge gaps in access to care. Addressing cultural barriers and legislative support also plays a vital role in ensuring that women receive timely diagnosis and appropriate management, ultimately reducing maternal mortality related to hypertensive disorders.

Emerging therapeutic approaches targeting the molecular mechanisms underlying pre-eclampsia offer promising adjuncts to traditional management focused on blood pressure control and delivery timing. Investigational treatments including antiangiogenic agents, hypoxia-inducible factor inhibitors, statins, CoQ10 supplementation, nitric oxide donors, and hydrogen sulfide donors are under study for their potential to improve maternal outcomes (Dickerson et al., 2025).

Additionally, addressing health disparities such as the disproportionately high risk among Black women due to genetic predispositions compounded by systemic inequities—is essential for equitable patient management. Integrating these biomedical innovations with social determinants of health frameworks may lead to more personalized and effective care strategies for diverse populations affected by pre-eclampsia.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter describes the research methods that will be used to conduct the study. It outlines the research design, study area, study population, sample size determination, sampling techniques, data collection methods and instruments, data quality control, data analysis procedures, and ethical considerations

3.1 Research Design

The study adopted a **Retrospective Cross-Sectional Analytical Design** (Chart Review). It directly answers the core question of the title by quantifying how pre-eclampsia was managed and what the measurable outcomes were, used data that already exists within the hospital's registers and patient files**.** The quantitative component will be used to establish statistical relationships between pre-eclampsia management practices (lifestyle management, supportive management, and patient education) and maternal health outcomes. The qualitative component will complement the quantitative findings by exploring healthcare providers' perspectives on the effectiveness of management strategies and existing challenges.

This design was appropriate because it allowed the researcher to collect data at a single point in time while examining associations between variables.

3.2 Study Area

The study was conducted at Dr. Bata Military Hospital, Nsamizi, located in Entebbe Municipality, Wakiso District, Uganda.

The hospital provides comprehensive maternal and child health services, including antenatal care, delivery services, and management of obstetric complications such as pre-eclampsia. It serves both military personnel and civilians and acts as a referral facility within the region.

3.3 Study Population

The study targeted data extractions from files and health worker respondents:

The records of all pregnant women who were admitted to Dr. Bata Military Hospital with a diagnosis of pre-eclampsia (mild, severe, or eclampsia) between January 2024 to December 2025.

Pregnant women diagnosed with pre-eclampsia who attended antenatal and maternity services, ICU at Dr. Bata Military Hospital; and Healthcare providers, including doctors, midwives, nurses, and clinical officers involved in maternal care

The data generated included the timing of admission, types of antihypertensives used, administration of Magnesium Sulfate (timing and dosage), gestational age at delivery, and mode of delivery (cesarean section vs. vaginal delivery). Data extracted will also focus on the end results. This includes maternal mortality, maternal morbidity for instance occurrence of eclampsia, HELLP syndrome, pulmonary edema, ICU admission, need for blood transfusion, and fetal outcomes to include stillbirth, APGAR scores, neonatal death.

3.4 Sample Size Determination

3.4.1 Quantitative Sample Size

The sample size for pregnant women who attended the hospital was determined using Cochran's formula that calculated the minimum sample size for a desired level of precision (margin of error), confidence level, and estimated proportion of an attribute in an infinite or large population. It is commonly used when studying large populations, typically requiring a 50% estimated proportion

Cochran's formula: $\mathbf{n_0 = Z^2 \times p(1-p) / e^2.}$

Each variable controls a different dimension of precision. Z (z-score) is determined by your confidence level.

Determine Z-value: For a 95% confidence level, use 1.96

Estimate Proportion (P): If unknown, use 0.5 (50%) for the most conservative estimate.

Determine Margin of Error (e): expressed as a decimal (e.g., 5% = 0.05)

$\mathbf{n_0 = Z^2 \times p(1-p) / e^2.}$

1.96*1.96*05(1-0.5)/0.05*0.05

$\mathbf{n_0}$**= 385 files**

3.4.2 Qualitative Sample Size

A total of **20–30 healthcare providers** will be purposively selected for interviews until data saturation is achieved.

3.5 Sampling Techniques

Systematic sampling or consecutive sampling of all patient files with a confirmed diagnosis of pre-eclampsia (mild, severe, or eclampsia) will be used within the study period for quantitative data collection, the researcher will deliberately and purposively select individuals with direct experience in managing pre-eclampsia. This will include obstetricians/gynecologists, medical officers, senior midwives, and theater nurses approximately 10 to 15 participants.

3.6 Inclusion and Exclusion Criteria

Inclusion Criteria

First, general guidance on defining inclusion and exclusion criteria was well covered in methodological literature. For example, designing Clinical Research emphasizes that eligibility criteria should clearly define the target population to ensure internal validity and reduce bias (Hulley, et al 2013).

Qualitative, Quantitative, and Mixed Methods Approaches explains that inclusion and exclusion criteria are essential for delimiting the study population and aligning it with the research objectives (Cresswell, 2018)

Pregnant women who were diagnosed with pre-eclampsia, women attended antenatal or maternity services during the study period and Healthcare providers directly involved in maternal care will be include in the study.

The study included chart review of the pregnant women were clinically diagnosed with pre-eclampsia. This group is central to the investigation as they represent the primary population affected by the condition, enabling the study to assess clinical outcomes, management practices, and associated risk factors. Inclusion was based on documented diagnosis in medical records or confirmation by a qualified healthcare professional during the study period (Hulley, et al 2013).

The study involved women who attended antenatal care (ANC) or maternity services during the study period.

Healthcare providers who were directly involved in maternal care will be included in the study. This will comprise of midwives, nurses, and medical doctors working in antenatal, delivery, and postnatal units. Their inclusion is critical for generating insights into clinical practices, challenges in managing pre-eclampsia, adherence to treatment guidelines, and health system factors influencing maternal outcomes.

Exclusion Criteria

Pregnant women who did not have a clinical diagnosis of pre-eclampsia will be excluded from the study. Since the primary focus is on understanding the characteristics, management, and outcomes associated with pre-eclampsia, including women without the condition would dilute the specificity of the findings and limit the study's ability to draw meaningful conclusions about the target population (World Medical Association 2013).

Health workers who are not directly involved in maternal care will not be included in the study. The research specifically seeks insights from professionals engaged in antenatal, delivery, and postnatal services, as they are most knowledgeable about the clinical management of pre-eclampsia. Including staff outside this scope would contribute limited relevant information and reduce the study's focus on maternal healthcare practice (WHO,2018)

3.7 Data Collection Methods & tools

3.7.1 Quantitative data method

Retrospective Chart Review

A Retrospective Chart Review/structured data extraction checklist/tool will be designed and pre-tested on a few records to ensure clarity and accuracy; and used to generate the quantitative data from the files.

Trained research assistants often nurse or medical clinical officer's familiar with medical terminology through the archives, locate the files using register numbers, and transcribe the data from the doctors' notes and nurses' charts onto the extraction checklist. Maternal age, parity, military/civilian status, blood pressure on admission, gestational age at onset, type of antihypertensives used, use and dosage of Magnesium Sulfate, timing of administration (within 1 hour of diagnosis?), and gestational age at delivery.

Data on maternal survival, progression to eclampsia, occurrence of HELLP syndrome, ICU admission, need for blood transfusion, and length of hospital stay including Perinatal Outcomes: Stillbirth, live birth, APGAR scores at 5 minutes, and neonatal death will be extracted from the files.

3.7.2 Qualitative data method

While the quantitative data will show the clinical reality on paper, the qualitative data will explore the "why" and "how." It was to uncover the hidden systemic barriers, provider experiences, and contextual realities of managing pre-eclampsia at the facility. A semi-structured Key informant guide was used for healthcare providers focusing on: clinical practices, resource availability training and guideline adherence and maternal health outcomes. An In-depth interview was conducted with healthcare providers to gather qualitative insights. The key informants included Healthcare providers currently or recently working in the maternity department of Dr. Bata Military Hospital.

3.8 Validity and Reliability of Instruments

3.9.1 Validity

Content validity will be ensured through expert review by supervisors and public health specialists. The Content Validity Index (CVI) will be calculated, and a value of 0.7 or above will be considered acceptable.

3.8.2 Reliability

Reliability of the Chart review was tested using Cronbach's Alpha, where a coefficient of **0.7 or higher** will indicate acceptable internal consistency.

3.9 Data Collection Procedure

- An introduction letter will be obtained from Nkumba University
- Permission will be sought from hospital administration
- Research assistants will be trained
- Pre-testing of tools will be conducted
- Data will be collected over a period of three months

3.10 Data Analysis

3.10.1 Quantitative Data Analysis &Interpretation

Data was entered and analyzed using **SPSS** version 31, 2025.

Descriptive statistics were presented using Frequencies tables, percentages mean and inferential Statistics through Pearson correlation and multiple regression analysis

3.10.2 Qualitative Data Analysis& Interpretation

Qualitative data was analyzed using thematic analysis**,** involving transcription, coding, theme development and Interpretation

3.11 Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of Nkumba University prior to the commencement of the study. This step was critical to ensure that the research methodology, data collection procedures, and participant protection strategies strictly adhere to national and international ethical standards for health research.

Formal administrative permission was sought and granted by the Directorate of Dr. Bata Military Hospital before any data collection begins. Given the institution's military status, securing this authoritative clearance was a mandatory prerequisite to gain legitimate access to the maternity unit, patient medical records, and the healthcare providers employed at the facility.

Informed consent was systematically obtained from all participating healthcare workers before the start of any qualitative interviews. Each potential participant was provided with clear, comprehensive information regarding the study’s purpose, procedures, potential risks, and benefits, ensuring they fully understand the nature of their involvement before providing written consent.

Strict measures were enforced to uphold the confidentiality and anonymity of all individuals associated with the study. Healthcare workers participating in interviews will be assigned alphanumeric codes or pseudonyms (e.g., HW 1, HW 2) to ensure their identities remain entirely anonymous in the final report, while all patient files extracted for the quantitative review was de-identified to prevent any linkage to specific medical cases.

Participation in the study was strictly voluntary, ensuring that no healthcare worker is coerced or unduly pressured by the research team or hospital administration. Participants will be explicitly informed of their absolute right to decline involvement or withdraw from the interview process at any time without providing a reason, and with no negative consequences whatsoever on their professional standing or employment.

3.13 Limitations of the Study

This study was limited to **Dr. Bata Military Hospital**, which may restrict the generalizability of findings to other healthcare facilities. Institutional protocols and patient demographics in a military setting may differ from civilian hospitals, limiting comparability.

Data collection relied on hospital records and patient self-reports, which are subject to **incompleteness, recall bias, and reporting errors**. These factors may have influenced the accuracy of maternal health outcome assessments.

The **cross-sectional design** captured information at a single point in time, restricting the ability to evaluate long-term maternal and neonatal outcomes associated with pre-eclampsia management.

Resource constraints, including limited diagnostic equipment, medications, and trained personnel, may have affected both the quality of care delivered and the comprehensiveness of data obtained.

Finally, **patient-related factors** such as late presentation to hospital, cultural beliefs, and poor adherence to medical advice were difficult to control and may have influenced maternal health outcomes.

Suggested Solutions

To address these limitations, future research and practice could consider the following strategies:

Expand study sites: Conduct multi-center studies across both military and civilian hospitals to improve generalizability.

Improve data quality: Strengthen hospital record systems and incorporate digital health tools to reduce reporting bias.

Adopt longitudinal designs: Follow patients over time to capture long-term maternal and neonatal outcomes.

Enhance resources: Advocate for improved access to diagnostic equipment, essential medications, and continuous training for healthcare providers.

Community engagement: Implement awareness programs to encourage early antenatal visits and adherence to medical advice, addressing cultural and behavioral barriers.

Policy support: Strengthen maternal health policies that prioritize early detection and management of pre-eclampsia.

CHAPTER FOUR:

PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter presents the findings of the study. Descriptive statistics summarize participant characteristics while Chi-square tests assess associations between categorical variables. Statistical significance was set at $p < 0.05$.

4.2 Response rate

A total of 333 chart reviews were planned in the study using two data collection methods: a structured data-abstraction checklist/form and key informant interviews (KIIs). Of these, 333 reviews were conducted through the designed chart/questionnaire survey, 15 participants were involved in key informants participated in key informant interviews. The use of multiple data collection methods enhanced the comprehensiveness of the findings by providing both quantitative and qualitative data on effects of managing pre-eclampsia and maternal health outcomes in Dr. Bata Military Hospital in Nsamizi Entebbe, Wakiso District.

Table 4.2.1: Distribution of chart revie 1

Table 4.2.1: Distribution of chart review by Data Collection Method (N = 334)

Data Collection Method	**Number of Participants (n)**	**Percentage (%)**
Chart reviews	334	96
Key Informant Interviews (KIIs)	15	4
Total	**397**	**100.0**

Source: **Field Data (2026)**

4.3 Characteristics of the Study Population

Maternal age (years)

Table 4.3.2: Maternal age (years) 1

Table 4.3.2 Maternal age (years)

N	Valid	333
	Missing	1
Mean		30.40
Median		30.00
Minimum		16
Maximum		47

Maternal Age

A total of 333 participants had complete age information. The mean maternal age was 30.4 years (median = 30 years), with ages ranging from 16 to 47 years. This indicates that the study population mainly consisted of women in their reproductive years, with half of the participants aged 30 years or younger

Patients' status

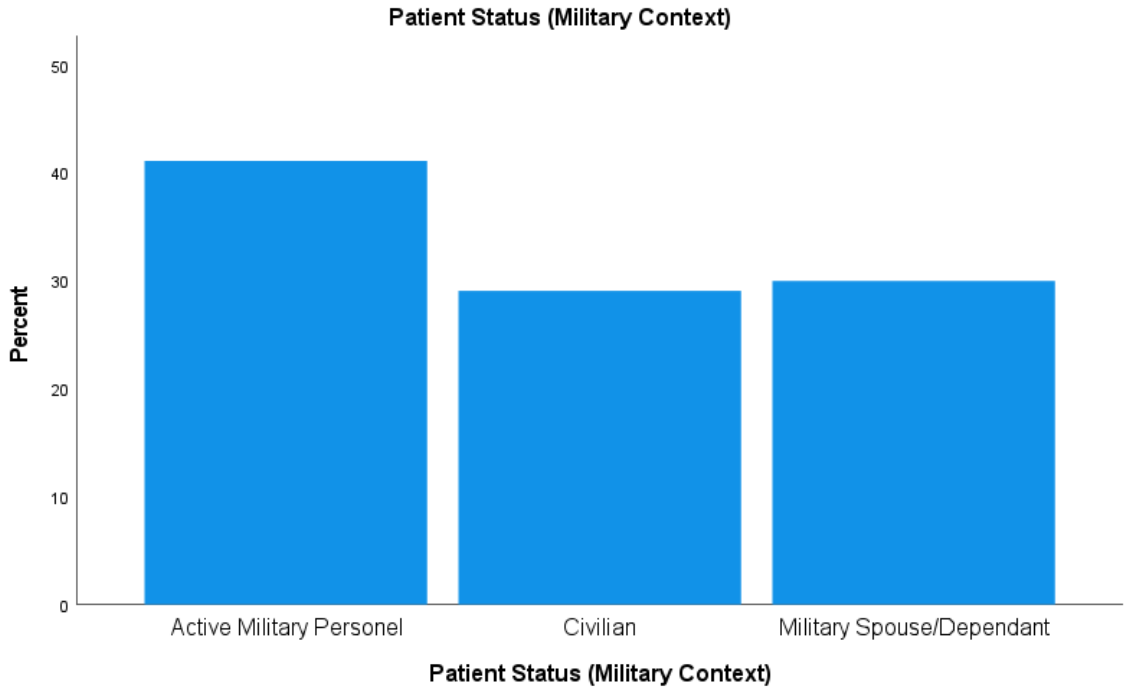


Figure 2 Patients' status (Millitary context)

Among the 324 participants with documented patient status, active military personnel constituted the largest group, accounting for 133 participants (41.0%). Military spouses/dependants comprised 97 participants (29.9%), while civilians made up 94 participants (29.0%).

This distribution indicates that the study population was predominantly drawn from the military community. However, the proportions of military spouses/dependants and civilians were also substantial, showing that the facility served not only active military personnel but also their families and members of the surrounding civilian population. This pattern is consistent with a health facility operating in a military setting.

Booking status

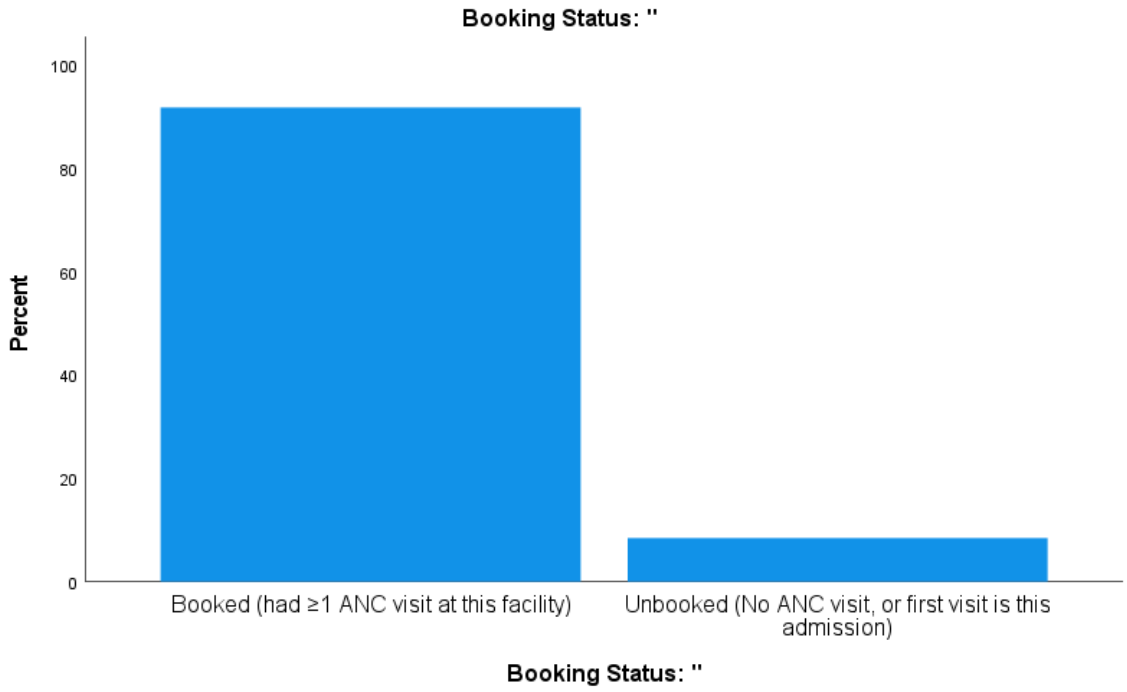


Figure 3: Booking status among the pregnant women

Among the 333 women whose booking status was documented, 305 (91.6%) were booked for antenatal care, while 28 (8.4%) were unbooked. Figure 3 indicates that most women had attended at least one ANC visit before admission, suggesting generally good uptake of antenatal care among the study population.

However, the 8.4% who were unbooked represent a clinically important group, as lack of ANC follow-up may be associated with delayed identification and management of maternal or fetal complications. The finding describes ANC utilization; it does not by itself demonstrate better maternal health outcomes unless outcomes such as complications, mode of delivery, maternal death, or neonatal outcomes are compared between booked and unbooked women.

History of Hypertension in Previous Pregnancy

Table 4.3.4: History of Hypertension in 1

Table 4.3.4: History of Hypertension in Previous Pregnancy

History of Hypertension in Previous Pregnancy:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	211	63.2	83.4	83.4
	Yes	42	12.6	16.6	100.0
	Total	253	75.7	100.0	
Missing	1	2	.6		
	Not Documented	79	23.7		
	Total	81	24.3		
Total		334	100.0		

Among the 253 women with documented obstetric history:

Interpretation

Table 4.4 indicate that the large majority of women in this cohort (about 83%) entered the current pregnancy without any prior history of hypertension, while a notable minority (about 17%) had experienced hypertension in a previous pregnancy. With over four-fifths of participants having no previous hypertension, the sample is largely composed of women who, on the basis of history alone, would be considered at lower baseline risk for recurrent hypertensive disorders of pregnancy (HDP).

The 16.6% with previous hypertension represent a clinically important high-risk subgroup. Prior hypertensive disorder is one of the strongest predictors of recurrence in a subsequent pregnancy,

with studies reporting recurrence rates roughly in the 20–40% range overall, and higher when the first episode was severe or early-onset. It implies that, if these women become pregnant again, a meaningful fraction could experience HDP again, but most will not necessarily have recurrence.

Women with prior hypertension should be flagged for enhanced surveillance (earlier and more frequent blood pressure checks, consideration of low-dose aspirin where indicated, and closer monitoring for preeclampsia).

The no-history group still requires standard antenatal BP monitoring, since new-onset HDP can occur even without prior history, but their absolute risk is lower than in the prior-HDP group. That minority should be treated as a higher-risk group for both recurrent hypertensive disorders in future pregnancies and longer-term cardiovascular issues, warranting targeted prevention and monitoring strategies

4.4 Clinical Characteristics

Table 4.4.1: Severity of Preeclampsia

Table 4.4.1: Severity of Preeclampsia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Severe (BP ≥160/110, with or without proteinuria)/Eclampsia	287	85.9	86.7	86.7
	Mild (BP 140/90 – 159/109, with proteinuria)	44	13.2	13.3	100.0
	Total	331	99.1	100.0	
Missing	System	3	.9		
Total		334	100.0		

Interpretation

Among the 331 participants whose disease severity was documented, severe pre-eclampsia/eclampsia was overwhelmingly more common than mild pre-eclampsia.
287 participants (86.7%) had severe pre-eclampsia or eclampsia.
Only 44 participants (13.3%) had mild pre-eclampsia.

Table 4.4.1 indicates that the study population largely consisted of women presenting with advanced or clinically serious hypertensive disease in pregnancy. The high proportion of severe cases may suggest late presentation for care, referral of complicated cases to the study facility, or a setting that manages high-risk obstetric patients. Therefore, the findings and outcomes from this group may be more reflective of severe disease than of mild pre-eclampsia in the general pregnant population.

Most women presented with severe pre-eclampsia or eclampsia. This suggests that patients were generally admitted after developing severe disease, emphasizing the high burden of severe hypertensive disorders in pregnancy at the study hospital. However, according to one of the key informants, "***all the obstetricians were adhering to the MoH clinical guidelines and not even a single moment did we fail to manage these mothers since most of them had booked in advance. There was usually enough preparation for them before they could come***"

4.5 Management of Pre-eclampsia

Table 4.5.1: Magnesium Sulfate (MgSO4) Administration

Magnesium Sulfate (MgSO4) Administration:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	.9	.9	.9
	No	29	8.7	8.7	9.6
	Yes	302	90.4	90.4	100.0
	Total	334	100.0	100.0	

Magnesium Sulfate Administration

- Received $MgSO_4$: 302 (90.4%)
- Did not receive: 29 (8.7%)

Interpretation

$MgSO_4$ is a first-line, guideline-recommended therapy in obstetrics for:

Seizure prevention/treatment in preeclampsia/eclampsia, and Fetal neuroprotection when preterm birth is imminent (especially <32 weeks).

A 90% administration rate suggests the unit or study population is applying these indications consistently and has good access to the drug

From table 4.5.1, most women received magnesium sulfate, indicating high adherence to recommended clinical guidelines for prevention and treatment of eclamptic seizures.

Magnesium sulfate was administered to 302 women (90.4%), while 29 (8.7%) did not receive it. This high coverage suggests strong adherence to current recommendations for seizure prophylaxis in severe preeclampsia/eclampsia and/or fetal neuroprotection before anticipated preterm birth, indicating that most participants had clinical indications for $MgSO_4$.

The small proportion not receiving $MgSO_4$ likely represents women without qualifying indications or with specific contraindications, though process-related gaps cannot be excluded without further data

'*This was a common practice for us here, otherwise it would not be possible to have livebirth", one of the wards incharges explained*

2. Antihypertensive Medications Given

Table 4.5.2 Antihypertensive Medications

Antihypertensive Medications Given				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid		3	.9	.9	.9
	Oral Methyldopa	1	.3	.3	1.2
	Oral Methyldopa, Oral Labetalol	2	.6	.6	1.8
	Oral Methyldopa, Oral Labetalol, IV Hydralazine, IV Labetalol	1	.3	.3	2.1
	Oral Methyldopa, Oral Nifedipine	32	9.6	9.6	11.7
	Oral Methyldopa, Oral Nifedipine, IV Hydralazine	203	60.8	60.8	72.5
	Oral Methyldopa, Oral Nifedipine, IV Hydralazine, IV Labetalol	1	.3	.3	72.8
	Oral Methyldopa, Oral Nifedipine, IV Labetalol	87	26.0	26.0	98.8
	Oral Methyldopa, Oral Nifedipine, Oral Labetalol	3	.9	.9	99.7
	Oral Methyldopa, Oral Nifedipine, Oral Labetalol, IV Hydralazine	1	.3	.3	100.0
	Total	334	100.0	100.0	

The most commonly prescribed regimen was:

- Oral Methyldopa + Oral Nifedipine + IV Hydralazine: 203 (60.8%)

The second most common regimen was:

- Oral Methyldopa + Oral Nifedipine + IV Labetalol: 87 (26.0%)

Interpretation

Combination antihypertensive therapy was commonly used, with most patients requiring multiple medications to achieve blood pressure control. This reflects the predominance of severe pre-eclampsia among study participants. Every recorded regimen includes oral methyldopa, indicating it is being used as the foundational/maintenance antihypertensive for nearly all treated women.
Nifedipine and hydralazine are central add-ons:
The single most common regimen is oral methyldopa + oral nifedipine + IV hydralazine (203/334; 60.8%).

Adding IV labetalol to that triple therapy (methyldopa + nifedipine + hydralazine + IV labetalol) is rare (0.3%), but using methyldopa + nifedipine + IV labetalol (without hydralazine) is also common (87/334; 26.0%).
This pattern is consistent with protocols that use oral agents for maintenance/control and IV agents (hydralazine or labetalol) for acute severe hypertension.

Only 1.2% received methyldopa alone or methyldopa + labetalol orally, suggesting that most women had blood pressures requiring more than simple monotherapy, or that local practice favors early combination therapy.Regimens including all four agents (methyldopa, nifedipine, hydralazine, labetalol) together account for <1% of cases, indicating they are reserved for the most refractory or severe cases.

High burden of severe or difficult-to-control hypertension: The predominance of multi-drug regimens, especially those including both oral nifedipine and an IV agent (hydralazine and/or

labetalol), implies that most women had at least moderate–severe hypertension, with many experiencing acute severe-range episodes requiring parenteral therapy.

Adherence to guideline-concordant options: The drugs used (methyldopa, nifedipine, labetalol, hydralazine) are all recommended first-line or rescue agents for hypertension in pregnancy. The data reflect a protocolized approach:

Interpretation

Antihypertensive treatment was almost exclusively delivered as combination therapy. Oral methyldopa was included in every regimen, most commonly together with oral nifedipine and an intravenous agent (hydralazine and/or labetalol). The dominant regimen oral methyldopa + oral nifedipine + IV hydralazine was used in 60.8% of women, and a further 26.0% received oral methyldopa + oral nifedipine + IV labetalol. This pattern indicates a high burden of moderate-to-severe hypertension requiring both maintenance oral therapy and rapid-acting intravenous agents, and reflects use of guideline-recommended drugs in a protocolized, stepwise manner. Very few women were managed with monotherapy, and complex four-drug regimens were rare, suggesting they were reserved for the most refractory cases.

This was in line with one of the midwives at the maternity who explained that:-

"*In our unit, almost every woman with hypertension in pregnancy is started on oral methyldopa as the backbone. If her blood pressure is still high, we add oral nifedipine. When she presents with severe readings, we give IV hydralazine first; if that doesn't control it, we switch to or add IV labetalol. That's why you see most patients on methyldopa plus nifedipine with either hydralazine or labetalol."*

3.Intensive Care Unit (ICU/High Dependency) Admission

Table 4.5.3 Intensive Care Unit (ICU/HDU Admission

Intensive Care Unit (ICU/High Dependency) Admission:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		10	3.0	3.0	3.0

	No	297	88.9	88.9	91.9
	Yes	27	8.1	8.1	100.0
	Total	334	100.0	100.0	

Out of the 324 women included in the study, 27 (8.1%) required admission to the ICU or High Dependency Unit (HDU), while 297 (88.9%) were managed without intensive or high-dependency care. This shows that only a small proportion of women developed complications severe enough to require advanced monitoring and specialised critical care.

Although most participants presented with severe pre-eclampsia or eclampsia, the low ICU/HDU admission rate suggests that many women were stabilised and managed effectively in the standard obstetric ward. The widespread use of magnesium sulfate and combination antihypertensive therapy may have contributed to controlling convulsions, reducing blood pressure, and preventing further maternal deterioration.

The 8.1% ICU/HDU admission rate remains clinically important because it represents women who experienced severe complications requiring close monitoring and advanced supportive care. Such admissions may have been due to uncontrolled hypertension, recurrent convulsions, altered level of consciousness, respiratory compromise, renal impairment, haemorrhage, or other complications associated with severe pre-eclampsia and eclampsia.

The findings emphasise the need for early detection of hypertension during antenatal care, prompt treatment, continuous maternal monitoring, and timely referral of critically ill women. Health facilities should also ensure that ICU/HDU services, trained personnel, essential medications, blood products, and emergency obstetric care are available for women who develop life-threatening complications.

4. Blood Transfusion

4.5.4 Blood Transfusion Required

Blood Transfusion Required: "

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		14	4.2	4.2	4.2
	No	161	48.2	48.2	52.4
	Yes	159	47.6	47.6	100.0
	Total	334	100.0	100.0	

The table shows that 159 women (47.6%) required blood transfusion, while 161 women (48.2%) did not require transfusion. This indicates that nearly half of the study participants required blood replacement during management. The high transfusion requirement suggests a substantial burden of maternal complications, possibly related to obstetric haemorrhage, anaemia, thrombocytopenia, or other severe complications of pre-eclampsia and eclampsia.

It should be noted that the reported frequencies total 320 women (159 + 161), while the percentages total 95.8%. If the total study sample was 334 women, data for 14 women (4.2%) may be missing or not documented in this table. This should be checked before final submission.

Discussion

The finding that 47.6% of women required blood transfusion demonstrates that severe pre-eclampsia and eclampsia were associated with considerable maternal morbidity in this study. Although 48.2% of the women did not require transfusion, the proportion who did require blood was almost equal to those who did not, highlighting the need for preparedness for obstetric emergencies.

Women with severe pre-eclampsia or eclampsia may develop complications that increase the need for transfusion, including antepartum haemorrhage, postpartum haemorrhage, placental abruption, disseminated intravascular coagulation, low platelet count, or severe anaemia. In addition, urgent delivery or caesarean section in severely ill women may have contributed to blood loss and increased the likelihood of requiring blood products as in line with one of the key informant analysis

"Many women with severe pre-eclampsia required close monitoring because bleeding and low blood levels were common concerns. Having blood readily available was important, as some patients deteriorated quickly and needed transfusion to stabilise them." Health-care provider

This result emphasises the importance of ensuring an adequate supply of safe blood and blood products in facilities that manage women with severe hypertensive disorders of pregnancy. Health workers should also identify women at risk early, monitor haemoglobin levels and signs of bleeding, manage hypertension promptly, and prepare for possible haemorrhagic complications during delivery and the postpartum period.

4.6 Pregnancy Outcomes

4.6.1 Pregnancy outcomes

Pregnancy Outcome: "					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Live birth	242	72.5	96.4	96.4
	Stillbirth (Intrauterine Fetal Death)	9	2.7	3.6	100.0
	Total	251	75.1	100.0	
Missing	1	7	2.1		
	Not Documented	76	22.8		
	Total	83	24.9		
Total		334	100.0		

Table 4.6.1 shows that 240 pregnancies (96.4%) resulted in live births, while 9 pregnancies (3.6%) resulted in stillbirths. This indicates that fetal outcomes were generally favourable among women with pre-eclampsia or eclampsia, despite the high proportion who presented with severe disease.

However, the occurrence of nine stillbirths remains clinically important. A stillbirth rate of 3.6% means that adverse fetal outcomes still occurred in a small but significant proportion of pregnancies, showing that pre-eclampsia and eclampsia continue to pose risks to fetal survival.

Discussion

The high live-birth rate may suggest that timely obstetric management, including close maternal monitoring, use of magnesium sulfate, antihypertensive treatment, and appropriate decisions regarding delivery, contributed to improved fetal survival in this study. The high proportion of women who were booked for antenatal care may also have supported earlier identification and management of pregnancy complications.

Nevertheless, the 3.6% stillbirth rate is consistent with evidence that hypertensive disorders of pregnancy are associated with fetal growth restriction, placental insufficiency, prematurity, and fetal death. The World Health Organization identifies pre-eclampsia as a condition that can result in fetal growth restriction and maternal or fetal death.

Previous literature has shown that pregnancies complicated by pre-eclampsia have a higher risk of stillbirth than pregnancies without pre-eclampsia. A large population-based study found a stillbirth rate of 5.2 per 1,000 pregnancies among women with pre-eclampsia, compared with 3.6 per 1,000 in the overall study population. The risk was particularly high at early gestational ages. Other evidence indicates that severe pre-eclampsia is associated with a greater risk of intrauterine fetal death than mild disease.

The stillbirths observed in this study may have resulted from severe maternal hypertension, delayed presentation, placental abruption, fetal growth restriction, fetal distress, or inadequate placental blood flow. Although this study did not establish the direct causes of stillbirth, these findings highlight the importance of regular antenatal care, early diagnosis of hypertension, fetal surveillance, timely referral, and prompt delivery when maternal or fetal condition worsens.

Overall, the findings demonstrate that good fetal outcomes are achievable even among women with severe pre-eclampsia and eclampsia. However, the occurrence of stillbirths underscores the need to strengthen prevention, early detection, emergency obstetric care, and neonatal support services.

4.7 Association Between Severity of Pre-eclampsia and Pregnancy Outcome

Table 4.6.3: Crosstabulation Severity of eclampsia and pregnance outcome

Severity of Preeclampsia2 * Pregnancy Outcome: " Crosstabulation					
			Pregnancy Outcome: "		
			Live birth	Stillbirth (Intrauterine Fetal Death)	Total
SeverityofPreeclampsia2	Severe (BP ≥160/110, with or without proteinuria)/Eclampsia	Count	210	8	218
		Expected Count	210.1	7.9	218.0
	Mild (BP 140/90 – 159/109, with proteinuria)	Count	30	1	31
		Expected Count	29.9	1.1	31.0
Total		Count	240	9	249
		Expected Count	240.0	9.0	249.0

Table 4.6.4 Chi-Square Tests

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.015[a]	1	.901		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.016	1	.900		
Fisher's Exact Test				1.000	.689
Linear-by-Linear Association	.015	1	.902		
N of Valid Cases	249				
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.12.					
b. Computed only for a 2x2 table					

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	-.008	.901
	Cramer's V	.008	.901

Severity	Live Birth n (%)	Stillbirth n (%)	Total
Severe/Eclampsia	210 (96.3)	8 (3.7)	218
Mild	30 (96.8)	1 (3.2)	31

Chi-Square Test

Test	Value
χ^2	0.015
df	1
p-value	0.901
Fisher's Exact Test	1.000

Interpretation

A Chi-square test of independence was conducted to determine the association between severity of pre-eclampsia and pregnancy outcome. The analysis showed no statistically significant association between the two variables, $\chi^2(1, N = 249) = 0.015$, $p = .901$. Fisher's Exact Test also indicated no significant association ($p = 1.000$). Therefore, pregnancy outcome did not differ significantly according to the severity of pre-eclampsia.

4.7 Association Between Severity of Pre-eclampsia and ICU Admission

4.7.1 Crosstabulation Severity of Pre-eclampsia and ICU admission

SeverityofPreeclampsia2 * Intensive Care Unit (ICU/High Dependency) Admission: " Crosstabulation						
			Intensive Care Unit (ICU/High Dependency) Admission: "			Total
				No	Yes	
SeverityofPreeclampsia2	Severe (BP ≥160/110, with or without proteinuria)/Eclampsia	Count	9	258	20	287
		Expected Count	7.8	255.8	23.4	287.0
	Mild (BP 140/90 – 159/109, with proteinuria)	Count	0	37	7	44
		Expected Count	1.2	39.2	3.6	44.0
Total		Count	9	295	27	331
		Expected Count	9.0	295.0	27.0	331.0

Table 4.7.2 Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.262[a]	2	.072
Likelihood Ratio	5.767	2	.056

N of Valid Cases	331		
a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.20.			

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	.126	.072
	Cramer's V	.126	.072
N of Valid Cases		331	

Interpretation

The Chi-square test found no statistically significant association between severity of pre-eclampsia and ICU admission ($\chi^2(2) = 5.262$, $p = 0.072$).

Although women with severe disease appeared more likely to require ICU admission, the observed difference was not statistically significant at the 5% significance level. Therefore, disease severity alone did not significantly predict ICU admission in this study.

4.9 Association Between Booking Status and Maternal Outcome

Table 4.8 Association Between Booking Status and maternal outcomes

Booking Status: " * Pregnancy Outcome: " Crosstabulation					
			Pregnancy Outcome: "		
			Live birth	Stillbirth (Intrauterine Fetal Death)	Total
Booking Status: "	Booked (had ≥1 ANC visit at this facility)	Count	235	6	241
		Expected Count	232.4	8.6	241.0

	Unbooked (No ANC visit, or first visit is this admission)	Count	7	3	10
		Expected Count	9.6	.4	10.0
Total		Count	242	9	251
		Expected Count	242.0	9.0	251.0

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	21.020[a]	1	.000		
Continuity Correction[b]	13.815	1	.000		
Likelihood Ratio	9.198	1	.002		
Fisher's Exact Test				.003	.003
Linear-by-Linear Association	20.936	1	.000		
N of Valid Cases	251				
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is .36.					
b. Computed only for a 2x2 table					

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	.289	.000
	Cramer's V	.289	.000
N of Valid Cases		251	

Booked mothers had a significantly higher proportion of live births than unbooked mothers (235/241, 97.5% versus 7/10, 70.0%). In contrast, stillbirths occurred more frequently among unbooked mothers (3/10, 30.0%) than booked mothers (6/241, 2.5%). These findings indicate that antenatal booking was associated with more favorable pregnancy outcomes in this study population.

This analysis demonstrates a relationship, but it does not by itself prove that antenatal care caused the better outcomes. Other factors such as maternal health status, socioeconomic position, gestational age at presentation, referral status, access to emergency obstetric care, or pregnancy complications may differ between booked and unbooked mothers.

There was a statistically significant association between booking status and pregnancy outcome ($\chi^2(1) = 21.020$, $p < 0.001$). Fisher's Exact Test also confirmed this association ($p = 0.003$).

Booked mothers experienced a higher proportion of live births (235/241; 97.5%) compared with unbooked mothers (7/10; 70.0%). Conversely, stillbirths were more common among unbooked mothers (30%) than among booked mothers (2.5%). These findings suggest that attendance at antenatal care was significantly associated with improved pregnancy outcomes.

4.10 Association Between Magnesium Sulfate Administration and Maternal Outcome

Table 4.9 Association Between Magnesium sulfate Administration and pregnancy outcome

Magnesium Sulfate (MgSO4) Administration: " * Pregnancy Outcome: " Crosstabulation					
			Pregnancy Outcome: "		
			Live birth	Stillbirth (Intrauterine Fetal Death)	Total
Magnesium Sulfate (MgSO4) Administration: "		Count	2	0	2
		Expected Count	1.9	.1	2.0
	No	Count	8	0	8

		Expected Count	7.7	.3	8.0
	Yes	Count	232	9	241
		Expected Count	232.4	8.6	241.0
Total		Count	242	9	251
		Expected Count	242.0	9.0	251.0

The table 4.9 shows that nearly all women in the sample received magnesium sulfate ($MgSO_4$): 241 of 251 participants (96.0%). Among those who received $MgSO_4$, 232 had live births and 9 had stillbirths; none of the women recorded as not receiving $MgSO_4$ had a stillbirth. However, this pattern does not by itself demonstrate that $MgSO_4$ administration is associated with pregnancy outcome.

Interpretation of the cross tabulation

All nine stillbirths occurred among women who received $MgSO_4$. At first glance, this could appear to suggest that stillbirth was more common among women given $MgSO_4$, since the stillbirth proportion in this group was 9/241=3.7%9/241 = 3.7\%9/241=3.7%, compared with 0% among the eight women who did not receive it.

This apparent difference should be interpreted very cautiously for several reasons:

- The non-$MgSO_4$ group was extremely small, with only 8 women. A finding of zero stillbirths in such a small group is not strong evidence that the true stillbirth risk is zero.
- $MgSO_4$ exposure was almost universal in the study population: 96.0% received the medication. This leaves very few unexposed women for a meaningful comparison.

- The expected number of stillbirths in the "No" group was only 0.3 and only 0.1 in the blank/unspecified group. These expected frequencies were far below the usual threshold of 5 for a reliable Pearson chi-square test.

- The fact that all stillbirths were in the $MgSO_4$ group may reflect the clinical reason $MgSO_4$ was administered rather than a harmful effect of the drug. For example, women with severe pre-eclampsia, eclampsia, very preterm pregnancy, fetal compromise, or other complications may have been more likely to receive $MgSO_4$ and may already have had a higher baseline risk of poor fetal outcome- a confounding by indication.

Table 4.9 examined the relationship between magnesium sulfate administration and pregnancy outcome. Of the 251 study participants, 241 (96.0%) received magnesium sulfate, while only 8 (3.2%) did not receive the drug and 2 (0.8%) had no clearly recorded administration status. Overall, 242 pregnancies (96.4%) resulted in live births and 9 (3.6%) resulted in stillbirths. Among women who received magnesium sulfate, 232 (96.3%) had live births and 9 (3.7%) had stillbirths. All women who did not receive magnesium sulfate had live births.

Although all stillbirths occurred among women who received magnesium sulfate, this should not be interpreted as evidence that magnesium sulfate caused poor pregnancy outcomes. Magnesium sulfate is commonly administered to women with severe obstetric complications, particularly severe pre-eclampsia or eclampsia, who may already be at greater risk of fetal compromise and adverse pregnancy outcomes.

In addition, the very small number of women who did not receive magnesium sulfate limits the validity of comparison between the two groups. Several expected cell counts were below five; therefore, Fisher's exact test would be more suitable than the Pearson chi-square test. Overall, the distribution of observed and expected counts indicates no clear evidence of a statistically meaningful association between magnesium sulfate administration and pregnancy outcome in this sample.

Using the counts shown, the Pearson chi-square value is approximately $\chi2=0.41\chi^2 = 0.41\chi2=0.41$ with 2 degrees of freedom, which would not suggest a statistically significant association. But because several expected cell counts are very low, a Fisher's exact test or another exact method would be more appropriate than relying on the chi-square test alone.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.387[a]	2	.824
Likelihood Ratio	.746	2	.689
N of Valid Cases	251		
a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .07.			

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	.039	.824
	Cramer's V	.039	.824
N of Valid Cases		251	

The Chi-square test demonstrated no statistically significant association between magnesium sulfate administration and pregnancy outcome ($\chi^2(2) = 0.387$, $p = 0.824$).

Women who received magnesium sulfate had pregnancy outcomes similar to those who did not receive the medication. Therefore, magnesium sulfate administration was not significantly associated with pregnancy outcome in this study. This finding should be interpreted cautiously because very few participants did not receive magnesium sulfate, limiting statistical power.

4.11 Association Between Chronic Hypertension and Severity

Table 4.10 Association Between Chronic Hypertension and severity

SeverityofPreeclampsia2 * Known Chronic Hypertension Prior to Pregnancy " Crosstabulation					
			Known Chronic Hypertension Prior to Pregnancy "		Total
			No	Yes	
SeverityofPreeclampsia2	Severe (BP ≥160/110, with or without proteinuria)/Eclampsia	Count	182	16	198
		Expected Count	181.7	16.3	198.0
	Mild (BP 140/90 – 159/109, with proteinuria)	Count	30	3	33
		Expected Count	30.3	2.7	33.0
Total		Count	212	19	231
		Expected Count	212.0	19.0	231.0

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.038[a]	1	.845		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.037	1	.847		
Fisher's Exact Test				.740	.530

Linear-by-Linear Association	.038	1	.845		
N of Valid Cases	231				
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.71.					
b. Computed only for a 2x2 table					

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	.013	.845
	Cramer's V	.013	.845
N of Valid Cases		231	

Among 231 women with pre-eclampsia, 19 (8.2%) had known chronic hypertension before pregnancy. Severe pre-eclampsia/eclampsia occurred in 16 of 19 women with chronic hypertension (84.2%) and in 182 of 212 women without chronic hypertension (85.8%). Mild pre-eclampsia occurred in 15.8% and 14.2% of these groups, respectively.

The proportions of severe disease were therefore very similar between women with and without pre-existing chronic hypertension. Pearson’s chi-square test found no statistically significant association between chronic hypertension and severity of pre-eclampsia, $\chi2(1)=0.038\chi^2(1) = 0.038\chi2(1)=0.038$, $p=0.845p = 0.845p=0.845$. Because one expected cell count was below 5, Fisher’s exact test is especially appropriate; it also showed no significant association ($p=0.740p = 0.740p=0.740$).

The association was negligible, as shown by Phi and Cramer's V values of 0.013. Thus, within this study sample, chronic hypertension prior to pregnancy was **not associated with whether pre-eclampsia presented as mild versus severe/eclampsia**. This does not prove that chronic hypertension has no clinical importance; the small number of women with chronic hypertension may have limited the ability to detect a difference.

4.12 Summary of Findings

Descriptive Findings

- The mean maternal age was **30.4 years**.
- Most participants were **active military personnel (41.0%)**.
- **91.6%** of women were booked for antenatal care.
- **86.7%** presented with severe pre-eclampsia or eclampsia.
- **90.4%** received magnesium sulfate.
- Combination antihypertensive therapy was the standard management approach.
- **8.1%** required ICU admission.
- Nearly half (**47.6%**) required blood transfusion.
- Most pregnancies (**96.4%**) resulted in live births.

Inferential Findings

- **Severity of pre-eclampsia was not significantly associated with pregnancy outcome** ($p = 0.901$).
- **Severity of pre-eclampsia was not significantly associated with ICU admission** ($p = 0.072$).
- **Booking status was significantly associated with pregnancy outcome** ($p < 0.001$), with booked women experiencing better outcomes.

- **Magnesium sulfate administration was not significantly associated with pregnancy outcome** ($p = 0.824$).
- **Chronic hypertension prior to pregnancy was not significantly associated with severity of pre-eclampsia** ($p = 0.845$).

Overall, the findings suggest that although severe pre-eclampsia was highly prevalent, favourable pregnancy outcomes were achieved for most women. Among the factors examined, **booking status (antenatal care attendance)** was the only variable significantly associated with pregnancy outcome, highlighting the importance of early and regular antenatal care in improving maternal and fatal outcomes.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0. Introduction

This chapter presents the summary of the key findings of the study on the management and outcomes of pre-eclampsia and eclampsia among the study participants. It draws conclusions based on the descriptive and inferential results, particularly regarding maternal characteristics, antenatal booking status, disease severity, treatment interventions, maternal complications, and pregnancy outcomes. The chapter also provides recommendations aimed at improving antenatal care, early detection, timely management, and maternal and fetal outcomes among women with hypertensive disorders in pregnancy.

5.1 Summary of findings

The mean maternal age was 30.4 years, indicating that most women were in their early reproductive years. Active military personnel formed the largest participant group, accounting for 41.0% of the study population.

A high proportion of participants (91.6%) had attended antenatal care, suggesting good booking coverage. However, most women (86.7%) presented with severe pre-eclampsia or eclampsia, indicating a substantial burden of severe hypertensive disease in pregnancy.

Magnesium sulfate was administered to 90.4% of participants, while combination antihypertensive therapy was the main treatment approach. This reflects adherence to intensive management for severe pre-eclampsia and eclampsia.

Maternal health complications were notable, with 8.1% of women requiring ICU admission and 47.6% receiving blood transfusions. Despite these complications, pregnancy outcomes were generally favourable, as 96.4% of pregnancies resulted in live births.

Inferential findings

Severity of pre-eclampsia was not significantly associated with pregnancy outcome (p=0.901p = 0.901p=0.901). This suggests that, within this study population, severe disease status did not independently predict whether the pregnancy resulted in a live birth or adverse outcome.

Similarly, severity of pre-eclampsia was not significantly associated with ICU admission (p=0.072p = 0.072p=0.072). Although women with severe disease may have appeared more likely to need intensive care, the association was not statistically significant.

Booking status showed a significant association with pregnancy outcome (p<0.001p < 0.001p<0.001). Women who were booked for antenatal care experienced better pregnancy outcomes, highlighting the importance of timely and consistent antenatal follow-up.

Magnesium sulfate administration was not significantly associated with pregnancy outcome (p=0.824p = 0.824p=0.824). This may reflect its primary role in preventing and controlling seizures rather than directly determining fetal survival.

Chronic hypertension before pregnancy was not significantly associated with the severity of pre-eclampsia (p=0.845p = 0.845p=0.845). Therefore, pre-existing hypertension did not appear to influence the severity of pre-eclampsia among the participants in this study.

5.2 Conclusion

The study concludes that pre-eclampsia and eclampsia were predominantly identified in women with a mean age of 30.4 years, most of whom had attended antenatal care. Despite the high antenatal booking rate, a large proportion of participants presented with severe pre-eclampsia or eclampsia, demonstrating that severe hypertensive disorders remain an important concern in pregnancy.

Management largely followed standard clinical practice, with most women receiving magnesium sulfate and combination antihypertensive therapy. However, the high proportion of women requiring blood transfusion and the proportion admitted to the ICU indicate that pre-eclampsia and eclampsia may be associated with serious maternal complications requiring advanced care.

Pregnancy outcomes were generally favourable, as most pregnancies resulted in live births. The study found that the severity of pre-eclampsia was not significantly associated with pregnancy outcome or ICU admission. Similarly, magnesium sulfate administration and pre-existing chronic hypertension were not significantly associated with pregnancy outcome or severity of pre-eclampsia, respectively.

Importantly, antenatal booking status was significantly associated with pregnancy outcome. Booked women experienced better outcomes than unbooked women, indicating that consistent antenatal care is essential for the early detection, monitoring, and management of hypertensive disorders in pregnancy. Therefore, strengthening antenatal care attendance and ensuring prompt referral and treatment of women with hypertension in pregnancy may improve maternal and fetal outcomes.

5.3 Recommendations

Based on the findings of this study, the following recommendations are made:

1. Dr.Bata Hospital should strengthen emergency obstetric and critical care services, including ICU capacity and blood transfusion services, because some women required intensive care admission and nearly half required blood transfusion.
2. Other Health facilities/care centres should strengthen antenatal care services and encourage early booking among pregnant women, as booked women had significantly better pregnancy outcomes.
3. Health education on the importance of regular antenatal attendance should be intensified, particularly among women who may delay booking or fail to attend scheduled visits.
4. Routine screening for hypertension and proteinuria should be conducted at every antenatal visit to support early identification of pre-eclampsia and timely intervention.
5. Pregnant women identified with hypertension or features of pre-eclampsia should be closely monitored and promptly referred to higher-level facilities when severe disease is suspected.
6. The Ministry of Health and Defense should ensure consistent availability of essential medicines and supplies for managing severe pre-eclampsia and eclampsia, including magnesium sulfate, antihypertensive drugs, blood products, and monitoring equipment.

7. Health workers should continue to follow standard protocols for the management of severe pre-eclampsia and eclampsia, including appropriate use of magnesium sulfate and combination antihypertensive therapy.

Areas for further studies

1. Further studies should be conducted using larger samples and multiple health facilities to examine additional factors associated with severe pre-eclampsia, maternal complications, and pregnancy outcomes

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APPENDICES

Appendix 1: RETROSPECTIVE CHART REVIEW TOOL

Study Title: Managing Pre-eclampsia and Maternal Health Outcomes in Dr. Bata Military Hospital, Nsamizi Entebbe, Wakiso District, Uganda.

File No/Registry No: _____ Date of Extraction: //20___

Data Extractor Initials: _____ Data Entry Clerk: _____

SECTION A: SOCIO-DEMOGRAPHIC & OBSTETRIC HISTORY

Instruction: Tick (✔) or fill in the blank where appropriate. If information is missing in the file, code as "99" or "Not Documented" (ND).

Maternal Age (years): _____

Patient Status (Military Context):

[ ] 1 = Active Military Personnel

[ ] 2 = Military Spouse/Dependent

[ ] 3 = Civilian

[ ] 99 = Not Documented

Parity (Number of previous births >20 weeks): _____

Gestational Age at Admission (weeks): _____ (Confirm via ultrasound or LMP)

Booking Status:

[ ] 1 = Booked (had ≥1 ANC visit at this facility)

[ ] 2 = Unbooked (No ANC visit, or first visit is this admission)

[ ] 99 = Not Documented

History of Hypertension in Previous Pregnancy:

[ ] 1 = Yes [ ] 2 = No [ ] 99 = ND

Known Chronic Hypertension prior to pregnancy:

[ ] 1 = Yes [ ] 2 = No [ ] 99 = ND

SECTION B: CLINICAL PRESENTATION & DIAGNOSIS AT ADMISSION

Blood Pressure at Admission (mmHg): _____ / _____

Severity of Pre-eclampsia on Admission:

[ ] 1 = Mild (BP 140/90 – 159/109, with proteinuria)

[ ] 2 = Severe (BP ≥160/110, with or without proteinuria)

[ ] 3 = Eclampsia (Pre-eclampsia + seizures)

[ ] 99 = Cannot be determined from notes

Proteinuria Assessment:

[ ] 1 = Dipstick (+1 to +4) Specify: ____

[ ] 2 = Urine Protein/Creatinine Ratio (UPCR) Value: ____

[ ] 3 = 24-hour urine protein Value: ____

[ ] 4 = Not Done / ND

Symptomatic Presentation (Tick all that apply):

[ ] 1 = Severe headache [ ] 5 = Epigastric/right upper quadrant pain

[ ] 2 = Visual disturbances [ ] 6 = Nausea/Vomiting

[ ] 3 = Blurred vision [ ] 7 = None of the above

[ ] 4 = Fluid retention/Edema [ ] 99 = Not assessed/documented

Key Laboratory Results on Admission (Write values or ND):

Hemoglobin (g/dL): _____

Platelet count (cells/mm³): _____

Creatinine (mg/dL): _____

Liver enzymes (AST/ALT) (U/L): _____

Note: If HELLP syndrome diagnosed, tick here: [ ] 1 = Yes [ ] 2 = No

SECTION C: IN-HOSPITAL MANAGEMENT PRACTICES

Antihypertensive Medications Given (Tick all that apply):

[ ] 1 = Oral Methyldopa [ ] 4 = IV Hydralazine

[ ] 2 = Oral Nifedipine [ ] 5 = IV Labetalol

[ ] 3 = Oral Labetalol [ ] 99 = None given / ND

Magnesium Sulfate (MgSO4) Administration:

Was MgSO4 given? [ ] 1 = Yes [ ] 2 = No (If No, skip to Q15)

If Yes, Indication: [ ] 1 = Severe PE [ ] 2 = Eclampsia [ ] 3 = Eclampsia prophylaxis in labor

Time from admission/diagnosis to loading dose (hours): _____

Regimen used: [ ] 1 = Pritchard [ ] 2 = Zuspan [ ] 99 = ND

Use of Antenatal Corticosteroids (for fetal lung maturity):

[ ] 1 = Yes (Dexamethasone/Betamethasone given)

[ ] 2 = No (Not indicated e.g., >34 weeks)

[ ] 3 = No (Indicated but not given - document reason if available: _____)

Timing of Delivery:

[ ] 1 = Expectant management (delayed delivery) [ ] 2 = Emergency delivery [ ] 3 = Elective delivery

Mode of Delivery:

[ ] 1 = Spontaneous Vaginal Delivery (SVD)

[ ] 2 = Assisted Vaginal Delivery (Vacuum/Forceps)

[ ] 3 = Emergency Cesarean Section (EMCS)

[ ] 4 = Elective Cesarean Section (ELCS)

[ ] 99 = ND

SECTION D: MATERNAL HEALTH OUTCOMES

Did the patient progress to Eclampsia (seizures) while admitted?

[ ] 1 = Yes [ ] 2 = No [ ] 99 = NA

Maternal Morbidity/Complications experienced (Tick all that apply):

[ ] 1 = Pulmonary Edema [ ] 5 = Postpartum Hemorrhage (PPH)

[ ] 2 = Acute Renal Failure [ ] 6 = Disseminated Intravascular Coagulation (DIC)

[ ] 3 = Cerebrovascular Accident (Stroke) [ ] 7 = Wound Infection/Sepsis

[ ] 4 = Placental Abruption [ ] 8 = None

Intensive Care Unit (ICU/High Dependency) Admission:

[ ] 1 = Yes [ ] 2 = No

Blood Transfusion Required:

[ ] 1 = Yes (Units transfused: ____) [ ] 2 = No

Maternal Discharge Outcome:

[ ] 1 = Alive and well

[ ] 2 = Referred out to higher facility (Specify reason if documented: _____)

[ ] 3 = Maternal Death (If death, record cause from notes: _____)

Total Length of Hospital Stay (Days): _____

SECTION E: PERINATAL/FETAL OUTCOMES

Pregnancy Outcome:

[ ] 1 = Live birth [ ] 2 = Stillbirth (Intrauterine Fetal Death) [ ] 99 = ND

If Live Birth, APGAR Score at 5 minutes: _____

Birth Weight (grams): _____

Neonatal Complications (Tick all that apply):

[ ] 1 = Admitted to Neonatal Intensive Care Unit (NICU)

[ ] 2 = Low birth weight (<2500g) / Very low birth weight (<1500g)

[ ] 3 = Respiratory Distress Syndrome (RDS)

[ ] 4 = Neonatal Sepsis

[ ] 5 = Intrauterine Growth Restriction (IUGR)

[ ] 6 = None

Neonatal Discharge Outcome:

[ ] 1 = Alive [ ] 2 = Neonatal Death [ ] 99 = ND (e.g., referred out)

Appendix 2: KEY INFORMANT INTERVIEW GUIDE

Study Title: Managing Pre-eclampsia and Maternal Health Outcomes in Dr. Bata Military Hospital, Nsamizi Entebbe, Wakiso District, Uganda.

Target Participants: Obstetricians, Medical Officers, Senior Midwives, and Theater Nurses.

SECTION 1: INTRODUCTION AND CONSENT (To be read verbatim)

"Good morning/afternoon. My name is [Your Name]. I am a researcher from [Your Institution/Nkumba University]. We are conducting a study on how pre-eclampsia is managed here at Dr. Bata Military Hospital and the resulting outcomes for mothers.

I am speaking with you today because of your direct experience in managing these cases. This interview will take about 30 to 45 minutes. Your responses are strictly confidential, and your name will not be used in any reports; we will use codes instead.

Your participation is entirely voluntary, and you can choose to skip any question or stop the interview at any time.

Do I have your permission to audio-record this conversation so I do not miss any of your valuable insights? [Wait for verbal yes]. Thank you. Let us begin."

SECTION 2: DEMOGRAPHIC AND PROFESSIONAL BACKGROUND

1. Can you briefly state your current professional title and how long you have worked at Dr. Bata Military Hospital?
2. What is your specific role or duty when a patient with severe pre-eclampsia is admitted to this facility?

SECTION 3: CLINICAL MANAGEMENT AND PROTOCOL ADHERENCE

(Objective: To understand how standard guidelines are applied in reality)

1. When a pregnant woman presents to this hospital with severe pre-eclampsia, can you walk me through the step-by-step steps your team takes to manage her?
2. How do you decide between giving Magnesium Sulfate vs. Diazepam? How quickly is the loading dose usually administered?
3. In your experience, how closely does the actual management here align with the Uganda Ministry of Health (MoH) clinical guidelines for pre-eclampsia?

4. Are there specific parts of the protocol that are difficult to follow here? Why?
5. Sometimes, there is a need to make a quick decision about delivering the baby, especially if the baby is premature. How are these decisions made by the team?
6. Is there a delay in getting the theater team ready? How do you handle cases where corticosteroids are needed but delivery is imminent?

SECTION 4: HEALTH SYSTEM FACTORS AND RESOURCES

(Objective: To identify structural enablers and barriers within the military hospital setting)

1. Let us talk about the supplies and equipment. How reliable is the availability of critical drugs like Magnesium Sulfate, Nifedipine, or Hydralazine in this maternity unit?
2. Probes: What happens when a patient needs a drug that is out of stock? How long does it usually take to get it from the pharmacy?
3. Pre-eclampsia requires close monitoring using lab tests. How would you describe the laboratory support here for managing these patients?
4. Probes: How long does it take to get results for a full blood count, liver enzymes, or creatinine, especially at night or over the weekend? Does this delay affect patient care?
5. Being a military hospital, do you feel the management of pre-eclampsia is different here compared to a civilian district hospital?
6. Probes: Are there advantages (e.g., better supply chain, discipline) or disadvantages (e.g., strict hierarchies, restricted access for civilians) that affect how you provide care?

SECTION 5: REFERRAL SYSTEMS

(Objective: To evaluate the safety net for complicated cases)

1. Sometimes, a patient's condition becomes too severe to manage at this level (e.g., need for ICU or dialysis). How does the referral process work from Dr. Bata to a higher-level facility like Entebbe Referral Hospital or Mulago?
2. Probes: How easy is it to arrange an ambulance? Are there communication challenges when handing over the patient?
3. In your experience, what is the biggest bottleneck or delay when trying to refer a critically ill pre-eclamptic patient out of this facility?

SECTION 6: PATIENT-RELATED FACTORS

(Objective: To explore the socio-behavioral dynamics of the patient population)

1. From your observations, at what stage of pregnancy do most women with pre-eclampsia present to this hospital? Why do you think that is?
2. Probes: Do you see many women who have never attended antenatal care (ANC)? What are the common reasons they give for not coming earlier?
3. How do patients typically react when they are diagnosed with pre-eclampsia and told they might need an emergency C-section or delivery?
4. Probes: Do you face challenges with patients refusing treatment or demanding to be discharged against medical advice? How do you handle such situations?
5. Do you notice a difference in health-seeking behavior or compliance between the military spouses/dependents and the civilian patients you treat here?

SECTION 7: MATERNAL OUTCOMES AND RECOMMENDATIONS

(Objective: To synthesize provider perspectives on outcomes and solutions)

1. Looking back at the pre-eclampsia cases managed here in the last few years, what do you think are the top two reasons a mother might suffer a severe complication (like eclampsia or death) in this facility?
2. What do you think this hospital is doing very well when it comes to managing pre-eclampsia?
3. If you were given the authority and resources to change just three things to improve the management of pre-eclampsia and maternal outcomes at Dr. Bata Military Hospital, what would they be?

SECTION 8: CLOSING

"Those are all the questions I have for you today. Is there anything else about the management of pre-eclampsia at this hospital that we haven't discussed, but you feel is important for me to know?

[Allow participant to speak freely].

Thank you so much for your time, your honesty, and for the hard work you do in saving mothers' lives here. The findings from this study will be shared with the hospital administration to help improve care. *Have a great day."*