

**ASSESSMENT OF IMPLEMENTATION OF WHO
RECOMMENDATIONS FOR THE DIAGNOSIS AND PREVENTION
OF PRE-ECLAMPSIA/ECLAMPSIA OFFERED TO THE PRE-
ECLAMPSIA WOMEN ATTENDING ANTENATAL CARE AT
AMANA REFFERAL HOSPITAL**

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**MMED (Obstetrics and Gynaecology) Dissertation
Muhimbili University of Health and Allied Sciences
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Muhimbili University of Health and Allied Sciences
Department of Obstetrics and Gynaecology



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OFFERED TO THE PRE-ECLAMPSIA WOMEN ATTENDING ANTENATAL
CARE AT AMANA REFFERAL HOSPITAL.**

By

Benjamin Kimaro,

**A Dissertation submitted in (Partial) Fulfillment of the Requirements for the
Degree of Master of Medicine (Obstetrics and Gynaecology) of**

Muhimbili University of Health and Allied Sciences

October, 2021

CERTIFICATION

The undersigned certifies that he has read and hereby recommends examination of a dissertation titled “**Assessment on implementation of WHO recommendations for the diagnosis and prevention of preeclampsia/eclampsia offered to the pre-eclampsia women attending antenatal care at the Amana referral hospital**”, in fulfillment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of Muhimbili University of Health and Allied Sciences.

PROF. SIRIEL N. MASSAWE

(Supervisor)

Date

DECLARATION AND COPYRIGHT

I, **Benjamin Kimaro**, declare that this **dissertation** is my own original work and that 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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DEDICATION

This dissertation is dedicated to my family, beloved Wife **Dr. C. Mtui**, my sons **Hanniel and Helkiah**, and my daughters **Hannes and Helgah** and other family members including my beloved mother **Aikande Temba** for being patient and tolerant of my absence from home related to this work. My heavenly father God bless you all above your expectation.

ABSTRACT

Background: Hypertensive Disorders in Pregnancy continues to be among the top three cause of maternal morbidity and mortality. More than 330,000 women die annually during pregnancy and childbirth. Almost all of these deaths occur in low and middle-income countries (99%). Reducing maternal mortality crucially depends upon ensuring that women have access to quality care before, during, and after childbirth. Pre-eclampsia (PE) accounts for 50,000 deaths annually globally. There is a need to assess the implementation of WHO recommendations for the diagnosis and prevention of Preeclampsia/eclampsia to reduce/prevent morbidity and mortality to mothers and children.

Objective: To assess the implementation of WHO recommendations for the diagnosis and prevention of Preeclampsia/eclampsia offered to pre-eclampsia women attending the antenatal care at Amana Referral Hospital.

Methods: It was a hospital-based cross-sectional study that assessed the implementation of WHO recommendations for the diagnosis and prevention of Preeclampsia/eclampsia offered to pre-eclampsia women at ANC-Amana Referral Hospital, who made at least four visits. Clients were recruited consecutively as they attended and met the inclusion criteria. Information was extracted from the antenatal card to assess the content of care received including antenatal visits, blood pressure measurements, urine for protein, biochemical test, number of and whether an obstetrical ultrasound was done. Assessment of counseling of women on danger signs and other relevant information was obtained using a checklist after the clients have been reviewed by the clinicians. Data analysis was done using SPSS version 23 and demographic data and other indicators were analyzed using frequency tables.

Results: Of the two hundred and forty participants only (17.6%) received the recommended ANC standard of care for Preeclampsia/Eclampsia. Four indicators on the adapted WHO recommendations for the prevention of Preeclampsia/eclampsia were as follows; blood pressure (22.9%), urine for protein (20.8%), obstetrical ultrasound (20%), and biochemical parameters (17.8%). Also among participants only (38.3%) were counseled on danger signs of pre-eclampsia during their ANC visits and only (18.3%) were able to mention three danger signs, and (11.7%) were not able to mention any danger signs despite being counseled.

Conclusion: There is substandard care to the pre-eclampsia patient attending at Amana ANC clinic. More effort should be put forward to ensure all pregnant mothers should receive the standard and quality care during ANC visits. Also to improve the best practice in counseling of danger signs to all mothers to reduce/prevent maternal-fetal morbidity/mortality and have a better pregnancy experience and good outcome.

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LIST OF ABBREVIATIONS

AKI	Acute Kidney Injury
ANC	Antenatal Care
ALT	Alanine Aminotransferase
AST	Aspartate Aminotransferase
BMI	Body Mass Index
FANC	Focused Antenatal Care
HELLP	Hemolysis, Elevated Liver enzymes, Low Platelets
PE	Pre-eclampsia
SDGs	Sustainable Development Goals
TDHS	Tanzania Demographic Health Survey
UNFPA	United Nations Population Fund
UNICEF	United Nation Children Fund
WHO	World Health Organization

OPERATIONAL DEFINITIONS

1. Adapted WHO recommendations for the prevention of Preeclampsia/eclampsia.

The WHO have recommendations set for the prevention and treatment of pre-eclampsia and eclampsia. I have selected those which can be assessed locally according to our setting.

The recommendations are counseled on the danger signs and symptoms, regular and short interval clinic visits (weekly or once in two weeks) for intensive antenatal surveillance for high-risk patients, proper screening for pre-eclampsia e.g. regular blood pressure measurement in each ANC visit, regular check-up on protein in urine, check biochemical parameters and obstetrical ultrasound for fetal surveillance (1)

2. Meet the standard of care:- Clients were considered to have received standard of care if they had check blood pressure at each visit, check urine for protein at each visit, check biochemical parameters at least twice in all visits or more and counselled on danger signs and symptoms according to WHO recommendations for the prevention of Preeclampsia.

1.0 INTRODUCTION

1.1 BACKGROUND

Preeclampsia (PE) is a multisystem syndrome that occurs in pregnant women and is defined as a BP of 140/90 mm Hg or greater after 20 weeks' gestation in a woman with previously normal BP and who has proteinuria (≥ 0.3 g protein in 24-h urine specimen). Eclampsia is defined as seizures that cannot be attributable to other causes, in a woman with preeclampsia. Worldwide, the incidence of preeclampsia ranges between 2% and 10% of pregnancies. World Health Organization estimates the incidence of preeclampsia to be seven times higher in developing countries (2.8% of live births) than in developed countries (0.4%) (2). Pre-eclampsia is an important cause of maternal mortality. It accounts for nearly 18% of all maternal deaths worldwide, with an estimated 62,000 to 77,000 deaths per year. As there are about 127 million births annually in the world, the risk of maternal death from PE is approximately one in 1700 to one in 2100 deliveries globally (3).

In Latin America and the Caribbean PE represents the highest cause of maternal death (4). There is, however, a wide variation across regions in the lifetime risk of a woman dying from maternal causes (from 1 in 3800 in developed countries to 1 in 39 in Sub-Saharan Africa), as well as in the contribution of PE to the total maternal mortality. In South Africa, pre-eclampsia is the primary cause of maternal death (5). Pre-eclampsia is worse in middle and low-income countries due to a lack of technological and therapeutic interventions (2). Pre-eclampsia contributes up to 30% of maternal death in Muhimbili National Hospital in Tanzania (Kidanto et al., 2009). Pre-eclampsia is associated with complications such as placental abruption, intracranial hemorrhage, hepatic failure, acute renal failure, and cardiovascular collapse in pregnant women. To unborn babies, pre-eclampsia may predispose to intrauterine growth restriction, intrauterine fetal demise, low birth weight and prematurity, small for gestational age (SGA), oligohydramnios, low Apgar score, neonatal intensive care unit admission, stillbirth, and neonatal death (7).

Screening for PE attempts to identify high-risk pregnancies to modify antenatal care and institute preventive treatment regimens to reduce complications and deaths. Prevention of pre-eclampsia may be primary, secondary, or tertiary. Primary prevention involves avoiding pregnancy in women at high risk for PE, modifying lifestyles, or improving nutrient intake in the whole population to decrease the incidence of the disease.

Secondary prevention of a disease is only possible if the following three requirements are met: knowledge of pathophysiological mechanisms, availability of methods of early detection; and means of intervention and correction of the pathophysiological changes. Recent efforts have focused on the selection of high-risk women and have proposed an effective intervention like being scheduled for more intensive antenatal surveillance e.g. One/two weeks interval instead of four) asked and counseled on the presence of danger signs and risk factors also proper screening for pre-eclampsia e.g. regular Blood pressure measurement in each antenatal care visit, regular check-up on protein in urine and Obstetrical Ultrasound for fetal surveillance, to avoid the disease or its severe complications. Tertiary prevention relies on using treatment to avoid PE complications like anti-hypertensive and anti-convulsions (8).

Women identified as high-risk can be scheduled for more intensive antenatal surveillance and prophylactic interventions. Current strategies for risk assessment are based on obstetric and medical history and on clinical examination. Unfortunately, evidence regarding the actual risk associated with individual factors is unreliable (9). PE can be classified into early and late-onset, and it is widely accepted that these subtypes of PE represent different forms of the disease. Early-onset PE, requiring delivery before 34 weeks' gestation, is commonly associated with intrauterine growth retardation (IUGR), abnormal uterine and umbilical artery Doppler waveforms, and adverse maternal and neonatal outcomes. In contrast, late-onset PE, with delivery at or after 34 weeks, is mostly associated with mild maternal disease and a low rate of fetal involvement. The perinatal outcomes of late-onset PE are usually favorable. Early detection of PE would allow for the planning of appropriate monitoring and for clinical management, following early identification of complications (10). According to Osungbade et al (2011), inadequate information is given to clients and their families on danger signs in pregnancy and where to seek help in case of signs severe pre-eclampsia and eclampsia has resulted in maternal and neonatal morbidity and mortality (11).

In our setting, we still have a lot of pre-eclampsia patients with complications and even eclampsia. This study will assess the implementation of WHO recommendations for the prevention of Preeclampsia/eclampsia offered to pre-eclampsia women attending antenatal clinic at Amana Referral Hospital. Proper provision WHO recommendations will help in preventing the maternal-fetal morbidity and mortality.

1.2 LITERATURE REVIEW

Eclampsia, which is a major complication of severe pre-eclampsia, can occur during pregnancy, delivery, or postnatal period. For many women who have mild pre-eclampsia, the outcome is good but severe pre-eclampsia may lead to death or serious complications, such as eclampsia, acute Kidney Injury, Pulmonary Edema, HELLP syndrome, Cerebral Vascular Accident, and high rate of premature delivery. Pre-eclampsia rates from African countries such as South Africa, Egypt, Tanzania, and Ethiopia vary from 1.8% to 7.1%. In Nigeria, prevalence of pre-eclampsia ranges between 2% to 16.7% (2).

In Kenya, severe pre-eclampsia is the second most frequent direct cause of maternal death (16%) after post-partum hemorrhage (22%). In one district hospital(Kibera), women admitted with eclampsia all died (13). Pre-eclampsia contributes up to 30 % of maternal death in Muhimbili National Hospital in Tanzania(6)

Focused antenatal care (FANC) requires that a pregnant woman with no complications makes at least four visits to the clinic during pregnancy. However, women with complications like pre-eclampsia are expected to have more than four visits. WHO recommendation on ANC for positive pregnant experience has come out with eight visits, however, this is on the process of being implemented in Tanzania. While this strategy has improved in recent years, it is generally recognized that the antenatal care services currently provided in many parts of the world minimally meet the recommended standards since the first consultation is normally late in pregnancy (2). Early detection of pre-eclampsia improves the outcome of pregnancy, especially when a client begins the first visit early in pregnancy. However, late enrollment for antenatal services is common in many African countries and may adversely influence the detection of early onset of pre-eclampsia (14). Women who do not receive antenatal care are more likely to die from complications of pre-eclampsia than women who had received any level of prenatal care (15).

In Tanzania, the majority of women (97.8%) have at least one antenatal care visit, however many start ANC late. Therefore most of the intervention towards screening pre-eclampsia and other severe forms of hypertensive disorders are jeopardized and the quality of care delivered to women with pre-eclampsia is sub-optimal. In 2015/2016 it was observed that only 51% of women had attended at least 4 antenatal visits (16).Strategies for risk

assessment for preeclampsia are based on obstetric and medical history and clinical examination in pregnancy (5).

Since it is difficult to prevent preeclampsia, early diagnosis by the skilled birth attendant is important so that monitoring and treatment can be initiated early enough to reduce the severity of the pre-eclampsia (17).

According to WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia there are more than 16 recommendations in which the pregnant mother with pre-eclampsia should receive to prevent severe pre-eclampsia and eclampsia, few among those are Low-dose acetylsalicylic acid (aspirin, 75 mg/day) which is recommended for the prevention of pre-eclampsia in women at high risk of developing the condition, regular check-up on protein in urine and obstetrical ultrasound for fetal surveillance. In areas where dietary calcium intake is low, calcium supplementation during pregnancy (at doses of 1.5–2.0 g elemental calcium/day) is recommended for the prevention of preeclampsia in all women, but especially in those at high risk of developing pre-eclampsia (9).

The WHO focused antenatal care strategy recommends screening for preeclampsia during the first antenatal visit around 20 weeks. In developing countries, strategies for risk assessment should still be based on obstetric and medical history and clinical examination of women. Pregnant women with GA more than 20 weeks should be assessed at their first antenatal clinic for risk factors of pre-eclampsia such as young age, null parity, first pregnancy after the age of 35 years, obesity before the current pregnancy, multiple gestations, prior history of pre-eclampsia, diabetes mellitus, and hypertension (18). Routine screening for pre-eclampsia based on measurement of blood pressure among all pregnant women should be practiced as recommended by the World Health Organization (19).

Counseling of danger signs of pre-eclampsia in sub-Saharan Africa is still suboptimal; a cross-section study to assess the extent to which women in 19 countries receive information during ANC for danger signs was done (20). The study demonstrated 15 of the 19 countries, reported to have less than 50% of their women received counseling with exception of Malawi which achieved 72% of women receiving the educational message about pregnancy complications, This study employed Demographic health Surveys of various countries to extract information rather than direct face to face interview with women, therefore didn't demonstrate why the low number of women receive information

about danger signs especially in countries with high maternal mortality and how and why Malawi managed to achieve 72% of women getting educational message about danger signs (21).

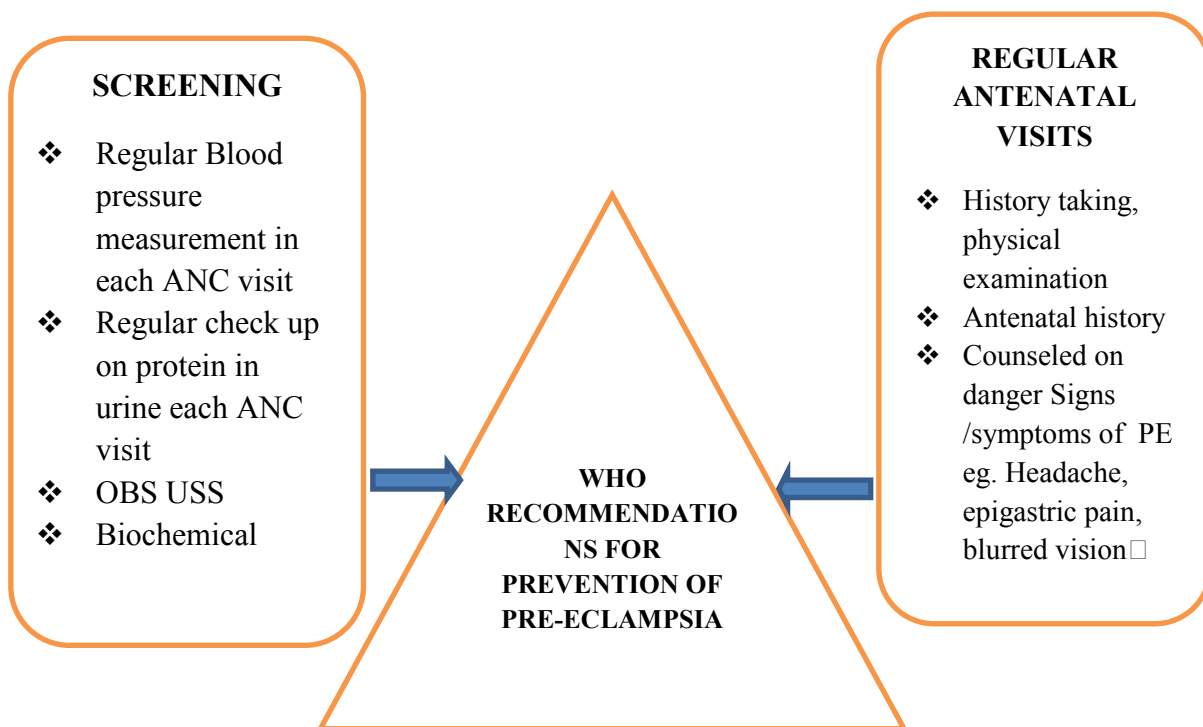
Counseling of danger signs of pre-eclampsia in Tanzania is also minimum even though it fosters early diagnosis and treatment. A cross-section study conducted in Rufiji Tanzania demonstrated that there was 42% of women who didn't receive information on danger signs of pre-eclampsia. There is still a quality gap in ensuring that women are well informed of their complications particularly in the line of preventing eclampsia and other hypertensive related complications (22).

According to our setting e.g. at Amana referral hospital it is difficult to provide and abide to all WHO recommendations, this brings about the adoption and adaptation of those recommendations which can be done in our setting e.g. women identified as high-risk can be scheduled for more intensive antenatal surveillance e.g. One/two weeks interval instead of four,) counseled on the presence of danger signs and risk factors also proper screening for pre-eclampsia e.g. regular blood pressure measurement in each ANC visit, regular check-up on protein in urine, check biochemical parameter and Obstetrical Ultrasound for fetal surveillance.

Screening urine for protein in hypertensive disorders is a measure of the disease severity; the more protein detected in urine, the severe of the disease (10). When urine for the protein of 300mg per 24hours is detected it signifies a severe form of the hypertensive disorder. This is mandatory to be taken every visit to screen those in severe forms of hypertensive disorders for proper treatment and prevention of complications (23). In assessing the content of antenatal care in Nigeria; a cross-section study demonstrated a reasonable capacity in the prevention of pre-eclampsia as 43.1% of pregnant mothers check urine for protein at least once during antenatal care (24). This study didn't elaborate on the proportion of pregnant mothers who had urine for protein checkups on every visit according to WHO standards regarding screening for pre-eclampsia. Most women with hypertensive disorders in pregnancy at St. Francis District hospital, south-East part of Tanzania had eclampsia attributed to substandard care during ANC as only 22% of pregnant women had urine for protein checked.

Nevertheless, the study didn't show the relationship on the number of visits in which urine for protein was tested; WHO standards require women have their urine tested on each visit (26).

1.3 CONCEPTUAL FRAMEWORK



The narration of the conceptual framework

For this study, it is the theoretical conceptual framework (self-designed) that explains and shows the necessary and important components which accomplishes the adapted WHO recommendations for the prevention of preeclampsia/eclampsia. When well-observed and implemented timely and effectively (e.g. proper counseling of danger signs and symptoms, regular screening during ANC visits etc.) will help to prevent/reduce maternal and fetal morbidity and mortality and ensure healthy mother and baby.

1.4 PROBLEM STATEMENT

Pre-eclampsia is among the hypertensive diseases of pregnancy, which are an important cause of severe morbidity, long term disability, and death among both mothers and their babies. We still have a lot of pre-eclampsia/eclampsia patients, initiative must be done to prevent complications and reduce/prevent the maternal-fetal morbidity and mortality. The proper and effective use of adapted WHO recommendations for the prevention of preeclampsia/eclampsia is of paramount importance in doing so. Apart from the effort made at Amana ANC there is a need to assess the implementation of WHO recommendations for the prevention of preeclampsia/eclampsia due to fact that many women who are admitted already developed complications, like Eclampsia, Acute Kidney Injury, etc. Also there is a high rate of Premature delivery due to Induction of labor or caesarian section in order to save the life of the mother and the newborn baby. Others are referred to tertiary hospitals (Muhimbili) for further management and ICU care.

At Amana Antenatal care clinic, cases attended per day are around 20 – 35 clients, where pregnant related hypertension are around 10 -15 clients per day, and from the hospital data from July 2018 up to March 2019 (almost 9 months), the total of 1480 hypertension patients were registered and treated, where 7% were severe pre-eclampsia and 3% were eclampsia and they were referred to MNH. This magnitude of the disease needs intervention. Despite high antenatal visits coverage still, there is a missed opportunity to prevent hypertensive related maternal complications and deaths related to pre-eclampsia. Therefore, because of the increased number of morbidities and mortalities, there is a need to assess the implementation of WHO recommendations for the prevention of Preeclampsia/eclampsia they receive during ANC.

1.5 RATIONALE

Pre-eclampsia and eclampsia continue to affect pregnant women and contribute to maternal morbidity and mortality. It is among the top three causes of maternal morbidity and mortality worldwide including Tanzania. This study will assess the implementation of WHO recommendations for the prevention of preeclampsia/eclampsia delivered to women with pre-eclampsia at Amana ANC Clinic at Dar es Salaam. Also to identify the gap, give feedback and recommend areas of improvement to improve services and quality of care by detecting women with pre-eclampsia early and offer proper preventive measure or

treatment to prevent/reduce mortality and morbidity associated with preeclampsia. There are a lot of patients who succumb the complications of severe pre-eclampsia and eclampsia. However, these findings will serve as a source of primary data for subsequent research on reproductive health.

1.6 RESEARCH QUESTIONS

1. What is the Proportion of pre-eclampsia women who receive antenatal care according to adapted WHO recommendation of prevention and treatment of pre-eclampsia/eclampsia).
2. What is the Proportion of pre-eclampsia women who were aware for the danger signs /symptoms of pre-eclampsia?

1.7 OBJECTIVES

1.7.1 BROAD OBJECTIVE

To assess the implementation of WHO recommendations for the diagnosis and prevention of preeclampsia/eclampsia offered to pre-eclampsia women attending the antenatal clinic at Amana Referral Hospital.

1.7.2 SPECIFIC OBJECTIVES

1. To determine the proportion of pre-eclampsia women who receive antenatal care according to adapted WHO recommendation of prevention of pre-eclampsia/eclampsia
2. To determine the proportion of pre-eclampsia women who are aware of the danger signs /symptoms of pre-eclampsia.

2.0 METHODOLOGY

2.1 STUDY DESIGN: A descriptive cross-sectional study.

2.2 STUDY SETTING

Amana Referral Hospital is one of the regional hospitals in Dar es Salaam, receiving referral cases from various places around Dar es Salaam.

It is located in Ilala Municipal with streets of Karume, Kasulu, Mafuriko, Sharifu shamba and Amana.

The ANC Clinic consist of 6 small rooms and waiting station where triage of the patients is done. The ANC Clinic has 2 clinicians and 4 nurses, and Amana Hospital has 5 obstetrician and gynecology specialists. The antenatal ward has 56 beds. This clinic receives patients referred from the peripheral ANC Clinics from both Government and private hospitals, government health facilities are Mnazi Mmoja, Buguruni, vingunguti, Kiwalani, Mongo la ndege, Chanika, Kivule, Zingiziwa, Majohe, Pugu, Mivuleni, Nguvukazi. Private health facilities are Benedict, Muslim, Madonna and Cardinal Rugambwa. Cases were referred to Amana ANC clinic according to National guidelines. All complicated cases were referred to Muhimbili National Hospital.

Antenatal clinic cases attended are around 20 to 35 per day (With an average of 28 clients per day among those 20 are new and 8-10 clients repeating their ANC routine clinics), Hypertension diseases in pregnancy cases attended are around 10 to 15 patients per day. Either among those pre-eclampsia patients who made four or more visits ranges between 4 to 8 new patients per day (average of 6 per day), this is after excluding those who already enrolled to avoid repetition after code their card with a green marker pen.

2.3 STUDY POPULATION

The study population comprised of all pregnant women attending ANC services at AMANA. Pregnant women eligible for inclusion were those who had attained a gestational age of 20 weeks or more.

2.3.1 Inclusion criteria

1. Pre-eclampsia women who made at least 4 ANC visits or more and consented took part in the study.

2.3.2 Exclusion criteria

1. Clients too sick to participate in the study
2. Those who are not able to express themselves

2.4 STUDY SAMPLE

The target population was all pregnant women diagnosed with pre-eclampsia who made at least 4 visits at AMANA Referral Hospital.

2.5 SAMPLE SIZE

The sample size was calculated using Kish Leslie formula for cross-sectional studies.

$$n = \frac{z^2 p(1-p)}{\epsilon^2}$$

- n, the required sample size;
- z, the critical value associated with a significance level of 95%, is 1.96;
- p, the estimated proportion of pregnant women with pre-eclampsia
- ϵ the margin of error is 5%.

With the proportion of pregnant women with pre-eclampsia received proper ANC care 16.7% (Study done at Nigeria representing the developing countries, 2011); the calculated minimum sample size was:-

$$\text{Therefore } N = \frac{1.96^2 \times 16.7 (100-16.7)}{5^2} = 213$$

Considering non respondent = NX Adjusted factor

$$\begin{aligned} & \frac{213 \times 100}{100-10} \\ & = 240 \end{aligned}$$

2.6 TRAINING OF A RESEARCH ASSISTANT AND PRETESTING OF THE QUESTIONNAIRE.

The questionnaire was pretested on 20 participants to find out areas of improvement preceding the data collection process, after which a few changes were made e.g. full blood picture components aiming at capturing hemoglobin level and platelet count and adding "other" item to different parameters. One Clinical Officer who was not yet employed was recruited and trained on the purpose of the study, meaning of every question in the questionnaire, and professional conduct in approaching women to be recruited for the study. The research assistant was recruited to take cover in case the principal investigator was not available for inevitable reasons. During the first two weeks of the study, we worked together so she gains experience in the proper filling of a checklist. A total of 43 out of 240 study participants were interviewed by the research assistant.

2.7 SAMPLING TECHNIQUE

The study participants were recruited consecutively as they are attending and meeting the inclusion criteria. This was done until the sample size was reached and it took almost two month and few days.

2.8 DATA COLLECTION

During the period of data collection (October 2019 to January 2020) every pregnant woman attending ANC was approached by the researcher or research assistant after they had been reviewed by the clinicians and those who needed emergency care were approached after stabilization. After the ANC clients reach the clinic, the nurses takes the card, and the client waits for the queue to be called, then nurses triage them and take vitals signs like blood pressure and other parameters. This is the time when we start identifying mothers who had made four visits and who at one point or another were found to have high blood pressure and protein in the urine where we ask the verbal consent first, if accepted we mark the antenatal card with green marker pen "zero signs" aside to the angle of the card. After being seen by Clinician we gave the consent form to the patient to sign it, then we took the antenatal card and pick the information from it regarding several antenatal visits, screening urine for protein, blood pressure measurements on every visit.

Counseling on danger signs and symptoms and other relevant information were asked from the mother using a checklist e.g. social-demographic characteristics, ask about counseling on danger signs and symptoms with responses, frequency of obstetrical ultrasound, and record for biochemical parameters like urea and creatinine. For those with Ultrasound results and biochemical parameters, the results were attached at separate papers since no space at Antenatal card to accommodate that information.

2.8.1 Data management, analysis, and presentations

The checklist was checked for completeness, coded and entry done in a computer Microsoft access database and Statistical Package for Social Sciences (SPSS) version 23.0 was used for analysis. Clients who were diagnosed with PE were considered to have received basic/standard of care if blood pressure and protein in urine for four or more visits were measured, to check biochemical parameters and performed obstetrical ultrasound twice or more during all visit and ability to mention three or more danger signs during antenatal visits. All those parameters were coded and analyzed. At the end all those five component were computed as composite variable. Descriptive statistics (frequencies,) were used to summarize the data. The presentation of data is in terms of tables. The sample socio-demographic Characteristics were described using frequency distribution and percentage.

2.9 ETHICAL CONSIDERATION

The ethical clearance for the study was obtained from the MUHAS Research and Publication Committee of Muhimbili University of Health and Allied Sciences (MUHAS). Permission to conduct the study was obtained from Ilala Municipal leaders including District Medical Officer, Medical Officer In-charge, Head of Department Obstetrics and Gynaecology, and ANC In-charge from Amana Hospital. Written informed consent was obtained from the participants after being informed about the purpose of the study. No crucial ethical issues were anticipated or encountered during the study period.

3.0 RESULTS

During the period of data collection (October 2019 to January 2020), 1026 pregnant women attended the Amana ANC Clinic. Two hundred and forty pre-eclamptic women were recruited, enrolled, and analyzed as per flow diagram figure 1 below. Few clients 11(4.6%) use the thumb to signs (with non-formal education). Those who need emergence care measures were followed at the ward after being stable and took the information after they consented.

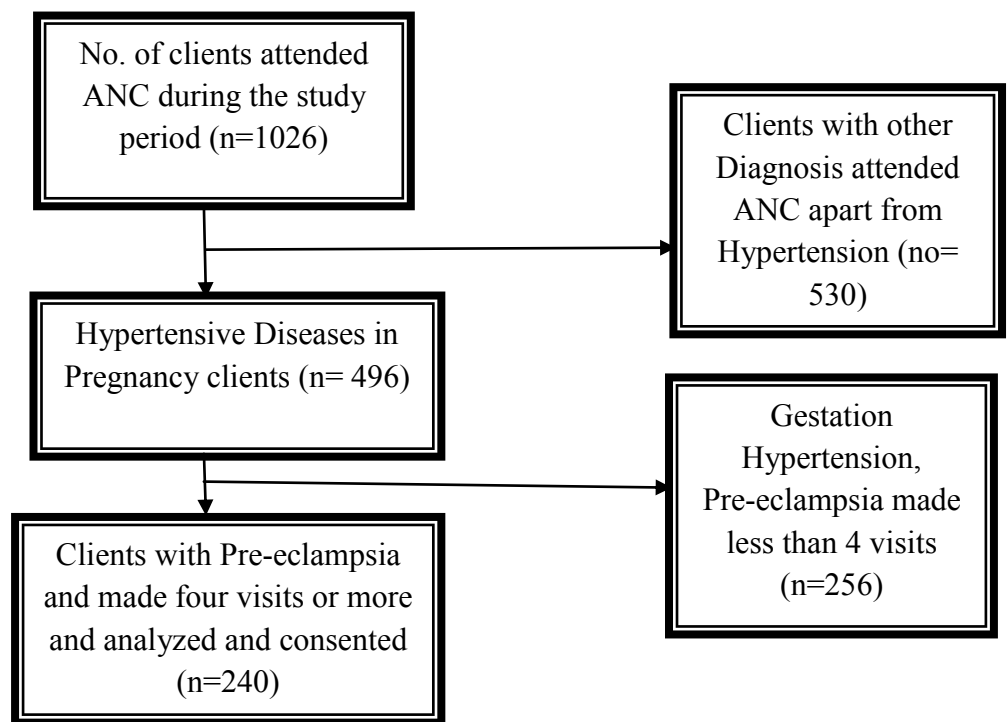


Figure 1: Study Flow Chart showing recruitment of the study participants

Table 1: Socio-demographic and obstetric characteristics of study participants (N=240).

Variable	Frequency (n)	Percentage (%)
Maternal age		
<20	24	10.0
20-34	134	55.8
≥35	82	34.2
Marital Status		
Married/Cohabiting	172	71.3
Single/Separated	68	28.3
Education Level		
Primary	169	70.4
Secondary /college	60	25.0
Non-formal	11	4.6
Occupation		
Un-employed	182	75.8
Employed	58	24.2
PMTCT		
Two	20	8.3
One	220	91.7
Diagnosis		
Preeclampsia with severe feature	150	62.5
Preeclampsia without severe feature	90	37.5
Gestational Age		
Preterm	176	73.3
Term	64	26.7

Out of 240 participants (47.5%) of the respondents attending ANC were aged between 26-35 years, over (71.3%) of the participants were married or cohabiting while (70.4%) had a minimum of primary school education and only (24.2%) were employed. And (62.5%) were preeclampsia with severe features who need admission and the majority (73.3%) of the respondents attending the antenatal clinic were preterm. (**Table 1**).

Table 2: Women who receive care as per WHO recommendations and composite variables (N=240).

Variable	Frequency (n)	Percentage (%)
Blood pressure measurement		
* ≥ 4 Times	55	22.9
3 Times	98	40.8
2 Times	87	36.3
Protein in urine measurement		
* ≥ 4 Times	50	20.8
3 Times	68	28.3
2 Times	87	36.2
1 Times	35	14.7
Ultrasound done		
Yes	48	20.0
No	192	80.0
Biochemical taken		
Yes	42	17.8
No	198	82.2
Patients counseling		
Yes	92	38.3
No	148	61.7
Patients response on counseling (those counseled)		
Mention ≥ 3	44	18.3
Mention < 3	20	8.3
Not able to mention any	28	11.7
Danger signs/symptoms mentioned correctly		
Headache	58	34.7
Swelling of face and fingers	54	32.3
Blurred vision	41	24.5
Convulsion	6	3.5
Epigastric pain	4	2.3
Reduced fetal movement	2	1.1

Through the above five indicators, the composite variable reveals (17.6%) meet the set standard.

* ≥ 4 Times -Means are all those who meet the standard by measuring blood pressure and protein in urine in all four visits. (Table 2).

Results from five indicators of adapted WHO recommendations attained indicating those clients whose blood pressure (22.9%), obstetrical ultrasound (20%), urine for protein (20.8%), (38.3%) were counseled on danger signs of pre-eclampsia during their ANC visits but only (18.3%) were able to mention three danger signs correctly and biochemical parameters e.g. Uric acid, urea, creatinine, AST, ALT (17.8%) done according to the set standard within four visits. (Table 2).

4.0 DISCUSSION

Among all study participants only (17.6%) were able to meet the standard of care in which they were able at least to receive the adapted WHO recommendation for prevention of preeclampsia/eclampsia according to set local standard. The components were to check blood pressure at each visit, check urine for protein at each visit, obstetrical ultrasound- at least twice in all visits, counseling for danger signs and symptoms at each visit and check biochemical parameters at least twice in all visits.

Many of our clients were attending Amana ANC regularly while others were referred from the peripheral ANC clinics. Among all four visits recorded from the ANC card only (22.9%) of the client's blood pressure measurement was taken in all four visits, while others the blood pressure was taken once, twice, or thrice in which they didn't meet the standard of taking blood in each visit. In a research done in different facilities in Malawi- the average performance of blood pressure measurement was 33% at a faith-based facility while at government facilities it was 18%. The study conclude that there was a substantial gap in access to blood pressure monitoring during antenatal care and that providing functional equipment is necessary but not sufficient to assure access to blood pressure measurement for pregnant women (21).

Measurement of protein in urine is regularly taken and even they have tried to create the minor laboratory near the RCH area for measuring protein in the urine, which is very good (they sometimes fail to do so if strips are out of stock). However only (20.8%) were screened for protein in urine in all four visits. Ruling out proteinuria is important for making a diagnosis of pre-eclampsia. In a study done in Kenya, the measurement of protein in urine was observed to be (22%) similar to this study but was not across the four visits (30). A study done at Zambia at a government hospital on urine for protein measurement among pregnant mothers reveal only 23% conducted urine tests during ANC which is almost similar our findings. In this study, they conclude that the majority of women attending ANC services are not being screened according to WHO-recommended standards (31). This can be due to lack of sustainable supplies and equipments.

Obstetrical ultrasound and V-scan/portable ultrasound have been done to ANC clients. Ultrasound is situated at the radiology department while V-scan/ portable ultrasound at the ANC clinic room.

However, only 48 clients had achieved to do obstetrical ultrasound due to reasons that it is a prepaid service and some cannot afford to pay. Due to the aforementioned reasons, only (20.0%) of the clients were able to afford to do obstetrical ultrasound twice or more in all four visits. Either according to the clinical significance of ultrasound in pre-eclampsia we consider the ultrasound done on early third-trimester ultrasound with a good interval for earlier detection of growth restriction and other fetal surveillance. Study done in the northern part of Nigeria looking upon barriers to utilization of prenatal Ultrasound in prenatal care they reported that heavy financial cost, long waiting times before scans, and long distances from service points are other barriers rated high in this study. However, the utilization was (28%) which generally low but a bit higher compared to our study result which is (20%). Among the suggestion they made is that the government at various levels can come in and subsidize the cost of prenatal ultrasound as a way of overcoming the barrier of poverty and to ensure sustainable availability of ultrasound machines to primary and secondary health levels (32).

A study done at Tanzania in an interview study of physicians' experiences and views regarding the use of obstetric ultrasound in Tanzania, they found utilization to be less than (26 %) and they suggest that the offer of a basic routine Ultrasound at the lowest level of health care can increase attendance at ANC visits and also motivate pregnant women to deliver at health care facilities. Also, there are large disparities in access to Ultrasound during ANC not only between rural and urban areas but also between regions and districts. An ultrasound examination during pregnancy has not yet become a routine part of Tanzanian public ANC (33).

Counseling on danger signs and symptoms also not routinely done at Amana ANC, this depends much on the number of staff present that day and the number of clients present. Few clients were able to mention a few danger signs and symptoms for pre-eclampsia regardless they have made 4 or even more ANC visits. Among all clients only (38.3%) were counseled about the danger signs of pre-eclampsia in pregnancies which include

severe frontal and occipital headache, blurred vision, epigastric pain, swelling of face and fingers, reduced fetal movement and convulsions.

However, among 38.3% who were counseled about the danger signs and symptoms of pre-eclampsia only (18.3%) were able to mention more than three danger signs and symptoms related to pre-eclampsia in which they meet standard means they are aware, and about (61.7%) were not counseled at all. According to policy, all pregnant women should be informed about danger signs in pregnancy. In a study done in six countries at sub-Saharan African reveal that asking women about danger signs in ANC consultations was generally poorly performed by health workers, with (27%) of ANC clients asked about a headache or blurred vision, the same number asked about swollen hands or face, and (39%) asked about either danger signs. Approximately one third (31%) of ANC clients were asked about at least one danger sign. This finding is almost near higher than this study though in our study 18.3% of our clients were able to mention three danger signs and symptoms mainly related to pre-eclampsia (30).

A study done at Jordan looking Awareness of danger signs and symptoms of pregnancy complications among women reported that only 25% of the study group were being informed of the three danger signs and symptoms and 38.8% could not name any of these signs and symptoms. This finding is almost the same with our finding in this study which is 38.3% and those who fail to name any danger signs is 11.7% (34).

Another study was done in three countries in selected rural health facilities in Burkina Faso, Ghana, and Tanzania about Counselling on and women's awareness of pregnancy danger signs report that about one-third of the women attending ANC consultations were not counseled at all (35). These findings are consistent with previous studies in sub-Saharan Africa, suggesting that counseling practices and knowledge of danger signs are poor (36). In the above studies, they concluded that counseling practice is poor and inefficient, women do not get the message. A new approach to informing pregnant women on danger signs is needed. Adopting a more client-centered approach might be an option.

Biochemical parameters for preeclampsia are not routinely done at Amana ANC. Among many reasons being that it is the prepaid investigations with the un-affordable price to many clients. This made many pre-eclamptic mothers not able to do the test and hence missed the opportunity. Only (17.8%) were able to do biochemical parameters which are

urea, creatinine, uric acid, and liver transaminase (ALT, AST, LDH) at least twice in all four visits.

5.0 STUDY LIMITATIONS

After the analysis of the results, it seems that many components had been performed below the standard of adapted WHO recommendation for prevention of Preeclampsia/eclampsia, e.g. Biochemical parameters and obstetrical ultrasound. Due to that and for the sake of data description purposes I have set the criteria which will help to describe the results to meet the operational definition of those who meet the standard of care according to the results from the study area.

Also, this study was conducted in Amana Regional Hospital at ANC, therefore these results can only give information about the situation in an urban region with associated nearby Health centers around Amana. It must be taken into consideration that Amana-Ilala is a small part of Tanzania and the results cannot be generalized to the rest of the country. Either we stay at the Clinic for almost 10 weeks. To get more representative data we should have to stay for longer and enroll a large sample size to get more validity and strength of the study.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Adapted WHO recommendations for the prevention of Preeclampsia/eclampsia at Amana ANC clinic are sub-optimally performed. All indicators are below twenty-five percent performance for all four visits made, broadly contributed by the insufficient provision of good quality of care e.g. not routinely check blood pressure at each visit, protein in urine at each visit, and counseling for danger signs and symptoms at each visit not regularly performed. This need intervention in order to ensure the best and safe outcome of pregnancy to mother and baby.

Area for further research

Observation study on counseling practice of health care workers during the ANC visits is important to identify the reasons and the gap for the poor performance. Also to assess health care adherence to standard operating procedures and protocols at ANC concerning pre-eclampsia. Research on barrier or factors which hinder the performance on regular blood pressure measurement, check protein in urine and biochemical parameters is of paramount importance.

6.2 RECOMMENDATIONS

According to the local setting of the study the Hospital management team and In-charge of ANC clinic must ensure all attended clients to ANC got the quality care service with all components of adapted WHO recommendations for the prevention of preeclampsia/eclampsia being attained so as to prevent the pre-eclampsia complications. Also, the management should identify the reasons and barriers for the poor performance of service delivery so as to improve the quality of care for a better outcome.

Regular supportive supervision, capacity building, and training can help the health care workers to be updated and adhere to the protocols and guidelines and being able to achieve the goal of good health to the clients in relation to pre-eclampsia/eclampsia and to have good pregnancy experience.

Capacity building to peripheral ANC facilities who refer cases to Amana e.g. Health centers and Dispensaries on blood pressure measurement, protein in urine measurement,

and regular counseling on danger signs and symptoms of pre-eclampsia/eclampsia could help early identification and treatment of pre-eclampsia and prevent morbidity and mortality.

In nutshell, more effort should be put forward to ensure all pre-eclamptic mothers should receive the standard of care by implementing the WHO recommendations for prevention of preeclampsia/eclampsia accordingly e.g. ensuring the ultrasound and biochemical parameter measurements are available and affordable to all mothers to reduce/prevent maternal-fetal morbidity/mortality and have a better outcome with good pregnancy experience.

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APPENDICES

Appendix I: CHECKLIST

Assessment on implementation of WHO recommendations for the diagnosis and prevention of pre-eclampsia/eclampsia among pre-eclampsia women attending ANC visits at Amana referral Hospital.

1. Gestation Age booking....., Attendance visits
GA..1st2nd3rd4th
a) LNMP.....
b) EDD
2. Diagnosis
 - a) Pre eclampsia With severe feature
 - b) Pre eclampsia Without severe feature
 - c) Eclampsia

Social demographic data

3. Age.....
4. Marital status.....
 - a) Single
 - b) Married
 - c) Cohabiting
 - d) Separated
5. Level of education
 - a) Non-formal education
 - b) Primary
 - c) Secondary/College
6. Occupation
 - a) Employed
 - b) Un-employed

Antenatal history

7. PMTCT Status 1. Two 2. One
8. The number of antenatal visits made.....1. four 2. More than four
9. Blood pressure measurements (mmHg) ...(Round the visit made and record BP)
 - a) 1st visit.....
 - b) 2nd visit
 - c) 3rd visit
 - d) 4th visit.....
 - e) Others.....

10. Protein in urine measurements.....(Round the visit made and record)

1. 1st visit
2. 2nd visit
3. 3rd visit
4. 4th visit.....
5. Others.....

11(a). Do you ever counsel on danger signs and symptoms of Pre-eclampsia?

1. Yes.....
2. No.....

11(b). If yes what are the danger signs and symptoms of Pre-eclampsia do you know?

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....

12(a). Is Obstetrical ultrasound done

1. Yes.....
2. No.....

12(b). If yes..... 1. Twice or more in all visits 2. Less than two in all visit

13. Hemoglobin at booking (g/dl)..... 1. More or equal to eleven 2. Less than eleven

14. History of pre eclampsia/ eclampsia.....1. Yes, 2. No

15.If any history of the following in the previous pregnancies

- a) Preterm delivery.....1. Yes.2. No
- b) Stillbirth delivery.....1. Yes2. No
- c) Early neonatal death.....1. Yes2. No

16. Check if the mother has been on any medications

- a) Calcium supplements 1.Yes 2.No
- b) Anti-hypertensive 1.Yes 2.No
- c) Asprin 1.Yes 2.No

17. Check if the mother had the history or is suffered from any of the following

- a) DM 1.Yes 2.No
- b) Anemia 1.Yes 2.No
- c) Chronic Hypertension 1.Yes 2.No
- d) Renal disease 1.Yes 2.No
- e) Cardiovascular disease 1.Yes 2.No
- f) Liver disease 1.Yes 2.No
- g) HIV 1.Yes 2.No

Clinical and laboratory parameters

18. Clinical symptoms present on any visit. (If Yes indicate the visit)
- | | | |
|---------------------------------|----------------------------|------|
| a) Headache..... | 1.Yes(...../...../.....) | 2.No |
| b) Epigastric pain..... | 1.Yes(...../...../.....) | 2.No |
| c) Blurred vision..... | 1.Yes(...../...../.....) | 2.No |
| d) Swelling of face and fingers | 1.Yes(...../...../...../.) | 2.No |
| e) Convulsion..... | 1.Yes(...../...../.....) | 2.No |
| f) Reduced fetal movement..... | 1.Yes(...../...../.....) | 2.No |
- 19.Laboratory (Biochemical) parameters and FBP if taken....1. Yes.....2.No
(If yes indicate which visit done)
- | | | |
|------------------------------|--------------------------|------|
| a) Hemoglobin..... | 1.Yes(...../...../.....) | 2.No |
| b) Platelets counts..... | 1.Yes(...../...../.....) | 2.No |
| c) Creatinine..... | 1.Yes(...../...../.....) | 2.No |
| d) Blood Urea Nitrogen (BUN) | 1.Yes(...../...../.....) | 2.No |
| e) Uric acid..... | 1.Yes(...../...../.....) | 2.No |
| f) AST..... | 1.Yes(...../...../.....) | 2.No |
| g) ALT..... | 1.Yes(...../...../.....) | 2.No |

Appendix II: WHO recommendations for the Prevention and treatment of pre-eclampsia and eclampsia.

Recommendation	Quality of evidence	Strength of recommendation
In areas where dietary calcium intake is low, calcium supplementation during pregnancy (at doses of 1.5–2.0 g elemental calcium/day) is recommended for the prevention of pre-eclampsia in all women, but especially those at high risk of developing pre-eclampsia.	Moderate	Strong
Low-dose acetylsalicylic acid (aspirin, 75 mg) is recommended for the prevention of pre-eclampsia in women at high risk of developing the condition.	Moderate	Strong
Low-dose acetylsalicylic acid (aspirin, 75 mg) for the prevention of pre-eclampsia and its related complications should be initiated before 20 weeks of pregnancy.	Low	Weak
Women with severe hypertension during pregnancy should receive treatment with antihypertensive drugs.	Very low	Strong
The choice and route of administration of an antihypertensive drug for severe hypertension during pregnancy, in preference to others, should be based primarily on the prescribing clinician's experience with that the particular drug, its cost and local availability. □	Very low	Weak
Magnesium sulfate is recommended for the prevention of eclampsia in women with severe pre-eclampsia in preference to other anticonvulsants.	High	Strong
Magnesium sulfate is recommended for the treatment of women with eclampsia in preference to other anticonvulsants.	Moderate	Strong
The full intravenous or intramuscular magnesium sulfate regimens are recommended for the prevention and treatment of eclampsia.	Moderate	Strong
For settings where it is not possible to administer the full magnesium	Very low	Weak

sulfate regimen, the use of magnesium sulfate loading dose followed by immediate transfer to a higher level health-care facility is recommended for women with severe pre-eclampsia and eclampsia.		
Induction of labour is recommended for women with severe pre-eclampsia at a gestational age when the fetus is not viable or unlikely to achieve viability within one or two weeks.	Very low	Strong
In women with severe pre-eclampsia, a viable fetus and before 34 weeks of gestation, a policy of expectant management is recommended, provided that uncontrolled maternal hypertension, increasing maternal organ dysfunction or fetal distress are absent and can be monitored.	Very low	Weak
In women with severe pre-eclampsia, a viable fetus and between 34 and 36 (plus 6 days) weeks of gestation, a policy of expectant management may be recommended, provided that uncontrolled maternal hypertension, increasing maternal organ dysfunction or fetal distress are absent and can be monitored.	Very low	Weak
In women with severe pre-eclampsia at term, early delivery is recommended.	Low	Strong
In women with mild pre-eclampsia or mild gestational hypertension at term, induction of labour is recommended.	Moderate	Weak
In women treated with antihypertensive drugs antenatally, continued antihypertensive treatment postpartum is recommended.	Very low	Strong
Treatment with antihypertensive drugs is recommended for severe postpartum hypertension.	Very low	Strong
Advice to rest at home is not recommended as an intervention for the primary prevention of pre-eclampsia and hypertensive disorders of pregnancy in women considered to be at risk of developing those conditions.	Low	Weak
Strict bedrest is not recommended for improving pregnancy outcomes in women with hypertension (with or without proteinuria) in pregnancy.	Low	Weak
Restriction in dietary salt intake during pregnancy with the aim of preventing the development of pre-eclampsia and its complications is not recommended.	Moderate	Weak
Vitamin D supplementation during pregnancy is not recommended to prevent the development of pre	Very low	Strong

eclampsia and its complications.		
Individual or combined vitamin C and vitamin E supplementation during pregnancy is not recommended to prevent the development of pre-eclampsia and its complications.	High	Strong
Diuretics, particularly thiazides, are not recommended for the prevention of pre-eclampsia and its complications.	Low	Strong
The use of corticosteroids for the specific purpose of treating women with HELLP syndrome is not recommended.	Very low	Weak
Continued monitoring of women with gestational hypertension or preeclampsia without severe features consists of serial ultrasonography to determine fetal growth.	Moderate	Strong
Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 2 to 4 weeks, if clinically indicated		
Weekly antepartum testing, close monitoring of blood pressure, and weekly laboratory tests for preeclampsia.	High	Strong
Measure full blood count, liver function and renal function at presentation and then weekly or according to the need		
Ambulatory management at home is an option only for women with gestational hypertension or preeclampsia without severe features and requires frequent fetal and maternal evaluation.	High	Strong
Hospitalization is appropriate for women with severe features and for women in whom adherence to frequent monitoring is a concern	High	Strong
In women with chronic hypertension, schedule additional antenatal appointments based on the individual needs of the woman and her baby, eg. appointments every 2 to 4 weeks if hypertension is well-controlled	High	Strong

Appendix III: Letter for approval

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

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Ref. No. DA.287/298/01A/

21st October, 2019

Dr. Benjamin Kimaro
 MMed. Obstetrics Gynaecology
MUHAS.

**RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED:
 "ASSESSMENT OF PRE-ECLAMPSIA CARE PACKAGE OFFERED TO THE
 PREGNANT WOMEN ATTENDING ANATENATAL CARE AT AMANA
 RFERRAL HOSPITAL, DAR ES SALAAM-TANZANA"**

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from **18th October, 2019 to 17th October, 2020**. In case you do not complete data analysis and dissertation report writing by **17th October, 2020**, you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
ACTING: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
 cc: Dean, School of Medicine, MUHAS

Appendix IV: Letter for Permission

UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER,
ELDER AND CHILDREN

DAR ES SALAAM REGION
ADDRESS: "HEALTH"
PHONE: 022 - 2861903



AMANA REGIONAL REFERRAL
HOSPITAL
P.O. BOX. 25411
DAR ES SALAAM.

IN REPLY PLEASE QUOTE

28/10/2019

REF. NO. MOHCDGEC/ARRH/R.I/X/

Director, Postgraduate studies,
MUHAS,
P.O. Box, 65001,
DAR ES SALAAM.

*HO Dd Incharge
OBAT Dept
Please allow the
above mentioned
doctor to collect
data to your dept.
T.M.
28/10/2019.*

RE: PERMISSION TO CONDUCT RESEARCH AND COLLECT DATA

Refer to your letter dated 24th October, 2019 which requested us to allow Dr. Benjamin Kimaro to conduct research and collect data in our institution.

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

Regards.

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

T.M.

Dr. Tuli Mwaisaka
**FOR: MEDICAL OFFICER INCHARGE
AMANA REGIONAL REFERRAL HOSPITAL**

Appendix V: Introductory Letter

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

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Ref. No. HD/MUH/T.118//2017

24th October, 2019

Medical Officer Incharge
 Amana Regional Referral Hospital
 P.O. Box 25411
DAR ES SALAAM.

Re: INTRODUCTION LETTER

The bearer of this letter Dr. Benjamin Kimaro is a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MMed. Obstetrics and Gynaecology.

As part of his studies he intends to do a study titled: *"Assessment of pre-eclampsia care package offered to the pregnant women attending Antenatal care at Amana Referral Hospital, Dar es Salaam-Tanzania"*.

The research has been approved by the Chairman of University Senate.

Kindly provide him the necessary assistance to facilitate the conduct of his research.

We thank you for your cooperation.


 Ms. Sharifa Kamby

For: DIRECTOR, POSTGRADUATE STUDIES

cc: Dean, School of Medicine
 cc: Prof. Sirel Massawe, Supervisor