KAIRUKI UNIVERSITY

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TITLE: MAGNITUDE OF ADVERSE MATERNAL AND NEWBORN OUTCOMES AMONG WOMEN WITH PREGNANCY INDUCED PRE-HYPERTENSION AT THREE REGIONAL REFERRAL HOSPITALS, DAR ES SALAAM FROM JANUARY TO APRIL 2024

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for examination by Hubert Kairuki University a dissertation entitled ***"Magnitude of Maternal and new born outcomes among women with pregnancy induced pre-hypertension at Amana , Temeke and Mwananyamala Regional referral hospital in Dar es Salaam."*** In (partial) fulfilment of the requirements for the degree of Master of Medicine in Obstetrics and Gynecology of Kairuki University.

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DECLARATION AND COPYRIGHT

I, Mwalim A, Abeid declare that this dissertation is my original work, and it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature---------- Date----------

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Lastly, I thank my parents for their financial support and sacrifices that they have made it possible for the study to be done.

DEDICATION

This work is dedicated to the people who have helped me throughout my education including my supervisor who gave me strength when I thought of giving up.

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ABBREVIATIONS.

ACC/AHA	- The American College of Cardiology (ACC) and the American Heart Association.
APGAR	- Appearance, Pulse, Grimace, Activity and Respiration.
BMI	- Body Mass Index
FGR	- Fetal Growth Restriction
IUFD	- Intra Uterine Fetus Death
HDP	- Hypertensive Disorders in Pregnancy.
LBW	- Low Birth Weight.
MAP	- Mean Arterial Pressure
SGA	- Small for gestational age
SDG3	- Targets of Sustainable Development Goal 3
WHO	- World Health Organization

DEFINITION OF WORDS

- **Late pregnancy Prehypertension:** In this study refers to elevated blood pressure 120-139/80-89mmHg in a pregnant woman in third trimester, Gestational age: 29 - 41week (WHO).
- **Adverse neonatal** outcomes include any of the following neonatal outcomes from birth up to discharge of the newborn;
  - **Löw APGAR score:** APGAR score <7 at 5 minutes
  - **Small-for-gestational age (SGA):** birth weight of >2 standard deviations below the mean weight for gestational age according to the sonographic sex-specific fetal growth curve (WHO).
  - **Stillbirth:** Birth of a dead fetus of 1 Kg or more, or after 28 completed weeks of gestation (WHO).
  - **Early neonatal death:** Death of a neonate within the first 7 days from birth (ACOG).
  - **Pre-term baby:** Baby born before 37 weeks of pregnancy (ACOG).

ABSTRACT

Introduction : Prehypertension is a prevalent condition in maternity wards worldwide. The debate is still ongoing on the contribution of prehypertension to the occurrence of adverse birth outcomes in both mothers and neonates, specifically in low-income countries where scarce studies have been conducted in this field. This study aimed to determine the early neonatal outcome, mother outcome, and their respective factors associated with women with and without prehypertension attending antenatal clinics at the Amana, Temeke, and Mwananyamala Regional Referral Hospitals. Adverse birth outcomes and their associated factors were examined.

Methods : This study was a case control study conducted among pregnant mothers with and without late prehypertension as well as their newborns from the antenatal period to one week postpartum periods. Social demographic and clinical data were collected using a pre-designed questionnaire. Data was analyzed using Statistical Package for Social Sciences. Descriptive statistics were used to summarize the data, while Chi square test was used to assess maternal and neonatal outcome among the study groups. Binary logistic regression analysis was used to assess factors associated with adverse maternal and neonatal outcome among prehypertensive pregnant women. A p value of less or equal to 0.05 was considered statistically significant.

Results : A total of 330 participants were enrolled in the study. The magnitude of neonatal birth outcome and maternal outcome in pregnant mothers with late pregnancy prehypertension were of 120 (65%) and 76 (96.2%) respectively. Low Apgar score, low birth weight, still birth, and fresh still death were the most frequent adverse neonatal birth outcomes observed, with a respective rate of 44 (13%), 41 (12.4%), 30 (9%), and 4

(1.2%). On the other hand, gestational hypertension followed by preeclampsia were the most common adverse maternal outcome observed in 54 (71%) and 22 (28.1%) of study participants respectively. Neonates from mothers with an age range of 20 to 24 years(AOR=5.7;95%CI=2.4-6.7;P=0.04),prolonged labor(AOR=1.6;95%CI=1.4-6.2;P=0.001) and Caesarian sections(AOR=1.3; 95%CI=1.14-1.6,p=0.04) were the most affected. On the other hand, mothers with business activities (AOR=1.2; 95%CI=1.1-1.9) those with 1–2children(AOR=1.4;95%CI=1.15;1.7),and those who had malpresentation (AOR=1.4;95% CI=1.15-1.5) in labor were the most affected.

Conclusion: The magnitude of adverse neonatal and maternal outcomes in pregnant mothers was more frequent in participants with late pregnancy hypertension than in those with normal blood pressure. The most affected newborns were those born from caesarian sections and those whose mothers had prolonged labor.

CHAPTER ONE

INTRODUCTION AND BACKGROUND.

Hypertension disorders in pregnancy include preeclampsia, which can occur de novo or in addition to chronic hypertension, postpartum preeclampsia, and eclampsia , which are defined by blood pressures above 140/90 mmHg (1).

In spite of numerous advancements in obstetric care, hypertensive disorders of pregnancy (HDP) affect between 5 and 10% of all pregnancies worldwide (2). They account for 14% of maternal deaths worldwide with over 9% of maternal deaths in Asia(3) and over 22% of maternal mortality in Latin America and the Caribbean (4). HDP represent the second leading cause of maternal mortality in Sub-Saharan Africa, accounting for up to 16% of mothers dying from pregnancy-related complications (5).

Prehypertension in pregnancy, also known as elevated blood pressure (BP) 120-139/80-89 mmHg, affects roughly 11% of all pregnancies, though regional prevalence varies (Japan - 14.98%, United States 23.75-61.27%, Sweden 11.89%). Although it is not currently included in the HDP, new research over the past ten years has shown that prehypertension significantly worsens obstetric outcomes (6,7).

Gestational prehypertension can be classified as early if it is discovered before 20 weeks' gestation or late if it is discovered in the second half of pregnancy. However it has been found that both early and late pregnancy prehypertension increase the risks of adverse obstetric outcomes, with early prehypertension being linked to more risks that persist for the mother after delivery (8,9).

In Tanzania, 6.9% of pregnant women were reported to present with hypertensive disorders among pregnant women attending antenatal clinic in rural and urban regions in Tanzania (10). In addition, HDP was reported as second causes of maternal death after postpartum hemorrhage in Tanzania and about 19% of maternal deaths were attributable to hypertensive diseases, with eclampsia accounting for the majority of these deaths (11).

Hypertensive disorders during pregnancy, specifically pre-eclampsia, were reported to be the reason of more than one-third of low birth weight and neonatal death in study conducted in rural hospital in Tanzania.

Currently, little is known about prehypertension states in pregnant women and their related birth outcomes in Tanzania and sub-Saharan countries. This study aimed to determine the effect of pregnancy induced prehypertension on maternal and neonate at Amana, Temeke and Mwananyamala RRH.

1.2. Problem statement.

A rising incidence of unfavorable delivery outcomes, including preterm, stillbirths, and maternal death, has made hypertensive disorders one of the main causes of morbidity and mortality among mothers and newborns (12). Prehypertensive disorders have been demonstrated to be a significant cause for concern in the maternity ward because to an increase in SGA, stillbirths, and preeclampsia/eclampsia (13). The link between it and unfavorable birth outcomes is still up for discussion, nevertheless, as some research have produced contrary findings (14).

Gestational prehypertension affects Up to 11% all pregnancies all over the word (13,14). Among the factor reported, hereditary factors contribute to the higher

prevalence of hypertension disorders in the black racial group(15,16). However, there are currently few prehypertension studies conducted on black population, Tanzania included. There are currently no guidelines to help maternal and child health providers reduce the risks associated with elevated blood pressure ranged between 120-139/80-89mmHg in a pregnant woman in third trimester despite mounting evidence of these catastrophic consequences of prehypertension and the recommendation to change the BP cut-off for stage 1 hypertension by the ACC/AHA 2017 guidelines (16).

Early diagnosis and effective use of management protocols are important aspects of the WHO recommendation to end preventable stillbirths(17), but the lack of data on this emerging topic makes it more challenging to prevent such negative outcomes in prehypertension, emphasizing the need for more research in this area.

There is paucity of data that predict and estimates adverse neonatal outcomes in pregnant prehypertensive women in Tanzania. According to a study conducted in Morogoro, premature birth and low birth weight were linked to hypertensive disorders in pregnancy(18). But the results only applied to hypertensive mothers who were pregnant; prehypertensive mothers were not included.

Thus this study will assess the magnitude and factors associated with adverse neonatal outcomes among newborns of women with late pregnancy pre-hypertension.

1.3. Rationale of the study.

Gestational prehypertension is a new and emerging concept that has been significantly linked to worsening obstetric outcomes (19), and have limited studies in the developing countries yet, Tanzania included.

This study is expected to determine the incidence and factors associated with adverse maternal and neonatal outcomes among newborns of women with late pregnancy prehypertension.

The findings of this may provide evidence of adverse obstetric outcomes and the predictors of these outcomes that are relevant in estimating and mitigation of risk in this prehypertension, thus contributing to improvement of health for women and their children, accelerating the achievement of the SDGs.

Awareness of the different factors associated with occurrence of adverse birth outcome in pregnant mother with prehypertensive disorder may help to set preventive measures in order to control and manage adverse birth outcome.

The findings of this study may also lead to opening up of other research areas within prehypertensive disorders of pregnancy.

1.4 Research questions

1. What is the early neonatal outcome among newborns delivered by women with and without late pregnancy prehypertension at Amana, Temeke and Mwananyamala regional referral hospitals?
2. What is the early maternal outcome of mothers with and without late pregnancy prehypertension at Amana, Temeke and Mwananyamala regional referral hospitals?
3. What are the factors associated with adverse neonatal outcome among women with late pregnancy prehypertension delivering at Amana, Temeke and Mwananyamala regional referral Hospital?
4. What are the factors associated with early maternal adverse outcome among women with late pregnancy prehypertension at Amana, Temeke and Mwananyamala regional referral hospitals?

1.5. Objectives of the study.

1.5.1. Broad objective

To determine the magnitude of effect and factors associated of pregnancy induced prehypertension on adverse maternal and newborn outcomes at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

1.5.2 Specific objectives

1. To determine early neonatal outcome among newborns delivered by women with and without late pregnancy prehypertension at Amana, Temeke and Mwananyamala Regional Referral Hospitals.
2. To determine early maternal outcome of mothers with late pregnancy hypertension among women with and without late prehypertension at Amana, Temeke and Mwananyamala Regional Referral Hospitals.
3. To determine factors associated with adverse neonatal outcome among newborns delivered by women with late pregnancy prehypertension at Amana, Temeke and Mwananyamala Regional Referral Hospitals.
4. To identify factors associated with early maternal adverse outcome among women with late pregnancy prehypertension at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

1.6 Study hypothesis

Alternative hypothesis: there is increased risk of having neonatal adverse outcomes in late pregnancy prehypertensive pregnant women compared to normal blood pressure pregnant women.

Null hypothesis: there is no difference of occurrence of neonatal adverse outcomes in prehypertensive pregnant women compared to those with normal blood pressure.

CHAPTER TWO

LITTERATURE REVIEW.

2.1. Overview of hypertension and prehypertension in pregnancy

Up to 5-10% of all pregnancies are affected by pregnancy hypertensive disorders, which are among the leading causes of unfavorable obstetric outcomes for the mother, fetus, and newborns. They also contribute to unacceptable levels of neonatal and fetal mortality and morbidity second to obstetric hemorrhage (7,22).

Blood pressure changes physiologically during pregnancy in a predictable manner, beginning to fall at around 5 to 6 weeks' gestation and reaching a low at around 22 to 24 weeks' gestation. Thereafter, blood pressure rises to levels that are similar to those seen before pregnancy as the baby approaches term (23,24). In order to maintain adequate perfusion of the uteroplacental unit during pregnancy, a variety of physiological changes occur, including an increase in blood volume, heart rate, and stroke volume, a decrease in mean arterial pressure (MAP), remodeling of the spiral arteries by endovascular trophoblasts, decreased production and sensitivity to vasoconstriction molecules, elevated levels of vasodilators, and an increase in systemic vascular resistance (25).

Failure of these physiological changes results in adjustments that cause endothelial damage and vasospasms, which cause blood pressure to rise and the hypo perfusion of the uteroplacental unit to follow. This results in adverse outcomes for the fetus and the newborn, while increased vascular permeability and hypertension cause target organ injury in the mother (25,26).

It is believed that the mechanisms underlying HDP are similar to those that underlie the negative effects of prehypertension during pregnancy. According to one study, increases of 5 mm Hg in mean 24 hour diastolic BP at 28 and 36 weeks' gestation result in birth weight losses of 68 and 76 grams, respectively (27).

Preeclampsia, gestational hypertension, chronic hypertension in pregnancy, eclampsia, and superimposed preeclampsia on chronic gestation are all currently recognized by all professional obstetrics and gynecology associations as belonging to the category of HDP(28).

Chronic hypertension is high blood pressure that is diagnosed before pregnancy, diagnosed before 20 weeks' gestation, or persists after delivery for more than 12 weeks. It affects 0.9% to 1.5% of pregnant women, though its incidence is said to be rising by 6% annually, with a 2-fold greater increase among people of color (1,29). SGA, low birthweight (LBW), preterm delivery, neonatal morbidity and mortality, as well as superimposed preeclampsia, fetal growth restriction (FGR), intrauterine fetal death (IUFD), FGR, low birth weight (LBW), and preterm delivery are all poor obstetric outcomes that are significantly associated to chronic hypertension (30). The ideal course of treatment entails strict blood pressure control (BP 110-140/85 mmHg) and regular monitoring for negative consequences (12,31).

Gestational hypertension is defined as newly developed increased blood pressure after 20 weeks of gestation without any signs of newly developed end organ damage, and it resolves by 12 weeks after delivery (32). About 1.8-4.4% of pregnancies are affected by gestational hypertension, and preeclampsia develops in roughly 50% of instances (33). Although therapy entails routine blood pressure monitoring and screening for potential preeclampsia development, it may result in an elevated maternal risk for cardiovascular diseases after delivery(32,33).

While its occurrence is unknown, delta hypertension is strongly associated with SGA and stillbirths. It is defined as a recorded increase in diastolic blood pressure of 15 mmHg between mid-pregnancy blood pressure reading and the measurement in late pregnancy (34).

Preeclampsia is defined as increased blood pressure after 20 weeks of pregnancy and newly occurring target organ damage as shown by proteinuria of less than 300 mg per 24-hour urine collection, 300 mg extrapolated from the time of collection, or spot urine. In the absence of additional quantitative measures or in the absence of additional quantitative measures or in the absence of proteinuria, a urine dipstick reading of 2+ or a protein to creatinine ratio of 0.3 mg/dl, a renal condition: If there is no other renal illness present and the serum creatinine level doubles or is greater than 1.1 mg/dL, Thrombocytopenia - Platelet count of 100,000 per liter; impaired liver performance - Blood levels of liver transaminases that are twice as high as normal, or Clinically obvious new-onset headaches, epigastric discomfort, oliguria, or blurred vision that don't respond to standard treatments or can't be explained by other causes are all examples of pulmonary edema (6,18,35). Preeclampsia is the most prevalent form of HDP, affecting 2-8% of pregnancies globally and leading to unacceptable rates of maternal, fetal, and neonatal morbidity and mortality across all areas, with developing nations bearing the brunt of this burden (36).

Eclampsia is characterized by elevated blood pressure and newly developed tonic-clonic, multifocal, or focal seizures without other obvious causes, such as cerebral arterial ischemia and infarction, epilepsy, intracranial hemorrhage, or drug use, which can result in severe maternal hypoxia, aspiration pneumonia, trauma, and neurological damage in mothers, as well as adverse outcomes for both the mother and the fetus, especially in low resource settings (6,18,37). Anticonvulsants and other relevant

treatments must be used to treat seizures, prevent further seizures, and manage their aftereffects in the patient. Delivery is often advised within 12 hours of the initial seizure via any delivery method (18,38).

While the blood pressure cut-off for all of the aforementioned HDP is 140/90 mmHg, gestational prehypertension is defined as elevated blood pressure between 120 and 139/80 and 89 mmHg (9,39). It is further divided into "early" (before 20 weeks' gestation) and "late" (after 20 weeks' gestation) onsets.

Up to 11% of all pregnancies around the world are affected by gestational prehypertension, with incidence rates of both early and late pregnancy prehypertension being similar at 11% (15,40). While the term "late gestational prehypertension" typically refers to cases over 20 weeks' gestation, some published studies show data analyzed based on different cut-offs for gestational age, including 20 weeks, 32 weeks, and 36 weeks; however, the reason for the specific cut-offs is not specified, and the results of all these studies replicate the same findings of adverse maternal, fetal, and neonatal outcomes in late prehypertension at alarming values in different populations (18,41).

Data on prenatal prehypertension are sparse throughout Sub-Saharan Africa because it is a new field of study; nevertheless, this study will help close some of that gap.

2.2. Adverse outcomes in prehypertensive pregnant women.

Regardless of when it is diagnosed, pregnancy prehypertension is strongly associated with unfavorable pregnancy outcomes for the mother, fetus, and newborn child. It increases the mother's risk for preeclampsia, postpartum hemorrhage, and postpartum cardiovascular diseases. It also increases the fetus's risk for SGA, stillbirth, fetal growth restriction, and unsettling fetal status. It also increases the incidence of LBW, low

APGAR score, NICU admission, neonatal sepsis, and early neonatal mortality in the neonates (12,42).

2.2.1. Adverse neonatal outcomes.

According to one study, compared to pregnant women with normal blood pressure, women with gestational prehypertension had an increased risk of having a poor neonatal outcome whereas women with chronic hypertension did not have an elevated risk for these outcomes (43). Another study indicated that compared to women with normal blood pressure, prehypertension during pregnancy increased the risk of unfavorable newborn outcomes by at least 100 times (44). However, the findings from above studies were form retrospective review assessing the risk of pregnant women to develop hypertensive disorders.

2.2.2. Small gestational age.

Gestational prehypertension has been linked to a 59 % increase in SGA, or birth weight at least two standard deviations below the gestational age expected sex-specific birth weight. The risk is higher in nulliparous women, those who smoke, those who are short in stature, and those who do not live with a partner. However, the risk is unaffected by maternal age and is decreased by gestational diabetes mellitus (45). Prehypertension alterations that impair the uteroplacental blood supply are the cause of SGA, which can also cause anomalies in the fetal heart rate tracing during labor (7,46). However, compared to women with normal blood pressure, one study found just a 10% increase (OR 1.10,CI 0.47-2.59) in SGA and low birth weight (9.6%), likely from premature birth (47). Also in the above findings were form systematic reviews of previous retrospective studies which assessed the impact of prehypertension to birth weight.

2.2.3. Stillbirth.

In mothers with gestational hypertension, the risk of stillbirth—the death of a fetus after 28 weeks of gestation but before delivery—is increased by up to 70%, and late pregnancy prehypertension tends to worsen composite adverse fetal outcomes with odds of up to 1.68 compared to early prehypertension. However, prospective studies are required to further estimate the predictive effects of these variables. Mothers with characteristics such as short stature, pregnancy diabetes mellitus, early pregnancy increased BMI, smoking, nulliparity, and not living with a partner have a higher risk of stillbirth (40,48).

2.2.4. NICU admission.

Prehypertensive status in pregnancy have shown to increase the risk of admission to the NICU, however information on the factors that may contribute to this risk is lacking (49). There is limited published data on correlation of NICU admission and prehypertension status.

2.2.5. Low APGAR score.

Most published research on the newborn effects of prehypertension during pregnancy have not investigated low APGAR scores, or APGAR 7 at 5 minutes (14,15). However, one study found that prehypertension patients were more likely to have cord blood with PH 7.2 (37% versus 20%) than women with normal blood pressure (47).

2.2.6. Preterm birth.

Preterm birth, or delivery before 37 weeks, is more likely in women with gestational prehypertension14.7% versus 10.3%; however, this was not statistically significant (50). In most of the published research on pregnant prehypertension, the specific elements that may explain the elevated probabilities were not specified.

2.2.7. Early neonatal death.

In papers relating to pregnancy prehypertension, early neonatal death is defined as the death of a neonate within the first week of life, is currently not properly assessed, partly because none of the published research followed up the newborn baby. However, Akinyemi et al. in United States found that pre-hypertension was associated with decreased risk of neonatal death (51). The difference in study population with previous studies which have shown correlation with hypertensive disorders might have been the raison. In addition others authors reported an increase risk of still birth up to 70 % in pregnant women with prehypertension (14,51).

Although, the above findings were also from a data base review of hospitals record of patients with prehypertensive disorders.

2.3. Adverse obstetric outcomes' risk in gestational prehypertension.

Prehypertension is a complex condition with numerous risk factors contributing to its development up until the point at which poor effects are experienced, hence there is no single known cause (52). Nulliparity and advanced maternal age were identified as independent risk factors for prehypertension development and were found to be present in 50.7% and 47.8% of cases, respectively. Other risks identified in recent studies include artificial insemination (16.9%), prior preeclampsia (6.6%), obesity (8.1%), diabetes mellitus (0.7%), and the baby's gender (male or female) (30;5). More studies need to be carried out to comprehensively identify the contribution of other known risks of HDP in mothers with prehypertension.

Although there are presently no prospective studies examining this link, it would typically be simpler to devise strategies to prevent and lessen the risks in women with late pregnancy prehypertension. However, more research in this area is required to help guide implementation of the ACC/AHA 2017 guidelines and assist professional

obstetric bodies in formulating protocols to prevent and mitigate risks of adverse outcomes. In one retrospective cohort study, SGA and stillbirth risks were more associated with nulliparity, short stature, increased early pregnancy BMI, smoking, non-living with partner, and more increases in diastolic blood pressure (14).

Smoking has been associated to worse fetal outcomes in mothers who had pregnancy prehypertension, despite the fact that it is thought to be protective against HDP (54). To comprehend this association, more research must be done.

CHAPTER THREE:

METHODOLOGY

3.1 Study Design.

This study was an hospital -based prospective cohort study in which pregnant mother visiting antenatal clinic in both Amana, Temeke and Mwananyamala Regional Referral Hospitals were followed up to understand the adverse new born and maternal outcomes. The patients followed up for two ANC visit, the first at 29weeks of GA and Second at 33weeks of GA and at delivery. For the patients who started, from 34 weeks of GA be considered for two visits at 34weeks of GA and at delivery till one week in postpartum period. For each visit, patients did investigation such as Random blood sugar, Blood pressure, Urine for protein and Full blood picture.

3.2 Study Area.

The study was conducted at Amana, Temeke and Mwananyamala regional referral hospital. Amana is a regional referral hospital located at Ilala urban district, Dar es salaam. The hospital has a total bed capacity of 600 beds and serves around 3505598 patients per year. The study was conducted at obstetrics and gynecology department, which provides both outpatient and inpatient services. Patients who are to undergo surgeries under general anaesthesia (GA) are usually admitted in the wards. This department has four wards, the antenatal ward, postnatal ward, labor ward and gynecology ward and has a total of 72 beds. There are about 7622 deliveries which are conducted per year, of which 3192 are by cesarean section. The department has 4 specialists; 40 midwife nurses and 9 registrars. The Labor ward has 6 delivery beds with sufficient privacy, 4 beds for observation after delivery, resuscitation unit and a nurse station. The department has a standard operating theater with 3 theater rooms, the theatre has 2 anesthesiologists, 6 anesthetists and 10 theater nurses.

Mwananyamala regional referral hospital is the regional referral located at Kinondoni district, Dar es Salaam. The study was conducted at obstetrics and gynecology department, which provides both outpatient and inpatient services. Patients who are to undergo surgeries under general anaesthesia (GA) are usually admitted in the wards. The department has four wards, the antenatal ward, postnatal ward, labor ward and gynecology ward and has a total of 72 beds. There are about 10425 deliveries which are conducted per year, of which 4015 are by cesarean section and 6240 by SVD. The department has 3 specialists; 36 midwife nurses and 8 registrars. The Labor ward has 8 beds which include delivery beds with sufficient privacy, beds for observation after delivery, resuscitation unit and a nurse station. The department has a standard operating theater with 3 theater rooms, the theatre has 2 anesthesiologist, 5 anesthetists and 10 theater nurses.

Temeke regional referral hospital is the regional referral located at Temeke district, Dar es Salaam. The study was conducted at obstetrics and gynecology department, which provides both outpatient and inpatient services. Patients who are to undergo surgeries under general anaesthesia (GA) are usually admitted in the wards. This department has four wards, the antenatal ward, postnatal ward, labor ward and gynecology ward and has a total of 78 beds. There are about 10400 deliveries which are conducted per year, of which 3815 are by cesarean section and 5360 by SVD. The department has 5 specialists; 40 midwife nurses and 9 registrars. Labor ward has 10 beds which include delivery beds with sufficient privacy, beds for observation after delivery, resuscitation unit and a nurse station. The department has a standard operating theater with 5 theater rooms, the theatre has 2 anesthesiologists, 7 anesthetists and 12 theater nurses.

3.3 Target Population

All women who attended Antenatal clinic and delivered at AMANA, Temeke Regional referral hospital and Mwananyamala Regional referral hospital and their neonates after delivery

3.3.1 Study Population

All women with confirmed late pregnancy prehypertension and those with normal 3rd trimester blood pressure coming to Antenatal clinic and deliver at Amana, Temeke and Mwananyamala Regional Referral Hospital in 3rd trimester who consented to this study.

3.4. Eligibility criteria

3.4.1 Inclusion criteria.

All pregnant women attended antenatal clinic or admitted in 3rd trimester (29 weeks + 0 days gestation to 41 weeks + 6 days gestation) who consent to participate in this study.

3.4.2 Exclusion criteria

Pregnant women with known hypertension during pregnancy (chronic hypertension, gestational hypertension, preeclampsia, and eclampsia) as well as those who refused to participate in the study and have known chronic medical conditions like diabetes mellitus, renal failure, and heart diseases.

3.5. Sampling technique.

Consecutive sampling enrollment into the study was done for pregnant women attend ANC clinic from GA 29 weeks and admitted for delivery at Amana, TEMEKE and Mwananyamala RRH who meet the inclusion criteria until the desired sample size is achieved.

3.5.1 Sample size estimation

The total number of participants in these was determined based on each specific objective, and the highest calculated figure will be used.

For objectives 1 and 2: early neonatal adverse outcomes in both exposed and non-exposed groups were obtained using Openepi online at OpenEpi: Sample Size for X-Sectional, Cohort, and Clinical Trials.

The incidence of composite adverse neonatal outcomes in mothers with prehypertension is 31.6%, while the incidence of composite outcomes in non-exposed normotensive controls is 17.6% (28).

Sample Size:X-Sectional, Cohort, & Randomized Clinical Trials

Two-sided significance level(1-alpha):	95
Power(1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	1
Percent of Unexposed with Outcome:	18
Percent of Exposed with Outcome:	32
Odds Ratio:	2.2
Risk/Prevalence Ratio:	1.8
Risk/Prevalence difference:	14

	Kelsey	Fleiss	Fleiss with CC
Sample Size - Exposed	150	148	162
Sample Size-Nonexposed	150	148	162
Total sample size:	300	296	324

References

Kelsey et al., Methods in Observational Epidemiology 2nd Edition, Table 12-15
Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 &3.19
CC = continuity correction
Results are rounded up to the nearest integer.
Print from the browser menu or select, copy, and paste to other programs.

Results from OpenEpi, Version 3, open source calculator--SSCohort
Print from the browser with ctrl-P
or select text to copy and paste to other programs.

Using Kelsey, the sample size is 300 participants.

Specific objective 3: Association between adverse neonatal outcomes was determined from independent variables included in the study checklist in those with

outcomes of interest. In one study of prehypertension, nulliparity doubled odds of adverse outcomes with an incidence of 2.45% (Wikström et al., 2016). Using the Daniel formula, n = (zα+zβ)2p (1−p) d2

Where;

n = desired sample size

d= Level of precision= 0.05

Zβ = z-statistic at β= 0.84

Zα = z-statistic at α= 1.96; 95% level of confidence

p= incidence of adverse neonatal outcome in mothers considered nulliparous females, 2.45%

Therefore,

n= (1.96+0.84)2× 0.0245 (1−0.0245) (0.05)2 n=75 participants

Therefore, since the sample size for the first two objectives is higher, then the sample size for this study will be **330** participants after adding 10% considerations for loss to follow-up. Among these, 165 were cases with prehypertension while 165 were control

3.6 Patient recruitment and data collection.

Women attended at Antenatal clinic and admitted until delivery to AMANA, Temeke AND MWANANYAMALA REGIONAL REFFERAL in the third trimester were enrolled sequentially and guided through the consent process in order to take part in the study. The patients recruited for three ANC visit, the first at 29weeks of GA and Second at 33weeks of GA and during admission for delivery. For the patients who recruited from 34weeks of GA be recruited at 34weeks of GA and during admission for delivery. The research assistants delivered a questionnaire right away to those who meet the requirements for inclusion and agree to take part in the study, which included the

following: socio-demographic factors such as marital status, maternal age, tobacco use, alcohol consumption, body weight and height, gestational age, and obstetrical factors such as Gravidity, Parity, gestational age, family hypertension history, personal hypertension in pregnancy, documented evidence of blood pressure antenatal in 3rd trimester (based on LMP and/or 1st or 2nd trimester ultrasound scan),

Then a brachial artery blood pressure readings was measured.

The first reading was taken manually (BP machine medtech, Hong Kong , China) on either upper arm after 5 minutes of rest while the second reading is taken after 5-10 minutes of rest to confirm blood pressure level (Mayo clinic, 2020). All readings was carried out during latent labor.

In this study, blood pressure levels of 120-139/80-89mmHg in a pregnant woman in third trimester are diagnostic of late pregnancy prehypertension, while values of blood pressure less than 120/80 mmHg in 3rd trimester represent normal blood pressure. Additionally, elevated blood pressure greater than or equal to 140/90 mmHg represents hypertension if persistent on at least 2 occasions, four hours apart.

A blood and urine samples for urinalysis was obtain by a laboratory assistant in order to obtain urine protein levels and blood glucose levels that are recorded in the checklist and report forms attached to the questionnaire.

For blood sugar test, no specific preparation was needed from the participant but the procedure was explained to participant. The participant's finger of choice is swabbed with an alcohol 70% swab after being cleaned, dried, and utilized in an aseptic manner, the finger is lanced to get a sample of capillary whole blood, which is then placed on the glucometer strips, and a reading is obtained. The participants finger was then be swabbed again to further mitigate infection and blood loss risks (34). The participant was involved in all the relevant steps, answering all their questions when

asked. Proper disposal of medical waste is done. The results were recorded in milligrams per deciliter.

For urine test, the required materials included result from, urine test strips, timer, gloves, absorbent towel/pad for blotting urine test strip, and sterile urine container. < 2 hours' fresh void urine is used and the urine is mixed well just before dipping with the test strip.

Urine was collected in midstream using sterile gloves then the specimen was labelled with full name of participant, date of birth or patient identifier labels. Then the sample was sent for test area.

A non-expired urine test strip is dipped into the urine container for about 1 second and quickly removed, then the edge is drawn along the rim of the test tube and any excess urine is removed by adsorbent pad. Then place test strip, test pads facing up, onto paper towel or pad and set timer for 60 seconds for test pads to develop. Holding the test strip vertically and strip container upright, each test pad is compared to the corresponding color blocks row on bottle label and results are obtained and recorded for urine protein in milligrams and other patient management-relevant results like Urobilinogen, Bilirubin, Ketone, Blood, Nitrite, Leukocytes, Glucose, Specific Gravity, and pH obtained in the same urine dipstick strip. The initials of the person testing are written down, and the used materials discarded properly as medical waste (35).

Neonatal characteristics such as the baby's gender, the number of fetuses, the mode of delivery, the birth weight (recorded to the nearest 0.01 kg), the viability of the newborn, and the Apgar score at 1 and 5 minutes are noted in the checklist after delivery.

A standardized chart of estimated fetal weights for each gestational age was used to determine whether a fetus is small-for-gestational age. The newborn was then monitored until discharge in order to look for early neonatal death, which was defined as a death of newborn before being released from the hospital.

The total follow-up time be three follow up at 29 GA, 33week of GA and during delivery up to when the neonate is discharged, referred or dies.

3.7 Research Assistants.

Three research assistants were trained for three days by the principal investigator, on how to use the checklist to retrieve information from ANC visit to admission until delivery to the participant discharge. The training was focused on orienting research assistants how to collect relevant information for the study.

3.8 Validity and Reliability

The data collection tool was modified and reviewed by experts before pretested at AMANA, Temeke AND MWANANYAMALA RRH. The tool was revised after the pretesting exercise to ensure that, the questionnaires captured the reliable information and modified to improve clarity before start of the study. Prior to study's start, the tool was revised to ensure that the study record accurate data and improve clarification to increase readability. The principal investigator and the research assistants will then use the redesigned tool after receiving training on the method of recording and the meaning of each data element.

3.9. Dependent and Independent variable

3.9.1 Dependent variables:

Adverse new born outcomes including Low APGAR score, small-for-gestation age, prematurity, stillbirth, early neonatal death.

Adverse Maternal outcome: occurrence of pre-eclampsia, eclampsia, death

3.9.2 Independent variables:

Socio-demographic factors: Maternal age, marital status, alcohol intake, cigarrete smoking, Body mass index

Medical-Obstetric factors: Gravidity, Parity, Family hypertension history, Personal hypertension in pregnancy history, Sex of baby, Pregnancy interval, and multiple gestation, Mode of delivery, BP reading, Gestational age, and Labor patterns.

Laboratory Tests: Fasting blood sugar , Random blood sugar, Urine protein, and FBP

3.10. Data analysis plan.

Data from questionnaires were collected by using Chi-Square test and entered, analyzed using SPSS software version 25.0., a statistical computer program. Date from Socio-demographic factors, Obstetric factors and lab results were presented as frequencies, means, standard deviations, and were presented in a tabular format.

For Objective 1 and 2: Magnitude of adverse neonatal and maternal outcomes.

The magnitude of maternal and néonatal outcomes were calculated as frequency with respective percentages in each category

Objective 3 and 4: Association between prehypertension and adverse neonatal outcomes

A binary variable of adverse outcome were generated to determine the association of adverse neonatal outcomes with late pregnancy prehypertension, and used as the dependent variable coded 1=having adverse outcome and 0=no adverse outcome.

After generating a binary variable, the bivariate analysis was carried based on both Logistic regression and Chi-square test, repeated analysis that compares maternal factors and neonatal factors with results from incidence of adverse outcome was done. Unadjusted odds ratios (OR) with the corresponding 95% confidence intervals will be reported. At this stage, all biologically plausible variables with p-value <0.2 were considered during multivariate analysis to control for confounding factors.

At the multivariate stage, multiple logistic regression assumptions like; the absence of multicollinearity normality and influence were checked. The final multivariate analysis model will be established by a manual back-ward stepwise selection method with independently significant variables. Here, we excluded variables which lose their true association with results from incidence of adverse outcome after testing for confounders. The final model quality check will be done using a goodness-of-fit test.

The final multivariate model factors were then be reported as OR, AOR and 95% CI. In this analysis, a p-value <0.05 determines the significance of a variable.

3.11 Ethical consideration

The HKMU Senate of Research and Publication Committee granted the study ethical approval before it is carried out. At AMANA, Temeke AND MWANANYAMALA RRH, the appropriate authorities were asked for permission before collecting data. After receiving a patient's signed informed consent, all qualified patients who arrived at AMANA, TEMEKE AND MWANANYAMALA RRH were enrolled. Patients who were not to

give consent were excluded. Numbers were used instead of names to hide patient's identity. Information that is acquired was coded and entered into a computer for records. By assigning each file a unique password that is known only to researchers, security was maintained. The written forms was maintained in a secure cabinet that was only be accessible to researchers. Participants in whom diagnosis of hypertensive disorders was made, a normal routine care of management of hypertensive disorders in pregnancy was provided accordingly.

3.12. Expected outcome/results

The study's findings and results were reported in the results section, and a discussion of how the results of this study compare to those of earlier studies were followed.

3.13. Dissemination plan

A final report was compiled and submitted to the Head of Department of Obstetrics and Gynaecology, Dean of School of Medicine, Director of Postgraduate studies KU, and Head of Clinical Medicine Services KU as a partial fulfilment for Masters of Clinical Medicine in Obstetrics and Gynaecology. This report will also be disseminated through presentations to scientific conferences and as a publication in a scientific journal.

CHAPTER FOUR

RESULTS OF THE STUDY.

4.1. Study flow chart.

A total of 357 éligible prégnant woment with and without late pregnancy Pr hypertension attended anténatal clinic of Amana, Temeke and Mwananyamala Regional Referral Hospitals vaginal during the time of data collection. 27 participants declined to participate in the study. Eligible participants were contacted and were consecutively enrolled in the study until the target sample size of 330 was reached.

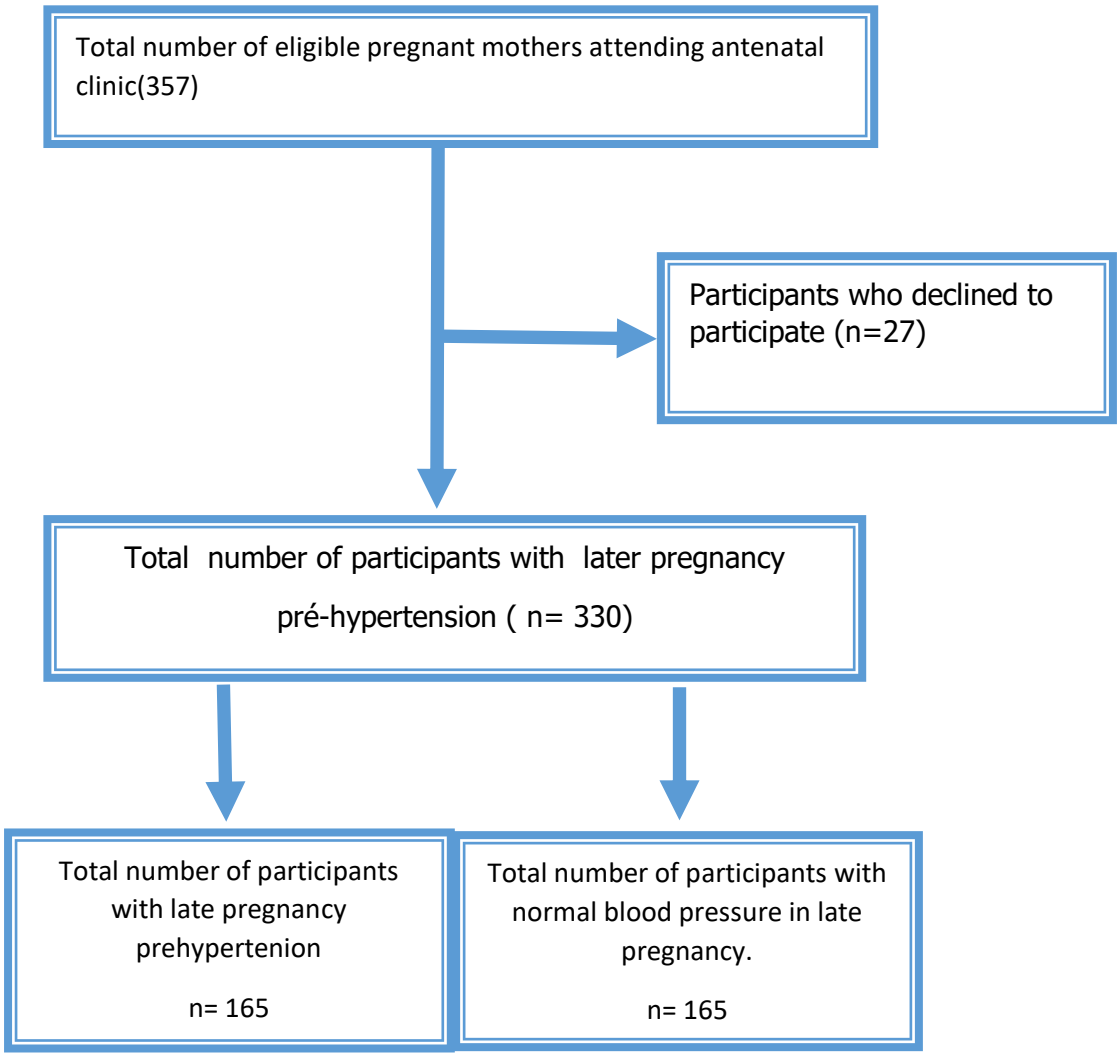

Figure 1: Study flow charts of pregnant mother with and without late prehypertension attending Amana, Temeke and Mwananyamala Regional Referral Hospitals.

4.2.Characteristics of women attending antenatal clinic at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

Table 1: Baseline sociodemographic factors among study participants.

Characteristics	Pre HTA	Normal BP
Age		
18-20	11(68.8%)	5(31.2%)
20-24	43(51.8%)	40(48.2%)
25-35	86(49.7%)	87(50.3%)
>35	25(43.1%)	33(56.9%)
Marital status		
Married	120(48.2%)	129(51.8%)
Single	43(54.4%)	36(45.6%)
Divorced	2(100%)	0(0.00%)
Occupation		
House wife	83(46.9%)	94(53.1%)
business	64(53.3%)	56(46.7%)
Employed	6(50.0%)	6(50.0%)
Student	12(57.1%)	9(42.9%)
Level of education		
Primary	14(42.4%)	19(57.6%)
Secondary	61(56.5%)	47(43.5%)
Study center		
Amana	57(51.8%)	53(48.2%)
Temeke	49(44.5%)	61(55.5%)
Mwanyamala	59(53.6%)	51(46.3%)

In this study, majority of participants were aged between 25-35 years and were married and educated at tertiary level in both pre hypertension and normal BP group.

4.2.2. Clinical characteristics among women attending antenatal clinic at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

Table 2: Baseline clinical characteristics among study participants

Clinical factor	Pre HTA	Normale BP
History of high BP		
Absent	159(49.7%)	161(50.3%)
Present	6(60.0%)	4(40.0%)
Family history of high BP		
Present	112(49.8%)	113(50.2%)
Absent	53(50.3%)	52(49.5%)
Bmi		
<25	136(49.3%)	140(50.7%)
>25	29(53.7%)	25(46.3%)
GA in weeks		
G.A at first visit(Week)		
29-30 weeks	123(49.2%)	127(50.8%)
31-33weeks	42(48.3%)	45(51.7%)
G.A at second visit(weeks)		
33- 34 weeks	114(47.6%)	125(52.3%)
34- 36	51(56%)	40(44%)
GA at delivery (weeks)		
37- 40	153(49.3%)	157(50.7%)
>41 weeks	12(60%)	8(40%)
Mode of delivery		
Caesarian section	96(48.5%)	102(51.5%)
Gravidity		
Primigravida	119(49.6%)	121(50.4%)
Multigravida	46(51.1%)	44(48.9%)
Number of children		
0	71(58.7%)	50(41.3%)
1-2	69(44.8%)	85(55.2%)
>3	25(45.5%)	30(54.5%)
Prolong labor	47(54.7%)	39(45.3%)
Malpresentation	23(59%)	16(41%)
Sex		
Female	76(49.7%)	77(50.3%)
Male	89(50.3%)	88(49.7%)

Most of participants had family history of blood pressure in both Pre HTA and those with normal BP group. Also, in both groups, majority of participants were primigravida and delivered by Caesarian section.

4.2.3. Investigation among study women attending antenatal clinic at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

Investigation	First visit 29 weeks	
	Prehypertension	**Normal BP**
	Mean(min-max)	**Mean (min-max)**
Random blood sugar	7.3(6.3-11.8)	7.2(6.1-11.3)
Fasting blood sugar	6.2(4.1-8.1)	6.1(4.5-7.5)
Urinary protein		
Absent	112(42.5%)	151(57.4%)
1+	35(71.4%)	14(28.6%)
2+	18(100%)	0(23.4%)
	Second visit at 33 weeks	
Random blood sugar	7.1(5.7-11.7)	7.4(6.1-11.9)
Fasting blood sugar	5.9(4.5-11.8)	5.4(4.2-8.1)
Urinary protein		
Absent	108(43.9%)	138(56.1%)
1+	41(62.1%)	25(37.8%)
2+	16(88.8%)	2(11.2%)
	At delivery	
Random blood sugar	7.1(5.7-11.7)	7.4(6.1-11.9)
Fasting blood sugar	5.9(4.5-11.8)	5.4(4.2-8.1)
Urinary protein		
Absent	120(43.9%)	153(56.1%)
1+	21(67.7%)	10(32.2%)
2+	24(96%)	1(4%)

In this study, random blood sugar and fasting blood sugar were in average in both participants with prehypertension and those with normal BP. How ever there was an increase in urinary protein in participants in prehypertension groups in both visit.

4.3. Early neonatal outcome among newborns delivered by women with late pregnancy prehypertension and those with normal BP at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

Table 3: Early neonatal outcome among study participants.

Study group	Présence of adverse néonatal out come		Total	$\chi^{2.}$	Sign
	YES	**NO**			
Pr hypertensive	120(65.0%)	45(34.2%)	165(50%)	7.6	0.04
Non Pr hypertensive	63(36.6%)	102(65.8%)	165(50%)		
Total	183(55.4%)	147(44.5%)	330(100%)		
	Low Birth weight				
	Yes	**No**			
Pr hypertensive	41(24.8%)	124(77.6%)	165(100%)	1.7	0.1
Non Pr hypertensive	32(19.39%)	133(80.6%)	165(100%)		
Total	73(22.1%)	257(77.8%)	330(100%)		
	Low Apgar score				
	Yes	**No**	**Total**		
Pr hypertensive	44(26.6%)	121(73.3%)	165(50%)	1.6	0.1
Non Pr hypertensive	17(10.3%)	148(89.6%)	165(150%)		
Total	61(18.48%)	269(81.5%)	330(100%)		
	Still birth				
	Yes	**No**	**Total**		
Pr hypertensive	30(18.1%)	135(71.9%)	165(50%)	16	0.01
Non Pr hypertensive	7(4.2%)	153(95.8%)	165(50%)		
Total	37(22.3%)	293(77.7%)	330(100%)		
	Early néonatal death				
	Yes	**No**	**Total**		
Pr hypertensive	5(3.1%)	160(96.9%)	165(50%)		
Non Pr hypertensive	0(0.0%)	165(100%)	165(50%)		
Total	5(1.5%)	325(98.5%)	330(100%)		

χ^2 : chi square test comparing adverse between prehypertension and non prehypertension groups.

In this study, adverses néonatal outcomes were Most pressent in participants with Pr hypertensive (65. %) than those without prehypertension (36.6%). Low Apgar score following by early neonatal death and still birth were more prévalent in participants with prehypertension than those without prehypertension.

4.4. Early maternal outcome among participants with late pregnancy hypertension and those without PRE HTA at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

Table 4: Early maternal outcome at delivery.

Out come	Presence of early maternal outcome		Total	x^2	sig
	YES	**No**			
Pre HTA	76(46%)	89(53.9%)	165(50%)	**24.4**	**0.01**
Non Pre HTA	3(1.8%)	162(98.1%)	165(50%)		
Total	79(23.9%)	251(76%)	330(100%)		
	Preeclampsia				
	YES	NO	Total	x^2	**Sig**
Pre HTA	22(13.3%)	143(86.7%)	165(50%)	21	0.01
Non Pre HTA	1(0.6%)	164(99.4%)	165(50%)		
Total	23(7%)	307(93%)	330(100%)		
	Gestationnel Prehypertension				
	Yes	No	Total		
Pre HTA	54(32.7%)	111(67.2%)	165(50%)	**61**	**0.01**
Non PREHTA	2(1.2%)	163(98.7%)	165(100%)		
Total	56(16.9%)	274(83%)	330(100%)		

4.5. Factors associated with adverse neonatal outcome among newborns delivered by women with late pregnancy prehypertension at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

Table 5: Bivariate analysis of factors associated with adverse neonatal outcome among prehypertensive pregnant women

Population Characteristics	**Good neonatal outcome**	**Adverse neonatal outcome**		
	n (row%)	n (row%)	COR(80 % CI)	P Value
Age				
18-20(reff)	4(36.4)	7(63.6)		
20-24	5(11.6)	38(88.4)	4.6 (1.6, 13)	**0.05**
25-35	27(31.4)	59(68.6)	1.4 (0.5,3.5)	0.5
>35	9(36.0)	16(64.0)	1.2 (0.4,3.3)	0.8
Marital status				
Married (reff)	37(30.8)	83(69.2)		
Single	8(18.6)	35(81.4)	1.6 (0.8,3.0)	0.29
Divorced	0(0.0)	2(100)		
Occupation				
House wife	20(24.1)	63(75.9)	4.2 (1.8,10)	0.028
Business	18(28.1)	46(71.9)	3.3 (1.4,7.8)	**0.07**
Employed	1(16.7)	5(83.3)	7.1 (1.4,36)	**0.12**
Student (reff)	6(50.0)	6(50.0)		
Level of education				
Primary (reff)	6(42.9)	8(57.1)		
Secondary	13(21.3)	48(78.7)	3.6 (1.5,8.3)	**0.046**
Tertiary	26(28.9)	64(71.1)	2.1 (0.9,4.6)	0.2
History of high BP				
Absent (reff)	43(27.0)	116(73.0)		
Present	2(33.3)	4(66.7)	3.6 (1.5,8.3)	0.22
Family history of high BP				
Present	35(31.2)	77(68.8)		

Absent	10(18.9)	43(81.1)		
Gravidity			0.8 (0.5,1.1)	0.44
Primigravida	33(27.7)	86(72.3)		
Multigravida	12(26.1)	34(73.9)		
Number of children			1.3 (0.7,2.5)	0.8
0 (reff)	16(22.5)	55(77.5)		
1-2	21(30.4)	48(69.6)	1.7 (0.8,3.6)	0.28
>3	8(32.0)	17(68.0)	1.2 (0.6,2.4)	0.63
Mode of delivery				
Caesarian section	36(37.5)	60(62.5)	0.2 (0.14,0.4)	**0.01**
SVD(reff)	9(13.0)	60(87.0)		
Interdelivery interval				
<2years (reff)	31(55.4)	25(44.6)		
>2years	14(41.2)	20(58.8)	1.6 (0.9,2.9)	0.2
Labors Patterns				
Nill (reff)	23(31.8)	51(68.2)		
Induced	8(38.1)	13(61.9)	1.3 (0.9-2.1)	0.3
Prolong labor	7(14.9)	40(85.1)	2.6 (1.4,4.8)	**0.04**
Mal présentation	7(30.4)	16(69.6)	1(0.5,1.9)	0.9
Sexe neonate				
Female	22(28.9)	54(71.1)	1.1 (0.7,1.8)	0.7
Male (reff)	23(25.8)	66(74.2)		

In bivariante régression, motter Age between 20-24 years, housewife, busness mother, ceasarian section, education at secondary level, and prolong labor were associated with occurrence of adverses birth outcome.

5.2.1. Multivariate Analysis of factors associated with adverse neonatal outcome among Pr hypertensive pregnant women

Table 6: Multivariate Analysis of factors associated with adverse neonatal outcome among prehypertensive pregnant women

Population Characteristics	Good neonatal outcome	Adverse neonatal outcome		
	n (row%)	n (row%)	AOR (95% CI)	P Value
Age				
18-20(reff)	4(36.4)	7(63.6)		
20-24	5(11.6)	38(88.4)	5.7 (2.4,6.7)	**0.04**
Occupation				
House wife	20(24.1)	63(75.9)	4.4 (0.7,5.6)	0.8
Business	18(28.1)	46(71.9)	1.0 (0.4,2.4)	0.8
Employed	1(16.7)	5(83.3)	0.12(0.1,1.3)	0.99
Student (reff)	6(50.0)	6(50.0)		
Level of education				
Primary (reff)	6(42.9)	8(57.1)		
Secondary	13(21.3)	48(78.7)	0.5(0.24,1.4)	0.25
Mode of delivery				
Caesarian section	36(37.5)	60(62.5)	1.3(1.14,1.6)	**0.04**
SVD(reff)	9(13.0)	60(87.0)		
Labors Patterns				
Nill (reff)	31(32.6)	64(67.4)		
Prolong labor	7(14.9)	40(85.1)	1.6(1.4,6.2)	**0.001**

Neonates from mother age range between 20 and 24 years , those who had prolong labor and those who underwent C section were the most susceptible to present with adverses neonatales outcomes.

4.6. Factors associated with early maternal adverse outcome among women with late pregnancy prehypertension at Amana, Temeke and Mwananyamala Regional Referral Hospitals.

4.6.1. Bivariate analysis of factors associated with early maternal adverse outcome among study participants.

Table 6. Bivariate analysis of factors associated with early maternal adverse outcome among study participants.

Population Characteristics	HTA ABSENT n (row%)	HTA PRESENT n (row%)	COR (95% CI)	P value
Age				
18-20	9(81.8)	2(18.2)		
20-24	26(60.5)	17(39.5)	1.2 (0.3,4.7)	0.8
25-35	41(47.7)	45(52.3)	2.0 (0.5,7.7)	0.5
>35	13(52.0)	12(48.0)	1.7 (0.4,7.5)	0.6
Marital status			0.2 (O.9,1.3)	0.9
Married (reff)	6(42.9)	8(57.1)		
Single	36(59.0)	25(41.0)	1.2 (0.7,2.1)	0.5
Divorced	47(52.2)	43(47.8)	1.7 (0.9,1,9)	0.9
Occupation				
house wife	45(54.2)	38(45.8)	3(0.7,11)	0.28
Business	28(43.8)	36(56.2)	4.5 (1.1,17)	**0.15**
Teacher	6(100)	0(0.0)		
Student (reff)	10(83.3)	2(16.7)		
Level of education				
Primary (reff)	25(75.8)	8(24.2)		
Secondary	82(75.9)	26(24.1)	1.3 (0.5,3.0)	0.6
Tertiary	144(76.2)	45(23.8)	0.8 (0.5,1.3)	0.6
History of high blood pressure				
Absent (reff)	85(53.5)	74(46.5)		
Present	4(66.7)	2(33.3)	1.9 (0.5,6.1)	0.4

Family history of high BP				
Present	62(55.4)	50(44.6)	1.1 (0.7,1.8)	0.6
Absent (reff)	27(50.9)	26(49.1)		
Gravidity				
Primigravida	66(55.5)	53(44.5)	0.7 (0.4,1.2)	0.4
Multigravida (ref)	23(50.0)	23(50.0)		
Number of children				
0	37(52.1)	34(47.9)	0.4 (0.17,0.9)	**0.16**
1-2	43(62.3)	26(37.7)	03(0.15,0.5)	**0.02**
>3 (reff)	9(36.0)	16(64.0)		
Mode of delivery			0.8 (0.5,1.2)	0.5
Caesarian section	49(51.0)	47(49.0)	1.3 (0.8,1.9)	0.3
SVD	40(58.0)	29(42.0)		
Interdelivery interval				
<2years (reff)	33(54.1)	28(45.9)		
>2years	16(55.2)	13(44.8)	1.1 (0.7,1.7)	0.6
Labors Patterns				
Nill	55(57.9)	40(42.1)		
Induced	12(57)	9(43)	1.1 (0.2-1.9)	0.6
Prolong labor	25(53.2)	22(46.8)	0.4 (0.2,0.9)	**0.1**
Malpresentation	9(39.1)	14(60.9)	1.9 f(1.2,3)	**0.14**

In binary regression, busness mothers, not having and having 1 to 2 childreen,prolong labor and malpresentation were the factors associated with pregnancy induced HTA in pegnant mother with late prehypertention.

5.2.2. Multivariate regression of factors associated with early maternal adverse outcome study participants.

Table 7: Multivariate regression among study participants

Characteristics	HTA Absente n(row%)	HTA Present n(row%)	AOR (95% CI)	P value
Occupation				
Business	28(43.8)	36(56.2)	1.2(1.1,1.9)	**0.02**
Student (reff)	10(83.3)	2(16.7)		
Number of children				
0	37(52.1)	34(47.9)	0.7(0.2,1.9)	0.49
1-2	43(62.3)	26(37.7)	0.4(0.15,0.7)	**0.04**
>3(reff)	9(36.0)	16(64.0)		
Nill	55(57.9)	40(42.1)		
Labor patterns				
Prolong labor	25(53.2)	22(46.8)	0.4(0.14,1.19)	0.17
Malpresentation	9(39.1)	14(60.9)	1.4(1.15,1.5)	**0.01**

In this study, there was significant association of pregnancy induced hypertension with Busness mothers and those with 1 to 2 childreen as well as those who had malpresentation in labor.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS.

5.1. Discussions.

Hypertensive disorders have been reported as the leading cause of morbidity and mortality for both mothers and children due to the increased rate of related adverse birth events such as preeclampsia, low birth weight, and stillbirth, among other complications.

In this study, neonatales from mother with prehypertenison had significantly high risk to present with adverses neonatal outcomes compare to those from normal blood pressure mothers. In addition, low Apgar score following by low birth weight , early neonatal death and still birth were the most frequent neonatales birth outcome observed.

Comparable results were reported by Yang and colleagues in a systematic review in Korean Health Insurance Review and Assessment (HIRA) service database where prehypertension was most induced low birth weight and still birth(36). Similar results were reported by Jonathan and colleagues in USA where adverse neonatal outcome were more frequent in neonate form prehypertensive mother than those with normal BP(37). How ever the findings of Jonathan and colleagues were from retrospective review in which birth outcome were compared in both children from prehypertensive mother and those with normal BP. In addition, there was some parameters which were not assessed in Jonathan and colleagues' study such as APGAR score. Anna and colleagues and Corrie and colleagues in USA reported also that prehypertension was increasing the risk of fetal growth restriction at 2.4-fold(3,4).

Churchill et al. reported that 5mmHg increases in mean 24h DBP at 28 and 36GW were associated with 68 and 76g decreases in birth weight, respectively(40). This suggests

that the adverse birth outcome in pregnant mothers with prehypertension may be explained by compromission of uteroplacental blood flow due to increased resistance, which may lead to reduced oxygen and nutrient supply to the fetus.

On the other hand, a the the second visite(33 weeks)participants with late pregnancy perhypertension had high risk to present with induced pregnancy as seen in 31(100%) participants compare to those with normal BP (33 Week) .Pre eclampsia was the most observed. Furthermore at delivery induced pregnancy HTA was significantly more prevalent in Pre HTA gpe (96.6%) compare to those without Pre HTA(3.8%). How ever estationnel hypertension was the frequent observed.

Comparable results to the present study were reported in a study conducted in USA by Sushma and colleague where pregnancy mother with later prehypertension state have increased risk to present preeclampsia and gestational hypertension(41). How ever, the findings of Sushma and colleagues were from retrospective review(42). Diana Paola and colleagues in Colombia observed also similar findings with prehypertension increasing risk of preeclampsia. On the other hand, the correlation of hypertensive disorders and occurrence of preeclampsia is well documented in literature. As in study conducted by Vesna and colleagues in USA, where 30% of women with chronic hypertension develop preeclampsia(43).

Recent data suggests that women with prehypertension are more likely to experience unfavorable outcomes for both mothers and babies. Pregnant women who have prehypertension are particularly susceptible to hypertensive disorders in the latter terms of their pregnancy (2). In literature its well documented that blood pressure begins to rise in the early stages of pregnancy and continues to rise until delivery. However, in patients with prehypertension, blood pressure increases more sharply

during the later stages of pregnancy, which may be the cause of the unfavorable outcomes seen in various populations(44). On the others hand, higher blood pressure in later pregnancy have been risk factors for preeclampsia as observed in several literature(25).

A number of factors were computed in the current study in order to determine important risk factors that had an impact on the mother and the newborn among study participants.

On the one hand, mothers who were between the ages of 20 and 24,those who had prolonged labor and those who had C sections were the most likely to give birth to babies who had unfavorable outcomes.

Aproximates findings were reported by johanna and colleagues among swedish pregnant mother with late prehypertension where adverses neonatales outcomes were frequent in mother age between 20 to 24 years(33). How ever, the findings of Johanna and colleagues were from retrospective review(33). Similar findings were reported by Anna-Karin and colleagues where also pregnant mother with late prehypertension between 20 to 24 years were the most affected.

On the other hand, in the present study, mothers activities such as busness was significantly associated with pregnancy induced hypertension. This may be explained by the stress related to busness activities which may drive and induce hypertension. This was evidenced by others authors such as Wergeland and colleagues in study conducted in European Agency for Safety and Health at Work found that women engaged in hectic work beyond the 3rd month of pregnancy had high chance to present with preeclampsia compared to those with no hectic ocupation(45) .Similar findings were reported by Anorlu and colleagues among pregnant women attending

tertiary hospital in Nigeria where they observed that stressful work during pregnancy was associated with increased risk of pre eclampsia(46).

On the other side in this study mother with 1 to 2 childreen had also significant risk to present pregnancy induced hypertension. There is limited littérature which have evaluated the correlation between number of childreen and pregnancy induced hypertension installation. How ever , there are findigns reporting nulliparity as risk factor for preecmpsia (47).

Lastly, we found association between malpresentation of fetal and pregnancy induced hypertension.we didnt found published data which have collaborate our findings. How ever, induction of labor was reported to be frequent in pregnant mother with hypertension(47).

5.2. Study limitations.

In this study, some factors were not assessed because we lacked certain clear data, such as weight gain during pregnancy, which can impact blood pressure trajectories and be associated with low birth weight. In addition this study focused only in early birth outcome and didn't assessed later post-partum complications related to prehypertension.

5.3. Conclusions.

The magnitude of adverse neonatal and maternal outcome in pregnant mothers was in average compared to those reported in literature .Pre-hypertension induced preeclampsia and gestational hypertension affected 24% of study participants.. The most affected newborns were those born from caesarian section and those whose mothers had prolonged labor.

5.4. Recommendations.

The following are recommendations for this study:

- Close observation of high-risk expectant mothers for prehypertension.
- Systematic screening of prehypertensive pregnant mothers for early identification and treatment of various unfavorable delivery outcomes.
- Conduct Further research evaluating long-term postpartum in pegnant mother with hypertension.

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APPENDICES

APPENDIX 1: INFORMED CONSENT (ENGLISH VERSION)

STUDY TITLE: MARTENAL AND NEW BORN OUTCOMES AMONG WOMEN WITH LATE PREGNANCY PRE-HYPERTENSION AT AMANA R.H.H, TEMEKE AND MWANANYAMALA R.R.H FROM DECEMBER 2023 – APRIL 2024.

Introduction:

Greetings! I am Dr. Mwalim A. Abeid, a postgraduate student undertaking Obstetrics and Gynecology at Hubert Kairuki Memorial University (HKMU). I am currently conducting a study with the title Maternal **and new born outcomes among women with late pregnancy pre-hypertension at Amana, Temeke R.H.H and Mwananyamala R.R.H From December 2023 - April 2024** as part of my study requirements. I hereby request your participation and support in my study once I or my research assistant approaches you. Your choice to participate or not will have no effect on your care and management. Please, you may ask questions, any time if you do not understand anything pertaining to this study**.**

Aim of the study:

The purpose of this study is to determine the adverse pregnancy and neonatal outcomes among women with late pregnancy pre-hypertension at Amana, Temeke R.H.H And Mwananyamala R.R.H from February 2024– April 2024.

Benefits:

There is no direct benefit to you or your child from participating in this study, but the results may lead to improved birth management for mothers and their babies.

Risks:

Since these treatments are commonly performed after childbirth, there won't be any additional procedures in our study that could endanger you or your baby.

What does this study involve?

This study involves the research assistant or principal investigator asking structured questions to you, the patient, or relatives and filling the responses in the prepared questionnaire. Other information will be gathered through clinical examination and radiological investigation, the management provided will be obtained from your hospital file then filled in the structured clinical form.

Consent:

Your consent to be enrolled in the study is entirely voluntary and amenable by signing the consent form. You are free not to consent and this will not affect care and management offered to your patient. You may decide on to stop participating in this study at any time for any reason**.**

Confidentiality:

The information you provide is extremely respected and will be preserved strictly confidential. The study information will be stored in protected computer files and in paper records stored in a locked filing cabinet. Only study staff will have access to the information.

Access of information:

By signing this form, you allow the research team to use the information and give it to others involved in the research. The research team includes the researcher, facilitators plus others working on this study at Hubert Kairuki Memorial University.

Who to contact:

In case of any queries about this study or further information, questions, you can contact**:**

1. Director of research services

   Hubert Kairuki Memorial University.

   P.O Box 65300,

   Dar es Salaam

   Tel:

2. The Principal Investigator,

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DR. SALVATORY MUKABALAMO,

Assistant Lecturer

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P. O. Box 65300,

Dar es Salaam, Tanzania.

Tel:

I, _____ have read/been told the contents of this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Date of signed consent _____

APPENDIX II: DATA COLLECTON TOOL

QUESTIONNAIRE NUMBER: ..... / .....

Research title: Incidence and factors associated with adverse neonatal outcomes among newborns of women with late pregnancy prehypertension at AMANA Regional Referral Hospital

SECTION I: SOCIO-DEMOGRAPHIC DATA

1. Age .....years

2. Marital status: Married ☐ Single ☐ Divorced ☐

3. Occupation: .....

4. Level of education: No formal education ☐ ☐mary ☐ Secondary ☐ Tertiary

5. Do you smoke cigarretes? YES ☐ NO ☐

6. Do you drink alcohol? YES ☐ N☐

7. Body weight: ..... Kg Body Height: ..... cm

SECTION II: MEDICAL FACTORS

8. Do you have any personal history of high blood pressure? Yes ☐ No ☐

9. Do you know anyone in your family with high blood pressure? Yes ☐ No ☐

10. Blood pressure readings: 3rd trimester .....

SECTION III: OBSTETRIC DATA

12. How many times have you been pregnant?.....times

13. Gestational age: …… (weeks + days)

14. How many children do you have?.....times

15. What was the mode of delivery? Vaginal ☐ Caesarian section ☐

16. Interdelivery interval …….... months

17. Multiple gestation? YES ☐ NO ☐

18a.Labor blood pressure: 1st ……/……... 2nd ……/……

b. Attach a completed partograph too

19. Labor patterns: tick any abnormal patterns

Prolonged ☐

Malpresentation ☐

Malposition ☐

Augmentation with drug (specify) …….

SECTION IV: OUTCOME TO DISCHARGE

19. Sex neonat : male ☐ female ☐

20. Survival: Yes No ☐

21. Length of hospital stay ……... days ☐

22. Specify (*Tick multiple*)

- Low APGAR score
- Prematurity
- Fresh stillbirth
- Macerated stillbirth
- Low birth weight
- Early neonatal death

SECTION V: Laboratory reports

23. Random blood sugar: ……

24. Urine protein (attach report) ……

25. Full blood pictures……

26. Blood group……

Masuali kwa lungha ya Kiswahili

NAMBA YA USAJILI: .....

Jina la utafiti: Matukio na sababu zinazohusiana na matokeo mabaya ya watoto wachanga na mama kwa mama wajawazito walio na shindikizo la damu katika Hospitali ya Rufaa ya Mkoa ya Amana,Temeke na Mwananyamala.

SEHEMU YA I: DATA YA SOCIO-DEMOGRAPHIC

1. Umri (miaka).....

2. Hali ya ndoa:

a.‥Mwenye Ndoa

b.‥Mwenye Talaka

3. Kazi:.....

4. Kiwango cha elimu:

a.‥ Hakuna elimu

b.‥ Shule ya msingi.

c.‥Shule ya secondary.

1. Je, unavuta sigara?

a.‥ NDIO

b.‥ Hapana

6. Je, unakunywa pombe?

a‥NDIYO

b.‥HAPANA

7a. Uzito wa mwili: Kg.....

b.Urefu wa Mwili: . sentimita.....

SEHEMU YA II: MAMBO YA MATIBABU

3. Je, una historia yoyote ya kibinafsi ya shinikizo la damu?

a.‥ Ndio b. ‥hapana

9. Je, unamfahamu mtu yeyote katika familia yako mwenye shinikizo la damu?

a.Ndio‥ b. ‥ Hapana.

10. Vipimo vya shindikizo la damu: trimester ya 3 .... ……..mmhg.

SEHEMU YA III: DATA YA UJAUZITO

12. Umekuwa mjamzito mara ngapi?.....

13. Umri wa ujauzito: (wiki + siku))……

14. Una watoto wangapi?.....

15. Njia ya utoaji ilikuwa nini? Sehemu ya Kaisari ya uke

16. Muda wa uwasilishaji .....miezi

17. Mimba nyingi? a. ‥NDIO b.‥LA

18a.Shinikizo la damu la leba: 1st ……mmhg.2nd.....

b. Ambatisha patografu iliyokamilika pia…….

18. Mitindo ya leba: weka alama kwenye mifumo yoyote isiyo ya kawaida

a.‥Muda mrefu

b.‥Uwasilishaji mbaya

c.‥Msimamo mbaya

d.‥Kuongezeka kwa dawa (taja)

SEHEMU YA IV: MATOKEO UZAZI.

19. Jinsia

a.‥mwanamume.

b. ‥ mwanamke

20. Kunusurika:

a.‥ Ndiyo

b.‥Hapana

21. Muda wa kukaa hospitalini siku ……

21. Matatizo:

a.‥Ndiyo

b.‥Hapana

22. Bainisha (Weka alama nyingi)

a.‥Alama ya chini ya APGAR

b.‥Prematurity

c.‥Uzazi mpya

d.‥Kuzaa mtoto mfu

e.‥ Uzito mdogo wa kuzaliwa

f.‥ Kifo cha mapema cha mtoto mchanga

SEHEMU YA V: Taarifa za Maabara

23. Sukari mwilini:)……

24. Protini ya mkojo (ambatisha ripoti):)……

25. Picha kamili za damu:)……

26. Kikundi cha damu:)……

APPENDIX III: CONSENT FORM (SWAHILI VERSION)

Fomu ya ridhaa ya kushiriki katika utafiti

Utangulizi:

Jina langu **Dkt. Mwalim A. Abeid**, mwanafunzi wa udaktari bingwa wa magonjwa ya kizazi na uzazi kwa akina mama katika chuo kikuu cha kumbukumbu ya Hubert Kairuki. Ninafanya utafiti juu ya **matokeo ya ucheleweshwaji wa kugunduliwa kwa upandaji wa shinikizo la damu juu ya mama na mtoto**. Ninaomba ushiriki wako katika utafiti huu endapo mimi ama msaidizi wangu atakapokufuata ili kukuuliza taarifa muhimu kuhusu tatizo lako.

Madhumuni ya utafiti:

Kuangalia muundo na matibabu yaliyotolewa katika ujazwajwi wa partogram na adhari zake kupitia kwa mama mjamzito mpaka kuzaliwa kwa mtoto na adhari zake wanaohudhuria katika hospital kuu ya Mnazi Mmoja Zanzibar.

Hatari /Athari:

Hakuna athari **/** madhara yatakayotokea au itokanayo kwa kushiriki utafiti huu

Faida za utafiti:

Ushiriki wako ama Ridhaa ya mgonjwa wako kushiriki katika utafiti huu, utawezesha kujua muundo na matibabu yaliyotolewa kwa wagonjwa waliopata matatizo ya ucheleweshwaji wa kugunduliwa kwa upandaji wa shinikizo la damu juu ya mama na mtoto**.**

Haki ya kutoshiriki:

Ni hiari kushiriki katika utafiti huu na unaruhusiwa pia kujitoa,hakuna madhara yoyote atakayopata mama mjamzito ikiwa umechagua kujitoa kwenye utafiti na haitaathiri upatikanaji wa huduma kwa mimba yako .

Usiri:

Taarifa zote zitakazokusanywa katika utafiti huu zitakuwa siri, hivyo ushiriki wako hautajulikana na mtu asiye husika na utafiti bali timu ya watafiti tu.

Malipo:

Kwa kushiriki kwenye utafiti huu, hautalipwa wala hautalipa gharama yoyote.

Ukiwa na swali au tatizo lolote, unaweza kuwasiliana na wafuatao:

2. Director of research services
   Hubert Kairuki Memorial University
   Box 65001.Dar es Salaam Tanzania
   Tel:

3. MTAFITI MKUU,
   DR. MWALIM A. ABEID
   Obstetrics and Gynecology department,
   HKMU,
   P. O. Box 65300, Dar es Salaam, Tanzania.
   Tel: 0629224194
   Email: Sabrinakibeki@yahoo.com

4. MSIMAMIZI
   DR. MONICA CHIDUO
   Senior Lecturer
   Department of Obstetrics and Gynecology
   P.O.BOX 65300, Dar es Salaam, Tanzania.
   Tel: 0713618847.

Kuweka sahihi ya makubaliano:

Mimi, _____, nimesoma/nimesomewa maelezo yote yaliyomo kwenye fomu hii na nimeelewa. Maswali yangu yamejibiwa vizuri na niko tayari kushiriki.

Sahihi ya mshiriki _____

Sahihi ya Mtafiti _____Tarehe _____.

APPENDIX IV: BUDGET AND JUSTIFICATION.

ACTIVITY	**DETAILS**	**UNIT**			**TOTAL COST (Tshs)**
		Measure	**Quantity**	**Unit cost (Tshs)**	
Proposal development.	Rim paper	Rim	2	10,000	20,000
	Photocopy	Pages	200	50	10,000
	Printing and Binding	Pages	100	1000	100,000
	TOTAL ACTIVITY				**130,000**
Preparation of data collection	Photocopy of Questionnaires	Pages	900	50	45,000
	Photocopy of consent form	Pages	900	50	45,000
	TOTAL ACTIVITY				**90,000**
Personnel	Allowance of research assistant (s)	Person	2	150,000@ Month	1,350,000
INVESTIGATION	Blood sugar	person	330	30000@each	210000
	Urine for Protein	Person	330	20000@each	60000
	Full blood picture	Person	330		300000
TOTAL					**670000**
	TOTAL ACTIVITY				**1,350,000**
Analysis and report writing	Printing and binding	Pages	200	100	200,000
	Photocopy	Pages	600	50	30,000
					230,000
TOTAL COST					**1,800,000**
CONTINGENCY	**15% Of total cost**				**270,000**
TOTAL					**2,740,000**

Justification

The purchase of stationeries for data collection, photocopying and binding of the proposal and dissertations together with motivated research assistants are required for a successful completion of the study. The total budget is **TShs. 2,740,000/=.**

APPENDIX V: TIME INTERVAL TABLE

Time / Activity	**December 2023-January 2024**	**January 2024-February 2024.**	**February 2024-April2024**	**April 2024**	**May 2024**
Proposal development and presentation					
Ethical clearance					
Data collection					
Data entry					
Report writing and dissemination					

APPENDIX VI: ETHICAL CLEARANCE

HUBERT KAIRUKI MEMORIAL UNIVERSITY (HKMU)

70 Chwaku Street,
Mikocheni,
P.O BOX 65300,
Dar es Salaam,
Tanzania.

Tel: +255-22-2700021/4
Fax: +255-22-2775591
Email: irec@hkmu.ac.tz
Website: www.hkmu.ac.tz

Ref. No. HKMU/IREC/27.10/434

09th April 2024

Dr. Mwalim. A. Abeid,
Hubert Kairuki Memorial University,
P.O. Box 65300,
Dar es Salaam, Tanzania.

RE: ETHICAL CLEARANCE CERTIFICATE FOR CONDUCTING HEALTH RESEARCH.

I am pleased to inform you that the research titled: **Maternal and Newborn Outcomes Among Women with Pregnancy-Induced Pre-hypertension at Amana, Mwananyamala and Temeke Regional Referral Hospitals, Dar Es Salaam (Abeid M.A., 2024)** has been granted ethical approval.

This approval is in effect for one year from the above date. Any changes in the procedures should be reported to the Institutional Research Ethics Committee. Significant changes will require the submission of a revised request for ethical approval. You will be required to submit **study progress report** every six months.

Permission to publish your findings should be sought from the National Institute for Medical Research (NIMR) before submission to a publisher and not concurrently.

CHAIR PERSON

Name: Prof. Fredrick Kaijage

Signature:

SECRETARY

Name: Prof. Columba Mbekenga

Signature:

KAIRUKI MEMORIAL UNIVERSITY
P. O. Box 65300

APPENDIX VII: PERMISSION LETTER FROM TEMEKE

JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA AFYA.
HOSPITAL YA RUFAA YA MKOA YA TEMEKE
Baruapepe:temekerh@afya.go.tz,S.L.P 45232 Dar es Salaam,Simu 0222856007

Kumb. Na. TRRH/RSC/9/10/01/12 **Tarehe: 10/05/2024**

Ndg. Mwalimu A. Abeid
Hubert Kairuki Memorial University
S.L.P 65300,.
DAR ES SALAAM.

YAH: OMBI LA KUFANYA UTAFITI "MATERNAL AND NEW BORN OUTCOMES AMONG WOMEN WITH PREGNANCY-INDUCED PRE-HYPERTENSION AT AMANA, MWANANYAMALA AND TEMEKE REGIONAL REFFERAL HOSPITALS IN DAR ES SALAAM." (RESEARCH)

Tafadhali husika na somo tajwa hapo juu.

2. Nimepokea barua yako ya tarehe 08 Aprili, 2024 kuhusu ombi lako la kufanya Utafiti (Research) katika Taasisi yetu, kuhusu **"maternal and new born outcomes among women with pregnancy-induced pre-hypertension at Amana, Mwananyamala and Temeke regional refferal hospitals in Dar es salaam."**

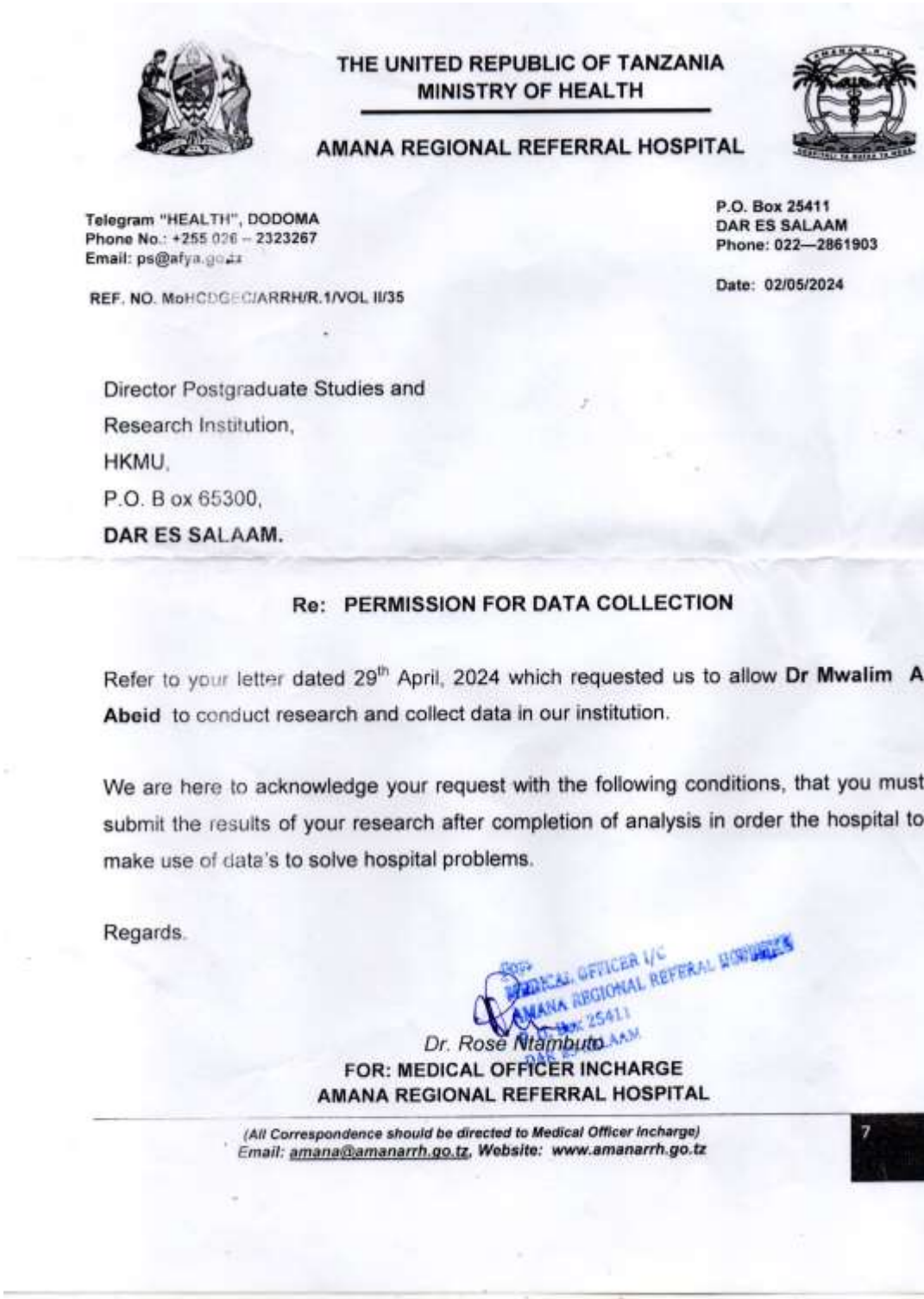
3. Ombi lako limekubaliwa, utatakiwa kulipa ada kiasi cha **Tshs. 100,000/=**. Hivyo wasiliana na mhasibu wa mapato wa Hospitali **Ndg. Lusajo Nsajigwa** kwa namba **0717 959495** ili akupatie control Number kwa ajili ya malipo ya ada hii ili uweze kuruhusiwa kufanya utafiti.

4. Asante kwa ushirikiano.

Dkt. Husna Msangi
Kny: **MKURUGENZI**
HOSPITALI YA RUFAA YA MKOA YA TEMEKE

Nakala: CSCO/OBGY - ***Tafadhali hakikisha taarifa ya utafiti inabaki hospitalini***

APPENDIX VIII: PERMISSION LETTER FROM AMANA



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH

AMANA REGIONAL REFERRAL HOSPITAL

Telegram "HEALTH", DODOMA
Phone No.: +255 026 – 2323267
Email: ps@afya.go.tz

P.O. Box 25411
DAR ES SALAAM
Phone: 022—2861903

REF. NO. MoHCDGEC/ARRH/R.1/VOL II/35

Date: 02/05/2024

Director Postgraduate Studies and
Research Institution,
HKMU,
P.O. B ox 65300,
DAR ES SALAAM.

Re: PERMISSION FOR DATA COLLECTION

Refer to your letter dated 29th April, 2024 which requested us to allow **Dr Mwalim A Abeid** to conduct research and collect data in our institution.

We are here to acknowledge your request with the following conditions, that you must submit the results of your research after completion of analysis in order the hospital to make use of data's to solve hospital problems.

Regards.

MEDICAL OFFICER I/C
AMANA REGIONAL REFERRAL HOSPITAL
P.O. Box 25411
DAR ES SALAAM

Dr. Rose Ntambuto
FOR: MEDICAL OFFICER INCHARGE
AMANA REGIONAL REFERRAL HOSPITAL

(All Correspondence should be directed to Medical Officer Incharge)
Email: amana@amanarrh.go.tz, Website: www.amanarrh.go.tz

7

APPENDIX IX: PERMISSION LETTER FROM MWANANYAMALA

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH

Telephone Address:

Telephone: 022-2760500

Mwananyamala Regional
Referral Hospital,
P.O.Box 61665
Dar es Salaam.

RE: NO: MA. 59/240/01/106

DATE: 5th May,2024

Director,
Hurbert Kairuki Memorial University,
P.O.BOX 65300,
DAR ES SALAAM.

RE: DR. MWALIM A. ABEID - TO CONDUCTI HIS RESEARCH IN MWANANYAMALA REGIONAL REFERRAL HOSPITAL

The captioned subject refers

2. May you be informed that your request to research Titled "***Maternal and New Born outcomes among women with pregnancy – induced pre hypertension at Mwananyamala***" ***Start*** **to 5th June,2024**, to 3 **th July,2024** is asserted.

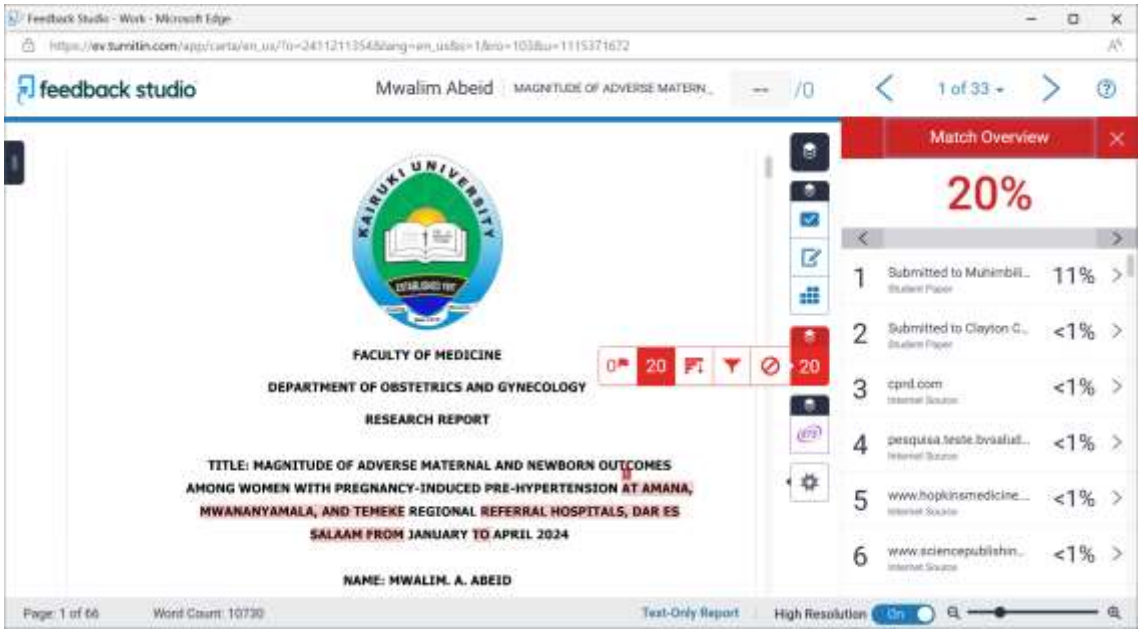
3. The Institution charges **50,000/=**, as Research fee as per student spent. The payments are to be made upon reporting.

4. May he report to the Administration and HR department head for further instruction.

Thanks.

Atugonza Kyaruzi
RESEARCH COORDINATOR
FOR: MEDICAL OFFICER INCHARGE
MWANANYAMALA REGIONAL REFERRAL HOSPITAL

COPY:
Heads of OBGY Department - **MWANANYAMALA REGIONAL REFERRAL HOSPITA**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DEPARTMENT OF OBSTETRICS AND GYNECOLOGY
RESEARCH REPORT
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NAME: MWALIM. A. ABEID
Page: 1 of 66
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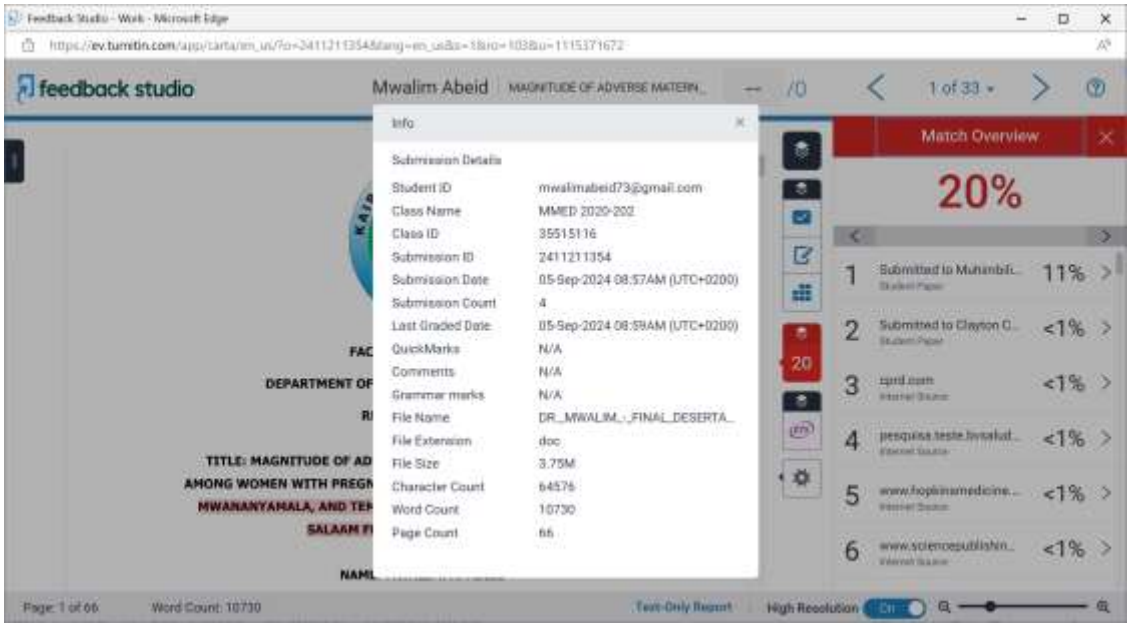
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Mwalim Abeid
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Last Graded Date 05-Sep-2024 08:59AM (UTC+0200)
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Comments N/A
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