

**EFFECT OF A TRAINING INTERVENTION ON UTILIZATION OF MATERNAL
HEALTH QUALITY OF CARE STANDARDS AMONG NURSE-MIDWIVES IN
EMBU AND MERU TEACHING AND REFERRAL HOSPITALS, KENYA.**

KOOME DOMISIANO IMPWII

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DECLARATION

I, **Koome Domisiano Impwii** declare that this thesis is my original work and has not been presented for any other award in any other Institution

Sign.......... Date 15-11-2023.....

SUPERVISORS' APPROVAL

This thesis is presented with our approval as the University supervisors

Sign.  Date 16/11/2023

Prof. Lucy Kivuti-Bitok, PhD, MHSM, BScN
University of Nairobi
School of Nursing Sciences

Prof. Anna K. Karani, PhD, MScN, RN (Post Humous)
University of Nairobi
School of Nursing Sciences

DEDICATION

To my dear loving wife Agnes, and my lovely children; Natalia, Daniella, and Ted for their patience, sacrifice and encouragement during the period of my study.

To my late Dad Andrew M'Impwii and my late mother Amalia M'Impwii for teaching me the value of persistence and hard work.

To all nurse-midwives who wake up every morning and work tirelessly to provide quality care to mothers and their babies despite the many challenges

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC	=	Antenatal Care
CDC	=	Centre for Disease Control
CIA	=	Central intelligence Agency
COPE	=	Client Oriented Provider Efficient
CPGs	=	Clinical Practice Guidelines
DRH	=	Division of Reproductive Health
EmONC	=	Emergency Obstetric and New-born Care
FHI	=	Family Health International
IAG	=	Inter-Agency Group
IOM	=	Institute of Medicine
KDHS	=	Kenya Demographic and Health Survey
KHSSP	=	Kenya Health Sector Strategic Plan
MDG	=	Millennium Development Goals
MHTF	=	Maternal Health Task Force
MMR	=	Maternal Mortality Ratio
MOH	=	Ministry of Health
NCK	=	Nursing Council of Kenya
PIH	=	Pregnancy Induced Hypertension
PPH	=	Post- partum Hemorrhage
QoC	=	Quality of Care
SBM-R	=	Standard Based Management and Recognition
SDG	=	Sustainable Development Goals
SMI	=	Safe motherhood Initiative

SPSS	=	Statistical Package for Social Sciences
UN	=	United Nations
UNICEF	=	United Nations Children and Education Fund
WHO	=	World Health Organization

OPERATIONAL DEFINITIONS

- Adherence** = The act of providing maternal care according to the set maternal care standards
- Attribute** = Quality or features inherent in the maternal care standards such clarity, easy to use.
- County** = an administrative area in Kenya covering several wards/locations.
- Effect** = Influence of a training on standards for maternal health care as measured by an increase or decrease in their compliance
- Incentive** = Financial and non-financial rewards given to individuals in an organization to influence them to work towards the achievement of certain goals.
- Maternal Death** = Death of a woman occurring in pregnancy or within 42 days of delivery or miscarriage the gestation and the location of the pregnancy notwithstanding due to factors related to or intensified by the pregnancy or its management but not due to accidental or incidental causes
- Maternal Health care** = Provision of a range of medical and supportive services to pregnant women before, during and after childbirth to ensure their well-being and the health of their newborns.
- Maternal Mortality Ratio** = The number of resident maternal deaths within 42 days of pregnancy termination emanating from complications of pregnancy, child birth and the puerperium in a given geographical area per 100,000 live births

Nurse-Midwife	=	An individual trained to assist in childbirth: includes registered and enrolled nurse midwives
Motivation	=	The level of effort and desire to perform well
Partograph	=	A graphic recording of labor and salient conditions of the mother and the fetus.
Quality of Care	=	Strict and consistent compliance with maternal health quality of care standards to ensure safe, effective and patient-centered care. Measured by the number of standards complied with.
Standards	=	Established guidelines and practices that set the expected level of quality and effectiveness in providing maternal health care. In this study, they refer to WHO(2016) “Standards for Improving Quality of maternal and Newborn Care in Health Facilities”
Training Intervention	=	Structured effort of providing education and instruction on maternal health quality of care standards to nurse- midwives through three days classroom theory and practicum, and two days clinical area practicum to improve their knowledge, skills and performance
Regional Hospital Referral	=	A regional hospital that serves as primary center for specialized medical care, diagnosis and treatment to clients
Utilization	=	Practical application of WHO(2016) maternal health quality of care standards in the assessment and care of women in labor, and management of labor related complications

ABSTRACT

Introduction: Kenya targets to reduce maternal mortality ratio (MMR) to 113 per 100,000 Live births by the year 2030. However, World Health Organization (WHO) data indicates that the Kenya MMR increased from 480 in 2015 to 530 in 2020. One of the factors derailing the efforts to reduce this ratio is suboptimal quality of care provided in health facilities. This is despite WHO in 2016 developing quality of care (QoC) standards to help health care facilities improve the quality of maternal health care. It is still not clear whether the problem lies in the poor implementation, the poor knowledge and attitude of nurse-midwives, inadequate training of the nurse midwives on the standards, presence of system barriers to the implementation or if the QoC standards have no effect on MMR since there are very few studies, if any, which have been conducted on the implementation of the standards.

Objectives: This study's main purpose was to determine the level of knowledge, attitude and utilization of QoC standards by nurse midwives in Embu and Meru teaching and referral hospitals, barriers to the utilization of the standards as well as the effect of a training intervention on selected maternal health QoC standards on knowledge attitude and utilization of the said standards.

Materials and methods: This study used a Quasi-experimental convergent mixed method design with pre-post intervention evaluation. A stratified random sampling strategy was employed to pick the study participants. Data were collected through a self-administered semi-structured questionnaire, structured observation and a focused group discussion. Quantitative data were analyzed using SPSS version 26.0, summarized and described using descriptive statistics. Pearson correlation, Chi-square, and paired samples t test were used to test relationships at a 95% CI. Qualitative data were thematic analyzed using Nvivo version 12.0. Data were then presented in narrative form and through tables and figures.

Results: The mean age of the participants was 36.6 years ($SD \pm 10.7$) with almost half of the participants (44.7%, $n=38$), aged 20-39 years. Most participants (84.7%, $n=72$) were female. Two thirds of the participants (64.7%, $n=55$) were diploma holders. Most participants (44.7%, $n=38$) had practiced for 1-9 years. Before the intervention only 30.6% ($n=26$) had a knowledge score of ≥ 7 . After the intervention there was a significant rise in knowledge scores ($t=3.774$, $df=42$ $p<0.001$). Most of the participants (88.2%, $n=75$) supported the use of the QoC standards before the intervention. There was no significant change in support after the intervention ($t=1.775$, $df=42$, $p=0.083$). Two thirds of the nurse midwives (67.0, $n=57$) indicated using the QoC standards in their practice. This significantly increased after the intervention ($t=12.287$, $df=42$, $p<0.001$). After the intervention, heavy workload and inadequate resources remained as significant barriers to the utilization of the standards.

Conclusion: A training intervention is an effective strategy for improving the nurse-midwives' utilization of maternal health QoC standards. However, there are system barriers that cannot be addressed by a training intervention that may hinder the successful implementation of quality of care standards.

Recommendations: It is recommended that in-service education and training be offered to all nurse-midwives at all health facility levels to equip them with the knowledge and skills required for the implementation of WHO (2016) maternal health QoC standards. Maternal health QoC standards should be added as content to the obstetric nursing/midwifery training curricula. The supply management system should also be streamlined, and more resources should be availed to ensure availability of adequate resources. Further research is recommended to establish the effect of utilization of Maternal QoC standards on maternal mortality and Satisfaction of mothers and their companions on maternal health Quality of service following the implementation of QoC standards.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

World health organization (WHO) defines maternal mortality ratio (MMR) as “the number of women who die as a result of factors related to pregnancy per 100,000 live births during a given period” (WHO et al., 2019). A global reduction in maternal mortality has been reported from a previous ratio of 342 in 2000 to 223/100 000 live births reported in 2020 indicating an annual decline of 2.1% (WHO et al., 2023). However, this reduction is way below what is expected to achieve sustainable development goal(SDG) target 3.1 of decreasing the maternal mortality ratio to fewer than 70 by 2030(WHO et al, 2023). To substantially reduce maternal deaths, enhancing accessibility to skilled attendance must go hand in hand with maternal and neonatal care quality and safety improvement (WHO,2022a).

To improve the quality of care (QoC), health facilities are called upon to determine the status of implementation of QoC standards and key factors contributing to poor quality. To assist health facilities, monitor and improve maternal and newborn health care service delivery and show areas for improvement, WHO in 2016, produced a set of standards titled "Standards for Improving Quality of maternal and Newborn Care in Health Facilities” (WHO, 2016). Additionally, in 2022, WHO produced another document titled “Improving the quality of care for maternal, newborn and child health: implementation guide for national, district and facility levels”. This second document is a useful resource for policy makers, programme managers, health care providers and other persons tasked with designing and implementing maternal, newborn and child health (MNCH) quality of care (QoC) programmes for at national, district and health facility level(WHO,2022a).

The “standards for Improving Quality of maternal and Newborn Care in Health Facilities” document has eight quality standards. These standards outline the measures to ensure provision of quality care to mothers and newborns during childbirth to reduce maternal and neonatal mortality (WHO, 2016). This study concentrated on the first quality standard: Every woman and newborn is offered routine, evidence-based care and treatment of complications during labor, childbirth and the early post delivery period, according to WHO guidelines (WHO, 2016). This standard seeks to ensure that mother and newborns are provided with evidence based quality care during labor, delivery and the immediate post-natal period (WHO, 2016). Additionally, this standard provides for the management of conditions responsible of high maternal and newborn morbidity and mortality according to WHO guidelines (WHO, 2016). The first quality standard has nine quality statements (WHO, 2016). However, this study focused on four of these quality statements. These statements relate to the management of the mother during labor, deliver and delivery as well as the management of bleeding during delivery, hypertension resulting from pregnancy and pregnancy related infections (WHO, 2016). These quality statements are:

- i. Quality statement 1.1a: Women are assessed routinely on admission and during labor and childbirth and are given timely, appropriate care.
- ii. Quality statement 1.2: Women with pre-eclampsia or eclampsia promptly receive appropriate interventions, according to WHO guidelines.
- iii. Quality statement 1.3: Women with postpartum hemorrhage promptly receive appropriate interventions, according to WHO guidelines.
- iv. Quality statement 1.7a: Women with or at risk for infection during labor, childbirth or the early postnatal period promptly receive appropriate interventions, according to WHO guidelines (WHO, 2016)

These quality statements were selected because they are under the control of nurse- midwives (Necochea *et al.*, 2015). More so they relate to the prevention and management of the three major causes of maternal morbidity and mortality globally and in Kenya: post- partum hemorrhage, hypertension resulting from pregnancy (pre-eclampsia and eclampsia), and pregnancy-related infections (MOH, 2017; Owalabi *et al.*, 2020). Therefore, addressing these four quality statements is most likely to impact positively on the outcome of labor (Owalabi *et al.*, 2020). Out of these four quality statements 19 performance standards were adopted and formed the basis of observed practice.

1.2 Background Information

Maternal death is defined as "a death occurring in a woman during pregnancy or during the 42 days following a delivery or miscarriage, the location and gestation notwithstanding, as long as it is due to factors that are associated with or worsened by pregnancy or its management but not due to accidental or incidental causes" (WHO, 2022b). Every day about 800 maternal deaths occur globally equating to a mother dying every two minutes (WHO *et al.*, 2023). Most of these maternal deaths results from factors that can be prevented (WHO, 2022a). The global MMR declined by 34% from 342 deaths in 2000 to 223 deaths per 100,000 live births in 2020(WHO *et al.*, 2023). Most of these deaths (70%) occurred in Sub-Saharan Africa (SSA) ahead of Central and Southern Asia which contributed about 17% (WHO *et al.*, 2023).

Over time several strategies have been tried to solve the problem of maternal mortality. The earliest reported was a strategy by Ignaz Semmelweis, a Hungarian doctor at Vienna General Hospital (Tyagi & Barwal, 2020). In 1846, he noticed that more women under the care of medical student/ doctor were developing puerperal fever and dying than those under the midwife's care. After investigations, he discovered that this could be attributed to the fact that

the doctors often attended to mothers after performing autopsies without practicing hand hygiene. As a result, he imposed a new rule that required doctors to wash their hands with chlorine. This decreased the number of maternal deaths in the ward drastically (Tyagi & Barwal, 2020). Despite the positive impact that hand hygiene has in reducing infections during childbirth, compliance in health care facilities is low (Hammerschmidt & Manser, 2019; Nalule *et al.*, 2021).

Another strategy reported to try and address maternal deaths is the use of a partograph/partogram. Partograph refers to a tool that is used to follow-up the progress of labor and the mother's condition for early detection of difficulties, for early referral, intervention or closer observation (Ghulaxe *et al.*, 2022). It is useful in detecting poor labor progress due to poor uterine contractions or cephalo-pelvic disproportion (CPD) before labor becomes obstructed (Bhatt *et al.*, 2018; Hofmeyr *et al.*, 2021). It is recommended as a tool for reducing maternal deaths due to complications of prolonged or obstructed labor (Sharma *et al.*, 2022).

The first partograph was designed by E.A. Friedman in 1954. It was adopted by WHO in 1987 and launched in 1988 as a routine tool for showing graphically the progress of labor (Hofmeyr *et al.*, 2021). The first WHO partograph had an eight-hour latent phase of labor followed by an active phase which commences when the cervix has a dilatation of 3 cm. The active phase had an alert line that served as a warning and an action line set 4 hours away, which indicated a time for action (Bhatt *et al.*, 2018). The WHO partograph was modified in 2018 following the update of WHO global recommendations on intra-partum care (Hofmeyr *et al.*, 2021). It was renamed WHO Labor Care guide (LCG) (WHO, 2018). In the LCG, the latent phase was removed and plotting of cervical dilation begins at 5 cm. The 1cm/hour alert line and the action-line were replaced by time limits for each cervical dilation centimeter (Hofmeyr *et*

al., 2021). Additionally, a section to monitor the second stage of labor was added (WHO, 2018, Hofmeyr *et al.*, 2021; Ghulaxe *et al.*, 2022). The partograph has been associated with improved maternal and peri-natal outcomes (Rajole & Agrawal, 2020; Sharma *et al.*, 2022).

In 1987, the conference on Safe motherhood was held in Nairobi. It brought together health experts, development professionals, and policymakers from all over the world so that they could come up with ways of ensuring that women go through pregnancy and childbirth safely (Tulchinsky *et al.*, 2023). During this conference, the Inter-Agency Group (IAG) of safe motherhood was born (Mahler, 1987). This group launched a global movement dubbed the Safe Motherhood Initiative (SMI). This initiative aimed to ensure that in developing countries, pregnancy-related deaths and ill health were halved by 2000 (Tulchinsky *et al.*, 2023). Subsequently, the Inter-Agency Group and other players devised specified strategies and interventions to protect women from pregnancy, labor, and childbirth-related death and disability. Among these are the utilization of antenatal care (ANC), appropriate management of abortions as well as skilled attendance during pregnancy, delivery and postpartum (Gazi *et al.*, 2018).

Antenatal care attendance was viewed as a key pillar under the safe motherhood initiative since women who receive appropriate antenatal care tend to have better delivery and birth outcomes (Ali *et al.*, 2020). During Antenatal care, risky pregnancies are identified, and appropriate interventions are implemented or planned. Early recognition of risky pregnancies can indirectly reduce the number of maternal deaths resulting from such pregnancies (Kibria *et al.*, 2017). Furthermore, attending antenatal care increased the likelihood of receiving skilled assistance during childbirth (Kibria *et al.*, 2017). Early ANC in developing and developed countries was designed similarly, resulting in sporadic clinic visits, long waiting times, and inadequate

feedback to the women (Villar, 2001). In 2002, World Health Organization introduced a new ANC model known as focused Antenatal care (FANC) to address this challenge. This model reduced the number of antenatal clinic visits to four. It included a classifying form to make the assessment of women easy. Also included was a checklist of activities to be performed throughout the four-visit schedule (Gudu& Addo, 2017; Mutai & Otieno, 2021). Studies have shown that a decrease in the number of ANC visits has not resulted in the envisaged increase in ANC utilization (Mutai & Otieno, 2021). In Kenya, only sixty-six percent of women made the recommended four or more ANC visits (KNBS &ICF, 2023). Additionally, WHO reports that decreased number of clinic visits instead, has resulted in increased peri-natal mortality hence a change in recommendation to increase the number of visits to a minimum of eight (WHO, 2018).

Another strategy that has been promoted is the campaign to improve skilled birth attendance and delivery in hospitals. However, this has encountered several hindrances. One of the key barriers is accessibility due to financial constraints. It was found by Shimazaki *et al.* (2018) in the Philippines that poor economic status in women increased the likelihood of home delivery where skilled assistance was unavailable. This scenario is replicated in most developing countries. In Kenya, 89% of live births are attended by a skilled provider (KNBS &ICF, 2023). However, the number of live births delivered by a skilled provider is directly proportional to the household economic status with those of the lower quartile likely to deliver at home (Karanja, 2018; KNBS &ICF, 2023). In order to improve accessibility and thus increase facility-based deliveries, the Kenyan Government initiated the Free Maternity Services through a declaration by His Excellency, The President of the Republic of Kenya, on 1st June 2013 (MOH, 2015). This declaration abolished user fees at public health care facilities and introduced free maternity services. The objective of this strategy was to make maternal care services

accessible and affordable so as to reduce maternal and neonatal mortality (MOH, 2015; Lang'at *et al.*, 2019).

Introduction of free maternity services in Kenya were an improvement of the 10/20 policy, introduced by the Government in 2004. Under the 10/20 policy, the maximum user fee to be paid by clients attended to at the dispensary and health center was set at 10 and 20 Kenyan shillings respectively (Pyone *et al.*, 2017). The introduction of free maternity services in Kenya saw an increase in ANC attendance and hospital based deliveries in county hospitals by 16.2% and 26.8% respectively (Njuguna *et al.*, 2017).

Recently, the focus on achieving global targets for reducing maternal mortality, especially in resource-constrained regions, has shifted from ensuring access to skilled delivery to ensuring delivery of quality maternal and newborn care. This has resulted from the realization that despite an increase in accessibility to skilled attendance, the rate of decline in maternal mortality has stagnated in the period between 2016 to 2022 compared to Millennium Development Goals (MDGs) years of 2000 to 2015 (WHO *et al.*, 2023).

In summary, the introduction of the partograph, adoption of focused antenatal care (FANC) and introduction of free maternity services are some of the strategies that have been adopted globally, regionally and locally over time. These strategies have had mixed results in improving maternal and newborn outcomes. To fast-track the achievement of SDG target 3.1, countries need to re-evaluate the care being delivered and develop more innovative ways to address quality issues which remains a major bottle neck. This can be aided by the use of WHO standards for quality assessment and improvement (WHO, 2016).

1.3 Problem Statement

In 2015, seventeen Sustainable Development Goals (SDGs) were launched to replace the MDGs. Among the 17 SDG was SDG 3 which had direct relationship with health. SDG target 3.1 is to “reduce MMR to less than 70 maternal deaths per 100,000live births”. MMR remains high particularly in developing countries including Kenya despite the adoption of strategies such as the introduction of free maternity services to increase accessibility to skilled attendance during labor and delivery. In 2016, the WHO developed quality of care (QoC) standards dubbed “standards for improving for improving quality of maternal and Newborn care in health facilities” aimed at addressing the leading causes of maternal mortality: obstetric hemorrhage, pregnancy induced hypertension and postpartum infections.

Despite the QoC standards having been introduced seven years ago and the fact that many pregnant women now deliver in hospitals, the MMR in Kenya has increased from 483 per 100,000 live births in 2015 to 530 per 100,000 live births in 2020. Embu and Meru counties each had a MMR of 111 and 107 per 100,000 live births in 2020 despite them having 92% and 82% of women respectively being attended by skilled birth attendants. It is still not clear whether the problem lies in the poor implementation, the poor knowledge of nurse-midwives, the poor attitude of the nurse-midwives, inadequate training of the nurse midwives on the QoC standards, presence of system barriers to the implementation or if the QoC standards have no effect on MMR. The effectiveness of the QoC standards depends on their adoption, use and adherence by nurse-midwives.

This study sought to explore the effect of a training intervention on utilization of maternal health quality of care standards among nurse-midwives in Embu and Meru Hospital maternity units. Increased adoption, use, and, adherence to maternal health QoC standards during labor and

delivery is likely to result in the provision of high quality care which may improve maternal and newborn outcomes during labor, delivery and the immediate post- partum period.

1.4 Study Justification

Sustainable development goal (SDG) 3.1 targets to reduce MMR by 2030 to 140 per 100,000 live births in countries with high mortality burden. Kenya targets to reduce its MMR to 113 per 100,000 live births by the year 2030. However, WHO data indicate that MMR increased in 2020 compared to 2015. A factor that may be contributing to this state of affair is provision of sub-optimal care in health care facilities.

A review of maternal death case notes by the Ministry of Health in Kenya (MOH-K) in 2017, noted that 88.0% of women who had died during labor and delivery had delivered in a hospital. Eighty-five percent of these women had received sub-optimal quality care and one or more health worker-related factors such as inadequate clinical skills, delay in initiating treatment and incomplete initial assessment were identified in about three quarter of the cases. This implies that most of these deaths could have been avoided if health workers had adequate clinical skills and provided prompt high quality maternal health care. This can be accomplished through training health workers on the use of quality of care standards for maternal health like those developed by WHO (2016). Unfortunately, very few studies, if any, have been carried out in Sub-Saharan Africa and specifically in Kenya on the implementation of these standards.

This study, therefore, sought to evaluate the extent to which selected WHO (2016) “standards for improving quality of maternal and New-born care in health facilities” were being implemented, retraining the nurse midwives on the same and measuring the effect of the training on the application of the selected standards.

The findings of this study will help the policymakers and maternal health care service supervisors to implement specific strategies to promote the use of maternal health QoC standards. Nurse-midwives will benefit from knowledge and skills transmitted during the training and monitoring during the study period. Mothers and newborns will benefit from the improved maternal care quality provided which in the long run, may reduce the risk of death and disability during pregnancy, labor, and delivery and in the immediate postpartum period. The findings will also build on obstetric nursing and nursing leadership and management body of knowledge.

1.5 Objectives of the Study

1.5.1 Broad Objective

To evaluate the effect of a training intervention on utilization of maternal health quality of care standards among nurse-midwives in Embu and Meru Teaching and Referral Hospitals, Kenya.

1.5.2 Specific Objectives

1.5.2.1 Phase One: Pre-intervention Evaluation

- i. To assess the knowledge of nurse-midwives regarding maternal health quality of care standards.
- ii. To measure the attitude of nurse-midwives on the use of maternal health quality of care standards.
- iii. To establish the extent to which the nurse-midwives use maternal health quality of care standards in their practice.
- iv. To identify barriers to the use of maternal health quality of care standards among nurses-midwives.

1.5.2.2 Phase Two: Intervention

- i. To adapt training materials and evaluation tools on maternal health quality of care standards
- ii. To train nurse-midwives on maternal health quality of care standards

1.5.2.3 Phase three: Post-Intervention Evaluation

- i. To evaluate the influence of training on the nurse-midwives' knowledge, attitude, and use of Maternal health quality of care standards.
- ii. To develop a quality improvement framework for health facilities

1.6 Study Hypothesis

HO₁: There is no significant relationship between training intervention and nurse-midwives' knowledge of maternal health quality of care standards.

HO₂: There is no significant relationship between training intervention and nurse-midwives' attitude towards the use of maternal health quality of care standards.

HO₃: There is no relationship between training intervention and nurse-midwives' use of maternal health quality of care standards.

CHAPTER TWO: LITERATURE REVIEW

2.1. Search Strategy

Electronic searches in scientific data bases was undertaken. The searched data bases were Medline, PubMed, Google scholar, Scopus, Science direct and Research gate. The following search terms were used: “Global maternal mortality ratio”, “studies on maternal health quality of care standards”, “studies on utilization/use of standards on management of postpartum hemorrhage/ pre-eclampsia/ puerperal sepsis”, “WHO guidelines on the management of postpartum hemorrhage/ pre-eclampsia/ puerperal sepsis”, “adherence to maternal Health care guidelines”, and “barriers/challenges to the utilization of maternal health care standards/guidelines”, “Adherence to clinical practice guidelines”. The search terms were connected as necessary using Boolean terms AND and OR. Retrieved articles from the electronic data bases were screened for relevance on the basis of their titles and abstracts. Relevant articles were downloaded and managed in Zotero reference management software.

2.2. Definition of Quality

Mar (2013) defines quality as compliance with best-known standards, processes, and specificities. Similarly, Business Dictionary (2018) defines quality as ensuring uniformity of a product by consistently and strictly following certain standards to satisfy specific customer or user requirements. From this definition, it is clear that quality exists when the standards of a given product or service are met.

2.3. Quality of Health Care

The Institute of Medicine (IOM) in 2001, defined quality of health care as "the extent to which health services rendered to individuals and populations increase the possibility of desired health outcomes and are congruent with current professional knowledge." Similarly, WHO (2018)

defines it as "the degree to which services that health care professionals provide to individuals and patient populations improve desired health outcomes". Allen- Duck *et al.* (2017) defines it as "the provision of effective and safe care, reflected in a culture of excellence, resulting in the attainment of optimal or desired outcome".

2.4. Quality of Maternal Health Care

Quality of maternal care refers to the extent to which health care services provided to mothers promote the probability of timely, appropriate care to attain desirable outcomes that are professionally sound while paying attention to what individual women and their families prefer and aspire to (WHO, 2018).

2.5. Domains of Healthcare Quality

Institute of medicine (IOM) (2001), Allen-Duck *et al.* (2017), and WHO (2018) highlights the following features a healthcare service should satisfy to attain quality.

2.5.1. Safety

Health care delivery should ensure that persons receiving health care are protected from harm that may result from such care. As such, measures should be put in place to reduce the risk emanating from the care.

2.5.2. Effectiveness

The selection of services offered to the client should be based on systematically acquired evidence indicating that the intervention can produce superior outcomes as opposed to other alternatives, including that of doing nothing.

2.5.3. Efficiency

Health care provided should be in a way that there is maximal utilization of resources with minimal wastage.

2.5.4. Equity

Health care provided should be similar in quality irrespective of differences in personal characteristics. On the other hand, equity also implies that there should be universal access to health care services.

2.5.5. Patient -Centred

The care delivered should consider the preference and desires of individual service users as well as the culture of their communities. Patient-centered health care requires that the service provider is compassionate and responsive to the needs and values of the service users.

2.5.6. Timeliness

Delivery of health care service should be done in such a way that it reduces delays. Delays result in emotional distress and may also cause physical harm. Delays also signal a need for more attention to flow and respect for the service users.

2.6. Maternal Mortality

2.6.1. Definition of Maternal Mortality

World Health Organization (2022b) defines maternal mortality as “death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from unintentional or incidental causes”. Kassebaum (2017) defined it as a death that occurs to

a woman due to obstetric complications or exacerbation by the pregnancy of antecedent medical problem but not as a result of incidental or accidental causes".

2.6.2. Maternal Mortality Ratio

The maternal mortality ratio (MMR) implies the number of maternal deaths in a population during a given time period in every 100,000 live births (WHO *et al.*, 2019). MMR is an indicator of each pregnancy's risk relative to the number of live births (WHO *et al.*, 2019). Globally, there has been a downward trend in MMR from 342/ 100 000 live births reported in 2000 to 223/100 000 reported in 2020(WHO *et al.*, 2023). A big gap exists between regions and countries. Australia and New Zealand regions had the lowest MMR of 4 while sub-Saharan Africa had an MMR of 545 which accounts for 70% of the global MMR (WHO *et al.*, 2023). In Sub-Saharan Africa, Eastern Africa sub-region ranks third with an MMR of 351/100,000 live births (WHO *et al.*, 2023).

In terms of countries, by 2020, South Sudan had the highest MMR of 1223 followed by Chad (1063) and Nigeria (1047) (WHO *et al.*, 2023). In Kenya, the MMR increased from 483 in 2015 to 530 in 2020 (WHO *et al.*, 2023). The number of maternal deaths increased from 7000 in 2015 to 7700 in 2020(WHO *et al.*, 2023). If the trend in Kenya is not urgently addressed, the SDG target of 113 per 1000, 000 live births may not be realized.

2.7.Causes and Timing of Maternal Mortality

2.7.1. Causes of Maternal Mortality

Causes of maternal mortality can be classified into two: direct and indirect. Direct causes refer to those resulting from obstetric complications and/or interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above (WHO *et al.*, 2023). Indirect

causes include previous existing disease or disease that developed during pregnancy and were not due to direct obstetric causes but were aggravated by the physiologic effects of pregnancy (WHO *et al.*, 2023). Globally, most of the maternal deaths are due to direct causes with 75% of all maternal deaths emanating from obstetric hemorrhage mostly after delivery, sepsis following childbirth, and high blood pressure associated with pregnancy. Other causes include delivery complications and unsafe abortion (Say *et al.*, 2014; AMANHI, 2018; WHO *et al.*, 2023). However, there are regional variations in the causes of maternal deaths. Most maternal deaths in the United States of America (USA) occur due to thrombotic pulmonary or other embolism (Peterson *et al.*, 2019). In Latin America and the Caribbean, hypertensive disorders lead to most deaths (Filippi *et al.*, 2016). Postpartum hemorrhage accounts for 36.9% of the cases in North Africa compared to 16.3% in developed countries (Filippi *et al.*, 2016).

In sub-Saharan Africa, most maternal deaths occur due to postpartum hemorrhage, complications of abortion, hypertensive disorders, and postpartum sepsis (Say *et al.*, 2014, Musarandega *et al.*, 2020). In Kenya, 40-60% of deaths occur due to obstetric hemorrhage, 15-20 % due to hypertensive disorders in pregnancy, 10 % due to pregnancy related infections and 9% due to abortions (MOH, 2017, Owalabi *et al.*, 2020).

2.7.2. Timing of Maternal Mortality

Maternal mortality can occur during the ante-partum, intra-partum, or postpartum period. Globally, a third of maternal deaths occur in the postpartum period with more than half of maternal deaths in Sub-Saharan Africa occurring after delivery (Kassebaum, 2013). Analysis by Peterson *et al.* (2019) on pregnancy-related deaths in the United States, 2011-2015, established that most of the deaths occur during pregnancy and deliver and up to one week after delivery. About 16.9% occurring on the day of delivery (Peterson *et al.*, 2019). Mgawadere *et*

al. (2017) determined that in Malawi, most maternal deaths (41.5%) occurred post-natal with approximately 23.4% of deaths happening during delivery.

In East Africa, most deaths occur in the postpartum period, unlike in central Africa, where they occur in ante-partum and intra-partum periods. In South Africa, they happen mainly in the ante-partum period (Merdad & Ali, 2018). In Kenya, about two-thirds of maternal deaths are postpartum, and most occur after a vaginal delivery (MOH, 2017).

2.8. Relationship between Quality of Care and Maternal Death

A lot of emphasis has been put on ensuring that mothers access skilled attendance during labor and delivery. This has seen countries especially in Sub Saharan Africa introduce free maternity services. Though delivering under the care of a skilled health provider can reduce the risk of adverse maternal outcome, it does not entirely cushion the mother from a maternal death. An Inquiry into maternal deaths in Kenya found that a majority of the mothers who died had delivered in the hospital (MOH, 2017). Similarly, it was established in Malawi by Mgawadere *et al.* (2017) that about two thirds of maternal deaths were hospital-based. Hospital-based maternal deaths may point to some inadequacies within the health facilities especially care provided to mothers with obstetric emergencies (MOH, 2017, Owalabi *et al.*, 2020).

The provision of poor-quality care at the health facility has been correlated with higher rates of maternal and newborn ill health and death. Nearly half of maternal deaths and sixty percent of newborn conditions occurring in poorer countries were due to poor quality of service (WHO, 2023). While many quality elements may contribute to maternal death, delayed treatment greatly affects the outcome. These delays include delay in determining when to seek care, delay in reaching the health facility and delay in receiving adequate care (Thaddeus *et al.*, 1994). The

third delay relates to what happens in the hospital after the mother has arrived and the quality of care rendered to the mothers upon arrival in the facility set-up. Furthermore, the quality of care influences one's decision to source for health care in a given facility (Thaddeus *et al.*, 1994). In Yogyakarta, Indonesia, a retrospective cohort study by Marwati *et al.* (2017) of near-miss and maternal deaths, it was found that near misses received better quality of care in regard to faster response time and better quality of care treatments. A Confidential inquiry into maternal deaths in Kenya found that about 92.4% of mothers who died received sub-optimal care including delay in starting treatment, inadequate clinical skills, and inadequate monitoring (MOH, 2017). Poor quality of care may not only result in poor maternal and neonatal outcomes but can also influence future health service utilization (Ansu-Mensah *et al.*, 2020).

Delivery of quality maternal health care especially in low income countries (LICs) has been hampered by inadequate knowledge and skills, inadequate human resource, lack of essential drugs and equipment among others (MOH, 2017; Sageer *et al.*, 2019; Ansu –Mensah *et al.*, 2020). Therefore, to reduce maternal mortality, it is fundamental that quality of care is addressed by countries through training, and allocation of adequate financial resources or supply of adequate resources (WHO, 2016; Sageer *et al.*, 2019; WHO, 2023).

2.9. Level of Utilization of Clinical Practice Standards and Guidelines

Quality is an essential component of addressing health system inequities and inefficiencies which is critical in improving health and survival (WHO, 2022a). Achievement of quality requires that health care providers comply with certain set standards. Standards with accompanying quality measures clearly communicate the requirements for the achievement of high quality (WHO, 2016; Zgirskas *et al.*, 2021). The adherence to clinical practice, checklist, protocols, standards and guidelines has been shown to result in improved patient outcomes

(WHO, 2016). Studies on the use of various clinical practice standards and guidelines by health providers have shown variable findings. Babiker *et al.* (2017) established that there was high level of reported use of care practice guidelines (CPGS) with 80% of the participants indicating utilization. Oh& Choi (2019) reported the level of adherence to standard precautions to be 87.4%. In Italy, Donati *et al.* (2023) determined that only 33% of the participants used checklists on the assessment of the risk of Post-Partum Hemorrhage (PPH). Similarly, Amsalu and Kassaye (2022) discovered that only 10.6% of the participants complied with infection prevention and control guidelines. Muthoni *et al.* (2021) established that only 25.9% of the health providers adhered to standards on active management of third stage of labor(AMTSL). In Kenyan hospitals, adherence to PPH risk assessment guidelines was found to be only 4% (Clarke-Deeder *et al.*, 2023). There could also be a variation between the reported use and the actual utilization in which the reported use may be higher than the actual use. There is limited literature on the utilization of maternal health care quality of care standards.

2.10. Socio-demographic Factors Influencing the Utilization of Maternal and Neonatal Care Quality Standards

Socio-demographic factors refer to a combination of social and demographic factors that define people in a specific group or population. They include gender, age, level of education, and marital status, among others (Koukouli *et al.*, 2002). Studies have shown that utilization of standards and guidelines is influenced by a number of socio-demographic factors including years of experience, age gender and level of training.

In terms of years of experience, it is reported that compliance with standards and guidelines by nurse-midwives is directly related to the years of experience (Panyapin *et al.*, 2021; Abalkhail *et al.*, 2021; Oh& Choi, 2021). This implies that nurses with more years of experience are more

likely to comply with the standards. Concerning age as a determinant, Albalkhail *et al.* (2021), Kibusi *et al.* (2019) and Wong *et al.* (2021) established that older respondents adhered to standards than the younger respondents.

Gender of the health provider and the academic qualification also influences the use of standards. Being a female and a registered nurse are positive predictors of the use of standards and guideline (Haile *et al.*, 2017; Kibusi *et al.*, 2018; Albalkhail *et al.*, 2021). It implies that many socio-demographic factors come into play to determine the extent to which health providers and especially nurse- midwives utilize quality of care standards and guidelines.

2.11. Influence of Knowledge on Utilization of Quality of Care Standards and Guidelines

Knowledge refers to awareness of an issue or phenomenon. Studies have shown a positive correlation between awareness of and the use of guidelines. Melanie *et al.* (2015) reported that one of the major reasons why CPGs were not used was due to a lack of knowledge or awareness that they even exist. Similarly, Fischer *et al.* (2016) identified lack of awareness and familiarity with the guidelines as one of the hindering factors to guideline use.

Knowledge of the standards can be acquired through training. Muthoni *et al.* (2021) established that nurse midwives who were trained on Emergency PPH management had greater compliance than those who were not trained. Albalkhail *et al.* (2021), and Amsalu and Kassaye (2022) identified good knowledge of infection prevention and control guidelines as a predictor of adherence. Iwaola *et al.* (2021) also reported that misoprostol education intervention was effective in improving knowledge and use of misoprostol. The level of knowledge is correlated with age and training of the health providers where older providers and those who have been trained are more knowledgeable (Wake& Wogie, 2020; Albalkhail *et al.*, 2021; Donati *et al.*,

2023). Forbes *et al.* (2023) recommends that successful implementation of the standards require more training for inexperienced and new staff.

2.12. The attitude of Nurses towards the Use of Quality of Care Standards

Attitude refers to an individual's feelings toward a particular issue under consideration. The feeling may be positive, implying support for, or negative, implying opposition. The attitude of health workers toward standards and guidelines influences their adherence. A study by Oh & Choi (2019) on factors influencing the adherence of nurses to standard precautions in South Korea hospital settings, reported that nurses with a positive attitude were more likely to adhere to the standard precautions. Hendaus *et al.* (2014) reported that health workers support the use of standards. Similarly, Shinyongo *et al.* (2022) determined that nurses have a positive attitude towards maternal health care guidelines. Other studies have also determined that nurses' attitude had a significant positive contribution to compliance with infection prevention and control guidelines (Kim & Hwang, 2019; Wong *et al.*, 2021). Important determinants of positive attitude are years of experience (Albalkhail *et al.*, 2022) and understanding of the recommended practice (Forbes *et al.*, 2023).

2.12.1. Reason for Support

Support of the use of QoC standards implies a positive attitude. One of the reasons advanced by the supporters is that standards help standardize care and lead to improved quality of care (Melanie *et al.*, 2015; Hendaus *et al.*, 2014; Amer *et al.*, 2018). Guidelines also improve patient care outcomes by helping clinicians make evidence based decisions about patient care in a timely manner (Guerra-Farfan *et al.*, 2022). Standards and Guidelines also reduce practice discrepancy while reducing over-provision or under-provision of care (Wrangler & Jansky, 2021; Guerra-Farfan *et al.*, 2022). Additionally, performing critical tasks in the same way as

stipulated in the standards may reduce errors that human beings are prone to due to fatigue (Wrangler & Jansky, 2021). Clinical care standards and guidelines also serve as useful resource materials for health workers to update themselves (Necochea *et al.*, 2015).

2.12.2. Reasons Against

Despite the many benefits accrued from the use of standards and guidelines, a number of health workers do not support their use. This is because health workers feel that the standards and guideline restricts the health provider's ability to act independently (Wrangler & Jansky, 2021). Use of standards is also inconsistent with the ideals of individualized patient care since they require the health provider to attend to the clients in a similar manner (Zheng *et al.*, 2014). Implementation of the standards also increases workload and cause a strain on the health provides available time. This coupled with shortage of staff makes the implementation of the standards impractical (Kaur *et al.*, 2023; Forbes *et al.*, 2023). The standards are also complicated to follow and may not be easily accessible (Kaur *et al.*, 2023, Panyapin *et al.*, 2021). It has also been reported that health providers did not support the use of the guidelines because some of them contradicted each other thus creating confusion among the service providers (Zheng *et al.*, 2014, Kaur *et al.*, 2023).

2.13. Key Barriers to the Implementation of Maternal and Neonatal Care Standards

2.13.1. Difficult- to- Use Guidelines

A guideline's attributes refer to its inherent quality or features (Field, 1990). Specific features of the guideline influence their use in clinical practice. The US Agency for Health care policy and research identifies eight attributes of a good clinical practice guideline, as Field (1990) reported. Some of these attributes include validity, clinical applicability, clinical flexibility, and clarity, among others. Adherence to the guidelines is increased when they are easy to use,

consistent, and evidence-based (Zheng *et al.*, 2014). One of the guideline related barrier to their use is difficulty in the guidelines themselves. Woiski *et al.* (2022) established that adherence to PPH management guidelines was suboptimal in Netherlands because the participants felt that the guidelines were difficult to follow. Similarly, Panyapin *et al.* (2021) and Wrangler & Jansky (2021) established that the health providers viewed the guidelines as difficult to follow. This implies that ensuring that guidelines are practical would catalyze the healthcare provider's use (Melanie *et al.*, 2015).

Accessibility to the standards is an important determinant to their use. Babiker *et al.* (2017) reported that health providers could not use the standards and guidelines since they were not accessible. Similarly, Forbes *et al.* (2023) established that lack of hospital specific protocols was a significant barrier to their use. Therefore, to facilitate their use, the guidelines should be availed in print or electronic form. Accessibility can also be achieved by disseminating the guidelines, including using unit-based computers (Fischer *et al.*, 2016).

2.13.2. Inadequate Resources

Successful implementation of QoC standards and guidelines require adequate supply of material resources including equipment and drugs. Inconsistency in essential supplies has hampered the successful implementation of the guidelines (Al-beity *et al.*, 2019). Sripad *et al.* (2018) reported that health providers could not implement pre-eclampsia management guidelines because there were no functional blood pressure measuring machines and diagnostic equipment were limited. Flanagan *et al.* (2021) and Forbes *et al.* (2023) established that adherence to PPH management protocols by health providers was hindered by limited equipment to assess and manage blood loss. Similarly, it has been reported in studies that health providers could not adhere to Pre-eclampsia and PPH management protocols because the

medications for the management of these conditions were either lacking or were inadequate (Sripad *et al.*, 2018, Forbes *et al.*, 2023).

2.13.3. Staff shortage

Staffing with adequate number of adequately trained staff is essential for successful implementation of QoC protocols and guidelines. This is because the standards increase the workload and are time-demanding (Fischer *et al.*, 2016). Confidence *et al.* (2022) and Sripad *et al.* (2018) ascertained that adherence to pre-eclampsia guidelines was hampered by human resource shortages. Similarly, implementation of PPH management protocols was hindered by staff shortage (Clarke-Deelder *et al.*, 2023; Forbes *et al.*, 2023). Additionally, Muthoni *et al.* (2021) indicated that shortage of adequate midwives inhibited guideline consultation on the management of PPH. The shortage of staff has been occasioned by high staff turnover emanating from poor wages and lack of professional recognition among other factors (Kaur *et al.*, 2023).

2.13.4. Lack of Motivation

Motivation is a psychological force that generates complex processes of goal-directed thoughts and behaviors (Shkoler & Kimura, 2020; Ipek *et al.*, 2017). Financial and nonfinancial incentives influence the level of motivation which in turn influences the utilization of guidelines. In a study in Ethiopia by Weldegebriel *et al.* (2016) on the motivation of health workers, the motivation level was dependent on nonfinancial motivators such as performance evaluation and feedback in addition to availability of necessary resources.

A study by al-Mazrou (2013) on factors influencing adherence to guidelines highlighted a lack of motivation as a key barrier. This finding is similar to a finding by Fischer *et al.* (2016) that

lack of motivation and outcome expectation among others, impeded the use of CPGs. Fischer *et al.* (2016) suggested that providing financial incentives will likely improve adherence. However, a study by Daneshkohan *et al.* (2014) did find that the absolute level of compensation has no significant influence on the level of motivation and thus may not improve the implementation of CPGs.

2.14. Ineffective Support Supervision

Support supervision is essential in the successful implementation of standards of care. This is because through support supervision bottle necks to adherence can be identified and the providers can receive useful feedback in their performance. Lack of performance feedback to the staff from their supervisors has been cited as a barrier to compliance with standards (Flanagan *et al.*, 2021). Confidence *et al.* (2022) in their study in Uganda found that only 50% of the participants were adhering to preeclampsia management guidelines. One of the reasons for this low level of adherence was the participants' lack of performance feedback from their supervisors. Kaur *et al.* (2023) and Al-beity *et al.* (2019) also established that there was lack of supportive leadership including mentorship and peer support for nurses which hampered their implementation of quality of care standards. Nyamhanga *et al.* (2021) indicates that ineffective support supervision emanates from lack of clear policies related to how progress is measured in quality improvement.

2.15. Summary of the Literature

The literature search confirms that the health providers are implementing various QoC standards, guidelines, and protocols. However, there is wide variation on the level of adherence. Additionally, there is little literature on the influence of Knowledge and attitude of the health workers on the use of QoC guideline. The information on the drivers of this knowledge and

attitude is also limited. Various factors are identified from the literature as either enabling or hindering the implementation of the standards. Among the enablers are the socio-demographic factors such as level of experience, education qualification and age. Inhibiting factors include inadequate resources, staff shortage and lack of effective supervision. It is not very clear from the literature what could be contributing to these barriers.

2.16. Paradigm of Inquiry

2.16.1. Introduction

In the research conceptualization stage, the researcher must select the most appropriate philosophical basis to guide the study, also referred to as a paradigm of inquiry (Grant & Onsaloo, 2014). According to Schwandt (2001) paradigm refers to “a shared world view that represents what a discipline believes and values, and uses the same as a guide in problem solving”. Paton (2002) defines it as a “way of describing world view based on philosophical assumptions about the nature of social reality, how knowing it occurs as well as what constitutes ethics and value systems”

Paradigm is important in research because it enables the researcher to formulate a research problem, select the appropriate research methodology, and collect, process and analyze data (Grant & Onsaloo, 2014; Vveinhardt *et al.*, 2017). A researcher can select from various options in the paradigm of inquiry. These include positivism, interpretivism, critical theory and pragmatism (Pham, 2018; Ryan, 2018; Alharahsheh & Pius, 2020).

2.16.2. Components of a Paradigm of Inquiry

A research paradigm has four main components: Epistemology, ontology, methodology, and axiology (Lincoln & Guba, 1985; Ryan 2018). Epistemology refers to the study of knowledge

and how it is constructed (Couper, 2020). It explains how the knowledge about reality is derived or “how we come to know reality” (Kivunja & Kuyini, 2017; Couper, 2020). In research, epistemology is concerned with how a researcher is aiming to uncover knowledge in order to reach reality (Alharahsheh & Pius, 2020). There are four types of epistemology based on the source of knowledge (Kivunja & Kuyini, 2017): Intuition, faith, and belief give rise to intuitive epistemology. Authoritative epistemology relies on data from various sources, such as people and literature. On the other hand, rationalistic epistemologists derive their data from reasoning, with empirical epistemologists obtaining their knowledge from data that can be evaluated objectively.

Ontology refers to the philosophical assumption of what one believes to be the nature of reality (Patton, 2002; Killam, 2013; Ryan, 2018). It is concerned with the assumptions we make in order to believe that something makes sense. This assumption is important because it influences the approach that the researcher uses in data analysis in order to discover reality (Kivunja & Kuyini, 2017; Alharahsheh & Pius, 2020). The major ontological perspectives are relativism and realism. Relativists believe that multiple socially constructed realities exist and depend on the individual views and experiences (Pham, 2018; Ryan, 2018). Realists believe that there is only one reality, which exists out there, independent of the observer (Guba & Lincoln, 1994; Ryan, 2018).

Methodology articulates the strategy that a researcher uses in order to uncover knowledge about a research problem (Kivunya & Kuyini, 2017; Alharahsheh & Pius, 2020). It provides clarity about methods of data collection and analysis that the researcher uses to discover knowledge and depends on the ontologic perspective (Killam, 2013; Park *et al.*, 2020). Axiology refers to the ethical issues that the researcher needs to consider when planning and executing an inquiry

(Kivunja & Kuyini, 2017). It deals with what the researcher believes is valuable and ethical (Killam, 2013). There is a need for a balance between the values of the researcher and ethical considerations in the execution of a research (Killam, 2013).

2.16.3. Types of Paradigms of Inquiry

There are several types of paradigm of inquiry that a researcher can consider: Positivism, interpretivism, and pragmatic among others (Ryan, 2018).

2.16.3.1 Positivism

Positivist philosophy claims that social world can be understood in an objective way (Vveinhardt, 2017; Pham, 2018). Researchers who subscribe to the positivism paradigm assert that real issues can be measured objectively and explained through logical analysis (Kamkam, 2019, Park *et al.*, 2020). As such, the researcher aims to explain and predict a phenomenon without the influence of his values and biases (Wong, 2014; Kivunja & Kuyini, 2017). This is possible mainly because he is not a participant in the whole process but rather a neutral observer (Wong, 2014). The researcher collects data about a phenomenon in an objective way such that the findings can be applied to decipher the causal-effect relationship between the independent (cause) and dependent variable (effect) through quantitative approaches (Wong, 2014, Park *et al.*, 2020).

The epistemology of positivism paradigm is objective/ empirical in that positivists believe that knowledge is best developed objectively using empirical tests without the value of the researchers or participants influencing the process (Pham, 2018; Park *et al.*, 2020). The ontological perspective of positivists is realism (Park *et al.*, 2020, Kivunja & Kuyini, 2017). Positivist belief that a single tangible truth exists that can be understood, identified, and

measured (Park *et al.*, 2020). The axiology of positivists is objectivity in which the subjective experiences of the researcher and the participants are not valued (Park *et al.*, 2020). Positivists rely mainly on experimentation methodology to establish the causal –effect relationship (Rehman & Alharthi, 2016; Alharahsheh & Pius, 2020)

2.16.3.2 Interpretivism

An interpretivist believe that truth and knowledge is subjective, influenced by the culture and lived experiences of the individual (Ryan, 2018). Therefore, interpretivism is concerned mainly with in-depth variables and factors related to a context to understand a phenomenon (Alharahsheh & Pius, 2020). The epistemology of interpretivism is subjective (Rehman & Alharthi, 2016). The researcher derives meaning of data through own thinking and through interaction with participants (Rehman & Alharthi, 2016; Kivunja & Kuyini, 2017). Ontologically, interpretivism adopts a relativist perspective (Ryan, 2018). Interpretivism believes that there are multiple socially constructed realities. These realities can be examined through the researcher interacting with the participants and among the participants (Ryan, 2018). The axiology of interpretivism is balanced in which it is assumed that the outcome of the research will be a manifestation of the values of the researcher attempting to present a balanced report of the findings (Kivunja & Kuyini, 2017). Interpretivists use a naturalistic methodology where they collect qualitative data usually over extended period of time (Rehman & Alharthi, 2016). This includes use of interviews and group discussions among others (Erciyes, 2020).

2.16.3.3 Pragmatism

Researchers who advocate for pragmatic paradigm of inquiry believe that it is not possible to understand the “truth” and reality using a single scientific method as advocated by positivism

paradigm or to determine a socially constructed reality as advanced by Interpretivists. (Kivunja & Kuyini, 2017). Shawn –Baker posits that pragmatism is directed towards addressing problems that exist in real world as opposed to being built on assumptions about the nature of knowledge. Having a similar understanding, Goldkuhl (2012) defines three types of pragmatism: functional, referential and methodological. Functional pragmatism implies that the role of scientific knowledge is to improve action and make a practical difference (Goldkuhl, 2012; Maarouf, 2019). Referential pragmatism refers to knowledge about action. That means pragmatism describes the world in an action oriented way (Goldkuhl, 2012; Maarouf, 2019). Methodological pragmatism posits that knowledge is created through action (Goldkuhl, 2012; Maarouf, 2019).

The epistemological perspective of pragmatism is that knowledge acquisition is a continuum rather than two opposing and mutually exclusive poles of either objectivity as indicated by positivists or subjectivity as described by the Interpretivists (Maarouf, 2019). According to pragmatics, inquiry using scientific methods allows for thoughtful decision making processes and choices aimed at reaching the intended outcomes (Kaushik & Walsh, 2019; Allemang *et al.*, 2021), and that the interaction of people and environment is what constructs knowledge (Denzin & Lincoln, 2011; Allemang, *et al.*, 2021).

The ontology of pragmatism is that of non-singular reality (Kivunja & Kuyini, 2017). According to this view, there is one reality but multiple perceptions of this reality depending on the situation (Maarouf, 2019). As such reality is renegotiated and interpreted based on usefulness in a particular context/situation (Denzin & Lincoln, 2011). Pragmatism advocates for value laden and practical axiology which implies that research should be carried out to benefit people (Lincoln *et al.*, 2011; Kivunja & Kuyini, 2017).

Pragmatism advocates for a mixed method methodology. Biddle & Schafft (2015), state that the researcher is at liberty to carry out a quantitative, qualitative or mixed research depending on the research purpose. This implies that the researcher is able to pick the research design that appropriately addresses the research question. Unlike positivism and interpretivism which are associated with deductive and inductive reasoning, pragmatism is associated with abductive reasoning that involves oscillating between deduction and induction (Maarouf, 2019).

2.16.4. Summary of the Paradigm of Inquiry

This research adopted a positivist epistemology which focusses on empirical evidence and measurable outcomes (Vveinhardt *et al.*, 2017, Park *et al.*, 2020). The effect of the training intervention on nurse-midwives use of maternal quality of care standards was assessed. Specifically, the effect of the training on quality of care standards on the knowledge, attitude and practice were measured through collection and analysis of both quantitative and qualitative data.

This research assumed a realist ontology. Realist ontology acknowledges the existence of an objective reality that can be studied and understood (Pham, 2018, Part *et al.*, 2020). It recognizes that there is maternal quality of care standards that can be measured. Training intervention impacts on the nurse-midwives' knowledge and skills which are critical in bringing observable changes in the utilization of quality of care standards.

In terms of axiology, this study values objectivity and sought to minimize researcher biases in data collection and analysis (Kivunja& Kuyini, 2017). Measures were undertaken to ensure validity and reliability of quantitative data as well as the trustworthiness of qualitative data. Attention was also paid to ethical considerations to ensure the well-being of the participants.

A mixed methods approach was employed combining quantitative measures such as pre-and post-training assessments of adherence to standards through structured observation and use of a questionnaire with qualitative data through focused group discussion to capture the nuanced aspects of nurse midwives’ experiences and perceptions. This comprehensive methodology sought to provide a holistic understanding of the effect of training intervention on the utilization of maternal quality of care standards.

2.17. Conceptual Framework

A conceptual framework refers to a network of related ideas combined to provide an understanding of a phenomenon (Jabareen, 2009). It depicts the relationship between various variables as identified in the literature review. The conceptual framework for this study is depicted in figure 1 below.

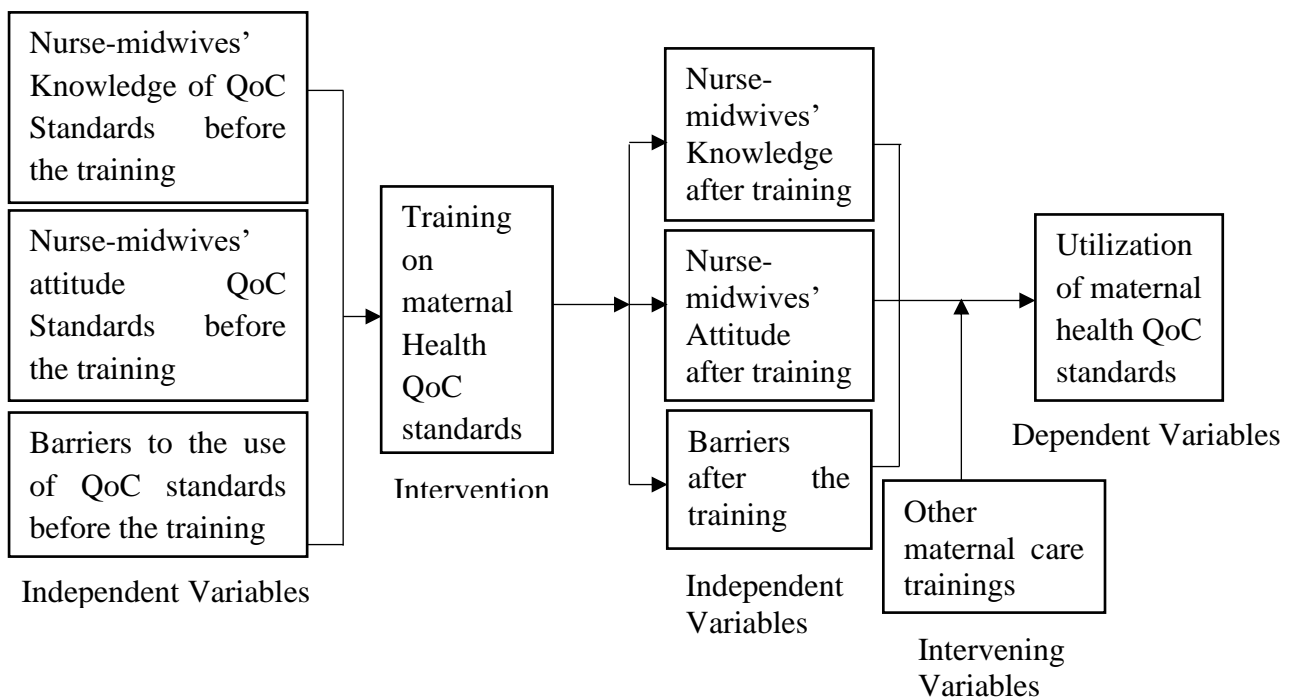


Figure 1: Conceptual Framework

Author, 2023

Independent variables:

Nurse-midwives' knowledge of QoC standards: This variable assesses the level of understanding of nurse-midwives concerning maternal health quality of care standards

Nurse-midwives' attitude towards the use of QoC standards: this variable explores that attitudes, beliefs and perceptions of midwives towards the use of quality of care standards in their practice

Barriers to the use of quality of care standards: This variable identifies and quantifies barriers and challenges nurse-midwives face in implementing quality of care standards

Intervention: Training of nurse midwives on Maternal Health Quality of Care standards

Dependent variable: Utilization of maternal Health quality of care standards

Intervening variables: Other trainings such as EmOC, Management of post-partum hemorrhage

The Relationship between variables is described below:

A positive relationship is expected between nurse-midwives' knowledge of, and the utilization of quality of care standards.as nurse-midwives gain more knowledge through training, they are more likely to implement the standards in their practice

A positive relationship is anticipated between nurse-midwives' positive attitude towards the use of standards and the utilization of the standards. Training intervention is expected to improve the nurse-midwives' support for the use of the standards resulting in higher utilization

Barriers are expected to result in decreased utilization of quality of care standards. However, a training intervention is expected to reduce barriers to the use of quality of care standards thus positively influencing their utilization.

2.18 Theoretical Framework

A theoretical framework is based on an existing theory in a field of study that other scholars have validated. A researcher usually "borrows" to build his/her study (Adom *et al.*, 2018). It is on the basis of the theoretical framework that the study design and data analysis procedures are decided upon (Adom *et al.*, 2018). Grant and Osanloo (2014), state that a theoretical framework "helps the researcher in thinking about the problem and data analysis by providing a common perspective or lens of looking at the issue." This study will use the open systems theory by Katz and Kahn (1978), adapted from Ramosaj & Berisha (2014), as depicted below.

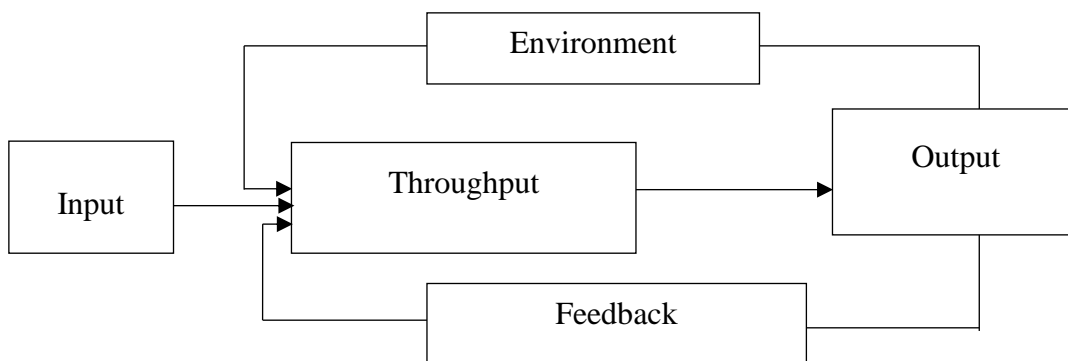


Figure 2: Open System's Model

An open system is defined as that which regularly exchanges feedback with its environment. It gets input from the environment either in the form of information or resources, internally processes them (throughput) and then releases the output into the environment. The system then gets feedback from the environment about the quality of output which may affect its ability to acquire more input. A health facility can be viewed as an open system based on these characteristic features:

Input: Raw materials and concepts that are transformed by the system. In this case, inputs include people, information, and resources such as standards and guidelines.

Throughput: Processes used by the system to convert inputs into outputs. Included here are training, support supervision and counseling

Output: Tangible results from the system, such as products and services. In the health facility, the output is quality health care.

Feedback: Data from the environment is used to monitor the system's effectiveness. Monitoring can be achieved through client exit interviews, questionnaires, as well as the use of suggestion boxes.

Boundary: line or point of demarcation where a system or sub-system is differentiated from its environment. An open system has a porous boundary that allows the exchange of materials between the system and its environment. The study focuses on Embu and Meru teaching and referral hospitals separate from the community of Embu and Meru counties.

External environment: factors outside the environment that affect the system, but the system has no control over it. This implies the entire Meru and Embu counties and the surrounding counties' community served by the two hospitals.

CHAPTER THREE: MATERIALS AND METHODS

3.1. Introduction

This chapter covers the study design that was employed as well as the study population and sampling techniques. It also describes the procedures applied in data collection, analysis, and presentation.

3.2. Study Design

The study employed a Quasi experimental convergent parallel mixed method design with pre- and post- intervention evaluation. It utilized both quantitative and qualitative methods. In a convergent parallel design, qualitative study is conducted in parallel to and independent of a quantitative study and the results of both studies are compared and combined at the stage of interpretation of results (Busetto & Gumbinger, 2020). The study was carried out between January 2021 and February 2023 in Embu and Meru teaching and referral hospitals. Use of multiple methods in a study is useful in increasing the validity of the study findings by corroboration of findings and to illustrate and clarify the results (Hunter & Brewer, 2015). A quasi-experimental design was selected to establish the impact of training on the utilization of the maternal QoC standards. This is because a quasi-experimental design allows for immediate assessment of the impact of an intervention and allows for use of statistical methods in data analysis (Stratton, 2019). Qualitative methods included the use of a FGD and structured observation. Qualitative methods were used to provide more insight on the compliance with maternal health QoC standards and barriers to the compliance. The study was undertaken in three phases. In phase one (Pre-intervention) a baseline survey was carried out to determine the knowledge and attitude of nurse-midwives on the use of maternal health quality of care (QoC) standards, the level of utilization of these standards, and the barriers to their use. The findings of the baseline informed the intervention phase. In phase two (Intervention), the study

population was divided into two groups: the study and control groups. The study group was trained and followed up whereas the control group was not. In phase three (Post-intervention); study and control groups were evaluated in order to determine the impact of the training on the use of maternal health QoC standards. The presence of the control group helped in improving the validity of the study findings by ruling out extraneous variables (Stratton, 2019).

3.3. Study Area

This study was conducted in Embu and Meru regional Referral Hospitals. These two hospitals are level 5 hospitals as per the ministry of health categorization. Level five hospitals which serve several counties. The two facilities were selected because they are located in two counties among the twenty-four counties which had not achieved the target of reducing institutional MMR to 93 per 100,00 as set out in the Kenya health sector strategic plan(KHSSP) 2018-2023(MOH, 2018). In 2019, Embu County had a MMR of 111 per 100,000 live births and Meru County had 107 per 100,000 live-births (MOH, 2020). Additionally, the two facilities being referral hospitals are the ones that mainly handle obstetric emergencies that contribute to majority of the maternal deaths. Specifically, the study was conducted in the maternity units of these two facilities.

Embu hospital is the largest referral hospital in the eastern south region. It serves Embu county and the surrounding counties of Tharaka Nithi, Kitui and parts of Machakos and Kirinyaga Counties. It is located in Embu County, Embu West sub-county, Municipality location, Njukiri sub-location at Latitude: 0° 31' 52.03" N and Longitude: 37° 27' 2.20" E coordinates. It is about 122 km North East of Nairobi city and 2 km from Embu town towards Meru on the Meru - Nairobi Highway. The hospital has 532 beds and 101 cots. All patient categories, including medical, surgical, obstetrics, and gynecologic cases, are handled. The maternity unit is divided

into four separate wards, namely labor, antenatal, and postnatal wards, as well as a newborn unit. The department is serviced by four consultant gynecologists, five medical officers and fifty- five nurse midwives. Approximately 3,100 deliveries and 1,200 Caesarian sections are conducted annually. In 2022, seven maternal deaths and forty- two fresh still births occurred.

Meru hospital is the largest referral hospital in the Eastern North region. It serves Meru county and the surrounding Counties of Isiolo, Marsabit and Samburu. It is located in the Imenti North sub-county within Meru Municipality at the latitude 0° 02' 46.54" N and Longitude: 37° 39' 21.13" E coordinates. It is about 271km northeast of Nairobi at the end of the Meru-Nairobi Highway, and about 3 Km from Meru Town within the municipality location. It has a total of 331 beds and 24 cots. All patient categories, from medical, surgical, obstetrics, and gynecologic cases, are handled. The maternity unit is divided into four wards: labor, Antenatal, Postnatal wards, and Newborn unit. The department is serviced by three consultant gynecologists, four medical officers and fifty nurse-midwives. Approximately 3,300 deliveries and 1,700 Cesarean sections are conducted annually. In 2022, six maternal deaths and thirty-four fresh still births occurred. The two facilities serve as internship centers for all cadres of health providers.

3.4. Study Population

The study population refers to all the people or items the investigator intends to study (Rahi, 2017). This study's target population included nurse-midwives working in the maternity unit. Nurse-midwives are the major providers of maternity services world-over. In health facilities 90% of maternal care services are offered by midwives (WHO, 2022b). In Kenya, Nurse-midwives are the main provider of care during labor (92%) and delivery (81%), with doctors accounting for 0.5% and gynecologists for 0.3% (Blanc et al., 2016). The total population

included all nurse-midwives working in the two maternity units comprising 55 and 50 nurse-midwives in Embu and Meru Teaching and Referral Hospitals, respectively.

3.5. Inclusion and Exclusion Criteria

3.5.1. Inclusion Criteria

All male and female nurse-midwives working in the maternity department, irrespective of their minimum qualification were included.

3.5.2. Exclusion Criteria

The study excluded nurses-midwives on contract and those working in the maternity unit temporarily. These were excluded because they were not likely to be in the facilities throughout the study period. Also excluded were nurse-midwives who did not consent to participate in the study.

3.6. Phase One: Pre-Intervention

3.6.1. Introduction

This phase involved determining the extent to which the maternal health quality of care standards were being utilized in the two health facilities. Specifically, factors that influence the utilization of these standards were determined. The study focused on the standards that concern service delivery. These standards are directly under the nurse-midwives' control and have a greater impact on reducing maternal morbidity and mortality.

3.6.2. Study Design

This phase utilized a descriptive survey design involving both quantitative and qualitative methods. Survey design is useful when the investigator is trying to obtain the current state of

phenomena without manipulation. Furthermore, according to Rahi (2017), descriptive design is useful when the researcher seeks to observe and document an occurring phenomenon without any objective value. Qualitative methods will be used because they help collect in-depth details on a particular topic through data description rather than manipulation (Rahi, 2017). The use of quantitative as well as qualitative methods enriches the study. This is because whereas quantitative methods focus on empirical data that can be analyzed, they ignore emotions and feelings captured by qualitative methods (Rahi, 2017).

3.6.3. Sample Size Determination

The sample size will be calculated using Cochran's (1967) formula for proportions:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

n is the Sample size

Z^2 is the standard normal deviate at the required confidence interval set at 95% (1.96)

e is the desired level of precision set at 5%(0.05)

p is the estimated proportion of the population with the attribute being measured

q is the proportion of the population lacking the attribute being measured(1-p).

Since there is no estimate of the proportion of the population who has the attribute being measured is available, 50% will be used as p

A 5% level of precision was set, which is acceptable in social research. This precision level was selected to avoid a very large sample because of constraints of resources since the smaller the level of precision, the larger the sample size (Taderhoost, 2016).

The total target population is **105** nurses/midwives

Substituting the figures:

$$n=1.96^2(0.5)(0.5)/0.05^2 =385.$$

The sample was adjusted because the study population is < 10,000, using the Finite Population Correction for Proportions formula:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where:

n is the desired sample size when the population is <10,000

n₀ is the desired sample size when the population is > 10,000

N is the population size.

Substituting the figures:

$$n=385/1+ \{(385-1)/105\}$$

$$=83$$

To cater for non-response and attrition, 10% of the sample size was added as proposed by Catalogue of Bias *et al.* (2017) bringing the sample to 93

To ensure proportionate distribution between the two hospitals, 49(52.4%) nurse-midwives were selected from Embu hospital and 44(47.6%) from Meru hospital respectively based on their population size.

Four Focus group discussions (FGDs) were conducted, two for each hospital. Each group had six nurse- midwives in-charges. The number of participants in FGD aligns with guidelines given

by Mishra (2016) and Busetto *et al.* (2020) that a focused group discussion requires six to eight participants. This number allows each participant to speak while generating a rich discussion.

3.6.4. Sampling Technique

A stratified random sampling technique was applied in picking the study participants. In random sampling, every element in the population is accorded an equal opportunity of being included in the sample, which reduces sampling errors and bias and allows for generalizing the study findings (Alvi, 2016; Taherdoost, 2016). Alvi (2016) recommends using stratified random sampling when the population differs in a characteristic. In this case, the two populations are from two different hospitals, hence this technique's applicability.

In the sampling process, each hospital was considered a separate stratum. A representative sample for each stratum as a proportion of the total population was selected in the following order: A sampling frame was developed using a duty rota for nurse-midwives in the maternity unit in each of the two hospitals, irrespective of the cadre. After developing the sampling frame, a computer-generated table of random numbers was generated for each hospital. Then using this table of random numbers and the sampling frame, the individuals selected were identified and contacted to complete the questionnaire.

The participants for the focus group discussion were purposively selected. In purposive sampling, the researcher has a prior purpose that makes him select specific members, such as seeking specific information from experts (Alvi, 2016). Nurse midwives who are mainly involved in quality management in maternity unit were targeted. As such, the maternity nurse-midwives in charges were recruited for FGDs.

3.6.5. Recruitment and Consenting of Study Participants

Nurses-midwives' duty rota was used as the sampling frame. Once the individuals to be interviewed were identified using a table of random numbers, they were contacted while they were on duty. The principal investigator or the pre-trained research assistant explained the consent information to the potential participant while allowing him or her to ask questions as necessary. At the end of the explanation, those willing to participate in the study were asked to indicate their name and sign the consent form (Appendix 1). It was only after this that the questionnaire was administered.

3.6.6. Data Collection Method

A variety of data collection methods were applied to enhance reliability. These included a self-administered semi-structured questionnaire developed by the researcher, a focused group discussion using a discussion guide, and a structured observation using a checklist.

3.6.6.1. Questionnaire

A questionnaire is a list of predetermined questions to collect data (Kabir, 2016). It can be structured in which all the questions have options from which the respondent selects the answers from, unstructured where all the questions are open ended and a quasi-questionnaire where there is a mixture of most closed ended questions and a few open ended questions (Taherdoost, 2022). The questionnaire can be administered through mail, phones, online or through face to face depending on the characteristics of the respondents and the available time (Taderhoost, 2022).

In this study, a quasi-structured questionnaire was used to collect socio-demographic data and data on knowledge, attitude, and barriers to the use of maternal health quality of care standards.

A quasi-questionnaire (Appendix 2) was used since it enabled the researcher to collect a combination of qualitative in addition to quantitative data (Kabir, 2016, Taherdoost, 2021). In addition, the questionnaire had ranking questions on the part of barriers to the use of maternal health QoC standards. The questionnaire was self-administered since all participants had a college level of education and could read and write. When a questionnaire is self-administered, it saves time and gives the respondents freedom of expression, thus resulting in more reliable responses (Taherdoost, 2022). A questionnaire was selected as a data collection tool since it is an effective and cost effective method of collecting data about knowledge, attitude, opinions and intentions from a relatively large number of participants (Taderhoost, 2021)

3.6.6.2.Observation

Observation is a data collection method where, an observer uses his/her senses especially looking to collect data from study participants in a systematic and meaningful way (Taderhoost, 2021). Observations are particularly useful to determine the actual practice as opposed to reported practice or opinions (Taderhoost, 2021; Busetto et al., 2020). During the observation, the observer takes notes on everything or certain pre-determined parts of what is happening around them and these notes are later transcribed into observation protocols (Busetto et al., 2020).

Observation can be participatory where the observer is part and parcel of the situation being observed or non-participatory where the observer remains outside of the activities under observation (Erciyes, 2020; Busetto et al., 2020). Observation can also be structured where the observer uses a checklist or un-structured where the observer observes as much as possible without using a checklist (Erciyes, 2020). The observation can also be covert where the participants are not aware of being observed, semi covert, where the participants are aware of

being observed but the content of observation is not availed to them, or overt where the participants are aware of being observed and the content of observation is availed to them (Erciyes, 2020).

In this study a non- participatory, structured, semi-covert observation was conducted. An observation checklist (Appendix 4) was used to collect data on the extent to which maternal QoC standards were being implemented. The checklist was adapted from Standard Based Management-Recognition (SBM-R) by the Ministry of Health-Tanzania (2011). The observation was semi-covert. For ethical reasons, the researcher or the research assistant informed the nurse-midwives they were being observed. However, the content of the observation was not revealed to them to reduce Hawthorne effect (Erciyes, 2020). However, at the end of the data collection process, the participants were debriefed of the content of observation.

3.6.6.3.Focus Group Discussion

A focused group refers to several people who engage in a discussion guided by a set of questions and moderated by a facilitator (Eaton, 2017). It is a useful data collection method in that it helps the researcher to take note of participants' reactions to other participants' contributions, which enables the researcher to capture similarities and differences in viewpoints (Paradis et al., 2016). A focus group discussion is normally used to strengthen or corroborate data collected through other methods (Stalmeijer et al., 2014). There is no consensus on the size of the focus group. Erciyes (2020) indicates that a focus group should have three to twelve participants. However, the most commonly recommended number of participants is six to eight (Mishra, 2016; Busetto et al., 2020). Small groups of less than three participants are likely to generate limited discussion whereas larger groups are more difficult to manage (Mishra, 2016). The facilitator uses a

discussion guide to direct the discussion. It is recommended that a discussion guide have a maximum of twelve primary questions (Eliot& Associates, 2005). A focus group discussion should last for between one and two hours to prevent fatigue among the participants (Nyumba et al., 2018, Muijeen et al., 2020).

There are several types of focus group discussions according to Krueger& Casey, (2000): single focus group, two- way focus group, dual moderator and dueling moderator focus groups. The most common type of these focus group discussions is the single focus group and the dual moderator group discussions (Nyumba et al., 2018). In single focus group, a collection of participants and a team of facilitators discuss a topic as one team (Krueger& Casey, 2000). In dual moderator focus group discussion, two moderators working together, each performing a different role within the same focus group facilitates a group discussion of a topic (Krueger& Casey, 2000). The use of two moderators ensures that the session progresses smoothly and all topics are covered (Krueger& Casey, 2000).

In this study four dual moderator focus group discussions were conducted using a discussion guide (Appendix 3) developed by the researcher. A discussion guide had twelve questions out of which two were engaging, nine were exploration, and one was exit. The guide had these three categories of questions as advised by Eliot and associates (2005). FGD were used to gain more insight onto the extent to which the midwives were implementing maternal health QoC standards and the hindrances to their use. Focus group discussion was favored to Key informant interviews (KII) since they are more rapid and resource efficient (Nyumba *et al.*, 2018, Taderhoost, 2021).

3.6.7. Selection and Training of Research Assistants

Four (4) research assistants, two for each health facility, were recruited and trained. The requirement for recruitment was a degree in nursing and an experience in the maternity unit. The research assistants were trained on the purpose of the study, the data collection procedures, and how they were expected to manage the process in the field. The need to observe ethical principles while undertaking data collection was emphasized. The assistants participated in the pre-testing of the study so as to have a feel of the actual data collection processes. Finally, they were introduced to hospital management before data collection. While in the field, the research assistants were under the supervision of the principal investigator.

3.6.8. Pre-test

Vogel & Draper-Rodi (2017) recommend that a pre-test be conducted before the main study to help the researchers identify and address difficulties likely to compromise the results. Furthermore, a pre-test enables the determination of the validity and reliability of the data collection tools as well as in estimating the time and resources required for the main study (Ismael *et al.*, 2018).

Before the survey, a pre-test was conducted at Chuka Level 4 hospital. Chuka Hospital was selected because it is within the same geographical area as the other two hospitals where the study was conducted; hence the target population was likely to have similar characteristics. The pre-test involved 15 participants representing 17.6% of the sample. Mugenda and Mugenda (2003) recommend that an appropriate pre-test involves about a tenth of the sample with homogenous characteristics. The research assistants participated in the pre-test.

3.6.9. Validity Testing

Validity refers to the extent to which a measurement tool assesses the variable it was intended to determine (Bolarinwa, 2018). The three aspects of validity are face, content and construct validity. Face validity refers to the degree to which the questionnaire appears to measure what is expected to measure whereas content validity is concerned with whether the questionnaire has all the relevant questions required to answer the research question (Yaddanapudi & Yaddanapudi, 2019). Construct validity is concerned with the extent to which the questionnaire measures what it claims to measure (Yaddanapudi & Yaddanapudi, 2019). Carefully selected experts went through the study instruments to determine the instrument's validity as Sangoseni *et al.* (2013) recommended. These were two midwifery lecturers one from University of Embu and one from Embu Medical training college (MTC), two gynecologists, one from Embu hospital and one from Meru hospital and two midwifery service providers from Chuka Level Four Hospital. Their input was used to improve the study instruments.

3.6.10. Reliability Testing

Reliability implies the extent to which identical results can be attained by a measurement procedure after using it repeatedly (Mugenda & Mugenda, 2003; Bolarinwa, 2018). Two types of reliability are test-retest which determines the stability of the study instrument over time and internal consistency reliability which determine the consistency of the results across the items (Yaddanapudi & Yaddanapudi, 2019; Bowling, 2023). For test-re-test reliability, the participants filled the same instruments at two different occasions. This method was used since the characteristic that was being measured remains stable over time. For internal consistency, Cronbach's alpha (α) test was used. A value of 0.79 was obtained which was within the > 0.70-0.90 range, indicating that the tool had an acceptable internal consistency (Nasrin & Trisha, 2009).

3.6.11. Trustworthiness of Qualitative Data

Trustworthiness of qualitative data is the equivalent of validity and reliability of quantitative data (Riazi *et al.*, 2023). It is one way that researchers can convince the readers that the data presented is worth their attention (Lincoln & Guba 1985). Lincoln & Guba (1985) introduced the criteria of credibility, transferability, dependability and confirmability for assessment of trustworthiness of qualitative data.

Credibility is one of the most important factors in establishing trustworthiness (Lincoln & Guba, 1985). Some of the methods that have been suggested to increase the credibility include prolonged engagement, triangulation, peer debriefing, iterative questioning and member checking (Lincoln & Guba 1985; Shenton, 2004; Gunawan, 2015). In this study, the researcher developed an early familiarization with the participants prior to the actual data collection to establish trust with the participants. Secondly, the research also adopted method and site triangulation to enhance credibility. Focus group discussion was used in combination with a self-administered questionnaire and structured observation. This enabled the researcher to determine whether what the participants reported was truthful. In addition, supporting documents were reviewed to provide supporting data or verify information supplied or alluded to by the participants during the discussion. The discussions were carried out at two different sites providing for site triangulation. This reduced the effect of local factors peculiar to one institution as indicated by Shenton (2004). The researcher also used tactics to ensure honesty in the participants when contributing to the discussion. Participants were given opportunity to turn down the request to participate thus ensuring those who took part were genuinely willing participants. The independent status of the researcher and the purpose of the study were also emphasized at the beginning of the discussion. The other strategy used was iterative questioning

as proposed by Shenton (2004). The researcher returned to matters discussed earlier once in a while to detect any falsehoods.

Transferability is concerned with the extent to which one study findings are applicable to other studies (Riazi *et al.*, 2023). Providing sufficient details for the study replicability (Thick description) is a way of ensuring transferability (Shenton 2004; Riazi *et al.*, 2023). Shenton (2004) suggests that information about the following should be made clear from the outset: Number of institutions taking part, any restrictions in the type of participants who took part, number of participants involved, number and length of data collection sessions and time period over which data was collected. In this study this information is provided in the data collection section of the study.

To enhance dependability, it is the researcher's responsibility to provide the details of the procedures for generating and analysing the result (Riazi *et al.*, 2023). In-depth methodological description of data collection is provided in the data collection section to enhance dependability. Additionally, a summary of the findings is provided in tabular form as suggested by Cloutier & Ravasi (2020).

Confirmability refers to the degree to which the researcher has reported data without bias (Riazi *et al.*, 2023). Confirmability is established when the other three criteria of credibility, transferability and dependability are achieved (Riazi *et al.*, 2023). Shenton (2004) posits that the researcher has a role of ensuring that the research findings reported are the ideas of the participants rather than the preferences of the researcher. Two important strategies for ensuring confirmability is the use of triangulation to reduce investigator bias as well as maintenance of an audit trail (Lincoln & Guba, 1985; Shenton, 2004). An audit trail allows any reader to trace

the research process step by step through the decisions made and procedures described. In this study, the researcher has maintained a record of the following as part of the audit trail to ensure confirmability: documentation of the research process including a record of the study design, the selection criteria for participants, and the data collection methods; data collection process including a record of the location of the research, the dates and times of data collection, and the procedures used to collect the data; data analysis process including the transcription process, the procedures used to analyze the data, including coding frameworks and analytical tools used; procedures for ensuring credibility of the data.

3.6.12. Data Collection Process

The pre-intervention data was collected for a period of seven months from August 2021 to February 2022. Data collection methods that were used included use of a questionnaire, FGD and observation.

3.6.12.1. Administration of the Questionnaires

Data was first collected through a questionnaire. Questionnaires were administered between August 2021 and September, 2021. Initially, the researcher together with the research assistants reported to the office of the chief Executive officer and the nursing services manager of the health facility to indicate the start of the data collection process. On entry to the unit/ward, the researcher/ research assistants alerted the nurse in-charge of the ward or of shift before commencing data collection. Written, informed consent was then sought from the eligible participants. The questionnaire was then given to those nurse-midwives who accepted to participate in the study. To ensure minimal interference with normal services, questionnaires were administered during tea break or as the nurse-midwives were about to leave at the end of their shift.

3.6.12.2. Observations

Structured observations were carried out between December 2021 and March 2022. The observation was conducted using an observation checklist during the day and at night as the nurse-midwives admitted expectant mothers and provided care during labor and delivery and in the immediate postpartum period. This was done to establish the actual as opposed to reported implementation of QoC standards. Informed consent was sought from the participant. The observer informed the participant that he/she was going to be observed as they admitted and cared for the client. However, the components of the observation were not disclosed to reduce the Hawthorne effect. The observer explained the content of observation to the participants at the end of the observation sessions. This was carried out after all the observations were completed. The observer recorded the observations in the observation checklist as per the instructions provided.

3.6.12.3. Focus Group Discussion

Focus group discussions were conducted between February 2022 and March 2022. Two focus group discussions were conducted for each hospital making a total of four FGDs. The researcher settled on the four since by this number, content saturation had been achieved as no new information was forthcoming. Each focus group had six participants as advocated by Mishra, (2016) and Busetto *et al.* (2020). The focus discussion involved nurse-midwives in-charges of the maternity unit wards and departments. The participants were purposively selected to ensure homogeneity of the group. The nurse- midwife in-charges were also better placed to provide the information being sought. The participants were informed of the date and the objectives of the discussion one week before. The discussion was carried out in the boardroom within the hospital. The board room was selected because it was large enough, comfortable, and had fewer distractions. The permission to use the hospital boardroom had been granted by the hospital

management. The discussion was carried out between 11.00 A.M to 1.00 P.M to ensure that the nurse mid-wives' activities were not disrupted. Only refreshments were served during the discussion.

On the day of the discussion, the researcher and the research assistants went through the questions to be discussed before the commencement of the discussion. The research assistants ensured that the seats were arranged in a circular manner to ensure that the facilitator, the research assistants and the participants had a clear view of each other. The research assistants also welcomed the participants as they arrived for the discussion.

The discussion commenced with a word of prayer. The facilitator thanked the participants for finding time to participate in the discussion and then introduced self and the Research assistants. The participants were then requested to introduce themselves. The purpose of the discussion was explained to the participants by the researcher and consent sought from the participants. The researcher emphasized on the confidentiality of the data collected and requested the participants to discuss freely. Ground rules for the discussion were also clarified including respect of each other's opinion.

The researcher conducted the FGDs assisted by two assistants. The two research assistants observed and took notes of the non- verbal interactions and also took notes of the general content of discussion. They also audio recorded the discussion with the consent of the participants, as the researcher facilitated the discussion. Each group discussion lasted for about one hour. The researcher began the main discussion with engaging questions followed by exploration type of questions and finally the exit question. During the discussion, the facilitator encouraged the participation by each participant by not targeting questions to specific

individuals. At the end of the discussion, the researcher thanked the participants again for their time. The participants were also informed that they can contact the researcher on matters related to the FGD if need arises. Refreshments were served and finally the research assistant then cleared the room.

3.6.13. Data Cleaning

The researcher or the research assistant reviewed the questionnaire before finalizing the data collection process. At the end of each day, the principal investigator went through all the questionnaires and observation checklists filled out that day. Each questionnaire and observation checklist was checked for uniformity and accuracy. Those that fit the criteria were coded and entered into the computer for analysis. Data from each questionnaire and checklist were entered twice to ensure reliability.

3.6.14. Data Analysis

Statistical Package for Social Sciences (SPSS) version 26.0 was used to analyze quantitative data. Descriptive statistics such as mean, mode, frequencies, and percentages were used to summarize quantitative data. Chi-square, Pearson's correlation, and paired samples t test were used to test relationships at a 95% confidence Interval. Paired sample t-test was specifically used to test the hypotheses of the study at an alpha of 0.05

Data from the focused group discussion was transcribed verbatim from the audio tapes. An effort was made to identify the speakers so that each speaker's contributions could be followed. After transcription, data was then coded using Nvivo version 12.0. Thematic analysis was carried out following the Braun and Clarke's (2006) 6-step framework for identifying patterns and themes. The following data analysis plan was followed.

Table 1: Data Analysis Plan

Objective	Variables	Type of Data	Method of Analysis
To assess the knowledge of nurses-midwives about maternal health QoC standards	Knowledge about quality of maternal health care	Nominal	Descriptive statistics
	Knowledge maternal health QoC standards	Ratio	Descriptive statistics Chi square, Pearson's correlation
	Source of information	Nominal	Descriptive statistics
To measure the attitude of nurse midwives on use of maternal Health QoC standards	Support for use	Nominal	Descriptive statistics, Chi-square.
	Reasons for supporting	Nominal	Descriptive statistics
	Reasons against	Nominal	Descriptive statistics
To determine the extent to which nurses-midwives are using maternal health QoC standards	Reported use		Quantitative Qualitative
	Reasons for using Reasons for not using		
To identify systems barriers to implementing maternal QoC standards among nurse-midwives.	availability of the standards, inadequate resources, heavy workload, lack of maternal health care standards	ordinal	Descriptive statistics, Thematic analysis
To evaluate the influence of training on the nurse-midwives' knowledge , attitude and use of maternal health QoC standards	Training, Knowledge, Attitude, Use of Maternal health QoC standards	nominal, ordinal	paired samples t test

3.6.15 Data Presentation

Quantitative data are presented in narrative form and using tables and figures. Qualitative data are presented mainly in narrative form.

3.7 Phase Two: Intervention: Training

3.7.1 Introduction

The intervention of this study was a training of nurse-midwives on selected WHO (2016) maternal health quality of care standards to bridge the knowledge, attitude and practice gap identified in the baseline study. The nurse –midwives were divided into two groups: an intervention group and a control group. Embu was assigned the intervention group and Meru the control group. Having an intervention and control group facilitated the comparison of the findings at the post-intervention phase ensuring that the results were due to the intervention and not due to extraneous factors. The groups were assigned randomly to the intervention and control group since findings of the baseline study in the two hospitals did not differ significantly hence the two groups were considered homogenous. Further, assigning participants from one hospital only as an intervention group and the other as a control ensured that contamination did not occur.

Initially, the training materials were adapted to the training needs of maternal health QoC standards. These materials were then used to train the nurse midwives in Embu hospital. Two training sessions were conducted in October, 2022. The nurse midwives were trained on maternal health quality of care management and strategies for improving maternal health as per the WHO (2016) QoC standards. These included assessment and care of a woman during labor, delivery and postpartum, infection prevention and control practices, and management of specified obstetric emergencies.

The training was conducted through classroom theory, practicum, and clinical area practicum. The measurable output of the training was the acquisition of knowledge, as demonstrated by the difference in individual scores between the pre-and post-test for each participant obtained

during the training. The other output was the ability of the nurse-midwife to demonstrate the required skill on the model and the real client during the classroom and clinical area practicum, respectively. After the training, the participants were followed up for mentorship in the clinical area in November, 2022 at four weeks.

3.7.2 Training Resources

The researcher sourced for and adapted the training resources before the training. These resources included reference materials, anatomic models, videos and presentations and job aids.

3.7.3 Reference Materials

The researcher ensured that there were adequate reference materials during the training. Reference materials were sourced from the Division of Reproductive Health (DRH), Ministry of Health and the WHO, Pathfinder International, and JHPIEGO websites. These included copies of maternal health quality of care standards, unused partographs, books and other documents on approaches in improving the quality of maternal health care, assessment and management of women during labor, delivery and post -partum, and management of obstetric emergencies. The reference materials were shared with the participants during the training and as reference manuals for use in the clinical area. The full list of the reference materials is shown in appendix 5.

3.7.4 Anatomic Models for Training on Maternal Health QoC Standards

The research sourced for anatomic models for the training from Kenya Medical Training College (KMTC)-Embu Campus and University of Embu school of Nursing. These models were used for skills demonstration and training in the classroom, and for further training in the clinical area. The models were used to train skills on examination of an expectant woman,

management of first and second stage of labor, active management of third stage of labor (AMSTL) and management of post -partum hemorrhage. These models were based on the WHO (2015) recommendation on models required for maternal health care training. A full list of the models is shown in appendix 5.

3.7.5 Videos and Presentations

Videos and presentations were used for skills training. These videos were downloaded from various internet sources. After theory training, the participants watched a video, where applicable, before embarking on the skills demonstration and practice. The videos were used to reinforce the skills being taught. The videos were also shared with the participants to carry home. The participants were encouraged to continue watching these videos at home after the day's training. To ensure authenticity, the videos were downloaded from trusted health information websites such as Global health project and MSD manuals. A full list of the videos and presentations is shown in appendix 5.

3.7.6 Job Aids

A job aid refers to any material in the form of instructions, diagrams, or similar methods available at the site where a job is being done to guide the worker to aid the individual in performing specific tasks more effectively and efficiently (Oka *et al.*, 2018). They use graphics and words in a simple manner to provide the right kind of information that makes the performance of tasks easier (Oka *et al.*, 2018). They act as a quick reference for health provider to ensure that the steps for each procedure are carried out correctly (Jennings *et al.*,2015). Job aids provided for this training included those on active management of third stage of labor and management of post-partum hemorrhage, classification of pre-eclampsia, and magnesium sulfate schedules for severe pre-eclampsia and eclampsia. Others included those on surgical

instrument cleaning and decontamination process and segregation of medical waste. These job aids were used during the training, and also given out to nurse midwives at the end of the training for future reference in their health facilities. The full list is shown in appendix 5.

3.7.7 Validity of the Training Materials

Validity of training is as good as the validity of the training materials. Subject matter experts who are also trainers in Emergency Obstetric care (EmOC) and standards Based Management and Recognition (SBM-R) were engaged to determine the content validity of the training materials. These experts were two midwifery lecturers, two gynecologists and two practicing midwives. They were requested to go through the materials and provide inputs which were used to improve on the materials.

3.7.8 Training

The training involved 43 out of the 45 participants in Embu hospital. Two participants did not attend the training since they were on leave and could not avail themselves during the training. The participants were divided into two groups of 21 and 22 each. The group size was based on the recommendation by WHO (2006) on the group size for training of health care providers on maternal and newborn care. Each group was trained for five days, as Ameh (2016) and Necochea *et al.* (2015) recommended.

To ensure continuity of services during the training, the hospital's nurse in-charge deployed nurse-midwives from other clinical service areas to the Maternity unit to assist the remaining nurse-midwives in attending to the clients. The training was carried out in October 2022. The training was conducted by four facilitators, two from Embu Hospital, one from University of Embu, and one from KMTC-Embu campus. To qualify as a facilitator, one needed to be a nurse

midwife trained in EmOC and SBM-R, have undertaken a clinical training skills (CTS) course by JHPIEGO or any other organization, and currently deployed in maternity or teaching midwifery in a school of nursing. The researcher supervised and supported the facilitators during the training.

3.7.8.1 Teaching and Learning Methods

The training was non-residential, carried out within the facility, and was conducted between 8.00 am and 5.00 pm every day for five days. The training commenced on Monday and closed on Friday. The participants registered at the beginning and the end of each day. On the first day of the training (Monday), the participants reported, registered, and commenced the training with introductions. Afterward, they selected their leaders to coordinate them during the training period. The group then set the ground rules for the training. Each participant was then asked to share their expectations for the training, after which the facilitators then shared the training objectives with the participants. The participants then took a pretest (Appendix 6) administered by the facilitators, after which the training commenced. Each participant was assigned a number to facilitate comparison of pretest and post-test results. The numbers were assigned anonymously, and only the participant knew his/her number. The number was indicated in both the pretest and the post-test.

The training was divided into first three days of classroom teaching followed by two days of clinical practicum. Each day was divided into three sessions: 8.00 am to 10.30 am, 11.00 am to 1.00 pm, and 2.00 pm to 4.30 pm. At the end of the three days of classroom training, the participants took a post-test.

At the end of the third day, the participants were divided into four groups of a maximum of 6 participants and then deployed to the clinical area for clinical area practicum. There were four clinical areas where the participants were deployed: the admission area, labor and delivery room, postnatal area/ward, and infection prevention. Each group rotated through the four clinical areas during the two days. During this period, the standards were used as the resource material, and each facilitator was assigned to a group as a resource person. At the end of each day, the researcher and the facilitators held a meeting to review the successes and challenges faced during the day. They also reviewed the participants' behavior towards the training.

3.7.8.2 Classroom Theory Training

Each classroom session started with a theory presentation followed by a practicum on models or how to use the quality standards depending on the coverage area. The classroom training methods included illustrated lectures, group discussions, role plays, demonstrations and practicum on models. Theory training was divided into six modules each with a number of units. A participant was expected to cover all the modules to qualify to proceed for clinical area practicum. The contents of each module are shown in Appendix 5.

3.7.8.3 Classroom Skills Training

The skills training was carried out through the use of anatomic models. Skills learning "stations" were set up in the classroom. A "station" was set up for each clinical skill the participant was expected to acquire competency. The participants used a copy of the quality of care standards as a checklist during the practical sessions. The learning of the skill started with the facilitator first demonstrating the skill. The participant did a return demonstration. After this, the participants were left to practice the skill in groups. At the end, each learner was assessed on

competency by the facilitator. Those who did not demonstrate mastery of the skill continued to practice until they became competent. The stations set for the mastery of the skills included:

- i. Normal delivery
- ii. Active management of the third stage of labor(AMTSL)
- iii. Management of post-partum hemorrhage
- iv. Manual removal of the placenta and bimanual compression of the uterus
- v. Decontamination of surgical instruments
- vi. Waste segregation

3.7.8.4 Clinical Practicum

On days four and five of the training, the participants proceeded to the clinical area for clinical area practicum. Each participant was given a logbook (appendix 9) containing the skills to be practiced during the attachment. Each of the four groups had a facilitator was assigned to follow up on the participants' progress to ensure that they were learning the required competencies and assist them in case they encountered difficulties. After the participant carried out each of the skill, the log book was signed by the facilitator. The models were also availed in the clinical area. The participants continued practicing on the models when the client flow was low. At the end of each day, the participants met with their facilitator to review their progress and address any specific issues that may have arisen during the day. Where a skill was not performed during the training, the participant was required to carry out the skill even after the training under the supervision of the facility based supervisor.

3.7.8.5 Ending of the Training

At the end of the fifth day, the researcher, facilitators, and participants converged in the classroom again for a closing meeting. During the meeting:

- i. Each participant developed an individual work plan on the actions to improve adherence to the standards. The researcher reviewed the content of the work-plans with the participants to ensure that they were in line with the objectives. The participant then made two copies of the work-plan: one for him/herself and the other was kept by the researcher. The one kept by the researcher was used during the follow-up.
- ii. Each participant completed an anonymous course evaluation questionnaire (appendix 7) to determine the learner's reaction to the training. The question covered the participant's view on how well the objectives were covered, the effectiveness of the teaching and learning methods, the adequacy of the training materials and experiences, and the appropriateness of the venue.
- iii. The facilitator discussed the dates and expectations of the follow-up visits with the participant.
- iv. The facilitators distributed to the participants the maternal health quality of care standard booklets, flowcharts on the diagnosis and management of obstetric emergencies as well as on infection prevention, and other resource materials for use by the participants back in their hospitals.
- v. The facilitators went through the participants' expectations to determine whether they had been met and finally went through the training objectives to determine if they had been accomplished.

3.7.9 Follow-up after the Training

Follow-up of the participants after a training program is essential in helping them to apply the new practices on the job and to develop confidence in carrying out the interventions. Follow-up of the participants takes place to ensure that the participants of a training program are still practicing what they learnt and address any challenges they may be having. Follow-up is

considered part of the training program. The participants in this training were followed up at four weeks. The researcher and the facilitators carried out the follow-up visit. The work-plan that was prepared by the participant during the training was used as the basis of the follow-up visit. During the visit:

- i. A briefing meeting was held with the facility management team to inform them of the objectives of the visit
- ii. The participant and the facilitator reviewed the degree of accomplishment of individual work plan.
- iii. The facilitator discussed with the participant the gaps in the implementation of the individual work-plan, the root cause and the possible interventions.
- iv. A debriefing meeting was held with the facility management team. In this meeting, the visit's findings were reported generally, and the implementation challenges that were beyond the participant's control but within the facility management domain were highlighted.

This follow-up did not involve data collection as it was meant to be a mentoring process.

3.8 Phase 3: Post –Intervention

3.8.1 Introduction

The post intervention phase included data collection from the intervention and the control group. Data from the control and intervention group was collected between January and February, 2023. It was necessary to collect data from the intervention group after three months had lapsed after the training. Three months is considered adequate time for the participants to practice the knowledge and skills acquired during the training (WHO, 2015, Gitonga, 2016). The post-intervention survey assessed the nurse-midwives' change in knowledge and attitude about maternal health QoC standards as well as adherence to the standards since the training.

Hindrances to adherence to the standards were also established. The findings from the intervention and control groups were compared to establish the impact of the training.

3.8.2 Data Collection

The same data collection instruments and procedures used in the pre-intervention phase were used in this study phase. However, focus group discussion was not carried out during post-intervention since the discussion aimed to provide in-depth information about the implementation of the standards before the intervention. The same nurse-midwives who participated in the pre-intervention were used in this phase to facilitate a comparison of outcomes.

3.8.3 Data Management

Similar processes to those used in the pre-intervention stage were used for cleaning, analyzing, and presenting the data during this phase.

3.9 Study Limitations

The study involved nurse- midwives stationed in the maternity units of two hospitals only. Due to this, it may not be possible to generalize the findings. However, the researcher used probability sampling method to try and address this. The study questions concerned potentially delicate and personal issues regarding attitude and behavior. Because of this, the participants may have with-held some information or given socially desirable responses. This was addressed by using different data collection methods. The questionnaire also had some questions framed differently but seeking similar information.

Five nurse-midwives went away on leave during the study, which decreased the number of participants during the post-intervention phase. However, this did not affect the integrity of the study since more nurse-midwives had been recruited at the initiation of the study and participated in the training. This study used a quasi-experimental design with its inherent limitations. These include selection bias because the design lacks true random assignment of participants to the experimental and control group as well as difficulty in controlling all the confounding variables.

Meru and Embu hospital are in close proximity. This may have resulted in informational exchange between participants from the two hospitals resulting in contamination. To address this, data was continuously monitored for unexpected trends or similarities between the two groups.

3.10 Assumptions

The study assumed that the participants provided reliable and valid data that was used to make conclusions concerning the study. Further, the study assumed that the records kept in the maternity unit were complete and current.

3.11 Ethical Considerations

KNH/UON Ethics and Research Committee granted the study's ethical approval vide license no. KNH-ERC/A/468(Appendix 10). The research committees of Embu and Meru hospitals further authorized the study (Appendix 12 and 13). National Commission for Science and Technology Innovation (NACOSTI) also granted authorization for data collection vide license number NACOSTI/P/21/8854(Appendix 11).

The study participants were recruited voluntarily, as no coercion or inducement was used. Informed and written consent was sought from the participants, and only those who consented were involved in the study. The participants were allowed not to answer questions they were uncomfortable with or withdraw from the study at any stage without suffering any consequences. Confidentiality and anonymity of data collected were maintained since data was only handled by the persons involved in the study. Participants were also requested not to indicate any identifier, including their name, on the questionnaire.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter describes the findings of the study's pre-intervention, intervention, and post-intervention phases in that order. The first part is a presentation of the results of the baseline survey. The second part presents the results from the training. In the last part, a comparison is made between the findings of pre-intervention and those of the post-intervention phases to determine the effect of training intervention on the use of maternal health quality of care standards by nurse-midwives in their practice.

4.2 Phase One: Baseline Results

The results from the pre-intervention phase are presented in this part. Results from the questionnaires are presented first, followed by those from the focus group discussion and finally those of the observation.

4.2.1 Quantitative Results of the Pre-Intervention Phase

Ninety-three nurse-midwives, were recruited for the study, out of which 85 participants responded, a response rate of 93.4%. Out of these participating nurse-midwives, forty-five (52.9%) and forty (47.5%) worked at Embu and Meru hospitals, respectively. The response rate was 91.8%(n=45) for Embu hospital and 91%(n=40) for Meru hospital respectively.

4.2.1.1 Socio-demographic Characteristics of the Participants

The mean age of participants in Embu hospital was 34.9 (SD± 9.6) with most participants (71.1%, n=32) aged 20-29 years. In Meru hospital, the mean age of the participants was 36.1(SD±8.7) with most participants (65%, n=26) aged 20-29 years. Most nurse-midwives who

participated in this study from Embu hospital (82.2%, n=37) and Meru Hospital (87.5%, n=35) were female. Majority of the participating nurse midwives in Embu hospital (51.1%, n=23) and Meru Hospital (65.0%, n=26) were married.

Cumulatively, two-thirds of the participants in this study (64.7%, n=55) had a diploma qualification, with only two having a certificate qualification. Diploma holders in Embu hospital comprised 71.1% (n=32), and in Meru hospital 57.5% (n=23). In the two hospitals combined, most participants (44.7%, n=38) had practiced for 1-9 years. In Embu Hospital, 44.4%(n=20) and in Meru hospital, 45.0% (n=18) had practiced for 1-9 years. Most participants in Embu (44.4%, n=20) and Meru hospital (52.5%, n=21) had been in the maternity unit for more than one year.

Most participants in this study (41.2%, n=35) worked in the labor ward, with the antenatal ward having the least (17.6%, n=15). Meru hospital had more nurses in Newborn unit than Embu and Embu had more nurses in the postnatal ward than at Meru hospital. Eighty percent of the participants in Embu hospital (n=36) and Meru hospital(n=32) were working as staff nurses.

Table 2: Participants' Socio-Demographic Characteristics

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Gender	Male	8(17.8)	5(12.5)	13(15.3)
	Female	37(82.2)	35(87.5)	72(84.7)
Age	20 – 29	24(53.3)	14(35.0)	38(44.7)
	30 – 39	8(17.8)	12(30.0)	20(23.5)
	40 – 49	6(13.3)	9(22.5)	15(17.7)
	50 – 59	7(15.6)	5(12.5)	12(14.1)
	Never married	19(42.2)	13(32.5)	32(37.6)
Marital Status	Married	23(51.1)	26(65.0)	49(57.6)
	Divorced/separated/widowed	3(6.7)	1(2.5)	4(4.7)
	Catholic	13(28.9)	16(40.0)	29(34.1)
Religion	Protestant	31(68.9)	24(60.0)	55(64.7)
	Muslim	1(2.2)	0	1(1.2)
Highest professional Qualification Level	Certificate	1(2.2)	1(2.5)	2(2.4)
	Diploma	32(71.1)	23(57.5)	55(64.7)
	Degree and above	12(26.7)	16(40.0)	28(32.9)
Length of practice in years	<1	11(24.4)	6(15.0)	17(20.0)
	1-9	20(44.4)	18(45.0)	38(44.7)
	10-19	8(17.8)	7(17.5)	15(17.6)
	20-29	2(4.4)	7(17.5)	9(10.6)
	30 and above	4(8.9)	2(5.0)	6(7.1)
Period in maternity	<1 year	11(24.4)	11(27.5)	22(28.9)
	1 year	14(31.1)	8(20.0)	22(28.9)
	>1 year	20(44.4)	21(52.5)	41(48.2)
Area of Deployment	Antenatal ward	8(17.8)	7(17.6)	15(17.6)
	Labor ward	18(40.0)	17(42.5)	35(41.2)
	Post-natal ward	11(24.4)	6(15.0)	17(20.0)
	Newborn unit	8(17.8)	10(25.0)	18(21.2)
primary Job Responsibility	Staff Nurse	36(80.0)	32(80.0)	68(80.0)
	Nurse manager	7(15.6)	5(12.5)	12(14.1)
	Nurse trainer	1(2.2)	2(5.0)	3(3.5)
	Nurse Counselor	1(2.2)	1(2.5)	2(2.4)

4.2.1.2 Participants' Knowledge about Maternal Health Care Quality and Quality of Care Standards

This study sought to assess the participant's level of knowledge about what quality maternal health care entails and about maternal health quality of care standards. The study also sought to establish whether the participants had been trained on the same and the lapsed period from the

time of training. The training institutions were also determined. Finally, the relationship between knowledge, training, and use maternal health quality of care standards was determined.

4.2.1.2.1 Participants' Knowledge of Quality Maternal Health Care

The participating nurse-midwives were asked to indicate what quality maternal health care is. About half of the participants (53.3%, n= 24) in Embu hospital indicated correctly that quality maternal health care is that which meets the laid down standards. Only 30% (n=12) indicated the same in Meru hospital, with the majority (62.5%, n=25) indicating that it is care that meets the needs of the patients. Five participants from Embu and two participants from Meru indicated that it is care that makes the clients happy.

Table 3: Participants' Knowledge of Quality Maternal Health Care

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
What is quality maternal health care?	Care that makes clients happy	5(11.1)	2(5.0)	7(8.2)
	Care that delivers value for money	1(2.2)	1(2.5)	2(2.4)
	Care that responds to clients' needs	15(33.3)	25(62.5)	40(47.0)
	Care that meets the laid down standards of care	24(53.3)	12(30.0)	36(42.4)

4.2.1.2.2 Participants' Training on Quality of Maternal Health Care

The majority of the participants in Embu Hospital (53.3%, n= 24) indicated that they had been trained on the quality of maternal health care. 47.2% (n=16) had been trained more than one year ago. Half of those trained (50.0%, n=12) were trained in college as they undertook their professional training. In Meru hospital, only 37.5% (n=15) of the participants had been trained, with the majority of those trained (40%, n=6) having been trained less than a year ago. Most of those trained (46.6%, n=7) had undertaken the training in college.

Table 4: Participants' Training on Quality of Maternal Health Care

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Trained on Quality of maternal health care?	Yes	24(53.3)	15(37.5)	39(45.9)
	No	21(46.7)	25(62.5)	46(54.1)
How long ago?	< 1 year ago	3(6.7)	6(15.0)	9(23.1)
	1 year ago	5(11.1)	5(12.5)	10(25.6)
	>1 year ago	16(47.2)	4(10.0)	20(51.2)
Trainer	In college	12(50.0)	7(46.6)	19(48.7)
	Non -Governmental organization	4(16.6)	3(20.0)	7(17.9)
	Hospital management	6(25.0)	3(20.0)	9(23.2)
	County health team	1(4.2)	1(6.7)	2(5.1)
	Other	1(4.2)	1(6.7)	2(5.1)

4.2.1.2.3 Participants' Awareness of Maternal Health Quality of Care (QoC) Standards

Most of this study's participants (82.4%, n=70) had heard about the standards. Separately, there were more nurse-midwives in Embu hospital (86.7%, n=39) compared to Meru Hospital (77.5%, n=31) who were aware of the standards. Most of the participants in Embu (46.2%, n=18) and Meru Hospital (48.4, n=15) had heard about the maternal healthcare quality standards in college. A notable 28.2% (n=11) and 29.0% (n=9) from Embu and Meru Hospitals, respectively, heard about standards from the hospital management.

Table 5: Participants' Awareness of Maternal Health QoC Standards

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Heard of maternal health QoC standards?	Yes	39(86.7)	31(77.5)	70(82.4)
	No	6(8.8)	9(22.5)	15(17.6)
Heard from Whom?	In college	18(46.2)	15(48.4)	33(47.1)
	Non -Governmental organization	8(20.5)	5(16.1)	13(18.6)
	Hospital management	11(28.2)	9(29.0)	20(28.6)
	County health team	2(5.1)	2(6.5)	4(5.7)

4.2.1.2.4 Training on Maternal Health QoC Standards

The participants were asked whether they had been trained on using maternal health QoC standards. Those trained were requested to indicate how long ago they were trained and the training institution immediately before the study. Only 40% (n=18) in Embu Hospital indicated they had been trained. Most of them (44.4%) had been trained more than one year ago, with most (44.4%) being trained in college as students. Only a third of the participants (37.5%, n=15) had been trained in Meru hospital. Most of these (33.3%, n=5) had been trained in college, and six participants (40.0%) were trained more than one year before the study period. A significant 27.8% (n=5) and 26.7% (n=4) in Embu and Meru Hospital respectively, were trained by hospital management.

Table 6: Training on Maternal Health QoC Standards

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Trained on maternal health QoC standards	Yes	18(40.0)	15(37.5)	33(38.8)
	No	27(60.0)	25(62.5)	52(61.2)
How long ago?	< 1 year ago	6(33.4)	5(33.3)	11(33.3)
	1 year ago	4(22.2)	4(26.7)	8(24.2)
	>1 year ago	8(44.4)	6(40.0)	14(42.5)
Trainer?	In college	8(44.4)	5(33.3)	13(39.4)
	Non- Governmental organization	2(11.1)	3(20.0)	5(15.2)
	Hospital management	5(27.8)	4(26.7)	9(27.3)
	County health team	2(11.1)	2(13.3)	4(12.1)
	Other	1(5.6)	1(6.7)	2(6.0)

4.2.1.2.5 Participants' Knowledge of Maternal Health QoC Standards

Questions were purposively sampled from the maternal health QoC standards to which the participants were required to respond. Each participant was asked a total of ten questions. Two questions each were about the admission of the mother in labor, monitoring of a mother during labor, and active management of the third stage. Two other questions each were about managing

postpartum hemorrhage and pre-eclampsia/ eclampsia. The mean knowledge score of participants in Embu hospital was 6.1 (SD±1.51) whereas in Meru Hospital, it was 5.98(SD±1.61). Most participants in Embu hospital (42.2%, n=19) had a score of ≤5 with only 35.6%(n=16) having a score of ≥7. In Meru hospital, 47.1%(n=40) had a score of ≤5, with only 29.6% (n=26) having a score of ≥7. Meru Hospital had more participants scoring the lower and the highest knowledge scores. The content area with most participants scoring low marks was the management of pre-eclampsia, followed by the immediate management of postpartum hemorrhage. All participants answered the questions concerning the active management of labor correctly.

Table 7: Participants’ Maternal Health QoC Standards Knowledge Scores

Variable	Knowledge scores	Embu n (%)	Meru n (%)	Total n (%)
Participants' Knowledge scores on maternal health QoC standards	<5	19(42.2)	21(52.5)	40(47.1)
	6	10(22.2)	9(22.5)	19(22.4)
	7	8(17.8)	2(5.0)	10(11.8)
	8	4(8.9)	4(10.0)	8(9.4)
	9	3(6.7)	2(5.0)	5(5.9)
	10	1(2.2)	2(5.0)	3(3.5)

4.2.1.2.6 The Relationship between Participants' Socio-demographic Characteristics and their Knowledge of Maternal Health QoC Standards

Participants' knowledge of maternal health quality of care standards was correlated with their gender, highest qualification level, years of experience, and period in maternity using Pearson’s correlation and Chi-square tests at alpha 0.05. None of the socio-demographic characteristics of the participants significantly correlates with knowledge of QoC standards.

Table 8: Relationship between Participants’ Socio-demographic Characteristics and their Knowledge of Maternal Health QoC Standards

Variable	Knowledge scores		Chi-Square p-Value	Pearson Correlation p -Value
	4-6	7-10		
Gender				
Male	8	5	0.503	0.509
Female	51	21		
Age(years)				
20-29	24	14	0.734	0.060
30-39	15	5		
40-49	11	4		
>50	9	3		
Highest Qualification Level				
Certificate	1	1	0.814	0.664
Diploma	38	17		
Degree and Above	20	8		
Period in Maternity				
<6 Months	12	9	0.37	0.211
6 Months-1 Year	16	6		
>1 Year	31	11		
Length of Practice (Years)				
< 1	10	7	0.541	0.774
1-9	27	11		
10-19	12	3		
20-29	7	2		
>30	3	3		

4.2.1.3 The attitude of Participants towards the Use of Maternal Health QoC Standards

The participating nurse-midwives were asked whether they felt the hospital offered quality maternal health care. Those who indicated in the affirmative were requested to indicate their reasons. Similarly, those who indicated that the facility is not offering quality care were also required to indicate their reasons. The participants were further asked whether they supported the use of maternal health quality of care standards. Those who indicated their support were required to indicate the reasons for the support. Similarly, those who indicated a lack of support were required to indicate their reasons.

4.2.1.3.1 Participants' Attitude about the Quality of Care Offered

Most participants in Embu hospital (82.2%, n=37) and Meru hospital (82.5%, n=33) indicated that their respective hospitals offered quality maternal health care. Four and three participants from Embu and Meru hospitals were unsure. Asked about why they felt that the hospital offers quality care, the majority in Embu hospital (48.6%, n=18) indicated that the standards of care were being adhered to. Most of the participants in Meru hospital (39.4%, n=13) indicated that the mothers were being attended to promptly.

Table 9: Participants' Attitude towards the Quality of Maternal Health Care Provided

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Do you think the facility is offering quality maternal care?	Yes	37(82.2)	33(82.5)	70(82.4)
	No	4(8.9)	4(10.0)	8(9.4)
	Not sure	4(8.9)	3(7.5)	7(8.2)
Reason	Mothers are attended to promptly	10(27.0)	13(39.4)	23(32.8)
	There are fewer maternal Deaths	4(10.8)	5(15.1)	9(12.8)
	There are many deliveries in the facility	1(2.7)	1(3.0)	2(2.9)
	There are qualified staff	4(10.8)	2(6.1)	6(8.6)
	standards are adhered to	18(48.6)	12(36.4)	30(42.9)

4.2.1.3.2 Participants' Attitude towards the Use of Maternal Health QoC standards

Most of the participants in Embu hospital (80%, n=36) and in Meru Hospital (97.5%, n=39) supported the use of QoC standards. Only nine and one participant in Embu and Meru hospital respectively opposed the use of the quality of care standards. Most participants in Embu (57.9%, n=22) indicated support of the use of standards because they ensured the delivery of quality health care. In contrast, majority in Meru hospital (68.9%, n=24) indicated support of the use of standards since they standardized the care provided to the mothers. Most participants who opposed the use of the standards (70.0%, n=7) did so since using the standards would be time-

consuming. Only one participant indicated that the use of standards would require a lot of resources.

Table 10: Participants' Attitude towards the Use of Maternal Health QoC Standards

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Support for the use of maternal health QoC standards	Yes	36(80.0)	39(97.5)	75(88.2)
	No	9(20.0)	1(2.5)	10(1.8)
Reason for supporting the use of maternal health QoC standards	Makes work easier	2(5.3)	3(8.1)	5(6.7)
	For standardization of care	14(36.8)	24(68.9)	38(50.7)
	To ensure the delivery of quality care	22(57.9)	10(27.0)	32(42.6)
Reason for Opposing the use of Maternal health QoC standards	Time-consuming	5(71.4)	2(66.7)	7(70)
	No need since the staff are highly trained	1(14.3)	1(33.3)	2(20)
	It will require a lot of resources	1(14.3)	0	1(10)

4.2.1.3.3 Relationship between Participants' Socio-demographic Characteristics, Knowledge, and Attitude towards the use of Maternal Health QoC standards

A Chi-square and Pearson tests were used to examine the correlation between participants' socio-demographic characteristics, knowledge and attitude towards the use of maternal health QoC standards. Results showed that nurses-midwives support for maternal health QoC standards is significantly related to gender (Chi square $p=0.021$; Pearson's correlation $p=0.021$) as well as the period served in maternity (Chi square $p=0.021$; Pearson's Correlation $p=0.026$). The relationship with the other socio-demographic characteristics was not significant. The relationship between nurse-midwives support of the use of maternal health QoC standards and their knowledge was not significant (Chi square $p=0.156$; Pearson's correlation $p=0.160$).

Table 11: Relationship between Participants' Socio-demographic Characteristics, Knowledge and attitude towards the Use of Maternal Health QoC Standards

Variable	Support for the Use of maternal Health standards		Chi-Square p-Value	Pearson Correlation p -Value
	Yes	No		
Gender				
Male	9	4	0.021*	0.021*
Female	66	6		
Age(years)				
20-29	31	7	0.301	0.060
30-39	18	2		
40-49	14	1		
>50	12	0		
Highest Qualification Level				
Certificate	2	0	0.841	0.676
Diploma	48	7		
Degree and Above	25	3		
Period in Maternity				
<6 Months	15	6	0.021*	0.026*
6 Months-1 Year	21	1		
>1 Year	39	3		
Length of Practice (Years)				
< 1	14	3	0.614	0.139
1-9	33	5		
10-19	19	2		
20-29	9	0		
>30	6	0		
Knowledge Scores(/10)				
4-6	54	5	0.156	0.160
7-10	21	5		

*-Significant relationship at 95% CI

4.2.1.4 Self-Reported Use of Maternal Health Quality of Care Standards

The study sought to establish whether the nurse midwives utilized maternal health quality of care standards as they provided care to mothers in their respective wards. It also sought to determine the reasons why they used or didn't use the standards in everyday practice.

4.2.1.4.1 Self-Reported Use of Maternal Health Quality of Care Standards

The participants were asked whether in their practice they used maternal health QoC standards. Two-thirds of the participants (62.2%, n=28) in Embu hospital indicated that they used the standards in their practice. In Meru hospital, 72.5% (n=29) of the participants reported using the standards. In the two hospitals combined, most participants (67.0%, n=57) indicated that they utilized the standards in their practice.

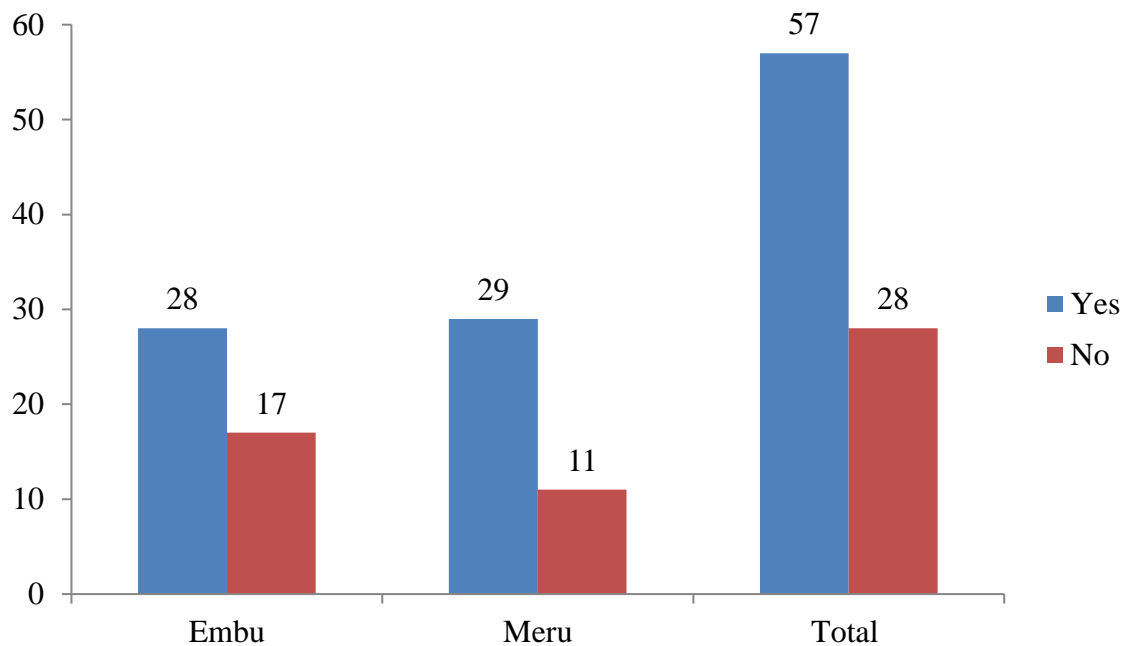


Figure 3: Participants' Self-Reported Use of Maternal Health QoC Standards

4.2.1.4.2 Participants' Reasons for Using or not using the Maternal Health QoC Standards

Fifty-seven participants who indicated using the standards were requested to indicate the reason for doing so and the twenty-eight participants who indicated not using the standards were also asked for the main reason. Most study's participants in Embu hospital (57.1% (n=17) indicated that they used the standards for quality care adherence. Similarly, majority of the participants from Meru hospital 65.5% (n=19) indicated the same reason. Only one participant from Embu hospital and one from Meru hospital indicated that standards made work easier. Most

participants in Embu hospital (82.4%, n=14) and Meru Hospital (83.3%, n=10) indicated that they did not use the standards because they were unavailable.

Table 12: Participants’ Reasons for using or not using Maternal Health QoC Standards

Variable	Category	Embu n (%)	Meru n (%)	Total n (%)
Reason for using maternal health QoC standards	Requirement by the Management	2(7.1)	2(6.9)	4(7.0)
	For standardization of care	9(32.1)	7(24.1)	16(28.0)
	Makes work easier	1(3.6)	1(3.4)	2(3.5)
	Quality care adherence	16(57.1)	19(65.5)	35(61.4)
Reason for not using maternal health QoC standards	Standards not available	14(82.4)	10(83.3)	24(82.8)
	No need	2(11.8)	1(8.3)	3(10.3)
	Time consuming	1(2.2)	1(8.3)	2(2.4)

4.2.1.4.3 Relationship between the Participant's Socio-demographic Characteristics, Knowledge, Attitude and Self-Reported Use of Maternal Health QoC Standards

The findings of socio-demographic characteristics and the use of maternal health quality of care standards were subjected to the Chi-square test and Pearson's correlation analysis to find out whether a significant relationship existed between them. The results indicated that the reported use of maternal health care standards was significantly related to age (Pearson correlation $p=0.045$) and highest level of qualification (Chi square $p=0.045$) of the participant.

The relationship between the participants' knowledge scores of the standards and their reported use of the standards was subjected to a chi-square test. The results indicated that the relationship was not significant (Chi square $p=0.433$; Pearson’s correlation $p=0.439$). A significant relationship existed between support for the use of the standards by the nurse midwives and their reported use (Chi square $p=0.008$; Pearson’s correlation $p=0.008$).

Table 13: Relationship between Participants Socio-demographic Characteristics and Self-Reported Use of Maternal health QoC standards

Variable	Use maternal health QoC standards?		Chi-Square p-Value	Pearson Correlation p -Value
	Yes	No		
Gender				
Male	8	5	0.645	0.65
Female	49	23		
Age(years)				
20-29	22	16	0.255	0.049*
30-39	13	7		
40-49	12	3		
>50	10	2		
Highest Qualification Level				
Certificate	20	0	0.129	0.045*
Diploma	40	15		
Degree and Above	15	13		
Period in Maternity				
<6 Months	12	9	0.207	0.100
6 Months-1 Year	13	9		
>1 Year	32	10		
Length of Practice (Years)				
< 1	10	7	0.559	0.210
1-9	24	14		
10-19	11	4		
20-29	8	1		
>30	4	2		
Knowledge Scores(/10)				
4-6	38	21	0.433*	0.439*
7-10	19	7		
Support the use of maternal health QoC standards				
Yes	54	21	0.008*	0.008*
No	3	7		

*-Significant relationship at 95% CI

4.2.1.5 Barriers to the Use of Maternal Health QoC Standards

The participants were provided with a list of possible barriers to using the maternal health QoC standards for which they were requested to provide a rating of the importance of each on a 3-point scale: important, undecided, and not important. The correlation between the barriers and reported use of the standards was then tested using Chi square and Pearson's correlation tests.

Most participants (95.5%, n=81, 95.5%, n=81, and 83.5%, n=71) respectively rated inadequate resources, lack of maternal health QoC standards and heavy workload as an important barrier. Additionally, most participants (85.5%, n=73) considered inadequate knowledge on the use of the QoC standards an important barrier. Hospital-wise, inadequate resources and lack of QoC standards were rated as important by most participants in Embu (97.8, n=44) and Meru (95.0%, n=38) respectively.

Inadequate resources (p=0.049) and standards are difficulty to use (p=0.036) were significantly correlated to the reported use of the maternal QoC standards though only slightly more than half of the participants (57.7%, n=49) had rated standards are difficult to use as an important barrier. Other barriers were not significantly correlated.

Table 14: Barriers to the Use of Maternal Health QoC Standards

Barrier	Ranking	Embu n (%)	Meru n (%)	Total n (%)	Use of Maternal Health QoC standards	
					Chi Square p value	Pearson's correlation p value
Inadequate Resources	Important	44(97.8)	37(92.5)	81(95.3)	0.189	0.049*
	Undecided	0	1(2.5)	1(1.2)		
	Not Important	1(2.2)	2(5.0)	3(3.5)		
Lack of Maternal health QoC standards	Important	43(95.6)	38(95.0)	81(95.3)	0.343	0.300
	Undecided	0	0	0(0.0)		
	Not Important	2(4.4)	10(5.0)	4(4.7)		
Heavy Workload	Important	37(82.2)	34(85.0)	71(83.5)	0.327	0.908
	Undecided	1(2.2)	2(5.0)	3(3.5)		
	Not Important	7(15.6)	4(10.0)	11(12.9)		
Inadequate Knowledge on the Use of Standards	Important	41(91.1)	32(81.0)	73(85.8)	0.470	0.591
	Undecided	3(6.7)	7(17.5)	10(11.8)		
	Not Important	1(2.2)	1(2.5)	2(2.4)		
Standards are Difficult to Use	Important	19(64.4)	20(50.0)	49(57.7)	0.187	0.036*
	Undecided	5(11.2)	1(17.5)	12(4.1)		
	Not Important	11(24.4)	13(32.5)	24(28.2)		
Lack of Incentives	Important	37(84.1)	23(60.5)	60(70.6)	0.816	0.466
	Undecided	3(6.8)	4(10.0)	7(8.2)		
	Not Important	5(11.1)	13(32.5)	18(21.2)		

*- Significant at 95% CI

4.2.1.5.1 Participants' Awareness of a Policy on the Use of Maternal Health QoC Standards

Participants were asked whether they were aware of a policy requiring nurse-midwives to use maternal QoC standards. Only 32.9% of the participants (n=28) reported awareness. In Embu and Meru hospitals, only 28.9% (n=23) and 37.5% (n=15) of the participants respectively were aware.

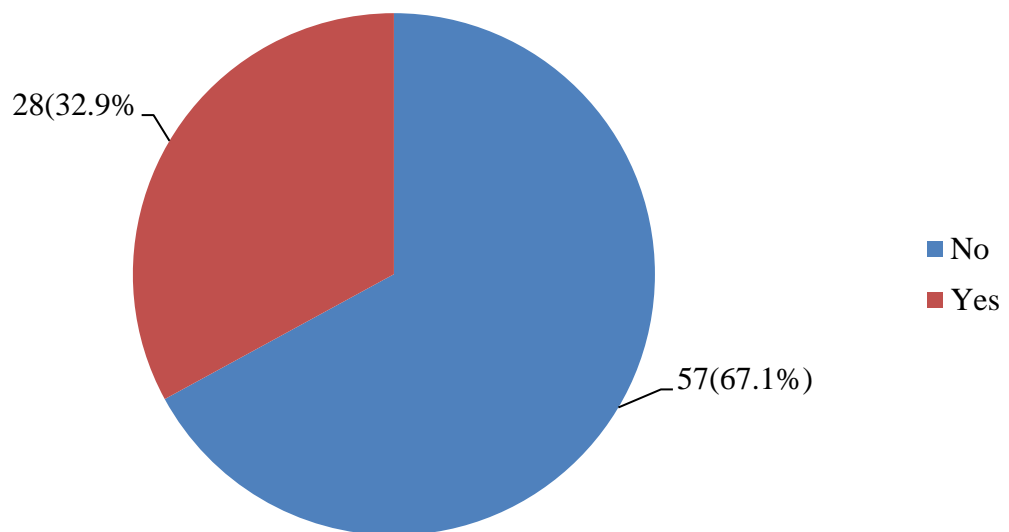


Figure 4: Participants' Awareness of a Policy on the Use of Maternal Health QoC Standards

4.2.1.5.2 Facility Managers' Concern about the Use of Maternal Health QoC Standards

The participants were asked to rate the facility managers' concern about the use of the maternal health QoC standards by the nurse-midwives in care delivery. Most participants in Embu (62.2%, n=28) and Meru hospital (62.5, n=25) rated it as average. Only 28.9% (n=13) and 32.0% (n=13) in Embu and Meru hospitals respectively rated it as high. Only four (8.9%) and two (n=5.0%) of the participants in Embu and Meru hospitals indicated low concern by the managers.

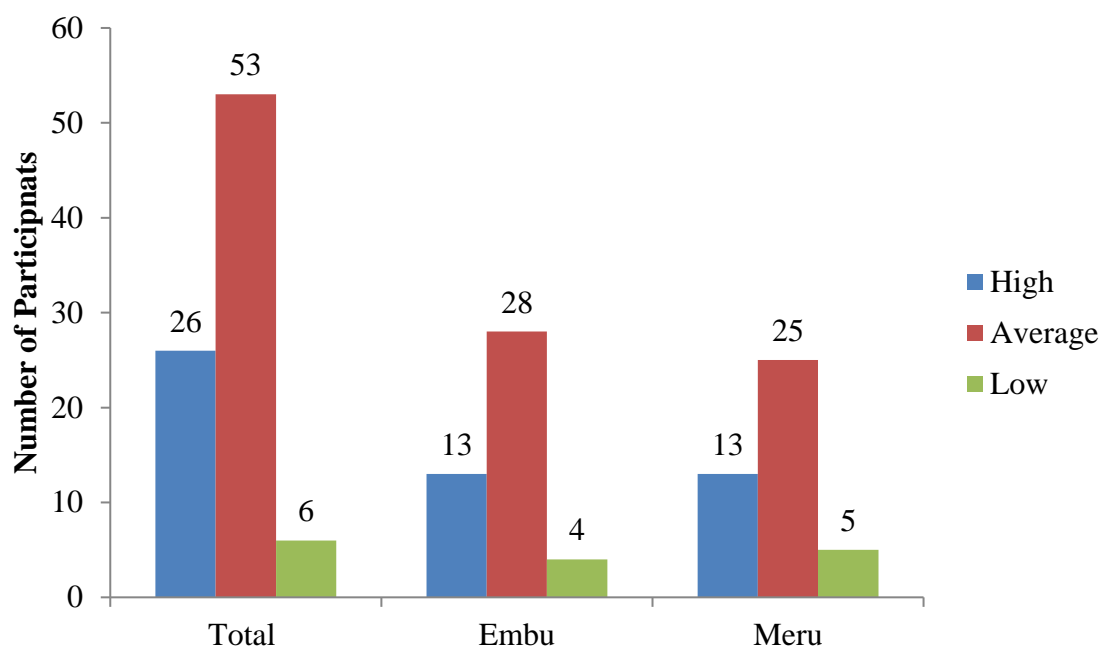


Figure 5: Facility Managers' Concern about the Use of Maternal Health QoC Standards

4.2.2 Findings of the Observed Practice

4.2.2.1 Introduction

The study sought to establish the level of nurse–midwives adherence to the maternal health quality of care standards. This was done through direct observation using a quality assessment tool adapted from "assessment tool for measuring quality using the standard based management –Recognition quality improvement strategy by the Ministry of Health –Tanzania: 2011". This tool was adapted since it captured the contents of the WHO (2016) maternal health quality of care standards. The tool has nineteen performance standards. These performance standards cover four quality statements all relating to quality standard 1: Every woman and newborn receives routine, evidence-based care and management of complications during labor, childbirth and the early postnatal period, according to WHO guidelines (WHO, 2016).

The four quality statements are:

- **Quality statement 1.1a:** Women are assessed routinely on admission and during labor and childbirth and are given timely, appropriate care
- **Quality statement 1.2:** Women with pre-eclampsia or eclampsia promptly receive appropriate interventions, according to WHO guidelines.
- **Quality statement 1.3:** Women with postpartum hemorrhage promptly receive appropriate interventions, according to WHO guideline
- **Quality statement 1.7a:** Women with or at risk for infection during labor, childbirth or the early postnatal period promptly receive appropriate interventions according to WHO guidelines.

Each of the performance standards has verification criteria that were observed. The observer indicated Yes(Y) if the action was undertaken correctly, No (N) if the action was not undertaken or was undertaken incorrectly, and Not Applicable (NA) if the action does not apply. A performance standard was considered achieved if all verification criteria were scored 'Yes' or 'Not applicable'. A standard was considered achieved by the facility if all the nurse-midwives achieved it. This form of scoring is advocated since it eliminates bias (Neocochea *et al.*, 2015).

A total of 51 nurse-midwives were observed. Of these, 52.9% (n=27) and 47.1% (n=24) were from Embu and Meru teaching and referral hospitals, respectively. The scores for all the nurse-midwives were collated to determine if the performance standard was achieved. For the standards not achieved, the gaps were identified.

4.2.2.2 Adherence to Maternal Health QoC Performance Standards

A total of nineteen performance standards were observed out of which only seven (36.8%) were achieved as illustrated in figure 13 below.

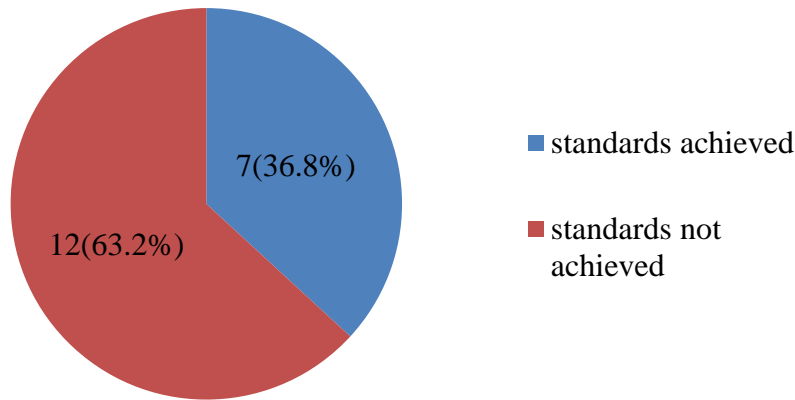


Figure 6: Proportion of Performance Standards Achieved

4.2.3.1. Performance on Quality statement 1.1 a: Women are Assessed Routinely on Admission and during Labor and Childbirth and are given timely, appropriate Care

A total of twelve standards were observed relating to routine assessment and care of mothers on admission, and during labor and childbirth. Out of these, only five standards were achieved, representing 41.7%. There was no difference between the two hospitals.

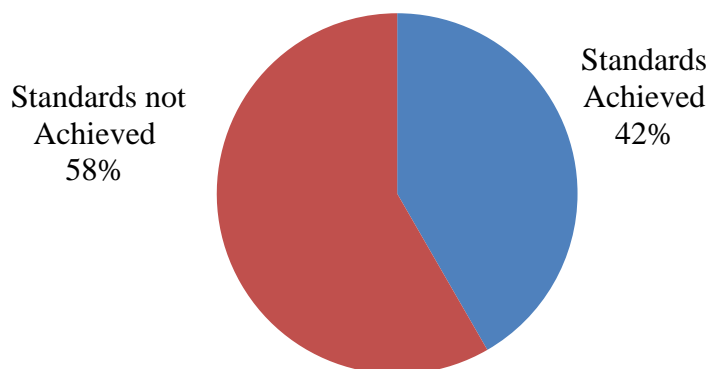


Figure 7: Number of standards achieved on Assessment and care of Mothers on Admission and During Labor

4.2.2.2.1 Performance Standards on Routine assessment of Mothers on Admission and during Labor and Childbirth

Out of the twelve performance standards relating to routine assessment and timely management of mother on admission and during childbirth, five performance standards related to the assessment of mother during labor and childbirth. Each nurse-midwife stationed in the labor and antenatal ward was observed while admitting an expectant mother to evaluate the extent to which the midwife was complying with the requirements of these standards. Out of the five standards observed, two standards were not achieved. These were performance standard 1: General assessment of an expectant mother in labor to identify signs of complications, and performance standard 3: Proper examination of the mother in labor. The other three performance standards were achieved.

Performance standard one was not achieved since none of the nurse midwife asked about the danger signs. Additionally, only 31.0% (n=9) of the participants in Embu and 44.4% (n=12) in Meru hospital, respectively, asked about the signs of imminent delivery.

Performance standard 3 was not achieved since none of the nurse midwives in the two hospitals tested urine for albumin. Additionally, none of the nurse-midwife took pulse rate and temperature.

Table 15: Performance Standards on Routine Assessment of Mothers on Admission and during Labor and Childbirth

Performance Standard	Observation criteria	Embu n (%)	Meru n (%)
1. The nurse-midwife undertakes a general assessment of the expectant mother in labor to identify signs of complications	The nurse midwife: Assesses signs of imminent delivery	9(33.3)	12(50.0)
	Inquires on admission if she has/had any danger signs such as vaginal bleeding, fever, convulsions, severe headache/blurred vision	0(0.0)	0(0.0)
	Takes appropriate action in case of any of the above signs	0(0.0)	0(0.0)
	Score	Not achieved	Not achieved
2. The nurse-midwife properly gathers and correctly documents the clinical history of the mother in labor	The nurse midwife: Asks for clients' biographical and social history	27(100.0)	24(100.0)
	Asks about the menstrual period and calculates expected date of delivery(EDD) and maturity by date	27(100.0)	24(100.0)
	Asks about the woman's obstetric history	27(100.0)	24(100.0)
	Asks the woman about her current labor	27(100.0)	24(100.0)
	Asks about medical and surgical history	27(100.0)	24(100.0)
	Asks whether the mother is allergic to food and/or drugs	27(100.0)	24(100.0)
	Asks if the mother is on medications, including natural and herbal remedies	27(100.0)	24(100.0)
	Checks if the mother has signs and symptoms or a diagnosis of STI, HIV, and TB	27(100.0)	24(100.0)
	Score	Achieved	Achieved
	The nurse midwife: Informs the mother about the procedure and encourages her to ask questions	0(0.0)	0(0.0)
3. The nurse-midwife properly carries out physical examination between contractions	Asks the mother to urinate and tests urine for albumin	0(0.0)	0(0.0)
	Performs hand hygiene	27(100.0)	24(100.0)
	Takes/ delegates vital signs to assistant	0(0.0)	0(0.0)
	Examines the conjunctiva and palms of hands for pallor and, if pale, takes a blood sample for hemoglobin levels	19(70.4)	15(62.5)
	Score	Not achieved	Not achieved

	The nurse midwife:		
	Inspects the abdominal shape and size and also notes the presence of scars and other skin lesions	27(100.0)	24(100.0)
4. The nurse-midwife Properly conducts the obstetric examination	Determines fetal lie and presentation	27(100.0)	24(100.0)
	Assesses the degree of engagement of the fetal head by abdominal palpation	27(100.0)	24(100.0)
	Palpates uterine contractions to determine the number and strength over a 10-minutes	27(100.0)	24(100.0)
	Auscultates fetal heart rate	27(100.0)	24(100.0)
	Documents all the findings in the mother's file and the partograph	27(100.0)	24(100.0)
	Score	Achieved	Achieved
	The nurse midwife:		
	Explains the procedure to the mother	27(100.0)	24(100.00)
	Performs hand hygiene	27(100.0)	24(100.0)
	Puts sterile examination gloves on both hands	27(100.0)	24(100.0)
	sensitively conducts a vaginal examination	27(100.0)	24(100.0)
5. The nurse-midwife properly conducts a vaginal examination	without withdrawing the fingers, the nurse-midwife determines cervical dilation, effacement, position, moulding, and station of the presenting part	27(100.0)	24(100.0)
	Washes hands after removing gloves	27(100.0)	24(100.0)
	Explains the findings to the mother and their meaning	27(100.0)	24(100.0)
	Records the findings of the vaginal examination on the mother's file and partograph	27(100.0)	24(100.0)
	Score	Achieved	achieved

4.2.2.2.2 Performance Standards on Proper Planning and Implementation of Appropriate Care during Labor and Delivery based on the findings of the Examination

Out of the twelve performance standards observed relating to routine assessment and timely management of mother on admission and during childbirth, four relate to proper planning and implementation of care during labor and delivery based on the findings of the assessment. All the four standards were observed and only performance standard 9: Active management of third stage was achieved. The other three Performance standards were not achieved.

Performance standard 6 was not achieved in Embu because only 18.5% (n=5) and 25.9% (n=7) of the nurse-midwives requested the mother to take glucose and light meals and empty bladder regularly respectively. The performance in Meru was almost similar (37.5%, n=9 and 20.8%, n=5) on the same indicators. Similarly, performance standard 7 was not achieved because none of the nurse midwives in the two hospitals assessed the blood pressure or temperature 4 hourly; neither observed and recorded contractions and fetal hearts half hourly as required. Additionally, none of the nurse-midwives recorded the input and output.

Performance standard 8 was not achieved since the nurse-midwives did not auscultate the fetal heart every 5 minutes. Similarly, gowns and sterile towels for use by the midwives were missing, and sterile cotton balls were not available.

Table 16: Performance Standards on Proper Planning and Implementation of Appropriate Care during Labor and Delivery based on the findings of the Examination

Performance Standard	Observation Criteria	Embu n (%)	Meru n (%)
6. The nurse-midwife properly plans and implements appropriate care during labor based on the history and physical examination findings assists the mother in	The nurse-midwife explains the importance of:		
	Emptying her bladder regularly.	7(25.9)	5(20.8)
	Taking liquids and light foods whenever she wants	5(18.5)	9(37.5)
	Ambulating freely and regularly changing positions according to her desire and comfort	27(100.0)	24(100.0)
	<i>score</i>	<i>Not achieved</i>	<i>Not achieved</i>
7. The nurse midwife uses the partograph to monitor labor and make adjustments to care	The nurse Midwife:		
	Records patient information on partograph	27(100.0)	24(100.0)
	Assesses and documents temperature and blood pressure every 4 hours	0(0.0)	0(0.0)
	Records required partograph information every half hour	0(0.0)	0(0.0)
	Assesses and documents in the partograph vaginal examination every 4 hours or less according to labor progress	0(0.0)	0(0.0)
	Records input and output	0(0.0)	0(0.0)
	Identifies complications, records the diagnosis, and modifies the care in line with the diagnosis if the findings are abnormal	27(100.0)	24(100.0)
	<i>Score</i>	<i>Not achieved</i>	<i>Not achieved</i>
8. The nurse-midwife assists the mother in having a clean and safe delivery	The nurse-midwife as she assists a woman in labor:		
	Auscultate or requests the assistant to auscultate the fetal heart every 5 min as the second stage progresses	0(0.0)	0(0.0)
	Puts on personal protective equipment	0(0.0)	0(0.0)
	Cleans hands with soap and running water and dries them with a sterile	0(0.0)	0(0.0)

		towel or applies alcohol-based hand sanitizer		
		Puts on two pairs of sterile gloves	27(100.0)	24(100.0)
		Cleanses the perineum using sterile cotton balls and an antiseptic solution	0(0.0)	0(0.0)
		Encourages the mother to bear down when she feels the desire during contractions and rest in between contractions	27(100.0)	24(100.0)
		Performs an episiotomy only if necessary	27(100.0)	24(100.0)
		Allows spontaneous crowning of the head while supporting the perineum	27(100.0)	24(100.0)
		After the emergence of the head, the nurse-midwife requests the mother to avoid bearing down and encourages her to breathe with her mouth	27(100.0)	24(100.0)
		Cleanses the mouth and nose of the baby using a sterile gauze	27(100.0)	24(100.0)
		Assists in delivering the baby	27(100.0)	24(100.0)
		Score	Not Achieved	Not achieved
9.	The nurse midwife correctly carries out active management of the third stage of labor	The nurse midwife: palpates the mother's abdomen to determine the possibility of a second twin(without stimulating a contraction) informs the mother that she will be given oxytocin administers or instructs the assistant to administer on the thigh 10 IC of oxytocin within 1 minute of birth performs controlled cord traction after the placenta is delivered, massages the uterus with one hand on a clean/sterile cloth over the abdomen while expelling the clots until the uterus contracts firmly examines the placenta and membranes to check are complete Estimates the blood loss; and takes immediate action if the blood loss affects the woman's condition	27(100.0) 27(100.0) 27(100.0) 27(100.0) 27(100.0) 27(100.0)	24(100.0) 24(100.0) 24(100.0) 24(100.0) 24(100.0) 24(100.0)
		Score	Achieved	Achieved

4.2.2.2.3 Performance Standard on Provision of Immediate Postpartum Care

Out of the twelve performance standards observed relating to routine assessment and timely management of mother on admission and during childbirth, one standard related to the provision of immediate post-partum care. The standard was not achieved since neither of the nurse midwives used an antiseptic while examining the birth canal for lacerations or tears or offered a sanitary pad to the mother.

Table 17: Performance Standard on Provision of Immediate Postpartum Care

Performance Standard	Observation Criteria	Embu n (%)	Meru n (%)	
10. The nurse-midwife adequately performs immediate postpartum care	The nurse midwife: Notifies the mother that she wants to examine the birth, canal, and cervix and then carefully and gently examines the vagina and perineum for any tears and /or lacerations.	27(100.0)	24(100.0)	
	Gently cleanses the vulva and the perineum with sterile gauze and an antiseptic solution.	0(00.0)	0(00.0)	
	Sutures tears, if necessary	27(100.0)	24(100.0)	
	Palpates the abdomen to determine if the uterus is well contracted, and if not, massages the fundus	27(100.0)	24(100.0)	
	Applies a clean sanitary pad on the perineum.	0(0.0)	0(0.0)	
	Ensures that the mother is clean, hydrated, and warmly covered.	27(100.0)	24(100.0)	
	Covers the baby adequately and gives the baby to the mother, and requests her to initiate breastfeeding within an hour of birth	27(100.0)	24(100.0)	
	Registers findings and events in the clinical record	27(100.0)	24(100.0)	
	Score		Not Achieved	Not Achieved

4.2.2.2.4 Performance Standard on Proper Clearance of Instruments and Disposal of Medical Wastes

Out of the twelve performance standards observed relating to routine assessment and timely management of mother on admission and during childbirth, one standard related to proper clearance of instruments and disposal of medical wastes after delivery. As shown in table 18 below, all the nurse-midwives observed in both hospitals disposed of the placenta appropriately. The standard was not achieved in either of the hospital. This is because a number of nurse midwives in the two hospitals did not dispose- off medical waste in the appropriate color-coded plastic bins. Similarly, only 44.4% (=12) and 58.3% (n=14) of the nurse midwives in Embu and Meru respectively placed the linen in the right container and ensured they were fully immersed. None opened the hinged instruments, and timed the decontamination process for 10 minutes.

Table 18: Performance Standard on Proper Clearance of Instruments and Disposal of Medical Wastes

Performance Standard	Observation Criteria	Embu	Meru
		n (%)	n (%)
11. The nurse midwife properly clears the used instruments and disposes of medical waste appropriately.	The nurse midwife: Uses appropriate gloves while clearing used instruments and disposing of waste.	27(100.0)	24(100.0)
	Disposes of the placenta in a leak-proof red-colored container with a red-colored plastic liner	27(100.0)	24(100.0)
	Discards medical waste in appropriate color-coded plastic bins with similar color-coded plastic bin liners.	19(70.4)	19(79.2)
	Places the used linen in a plastic container containing 0.5% chlorine solution, ensuring they are fully immersed.	12(44.4)	14(58.3)
	Opens up all hinged instruments and puts them in a plastic container with 0.5% chlorine solution for 10 minutes	0.00	0.00
	Puts used needles and syringes in a tamper-proof container /safety box.	27(100.0)	24(100.0)
	Cleans all the surfaces using 0.5% chlorine solution	27(100.0)	24(100.0)
	Removes the gloves and discards, then put them in a bin with a yellow colored plastic bin liner	27(100.0)	24(100.0)
	Performs hand hygiene after removing gloves	27(100.0)	24(100.0)
	Score	Not Achieved	Not Achieved

4.2.2.2.5 Performance standard on Close Monitoring of Mother for At-least two Hours after Delivery

This standard requires the nurse-midwife retains the mother in the labor/delivery room or transfer her to the post-natal ward. Specific parameters such as vital signs, uterine tone, per vaginal bleeding, and urinary bladder distention are checked during the first two hours. The

nurse-midwives carried out interventions as per the requirements of this standard; hence the standard was achieved.

Table 19: Performance Standard on Close Monitoring of Mother for At least two Hours after Delivery

Performance Standard	Observation criteria	Embu n (%)	Meru n (%)
12. The nurse midwife closely monitors the mother for at least two hours after delivery	The nurse midwife: Retains the mother in the labor ward/delivery room or transfers her to the postnatal ward and ensures that her vital signs and bleeding is checked two hourly	27(100.0)	24(100.0)
	Assesses in the mother every quarter-hourly in the first hour specific parameters including Uterine tone, per vaginal bleeding, Bladder distension, Blood pressure, and Pulse rate	27(100.0)	24(100.0)
	Checks specific parameters in the mother half hourly in the second hour	27(100.0)	24(100.0)
	Asks the woman if she has passed urine within the two hours after delivery and encourages her to do so whenever she wishes	27(100.0)	24(100.0)
	Score	Achieved	Achieved

4.2.2.2.6 Performance on Quality Statement 1.2: WOMEN with Pre-Eclampsia or Eclampsia Promptly Receive Appropriate Interventions, According to WHO Guidelines

A total of two standards were assessed relating to the management of mothers with pre-eclampsia or eclampsia. Where a case could not be observed, patient records were checked. If there were no records, the nurse–midwife was asked to explain the management. None of the standards was achieved in the two hospitals.

In the two hospitals there were charts providing basic information about the management of pre-eclampsia and eclampsia. Only about half of the participants in both hospitals indicated when magnesium sulfate should be commenced. Less than half of the participants in Embu

(37.0%, n=10) and Meru (33.3%, n=8) would correctly administer magnesium sulfate loading and maintenance dose.

On the follow-up management of women with pre-eclampsia/ eclampsia (Performance standard 14), less than half of the participants in Embu (22.2%, n=6) and Meru (33.3%, n=8) indicated the action to be taken if the urine output was less than 25ml/hour. Additionally, only 22.2% (n=6) of the participants in Embu hospital and 20.8% (n=5) in Meru indicated the correct management of pulmonary edema.

Table 20: Performance Standards on the Prompt Management of Women with Pre-Eclampsia According to WHO Guidelines

Performance Standard	Observation Criteria	Embu n (%)	Meru n (%)	
1. The Midwife correctly manages severe pre-eclampsia and /eclampsia according to WHO guidelines	The nurse midwife: Check if there is chart or any other document with basic information that helps nurses/midwives diagnose severe pre-eclampsia and/or eclampsia	27(100.0)	24(100.)	
	There is a record that treatment with magnesium sulfate was immediately commenced If BP is >160/110 mmHg or more, or in cases of eclampsia	16(59.3)	14(58.3)	
	IV line was established and saline or Ringer’s lactate solution infused	20(74.1)	21(87.5)	
	An anti-hypertensive was administered if the BP is >160/110 mmHg or more.	18(66.7)	13(54.2)	
	Correctly administers the initial dosing of magnesium sulfate	10(37.0)	8(33.3)	
	Correctly administers the maintenance dose of magnesium sulfate	10(37.0)	8(33.3)	
	Score		Not Achieved	Not Achieved
	The nurse midwife: Signs of magnesium sulfate toxicity are assessed and documented hourly until the patient improves	15(55.6)	13(54.2)	
	Administration of magnesium sulfate is stopped in case the respirations are less than 16/minute, patellar reflexes absent, or urinary output is less than 25 ml/hour	15(55.6)	12(50.0)	
	If urine output is less than 25 ml/hour, one litre of IV fluids is infused in eight hours and signs of pulmonary edema monitored.	6(22.2)	8(33.3)	
2. The midwife provides follow-up care to mothers with severe pre-eclampsia or eclampsia	In the event of respiratory arrest, appropriate procedures were performed	9(33.3)	11(45.8)	
	A single dose of furosemide 40mg IV was given to manage pulmonary edema if it developed.	6(22.2)	5(20.8)	
	Score	Not Achieved	Not Achieved	

4.2.2.2.7 Performance on Quality Statement 1.3: Women with Postpartum Hemorrhage Promptly Receive Appropriate Interventions According to WHO Guidelines

This quality statement has four standards. These standards focus on the general and specific management of postpartum hemorrhage, follow-up care, and management of secondary postpartum hemorrhage. Only two standards were achieved in the two hospitals. These were performance standard 2: Specific management of women with PPH, and performance standard 4: management of women with secondary PPH.

Performance standard 1 was not achieved because none indicated that they would elevate feet higher than the heart or administer oxygen to a mother with postpartum hemorrhage. Additionally, only 88.9% (n=24) and 87.5% (n=21) of the participants in Embu and Meru hospital respectively, indicated that they would establish two intravenous lines.

Standard 4 was not achieved in either of the hospital. This is because only nine participants from Embu Hospital (33.3%) and eleven from Meru hospital (45.8%) indicated that they would measure intake and output. In addition, only three participants from Embu hospital (11.1%) and five from Meru hospital (20.8%) indicated they would carry out clotting studies and manage coagulopathy if bleeding persisted. However, most of the participants in Embu hospital (85.2%, n=23) and Meru hospital (87.5%, n=21) indicated that they would take blood for hemoglobin 24 hours after the bleeding had stopped.

Table 21: Performance Standards on Prompt Management of Women with Post- Partum Hemorrhage

Standard	Criteria	Embu n (%)	Meru n (%)
1. The nurse midwife promptly carries out general interventions to manage postpartum hemorrhage	The nurse midwife: Checks for and appropriate documents signs of PPH	27(100.0)	24(100.0)
	Takes and records vital signs immediately	27(100.0)	24(100.0)
	Seeks assistance if shock develops or is suspected.	27(100.0)	24(100.0)
	Administers 10 IU of oxytocin intramuscularly and massages the uterus until it is well contracted.	27(100.0)	24(100.0)
	Covers the woman and elevates feet higher than the heart	0(0.0)	0(0.0)
	Starts oxygen at 6–8 liters/minute	0(0.0)	0(0.0)
	Establishes two IV lines	24(88.9)	21(87.5)
	Collects a blood specimen for hemoglobin level grouping and cross-matching and clotting studies	27(100.0)	24(100.0)
	Score	Not Achieved	Not achieved
	2. The nurse-midwife carries out specific interventions to manage the cause of PPH.	The nurse midwife: Identifies the cause of bleeding and immediately commences specific interventions depending on the cause.	27(100.0)
Uses appropriate interventions such as manual removal to stop bleeding if it is due to retained placenta or placental fragments		27(100.0)	24(100.0)
Uses appropriate interventions such as massaging the uterus and administering oxytocin to manage bleeding if it is due to uterine atony.		27(100.0)	24(100.0)
Uses appropriate procedure such as packing or suturing to stop bleeding if it is due to perineal or cervical tears		27(100.0)	24(100.0)
Score		Achieved	Achieved
3. The Nurse-midwife carries out follow-up care for a woman with PPH	The nurse midwife: Assesses uterine contraction, blood pressure and pulse as well as bleeding quarterly during the	27(100.0)	24(100.0)

	first two hours then half hourly for four hours		
	Measures intake and output hourly	9(33.3)	11(45.8)
	Replaces volume and transfuses if necessary	27(100.0)	24(100.0)
	Performs clotting test if hemorrhage persists and manages coagulopathy as appropriate	3(11.1)	5(20.8)
	Takes blood sample for measurement hemoglobin 24 hours after bleeding is stopped	23(85.2)	21(87.5)
	Prescribes 120 mg of iron sulfate and 400 mcg of folic acid orally three months if hemoglobin is less than 8.5g/dl,	27(100.0)	27(100.0)
	Score	Not achieved	Not achieved
4. The nurse-midwife correctly manages secondary PPH	The nurse midwife: Establishes a line and commences IV infusion of 0.9% Sodium Chloride or Ringers lactate or a Plasma Expanders if the mother has signs of shock	27(100.0)	24(100.0)
	Conducts catheterization procedure	27(100.0)	24(100.0)
	Check the presence of and remove any retained placenta, placental fragments, and/ or membrane and massages the uterus	27(100.0)	24(100.0)
	Check for pack or suture cervical, vaginal, and /or perineal tears.	27(100.0)	24(100.0)
	Measures blood pressure and pulse rate quarter-hourly and temperature four hourly.	27(100.0)	24(100.0)
	Administers broad-spectrum antibiotics in case infection is present.	27(100.0)	24(100.0)
	Collects a blood specimen for hemoglobin estimation. If HB <8.5g/dl, gives Ferrous sulfate 200mg orally for one month, then review, and if < 5g/dl, transfuses whole blood	27(100.0)	24(100.0)
	Score	Achieved	Achieved

4.2.2.2.8 Performance on Quality Statement 1.7a: Women with or at Risk for Infection during Labor, Childbirth or the Early Postnatal Period Promptly Receive Appropriate Interventions according to WHO Guidelines.

This quality statement has one performance standard detailing the interventions required to be carried out in case the woman is at risk of or has an infection during labor, childbirth, or the early postnatal period. The standard was not achieved because few nurse midwives in Embu Hospital (18.5%, n=5) and Meru Hospital (20.8%, n=5) could identify the clinical criteria for diagnosing puerperal sepsis. In addition, only 74.1% (n=20) of participants in Embu Hospital and 83.3% (n=20) in Meru Hospital indicated that they would monitor fluid balance. None of the participants indicated that they would isolate the patient and nurse the patient in an upright position. Furthermore, only 55.6% (n=15) and 54.2% (n=13) of the participants from Embu and Meru hospitals, respectively, indicated the correct antibiotic and dosage.

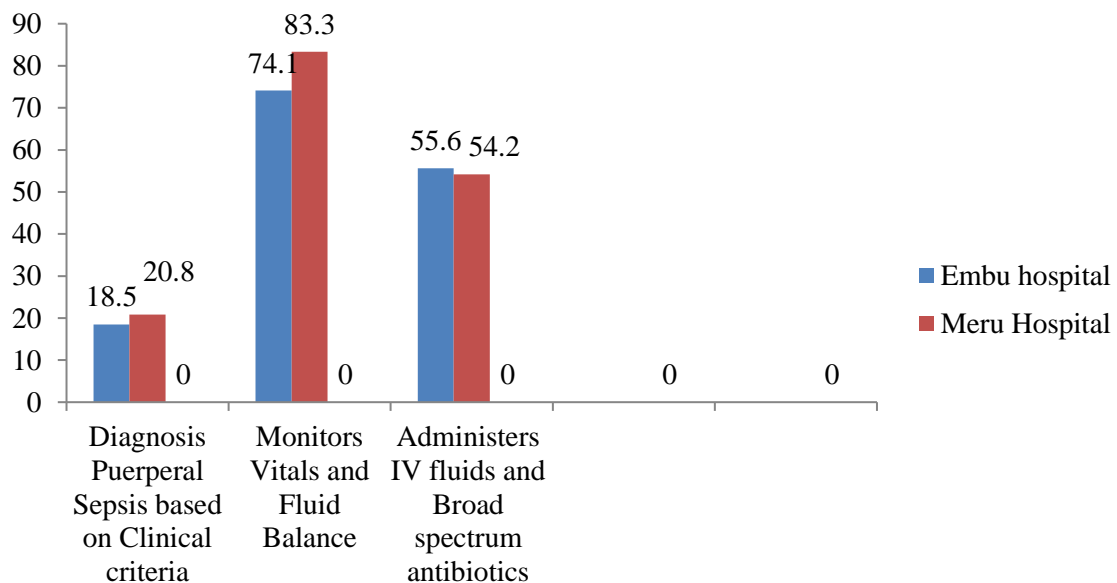


Figure 8: Performance Standard on the Management of Puerperal Sepsis

4.2.3. Qualitative Outcomes of Focused Group Discussion

4.2.3.1. Introduction

Four focus group discussions (FGDs), two for each hospital, were conducted. At this point content saturation had been reached hence there was no need for more group discussions. The

purpose of the FGDs was to clarify and corroborate the information gotten from the questionnaires and observations. To ensure homogeneity, all the participants were nurse-midwife in-charges of the wards and departments in the maternity unit. Most participants in the FGDs (87.5%, n=21) were female and majority (75.0%, n=18) were aged between 40-49 years. Majority of the participants (83.3%, n=20) were diploma holders. Majority (79.2%, n=19) had practiced for between 20-29 years and most (87.5%, n=21) had been in the maternity unit for more than one year.

Table 22: Socio-demographic Characteristics of Focus Group Discussion Participants

Variable	Category	Frequency	Percent
Gender	Male	3	12.5
	Female	21	87.5
Age	30 – 39 years	2	8.3
	40 – 49 years	18	75.0
	50 years and above	4	16.7
Marital Status	Never married	2	8.3
	Married	22	91.7
Highest qualification	Academic Diploma	20	83.3
	Degree and above	4	16.7
Length of practice	10 - 19 years	5	20.8
	20 - 29 years	19	79.2
Period in maternity	6-12 months	4	2.5
	>12 months	21	87.5

4.2.3.2. Themes and Sub- themes

Qualitative data was analysed thematically using Braun & Clarke (2006) framework. Two main themes emerged from the focus group discussion: Burden of maternal mortality and quality of maternal care. The subthemes under the maternal mortality include the causes of maternal mortality. Under the quality of maternal care among the subthemes are the barriers to the provision of quality maternal care.

Table 23: Themes and Sub-themes

Individual quotes	Codes	Subthemes	Theme
<i>“This year alone since January, we have had about nine maternal deaths” P₁, FGD₁</i>	Maternal mortality is a health care burden	Burden of maternal mortality	Maternal mortality
<i>“I would say that mainly they(maternal deaths) occur due to bleeding immediately after delivery”P₂, FGD₃</i>	Postpartum hemorrhage is a major cause of maternal deaths	Causes of maternal mortality	
<i>“Some of these referrals come (to the health facility) when they have lost a lot of blood”P₅, FGD₂</i>	Late referral contributing to maternal deaths		
<i>“I would say that the two reasons why mothers are dying in this facility are due to either severe bleeding or severe hypertension”P₂, FGD₁</i>	Pre-eclampsia is a cause of maternal deaths		
<i>“We wouldn’t say that we have much puerperal sepsis” P₃,FGD₂</i>	Puerperal sepsis is not a major problem		
<i>“Sometimes our mothers are dying unnecessarily mainly due to delays”P₆, FGD₄</i>	Delay in care delivery	Sub-optimal quality of maternal care	Quality of maternal health care
<i>Even the drugs we are supposed to have to combat emergencies like tranexamic acid and misoprostol. Most of the times are out of stock”P₆, FGD₄</i>	Lack of/inadequate supplies	Barriers to the provision of quality maternal care	
<i>“In my ward (Antenatal ward) we are only two midwives who are trained on EmOC. All the others are new nurses who have been relocated from other areas and are not trained”P₁, FGD₁</i>	Lack of training		
<i>“Since I reported to this department, I have never seen a copy of the standards though I know it could be somewhere... I need to look for it” P₄, FGD₂</i>	Quality of care standards not available		
<i>Only one midwife reports per shift and sometimes you don’t even have that one.P₅,FGD₃</i>	Inadequate staffing		
<i>“The county health management team rarely comes around for support supervision...they only come when a complaint has been raised about the nurses” P₁, FGD₄</i>	Ineffective support supervision		

4.2.3.3. Burden of Maternal Mortality

One of the themes that emanated from the discussion was maternal mortality was a health problem in the facilities concerned. The participants reported that most maternal deaths were still occurring:

“This year alone since January, we have had about nine maternal deaths”-Participant 1,

Focus group 1

“Actually maternal deaths are still occurring in our facilities”- Participant 2, focus group 3

4.2.3.4. Causes of Maternal Mortality

A sub-theme under the burden of maternal mortality that emanated from the discussion was the causes of maternal mortality. The participants said that most maternal deaths occur due to obstetric emergencies mainly postpartum hemorrhage and pre-eclampsia. However, unlike other areas, puerperal sepsis was not a major issue of concern in the maternity unit.

4.2.3.4.1. Postpartum Hemorrhage

Participants talked about postpartum hemorrhage as the leading cause of maternal mortality in their hospitals. They further expressed that most of these maternal deaths occur mainly within 24 hours of delivery. As reported by the participants,

“This year alone since January, we have had about nine maternal deaths. Most of these deaths occurred due to postpartum hemorrhage (PPH)”. Participant 1, focus group 1

“Actually maternal deaths are still occurring in our facilities. I would say that mainly they occur due to bleeding immediately after delivery. Some of those I have seen are due to cervical rupture and the doctor is not immediately available so the mothers ended up bleeding to death”.

Participant 2, focus group 3

A number of the mothers who died were referrals from other facilities as stated by one participant:

“We receive referrals from the health centers around. Some of these referrals come (to the health facility) when they have lost a lot of blood. Before we intervene they die”. Participant 5, focus group 2

4.2.3.4.2. Pre-eclampsia and Eclampsia

Participants said that pre-eclampsia is also a condition contributing to maternal deaths in the hospital.

“I have seen mothers die. The one I saw had uncontrollable blood pressure. We tried everything but we still lost her”. Participant 2, focus group 4

“I would say that the two reasons why mothers are dying in this facility are due to either severe bleeding or severe hypertension”. Participant 5, focus group 1

4.2.3.4.3. Puerperal Sepsis

Participants stated that puerperal sepsis is not a major health concern especially in labour and delivery. It was only a concern in the gynaecologic ward.

“We wouldn’t say that we have much puerperal sepsis. In our case, sepsis is not puerperal but due to abortions and most of these patients come with sepsis from home”. Participant 3, focus group 2

“If there are cases of puerperal sepsis, I have not encountered them in this ward. Maybe in ward four (Gynecological ward)”. Participant 5, focus group 1

4.2.3.5. Quality of Obstetric Care

Participants said that the quality of obstetric care offered to mothers, especially during labor and delivery, was sub-optimal. This state has resulted in a decline in the number of mothers delivering in the hospital and has also contributed to maternal deaths, which could have been avoided:

“We are concerned about the quality of care provided. We get mothers with high blood pressure who end up with placenta abruption for example. Due to delayed interventions, these mothers end up with bleeding and may eventually die”. Participant1, focus group 2.

“Sometimes our mothers are dying unnecessarily mainly due to delays. We only have one operating theatre. If we have two mothers with emergencies.....what can we do? One has to wait as we pray for the best”. Participant 6, focus group 4

“The quality of maternal care here (in the hospital) is wanting ...things are getting worse by the day. As you can see very few mothers are coming now to our facility because they know that there are no resources”. Participant 3, focus group 1.

4.2.3.6 Barriers to the Provision of Quality Maternal Health Care

There was a consensus among the participants that there are major barriers that are hindering nurse-midwives from providing quality obstetric care. These ranged from inadequate supplies to inadequate support supervision.

4.2.3.6.1 Inadequate Supplies

Maternal care, especially during labor and delivery, requires essential supplies. These supplies are required for the assessment of the mother, assisting the mother during the delivery as well as in managing obstetric emergencies that may arise. However, as vented by the participants in

the FGDs, the two facilities face a severe shortage of equipment, drugs and fluids essential to preventing and managing obstetric emergencies. This is captured by the participants' statements below:

"Even the drugs we are supposed to have to combat emergencies like tranexamic acid and misoprostol. Most of the times are out of stock". Participant 2, focus group 2

"There was a time like three weeks... there was no normal saline. There was only Ringer's lactate...I don't know how we would have managed if a mother developed postpartum hemorrhage". Participant6, focus group1

Likewise, the participants said that shortage of non-drug materials was also a challenge. These include equipment and non- pharmaceuticals. They vented that the nurse-midwives are forced to improvise many a times and where improvisation is not possible, then the nurse-midwife foregoes the activity altogether. As reported by the participants:

"The patient could come bleeding but you have no gloves to assist, sometimes we miss (lack) cotton wool, we miss gauze (pause)..... sanitary pads, that is history in this hospital".

Participant 2, Focus group1

"The last time I saw a complete delivery pack was when students undertook (practical) assessment (in the labor ward). They come with theirs (delivery packs) from college since ours are not "complete." After Assessment they carry them away". Participant 5, Focus group 2

"Sometimes you do a caesarian section and you don't have strapping to dress the wound. You press the gauze but ... sometimes you end up using the masking tape that is used in CSSD (Central Sterile Supply Department)". Participant 2, focus group2

This challenge is attributable to procurement challenges since Kenya's devolution of health services. The participants asserted that the resources allocated are inadequate since the county administration took over the health services management. The participants reported that:

“After devolution ... (Shaking the head) This hospital was better before devolution than the way it is now... now it is worsening. The hospital is critically underfunded”-participant 1, focus group 1

“It was better when the hospital was retaining 75% of cost sharing money. Now everything goes to the county in a common pool...when we ask for supplies we are told “hakuna pesa” (No money) so we have to do with what we have”. Participant 4, Focus group 3

4.2.3.6.2 Inadequate Knowledge and Skills

Quality maternal health care requires healthcare providers to have the requisite knowledge and skills to attend to mothers, especially during obstetric emergencies, which helps improve maternal outcomes. However, the participants of the FGD broached that only a handful of nurse-midwives deployed in the maternity unit are trained in emergency obstetric care (EmOC). As expressed by the participants.

“In my ward (Antenatal ward) we are only two midwives who are trained on EmOC. All the others are new nurses who have been relocated from other areas and are not trained”.

Participant 1, focus group 1

“In the labor ward, we have very new nurses (midwives) who have come with UHC (universal health care) contracts. If there are midwives who are trained here (in the ward), they could be five”. Participant 4, focus group 1

According to the participants, this lack of knowledge is attributable to inadequate funding for training activities in the hospital. In most cases, the training has been left to donors. They further

stated that situation is worsened by the frequent deployment of already trained nurse-midwives away from the maternity unit to other units. This is captured by the participants' sentiments:

"Most of the midwives who were trained in BEmOC (Basic emergency obstetric care) were relocated to other areas (departments). At one time we had virtually all midwives in the labor ward and antenatal ward trained. But then there was a change- over that removed almost all of them". Participant1, focus group 3

"I conducted the last (EmOC) training like two years ago with the funding from Liverpool School of Medicine. Since then no other training has happened and yet we have received new nurses (midwives". Participant 6, focus group 2

4.2.3.6.3 Lack of Maternal Health QoC Standards

This is one of the other barriers that came out strongly during the group discussion. The participants stated that maternal health quality of care standards are non- existence in the health facilities. As such the staff may not be aware of the current recommended practice. As shared by the participants:

"We used to have copies of standards a long time ago...I think by JHPIEGO... I don't know where they went. Currently, we have none". Participant 3, focus group 1

"Since I reported to this department, I have never seen a copy of the standards though I know it could be somewhere... I need to look for it". Participant 4, focus group 2

4.2.3.6.4 Inadequate Staffing

Adequate staff with requisite skill is a requirement for delivery of quality maternal health care. However, from the discussion, it was clear that there was a severe shortage of nurse-midwives

which has resulted in a heavy workload for the available nurse-midwives. As a result, it has become increasingly difficult for nurse–midwives to carry out all the activities outlined in the maternal health quality of care standards. This is captured by the sentiments of the participants as follows:

“Shortage of staff is critical. Only one midwife reports per shift and sometimes you don’t even have that one. You end up either calling someone who is off-duty or that one nurse covers the whole day... you don’t tell me that one nurse can provide standard[quality] care!”. Participant 5, focus group 3

“Thank God we have students. They are the ones who help us. When they go on leave we are so stretched that we only carryout critical tasks only”. Participant 6, Focus group 1

The participants attributed the shortage of nurse midwives to natural attrition coupled with a moratorium on employment by the county government. They also indicated that many nurses have also relocated to western countries in search of greener pastures without replacement. As reported:

“Nurses have been retiring. Others have relocated to Canada, the United Kingdom, and the United States of America. These nurses have not been replaced. The only new nurses we have received are those from UHC (Universal Health Care)”. Participant 3, focus group 1

“Since last year three of my colleague nurses have relocated. Two have gone to the United Kingdom and one to Canada. Other two are waiting to sit for NCLEX (National council licensure exam) which will enable them go to United States (of America)”. Participant 5, focus group 3.

“The last time our county government employed was in 2018... and actually those nurses were employed on contract... since then so many nurses have retired. At the same time new departments have been opened spreading out the few nurses”. Participant 6, Focus group 1

4.2.3.6.5 Inadequate Support Supervision

The County health and the hospital management teams oversee the overall implementation of quality of care standards. This is through regular support supervision. However, from the discussion, the management is not concerned about the quality of care provided. As one participant shared:

“The current county government... all they consider important is that we are here (in the hospital) so (that) when patients come they find the clinician is there. They are not concerned about what happens when the patient reaches the provider; whether they get drugs, or whether they get investigations. Nobody cares. So long as the hospital is not closed they are not worried”. Participant 1, focus group 1

According to the participants in the discussion, the management rarely carries out support supervision. Mainly this is because they are aware that there are challenges the nurse midwives are facing for which they have no solutions since the action required is beyond their scope.

“The hospital management fears coming to the wards. When they come and find we have challenges, we expect them to address them. When they come to us without addressing the challenges...they fear we will see them as inadequate”. Participant 5, focus group 2

“...The county health management team rarely comes around for support supervision...they only come when a complaint has been raised about the nurses”. Participant 1, Focus group 4

4.3 Phase Two (Intervention): Training

4.3.1 Introduction

Two trainings were conducted involving 43 participants. Two participants out of the 45 sampled did not participate in the training because they were on leave during the training period. The participants were divided into two groups of twenty-one and twenty-two each. During the

training each participant took a pre-and post- test to gauge the knowledge acquisition during the training. At the end of the training, each participant also filled a course evaluation questionnaire to evaluate the learning experience.

4.3.2 Training Pre-test and Post Test Results

All the 43 participants sat for a pre-test and a post-test at the beginning and the end of the training session respectively. The two tests were similar. In the pre-test, the mean score was 49.53(SD±9.75). The score ranged from 35-70% with most of the participants (20.9%, n=9) scoring 40%. In the post test, the mean score of the participants was 93.14(SD± 6.27). The score ranged from 80-100% with most participants (32.6%, n=14) scoring 100%.

Table 24: Training Pre-test and Post test Scores

Variable	Percentage Score	Pre-test N (%)	Post test N (%)
Test scores	30-45	20(46.5)	0(0.0)
	50-65	21(48.8)	0(0.0)
	70-85	2(4.7)	8(18.6)
	90-100	0(0.0)	35(81.4)

4.3.3 Evaluation of Learning Experience

The participants were required to rate the training overall on a five-point scale: very good, good, neutral, poor and very poor. They were also required to rate eight other items on a five-point rating scale: strongly agree, agree, neutral, disagree and strongly disagree. Most participants (86.0%, n=37) indicated that the training was very good. Majority (90.7, n=39) strongly agreed that the training met their expectations, the training objectives were met, and the trainers were knowledgeable. Less than half of the participants (25.6%, n=11 and 46.5%, n=20) strongly

agreed that the time allocated for the training was adequate and the training venue was conducive for learning respectively.

Table 25: Evaluation of Learning Experience

Variable	Rating	Frequency n (%)
Overall rating of the training	Very good	37(86.0)
	Good	6(14.0)
The training met my expectations	Strongly agree	39(90.7)
	Agree	4(9.3)
I will be able to apply the knowledge acquired	Strongly agree	35(81.4)
	Agree	8(18.6)
The training objectives were indicated and achieved	Strongly agree	39(90.7)
	Agree	4(9.3)
The content was organized and easy to follow	Strongly agree	36(83.7)
	Agree	7(16.3)
The course materials were pertinent and useful	Strongly agree	32(74.4)
	Agree	4(9.3)
The trainers were knowledgeable and well prepared	Strongly agree	39(90.7)
	Agree	4(9.7)
Time allowed for the training was adequate	Strongly agree	11(25.6)
	Agree	25(58.1)
	Neutral	7(16.3)
The training venue was conducive for learning	Strongly agree	20(46.5)
	Agree	15(34.9)
	Neutral	8(18.6)
Group activities encouraged my participation	Strongly agree	35(81.4)
	Agree	8(18.6)

4.4 Phase Three: Post Intervention

4.4.1 Introduction

The training of the nurse-midwives was carried out in October 2022. The post intervention data was collected between in January and February 2023. Post intervention data were collected from Embu and Meru hospitals simultaneously to enable comparison between the two hospitals. Eighty nurse-midwives participated in the third phase of the study, indicating an attrition rate of 5.9%. Forty-three participants (53.8%) were in Embu hospital, and 37(46.2%) were from

Meru. The participants who did not participate were on leave during the intervention and post intervention phase.

The same tools used in the pre-intervention phase of the study were used to collect data during this phase. However, focused group discussion was omitted since it was meant to shed more light on the barriers to using the maternal health quality of care standards in the pre-intervention phase. In the questionnaire, questions regarding the training on quality maternal care and awareness of maternal health QoC standards were also omitted because that had been taken care of by the training.

4.4.2 Participants' Knowledge of Maternal Health Quality of Care Standards

Each participant was asked ten questions similar to the ones at baseline. The questions were then scored out of ten marks. The scores are shown in table 25 below.

Table 26: Participants' Maternal Health QoC Standards Knowledge Scores

variable	Knowledge score	Embu		Meru	
		Pre-intervention (%)	Post-intervention (%)	Pre-intervention(%)	Post-intervention(%)
Participants	≤5	42.2	0	47.1	37.8
maternal	6	22.2	0	22.4	24.3
health QoC	7	17.8	0	11.8	13.5
standards	8	8.9	9.3	9.4	10.8
knowledge	9	6.7	55.8	5.9	8.2
scores	10	2.2	34.9	3.5	5.4

In Embu hospital, the knowledge mean score improved to 8.6(SD± 0.8) with most participants (55.8%, n=24) scoring 9. However, in Meru hospital the mean improved slightly to 6.46(SD ±1.52) with most participants (37.8%, n=14) scoring ≤5.

4.4.2.1 Relationship between Knowledge of Standards and the Training Intervention

The relationship between the two variables was tested using paired samples t test. The results were $t=3.774$, $p<0.001$. This implies that there is a strong relationship between training intervention and nurse-midwives' knowledge of QoC standards.

4.4.3 Participants' Attitude towards the Use of Maternal Health QoC Standards

Participants may acquire the right knowledge, but that may not necessarily translate to a change in attitude. Due to this, the study sought to evaluate whether the attitude of the nurse-midwives had changed as a result of the training intervention.

4.4.3.1 Support for the Use of Maternal Health QoC standards

The study sought to establish whether the support for using the standards has changed following the intervention. In Embu hospital, support for using standards increased from 80.0% in the baseline to 93.0% after the intervention. In Meru hospital, support decreased from 97.5% to 83.8%.

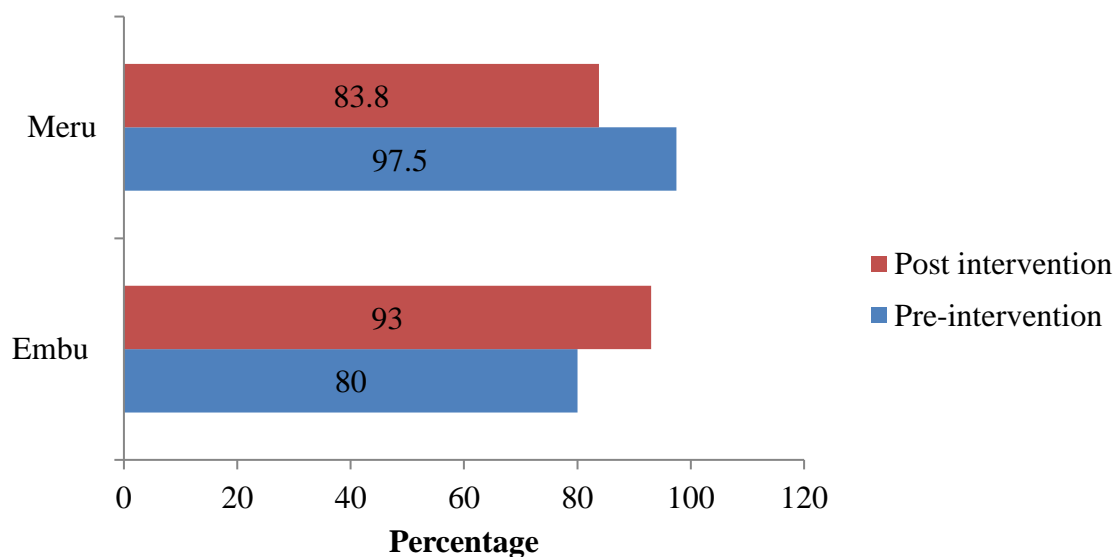


Figure 9: Comparison of the Support for the use of Maternal Health QoC Standards

4.4.3.2 Reason for support of the use of Maternal Health QoC Standards

Participants who indicated support for the use of the standards were asked to indicate the reason. The desired reason was that “standards ensured delivery of quality care.” In Embu hospital, this was indicated by 57.9% at baseline and by 97.5% of the participants after the intervention. In Meru hospital, 27.0% indicated the desired reason at baseline and 32.3% post intervention. The main reason for supporting the use of standards in Meru at both the base line and end line was that it standardized the care provided (68.9% and 64.5%).

Table 27: Comparison of the Reasons for Supporting the Use of Maternal Health Quality of care Standards

Variable	Category	Embu Hospital		Meru Hospital	
		Pre-intervention (%)	Post-intervention (%)	Pre-intervention (%)	Post-intervention (%)
Reasons for supporting the use of the maternal health quality of Care standards	To ensure quality care delivery	57.9	97.5	27.0	32.3
	For standardization of care	36.8	2.5	68.9	64.5
	Makes work easier	5.3	0.0	8.1	3.2

4.4.3.3 Reasons for Not Supporting the Use of Maternal Health QoC Standards

The pre-intervention majority opposing the standard's use in the two hospitals indicated that the standards consumed much time. Similarly, all those lacking support indicated this as the reason for their opposition.

4.4.3.4 Relationship between Training Intervention and Support for the Use of Maternal QoC Standards

The relationship between training intervention and the nurse-midwives support for the use of maternal standards was tested through paired sample t test. The results were: $t=1.775$, $p=0.083$. This implies that that the training intervention did no influence the nurse-midwives' attitude towards the use of the standards.

4.4.4 Reported Use of maternal health Quality of Care Standards

The study sought to find out whether the interventions impacted on the nurse-midwives' reported use of maternal health QoC standards. The results indicated a noticeable increase in nurse- midwives' use of the standards in the intervention group where the reported use increased from 62.2% in the baseline to 92.5% after the intervention. In the control group there was only a slight increased from 72.5 to 75.7%

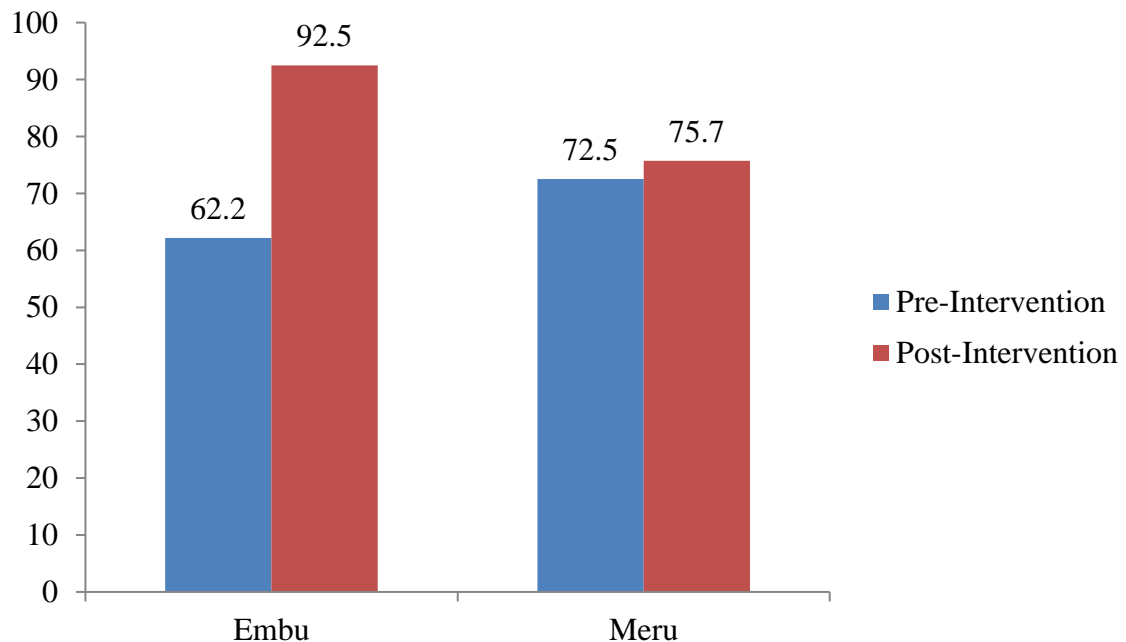


Figure 10: Reported Use of Maternal Health Quality of Care Standards

4.4.4.1 Reasons for Using Maternal Health QoC Standards

The participants were asked to indicate the main reason for using the standards to determine whether the reasons had changed since the intervention. The desired reason was “to ensure adherence to quality of care.” The percentage of participants who indicated this in Embu increased from 57.1 to 90.0% after the intervention. However, in Meru hospital, the percentage decreased from 65.5% to 62.1%.

Table 28: Reason for Using Maternal Health QoC Standards

Variable	Category	Embu Hospital		Meru Hospital	
		Pre-intervention (%)	Post-intervention (%)	Pre-intervention (%)	Post-intervention (%)
Reason for using maternal health QoC standards	Requirement by the management	7.1	0.0	6.9	5.4
	For standardization of care	32.1	7.5	24.1	27.0
	makes work easier	3.6	2.5	3.4	5.4
	quality of care adherence	57.1	90.0	65.5	62.1

4.4.4.2 Reasons for Non Use of Maternal Health QoC Standards

In the post intervention six participants (15.0%) in Embu and nine participants (24.3%) in Meru hospital reported not using the QoC standards. The main reason for non-use in Embu hospital changed from the unavailability of the standards (82.4%) to that the standards are time consuming (83.3%, n=5). In Meru hospital the main reason persisted that the standards were not available (66.7%, n=6).

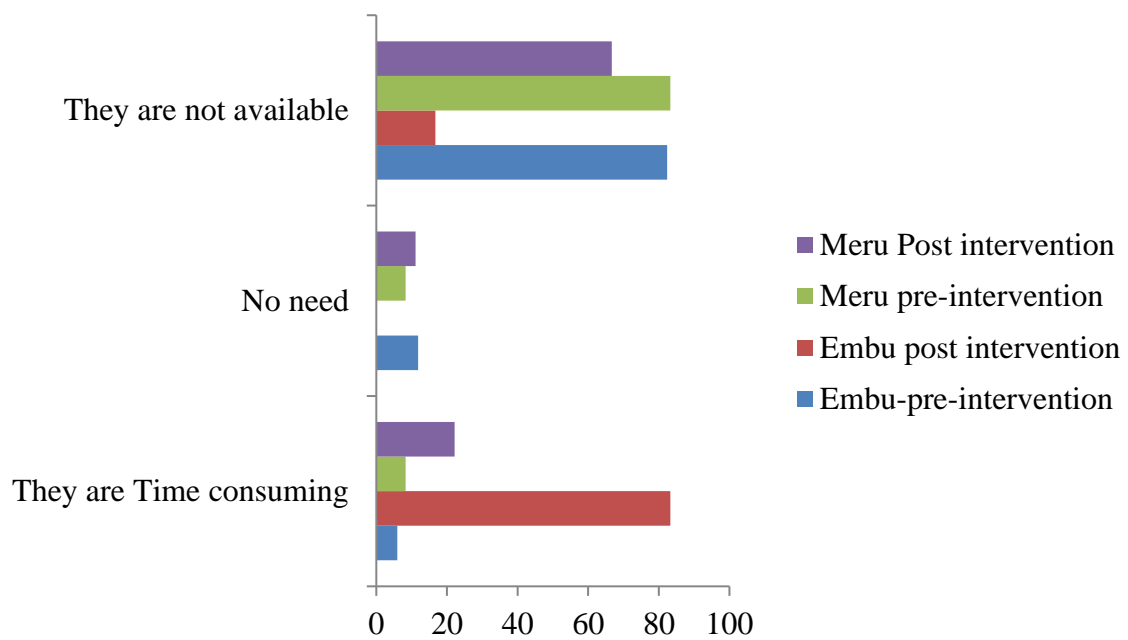


Figure 11: Reasons for Non Use of Maternal Health QoC standards

4.4.4.3 Relationship between training intervention and reported use of Maternal Health QoC standards

The relationship between the participants reported use of the standards and the training intervention were tested using paired sample t test. The test results were: $t=12.287$, $p<0.001$ which implies the difference between training intervention and reported use of maternal QoC standards was statistically significant.

4.4.5 Barriers to the Use of Maternal Health QoC Standards

In the pre-intervention phase, participants were presented with a list of possible barriers to using maternal health QoC standards. Further insight into these barriers was sought through the focused group discussion. In the post-intervention phase, the participants were presented with the same list of barriers to establish whether the barriers had been alleviated following the intervention.

4.4.5.1 Inadequate Resources

The percentage of those who considered inadequate resources as an important barrier declined from 97.8% pre-intervention to 88.3% post intervention. Similarly, in Meru hospital, those considering inadequate resources an important barrier declined from 92.7% before the intervention to 86.5% after the intervention.

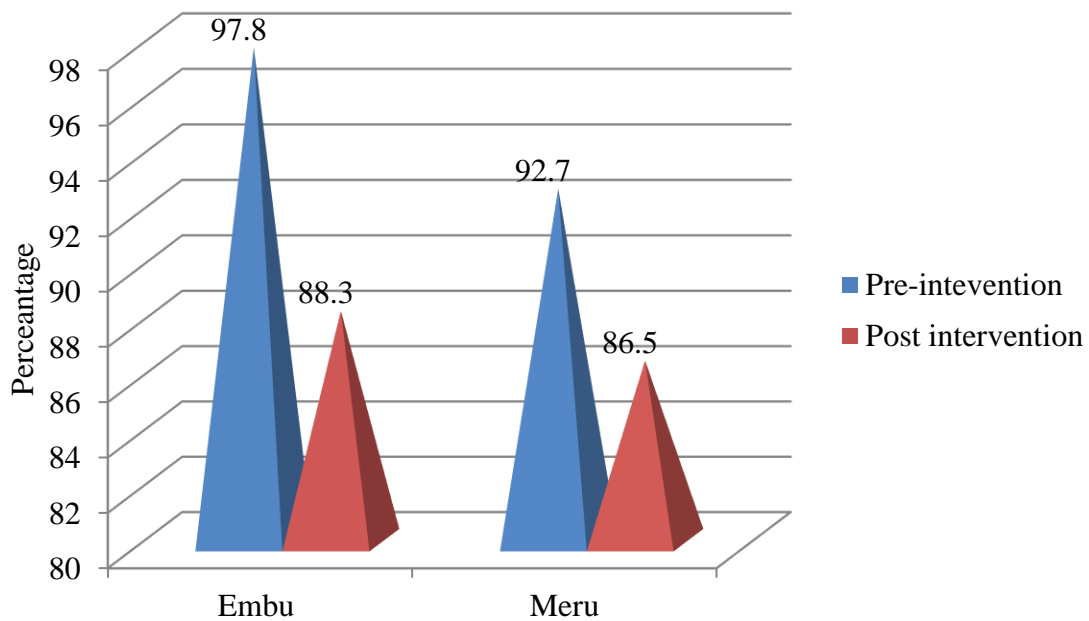


Figure 12: Comparison of Inadequate Resources as a Barrier to the Use of Maternal Health QoC Standards

4.4.5.2 Heavy Workload

In the pre-intervention study, 82.5% and 85.0 % of the participants in Embu and Meru respectively, indicated that heavy workload was an important barrier. In the post-intervention phase, the percentage increased to 93.0% and 86.5% in Embu and Meru hospitals respectively.

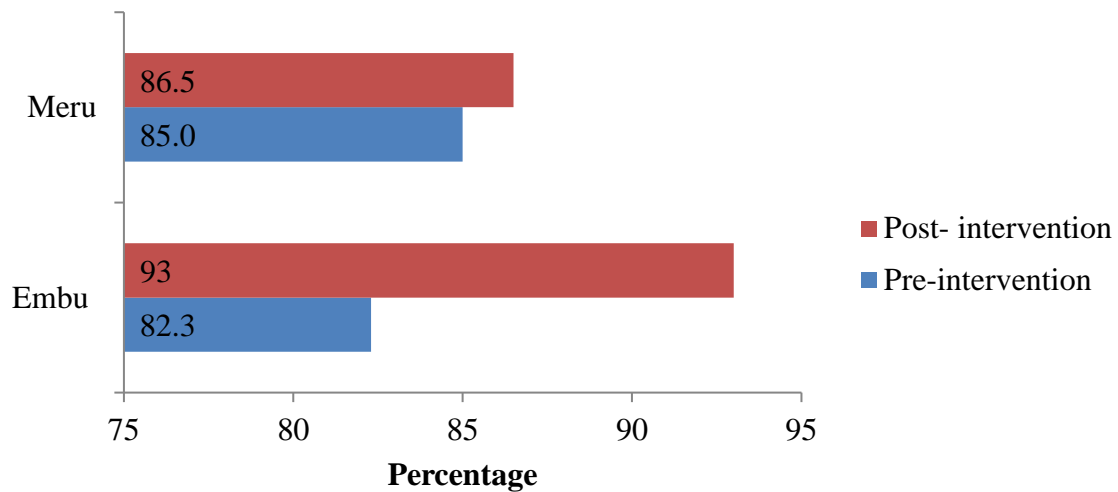


Figure 13: Comparison of Heavy Workload as an Important Barrier to the Use of Maternal Health QoC Standards.

4.4.5.3 Inadequate Knowledge of the Standards

As shown in figure 14 below, before the intervention, 91.1% of the participants in Embu had rated inadequate knowledge of standards as an important barrier. The percentage decreased to only 4.7% after the training. In Meru hospital, the percentage increased from 81.0% in the pre-intervention to 83.8% post-intervention.

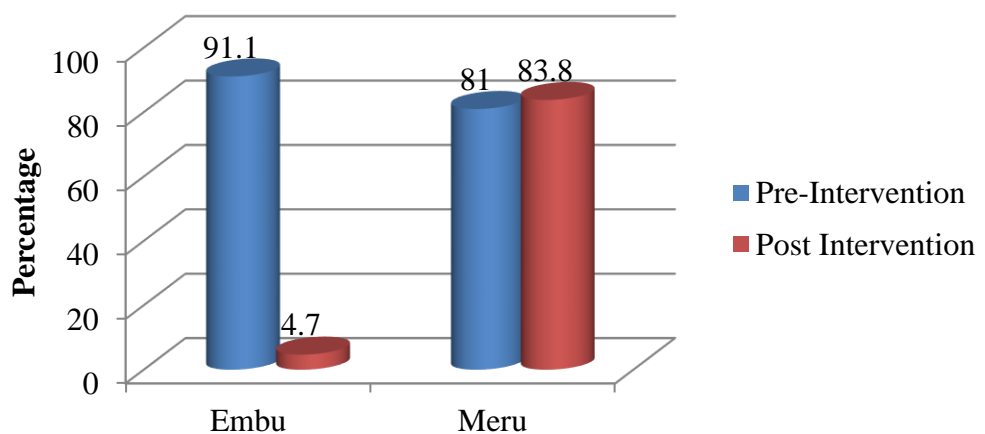


Figure 14: Comparison of Inadequate Knowledge as a Barrier to the Use of Maternal Health QoC Standards

4.4.5.4 Lack of Maternal Health Quality of Care Standards

As shown in figure 15 below, most participants in Embu hospital (95.3%) in the pre-intervention study indicated that the unavailability of the maternal Health QoC standards was an important hindrance to their use. This percentage decreased to 2.3% after the intervention. In Meru Hospital 95.0% and 94.6% of the participants rated it as an important barrier in the baseline and end-line respectively.

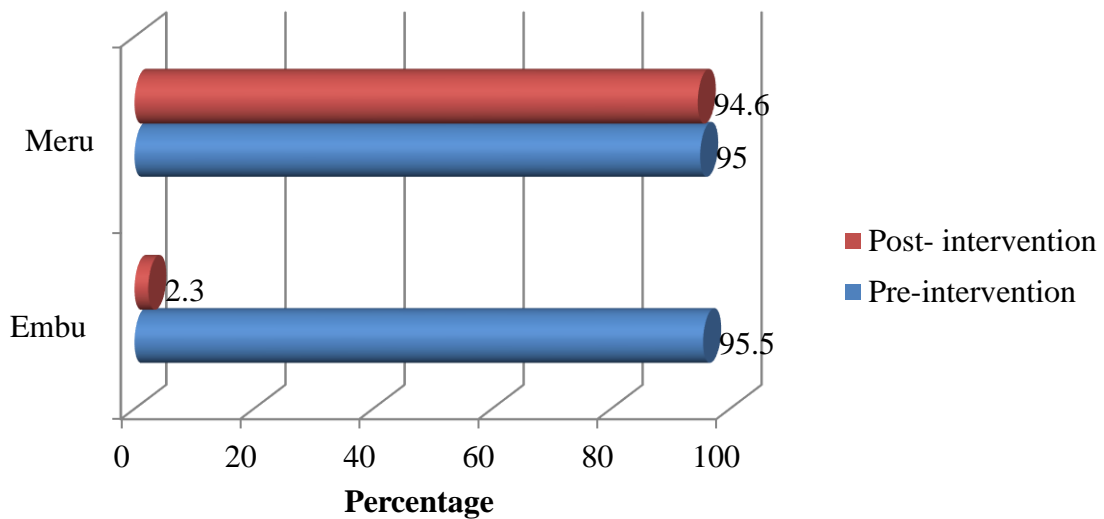


Figure 15: Comparison of Lack of Maternal Health QoC Standards as a Barrier to their Use

4.4.5.5 'Difficult to Use' Maternal Health QoC standards

Before the intervention, 64.4% and 50.0% of the participants in Embu and Meru respectively had reported that the standards were difficult to use hence an important barrier. After the training, the percentage in Embu decreased to only 9.3%. However, in Meru hospital, the percentage decrease was marginal (48.6%).

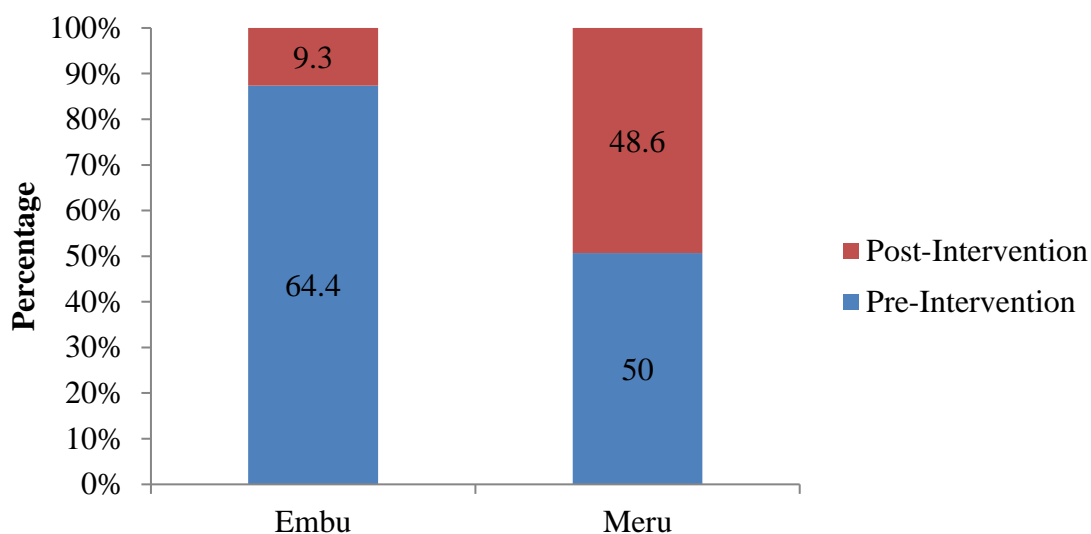


Figure 16: Comparison of ‘Difficult to Use’ Maternal Health QoC Standards as an Important Barrier to their Use

4.4.5.6 Lack of Incentives

After the training intervention, participants labeling lack of incentives as an important barrier increased in Embu hospital from 75.3% at baseline to 86.0%. In Meru Hospital, the percentage increased from 70.6% baseline to 83.8% end-line.

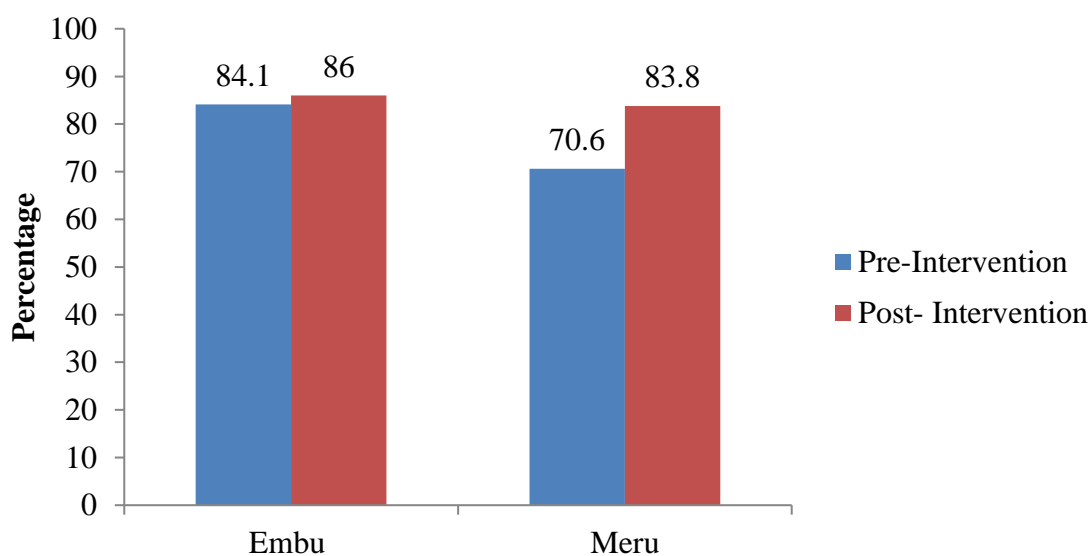


Figure 17: Comparison of Lack of Incentives as a Barrier to the Use of Maternal Health QoC Standards

4.4.5.7 Participants' Awareness of a Policy on the Use of Maternal Health QoC Standards

At baseline, only 28.9% of the participants in Embu and 37.5% of the participants from Meru hospital indicated that the hospital has a policy on the utilization of maternal health QoC standards. After the training of nurse midwives in Embu reporting this decreased to 16.3 %. In Meru hospital, the percentage of the participants aware of the existence of a policy increased slightly to 40.5%.

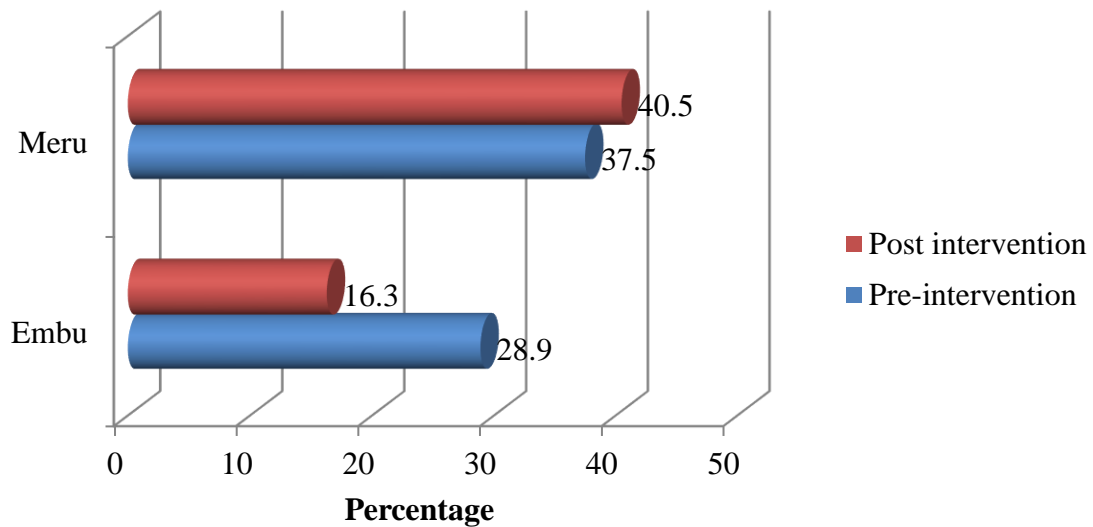


Figure 18: Comparison of Participants' Awareness of the Existence of a Policy on the Use of Maternal Health QoC Standards

4.4.6 Findings of the Observed Practice

4.4.6.1 Introduction

The same observation checklist that was used during before the intervention was utilized to assess how much the nurse-midwives adhered to the maternal health QoC standards after the intervention. The same scoring criteria used before the intervention were used after the intervention. The same nurse-midwives observed in the pre-intervention were observed in the post-intervention for comparison purposes. A total of 25(50.0%) nurse-midwives in Embu and

25(50.0%) in Meru were observed. All the nurse-midwives observed were those stationed in the Antenatal and labor wards of the two facilities. In Embu hospital only those nurse midwives who had participated in the training fully were observed. All the nineteen (19) performance standards were observed.

4.4.6.2 Adherence to Maternal Health Quality of Care Standards

This study sought to find out the intervention's impact on nurse-midwives' adherence to maternal health QoC standards. In the pre-intervention, only 7 out of the 19 performance standards observed were achieved in either of the hospitals, translating to 36.8%. Three months after the intervention, the number of performance standards achieved in Embu hospital increased to fifteen (78.9%) indicating a 42.1% increment. However, in Meru hospital, only the same seven performance standards (36.8%) achieved at the baseline were achieved at end-line.

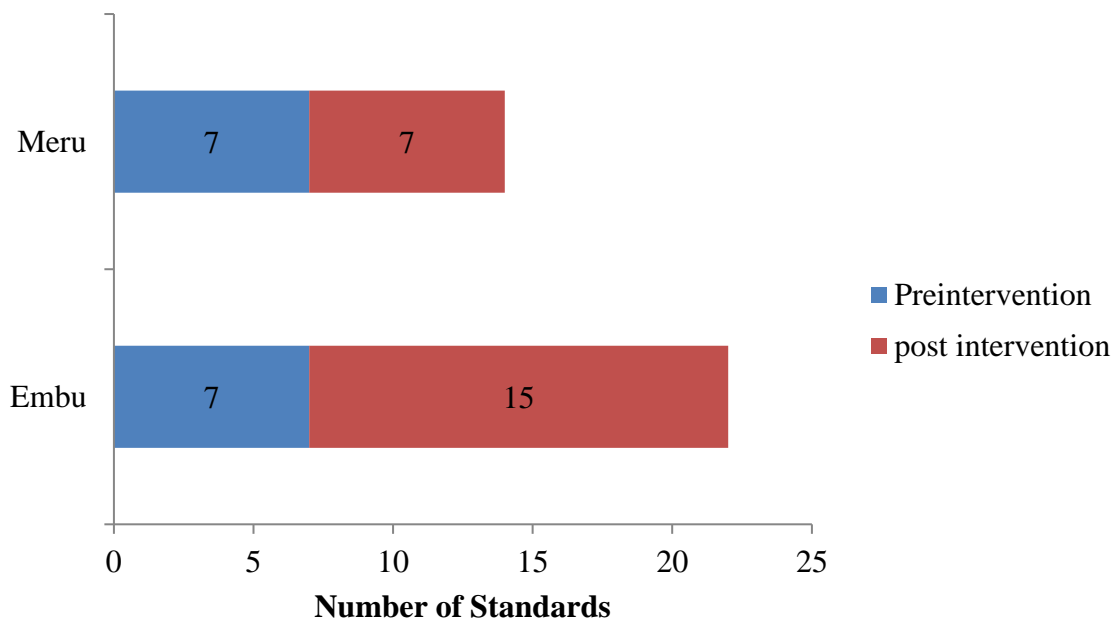


Figure 19: Number of Standards Achieved

4.3.1.1. Performance on Quality statement 1.1a: Women are Assessed Routinely on Admission and during Labor and Childbirth and are given timely, appropriate Care

4.4.6.3 Proportion of Performance Standards Achieved on Routine Assessment and Care of Women on Admission and during Labor and Childbirth

A total of twelve performance standards were observed both in the pre-intervention and post intervention relating to quality statement 1.1a. The number of standards achieved in Embu increased from five (41.7%) in the pre-intervention to eight (66.7%) in the post intervention reflecting a 25.0% increment in adherence. In Meru, only five standards (41.7%) were achieved in both the pre-and post-intervention.

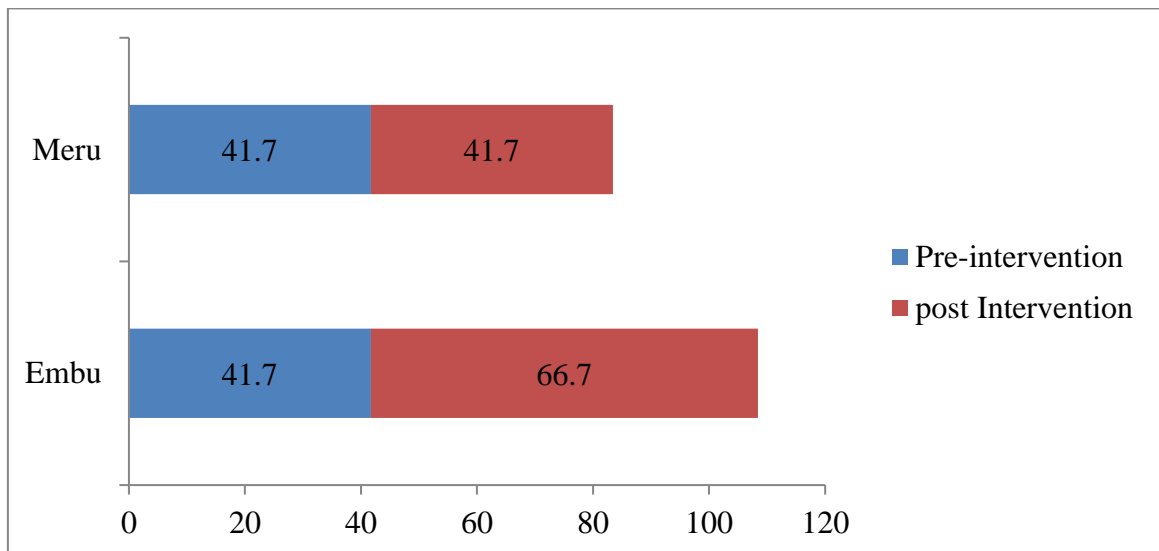


Figure 20: Proportion of standards achieved on Assessment and care of Mothers on Admission and During Labor

4.4.6.4 Performance Standards on Routine Assessment of Mothers on Admission and during Labor and Childbirth

A total of five standards relating to routine assessment of mothers were observed in both the baseline and end-line. The number of standards achieved in Embu increased from three (60.0%) to four (80.0%). Those achieved in Meru remained three during the post intervention. Standard 1 was met in Embu hospital. However, it was not achieved in Meru hospital since only 44.0%

of the midwives assessed signs of imminent delivery and none inquired about the danger signs. Standard 3 was not achieved in either of the hospital since none of the midwives informed the mother about the procedure or tested the mother's urine for albumin.

Table 29: Performance Standards on Routine Assessment of Mothers on Admission and during Labor and Childbirth

Performance Standard	Observation criteria	Embu n (%)	Meru n (%)
1. The nurse-midwife undertakes a general assessment of the expectant mother in labor to identify signs of complications	The nurse midwife: Assesses signs of imminent delivery	25(100.0)	11(44.0)
	Inquires on admission if she has/had any danger signs such as vaginal bleeding, fever, convulsions, severe headache/blurred vision	25(100.0)	0(0.0)
	Takes appropriate action in case of any of the above signs	25(100.0)	0(0.0)
	<i>Score</i>	<i>Achieved</i>	<i>Not achieved</i>
2. The nurse-midwife properly carries out physical examination between contractions	The nurse midwife: Informs the mother about the procedure and encourages her to ask questions	0(0.0)	0(0.0)
	Asks the mother to urinate and tests urine for albumin	0(0.0)	0(0.0)
	Takes/ delegates vital signs to assistant	0(0.0)	0(0.0)
	Examines the conjunctiva and palms of hands for pallor and, if pale, takes a blood sample for hemoglobin levels	16(64.0)	14(56.0)
	<i>Score</i>	<i>Not achieved</i>	<i>Not achieved</i>

4.4.6.5 Performance Standards on Proper Planning and Implementation of Appropriate Care during Labor and Delivery based on the Findings of the Examination

Four performance standards observed during the pre-and post-intervention study related to timely planning and provision of appropriate care to mothers during labor and child-birth based on the findings of the assessment. Out of these two standards (50.0%) were achieved in the Embu hospital and one (25%) in Meru hospital. Performance standard 6 was not achieved in

Meru hospital but was achieved in Embu hospital. Performance standards 7 and 8 were not achieved in either of the hospitals. On performance standard 7 relating to the use of partograph, only two of the six performance criteria (33.3%) were achieved in Meru hospital. However, in Embu hospital, four out of the six standards (66.7%) were achieved. On performance standard 8, nine observation criteria (81.8%) out of the eleven criteria observed were achieved. However, in Meru hospital only seven criteria (63.6%) were achieved.

Table 30: Performance Standards on Proper Planning and Implementation of Appropriate Care during Labor and Delivery based on the findings of the Examination

Performance Standard	Observation Criteria	Embu n (%)	Meru n (%)
6. The nurse-midwife properly plans and implements appropriate care during labor based on the history and physical examination findings assists the mother in	The nurse-midwife explains the importance of: Emptying her bladder regularly.	25(100.0)	5(20.0)
	Taking liquids and light foods whenever she wants	25(100.0)	10(40.0)
	Ambulating freely and regularly changing positions according to her desire and comfort	25(100.0)	25(100.0)
	score	Achieved	Not achieved
7. The nurse midwife uses the partograph to monitor labor and make adjustments to care	The nurse Midwife: Records patient information on partograph	25(100.0)	25(100.0)
	Assesses and documents temperature and blood pressure every 4 hours	25(100.0)	0(0.0)
	Records required partograph information every half hour	0(0.0)	0(0.0)
	Assesses and documents in the partograph vaginal examination every 4 hours or less according to labor progress	25(100.0)	0(0.0)
	Records input and output	0(0.0)	0(0.0)
	Score	Not achieved	Not achieved

8. The nurse-midwife assists the mother in having a clean and safe delivery	The nurse-midwife as she assists a woman in labor:		
	Auscultate or requests the assistant to auscultate the fetal heart every 5 min as the second stage progresses	25(100.0)	0(0.0)
	Puts on personal protective equipment	0(0.0)	0(0.0)
	Cleans hands with soap and running water and dries them with a sterile towel or applies alcohol-based hand sanitizer	0(0.0)	0(0.0)
	Puts on two pairs of sterile gloves	25(100.0)	25(100.0)
	Cleanses the perineum using sterile cotton balls and an antiseptic solution	0(0.0)	0(0.0)
	Encourages the mother to bear down when she feels the desire during contractions and rest in between contractions	25(100.0)	25(100.0)
	Performs an episiotomy only if necessary	25(100.0)	25(100.0)
	Allows spontaneous crowning of the head while supporting the perineum	25(100.0)	25(100.0)
	After the emergence of the head, the nurse-midwife requests the mother to avoid bearing down and encourages her to breathe with her mouth	25(100.0)	25(100.0)
	Cleanses the mouth and nose of the baby using a sterile gauze	25(100.0)	25(100.0)
	Assists in delivering the baby	25(100.0)	25(100.0)
	Score	Not Achieved	Not achieved

4.4.6.6 Performance Standards on Proper Clearance of Instruments and Disposal of Medical Wastes

One standard relating to proper clearance of instruments and disposal of medical wastes after delivery was observed in the two phases of the study. The standard was achieved in Embu

hospital but not in Meru Hospital. This is because in Meru Hospital, only 18 nurse midwives (72.0%) disposed- off medical waste in the appropriate color-coded plastic bins. Similarly, only 56.0 % (n=14) of the nurse midwives placed used linen in the right container and ensured they were fully immersed. None of the midwives in Meru Hospital opened the hinged instruments, and timed the decontamination process for 10 minutes.

Table 31: Performance Standards on Proper Clearance of Instruments and Disposal of Medical Wastes

Performance Standard	Observation Criteria	Embu n (%)	Meru n (%)	
10. The nurse midwife properly clears the used instruments and disposes of medical waste appropriately.	The nurse midwife: Uses appropriate gloves while clearing used instruments and disposing of waste.	25(100.0)	25(100.0)	
	Discards medical waste in appropriate color-coded plastic bins with similar color-coded plastic bin liners.	25(100.0)	18(72.0)	
	Places the used linen in a plastic container containing 0.5% chlorine solution, ensuring they are fully immersed.	25(100.0)	14(56.0)	
	Opens up all hinged instruments and puts them in a plastic container with 0.5% chlorine solution for 10 minutes	25(100.0)	0.00	
	Puts used needles and syringes in a tamper-proof container /safety box.	25(100.0)	25(100.0)	
	Cleans all the surfaces using 0.5% chlorine solution	25(100.0)	25(100.0)	
	Removes the gloves and discards, then put them in a bin with a yellow colored plastic bin liner	25(100.0)	25(100.0)	
	Performs hand hygiene after removing gloves	25(100.0)	25(100.0)	
	Score		Achieved	Not Achieved

4.4.6.7 Performance on Quality Statement 1.2: Women with Pre-Eclampsia or Eclampsia Promptly Receive Appropriate Interventions, According to WHO Guideline

A total of two standards relating to the management of mothers with pre-eclampsia or eclampsia were observed in the two phases of the study. In the pre-intervention phase, none of the standards was achieved in either of the hospitals. All four standards (100.0%) were achieved in Embu hospital after the intervention but none was achieved in Meru hospital, with only one observation criterion (16.7%) achieved out of the six observed.

Table 32: Performance Standards on the Prompt Management of Women with Pre-Eclampsia According to WHO Guidelines

Performance Standard	Observation Criteria	Embu n (%)	Meru n (%)
1. The Midwife correctly manages severe pre-eclampsia and /eclampsia according to WHO guidelines	The nurse midwife: Check if there is chart or any other document with basic information that helps nurses/midwives diagnose severe pre-eclampsia and/or eclampsia	(100.0)	(100.0)
	There is a record that treatment with magnesium sulfate was immediately commenced If BP is >160/110 mmHg or more, or in cases of eclampsia	25(100.0)	14(56.0)
	IV line was established and saline or Ringer’s lactate solution infused	25(100.0)	19(76.0)
	An anti-hypertensive was administered if the BP is >160/110 mmHg or more.	25(100.0)	13(52.0)
	Correctly administers the initial dosing of magnesium sulfate	25(100.0)	10(40.0)
	Correctly administers the maintenance dose of magnesium sulfate	25(100.0)	10(40.0)
	Score	Achieved	Not Achieved
3. The midwife provides follow-up care to mothers with severe pre-eclampsia or eclampsia	The nurse midwife: assesses and documents signs of magnesium sulfate toxicity hourly until the patient improves	25(100.0)	25(100.0)
	Administration of magnesium sulfate is stopped in case the	25(100.0)	13(52.0)

respirations are less than 16/minute, patellar reflexes absent, or urinary output is less than 25 ml/hour

If urine output is less than 25 ml/hour, one litre of IV fluids is infused in eight hours and signs of pulmonary edema monitored.

25(100.0) 8(32.0)

In the event of respiratory arrest, appropriate procedures were performed

25(100.0) 10(40.0)

A single dose of furosemide 40mg IV was given to manage pulmonary edema if it developed.

25(100.0) 7(28.0)

Score **Achieved** **Not Achieved**

4.4.6.8 Performance on Quality Statement 1.3: Women with Postpartum Hemorrhage Promptly Receive Appropriate Interventions according to WHO Guidelines

4.4.6.9 Proportion of Performance Standards on Appropriate Management of Mothers with Postpartum Hemorrhage according to WHO Guidelines Achieved

In the baseline, four standards were observed for managing mothers with postpartum hemorrhage, out of which two (50.0%) were achieved. During the follow-up, the four standards were observed in the two hospitals, and all of them were achieved in Embu Hospital (100.0%) but only two (50.0%) were achieved in Meru hospital.

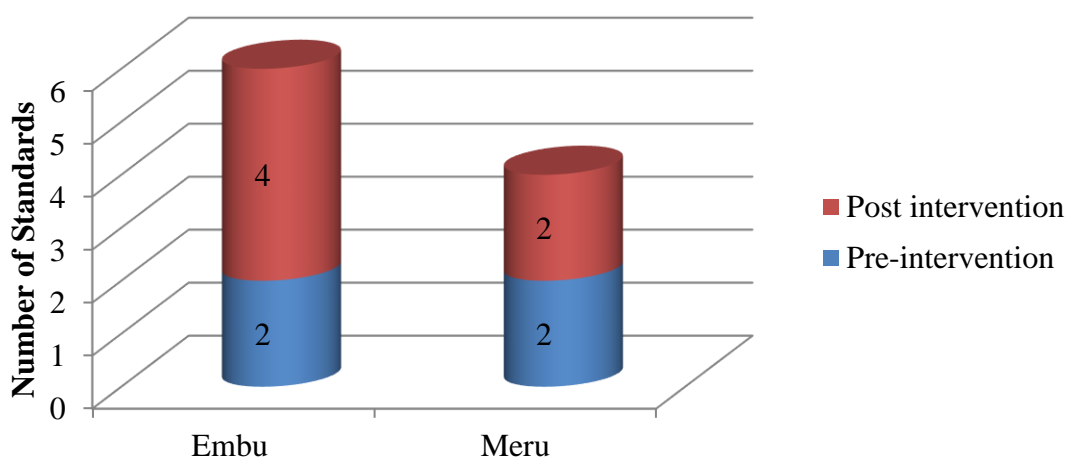


Figure 21: Proportion of Performance Standards on the Management of Mothers with Postpartum Hemorrhage Achieved

4.4.6.10 Performance Standards on Appropriate Management of Mothers with Postpartum Hemorrhage according to WHO Guidelines

During the pre-intervention study, performance standards 1 and 3 were not achieved in either of the hospital. During the post intervention study both were achieved in Embu hospital but still were not achieved in Meru Hospital. In Meru, Performance standard 1 was not achieved because none of the nurse midwives stated that they would elevate the feet of the patient higher than the heart or administer oxygen to a mother with postpartum hemorrhage. Additionally, only 84% (n=21) of the nurse-midwives indicated that they would establish two intravenous lines. Performance standard 3 was not achieved because only eleven participants (44.0%) indicated that they would measure intake and output. In addition, only five participants (20.0%) indicated they would carry out clotting studies and manage coagulopathy if bleeding persisted.

Table 33: Performance on Standards on Prompt Management of Women with Post-Partum Hemorrhage

Standard	Criteria	Embu n (%)	Meru n (%)	
1. The nurse midwife promptly carries out general interventions to manage postpartum hemorrhage	The nurse midwife: Checks for and appropriate documents signs of PPH	25(100.0)	25(100.0)	
	Takes and records vital signs immediately	25(100.0)	25(100.0)	
	Seeks assistance if shock develops or is suspected.	25(100.0)	25(100.0)	
	Administers 10 IU of oxytocin intramuscularly and massages the uterus until it is well contracted.	25(100.0)	25(100.0)	
	Covers the woman and elevates feet higher than the heart	25(100.0)	0(0.0)	
	Starts oxygen at 6–8 liters/minute	25(100.0)	0(0.0)	
	Establishes two IV lines	25(100.0)	21(84.0)	
	Collects a blood specimen for hemoglobin level grouping and cross-matching and clotting studies	25(100.0)	25(100.0)	
	Score		Achieved	Not achieved

4.4.6.11 Performance on Quality Statement 1.7a: Women with or at Risk for Infection during Labor, Childbirth or the Early Postnatal Period Promptly Receive Appropriate Interventions according to WHO Guidelines

This quality statement has one standard detailing the interventions required to be carried out in case the woman is at risk of or has an infection during labor, childbirth, or the early postnatal period. This standard was not achieved by either of the hospital in the baseline. However, in the post intervention it was achieved in Embu Hospital but not in Meru hospital. In Meru Hospital, only six participants (24.0%) gave the correct clinical criteria for diagnosing puerperal sepsis. In addition, only 80.0% of the nurse-midwives (n=20) said that they would monitor fluid balance. None of the participants said that they would isolate the patient and nurse the patient in an upright position.

Table 34: Performance Standard on Prompt Management of Women with or at Risk for Infection during Labor, Childbirth or the Early Postnatal Period according to WHO Guidelines

Standard	Criteria	Embu n (%)	Meru n (%)
The nurse midwife promptly carries out interventions to manage Puerperal sepsis according to WHO guideline	The nurse midwife: Diagnoses puerperal sepsis based on clinical criteria	25(100.0)	6(24.0)
	Requests laboratory tests such as full hemogram, high vaginal swab and urinalysis.	25(100.0)	25(100.0)
	Undertakes appropriate nursing care measures including isolation and bed rest upright position	25(100.0)	0(0.0)
	Monitors vital signs and fluid balance	25(100.0)	20(80.0)
	Checks uterus for involution	25(100.0)	25(100.0)
	Administers IV fluids and broad spectrum antibiotics for seven days as prescribed	25(100.0)	25(100.0)
	Score		Achieved

CHAPTER FIVE: DISCUSSION

This study set out to evaluate the effectiveness of a training intervention on utilization of maternal health quality of care standards by nurse-midwives. It has been reported previously that increasing the use of facility based maternal health care services without addressing the quality may not reduce the burden of maternal morbidity and mortality (Njuguna *et al.*, 2017; MHTF, 2018). Ensuring maternal care quality requires the application of maternal health quality of care standards like those developed by World Health Organization (2016).

During the baseline, eighty -five nurse-midwives participated in the study. However, during the end-line, the number decreased to eighty participants representing an attrition rate of 5.9%. This decrease occurred because the five participants went on leave during the period of study. Attrition is expected in longitudinal studies, and an attrition rate of less than 20% is acceptable since it does not seriously affect the validity of the results (Catalogue of bias collaboration *et al.*, 2017).

Most participants in this study (84.7%, n=72) were females, and majority were married. This finding may be because of the origin of nursing as a caring profession thus attracting more women than men. In most cases, it is the women who are involved in caring for the sick. Additionally, more women take up nursing and midwifery training compared to men. This finding is consistent with findings by Ndirangu *et al.* (2021), Nishimwe *et al.* (2021) and WHO (2022).

The mean age of the participants in Embu was 34.9 years (SD+ 9.62) whereas in Meru was 36.08(SD±8.66) with most participants aged between 20-29 years. This finding may be attributed to the deployment pattern many public hospitals. Since maternity unit is a labor-

intensive department, the management tends to deploy younger nurse-midwives there. However, this finding is different from the findings of Gitonga (2016) and Nishiwe *et al* (2021) which indicated that majority of the nurse-midwives in the maternity unit were aged 30-35 years.

This study also established that most of the nurse-midwives were diploma holders. This finding could be due to the decrease in the number of certificate training programs in Kenya coupled with introduction of upgrading programs from certificate to diploma and the presence of many medical training colleges offering diploma training as opposed to those providing degree-level training. Identical findings are reported by Tallam *et al.* (2021) and Ndirangu *et al.* (2021).

Concerning knowledge regarding quality of care standards, during the baseline, only 42.4% (n=36) of the participants correctly indicated that quality maternal health care is that which meets the laid down standards. Most participants (47.0, n=40) indicated that it implies care that responds to the client's needs. This finding could be due to inadequate training of nurse-midwives on quality of maternal health care. In-service training of nurse-midwives is essential for ensuring that they are abreast with the current best practices. Incidentally, in this study it was established that only 38.8% of the nurse-midwives are trained on the maternal health quality of care standards, most of who were trained in college. This also came out in the FGD. Concerning knowledge of the standards, mean score before the intervention was 6.15 (SD1.4) with most participants (47.1%, n=40) scoring ≤ 5 . In Embu hospital, the mean score improved to 8.6(SD \pm 0.8) with most participants (55.8%, n=24) scoring 9. However, in Meru hospital the mean improved slightly to 6.46(SD \pm 1.52) with most participants (37.8%, n=14) scoring 5. The change in scores in the intervention group may be due to the fact that the training was targeted paying attention to the knowledge gaps which were noted in the baseline. Similar improvement

in knowledge after a training intervention has been reported in other studies. Siaulyset *al.* (2019) and Varghese *et al.* (2016) found that a training intervention improved knowledge scores on managing labor, childbirth, and obstetric emergencies. Similarly, Mwanzisya *et al.* (2022) established in their study on the impact of training on self-reported performance in reproductive, maternal, and newborn health services delivery among health workers in Tanzania that training improved knowledge and performance of a wide range of maternal and neonatal issues. Unfortunately, there may be very few training on quality of care standards especially in Kenya. This is because most of the trainings have focused more on EmOC leaving out the component of the implementation of quality of care standards (Ameh&Althabe, 2022, Shikuku *et al.*, 2022). Some of the reasons contributing to low levels of training especially in Kenya may be inadequate resource allocation for training by the county governments since the devolution of health services as elucidated in the FGDs. This is because the county governments tend to focus more on visible priorities like infrastructure development for political reasons with little focus on capacity building (McCollum *et al.*, 2018, Nyawira *et al.*, 2021). This is made worse by frequent deployment of already trained midwives from the maternity unit as expressed by the participants in the FGDs, and a decrease in training opportunities offered by Non-Governmental Organizations which were carrying out most of the in service training initially before health became a devolved function (Gitonga, 2016).

Most of the nurse-midwives interviewed during the baseline (88.2%, n=75) indicated that they supported the use of maternal health quality of care standards since they standardized the quality of care. However, the support was greater in Meru than in Embu (97.5% against 80.0%). However, after the training intervention, the support for the standards in Embu increased to 93% while that of Meru declined to 83.8%. The main reason for support of the standards in Embu was to ensure the delivery of quality of maternal health care whereas in Meru was to

standardize the care given. The high level of support for the use of the standards is congruent with findings from other studies, such as those by Melanie *et al.* (2015) and Hendaus *et al.* (2014). The noticeable increase in support in Embu after the training may be attributed to an increased understanding of the content and purpose of using the standards after the training. This finding mirrors that of Ameh *et al.* (2019) and Ramavhoya *et al.* (2021) who reported an improvement in attitude following maternal health care trainings. Incidentally, the support for the standards in the control group decreased during the post -intervention phase. This could be due to budget constraints and change in the facility management which occurred after the general elections. Most participants (70%) who do not support using the standards both before and after the intervention indicated that it would be time-consuming. This may be because a nurse-midwife must follow every step as stipulated in the guideline which may require frequent consultation of the guideline. This finding supports other study findings in which health care workers stated that standards of care consumed most of the health care workers time and coupled with shortage of staffs; it would be difficult to follow (Ramavhoya *et al.*, 2021).

The study found that the self-reported use of the maternal health QoC standards amongst the participants in Embu increased from 62.2% before the intervention to 92.5%. In Meru, there was a slight increase from 72.5 to 75.7. The low level of use of the standards before the intervention may be due to lack of awareness of the standards as indicated by participants in the focus group discussion. This is because the standards being relatively new, the Ministry of Health may not have adequately adopted and adequately disseminated them to the health facilities as indicated by Okonofua *et al.* (2019) and Babiker *et al.* (2018). Furthermore, lack of knowledge and skills of standards has been found to be a contributor to their non-use (Necochea *et al.*, 2015). Therefore, the incremental change in the use of the standards may be a direct result of the training through which the participants were made aware of the standards and were

equipped with the requisite knowledge and skills required for the implementation of the standards confidently. Similar to this study finding, previous studies by Necochea *et al.* (2015) and Burstein *et al.* (2016) on implementing quality-of-care standards and other protocols indicated that training the healthcare providers increased the rate of adoption and implementation.

On assessing the use of maternal health QoC standards through observed practice, only seven out of 19 standards were adhered to at baseline representing 36.8%. (n= 7). The adherence level in Embu increased to 78.9% (n=15) following the intervention. There was no change in Meru hospital. Low performance standards adherence scores before the intervention mirrors what has been established in other countries. In Afghanistan and Ethiopia, for instance, before the introduction of a Standards-based management program, the compliance to standards was 26.0% and 28.0%, respectively (Necochea *et al.*, 2015). However, the findings of study contradict that in Brazil by Carvalho *et al.* (2019), where higher compliance scores were achieved. The increase in compliance with the standards may be due to acquisition of knowledge and skills which may have increased the confidence of the nurse midwives in the application of the standards. Other studies assessing the adherence of health service providers to quality of care standards following a training intervention have reported similar findings. Baumgartner *et al.* (2021) reported that training increased real-time partograph use. Similarly, Ameh *et al.* (2019) and Burstein *et al.* (2016) in their respective studies reported that training increased adherence to protocols of care and evidence-based practice.

The number of standards of care relating to routine assessment and care of women on admission and during labor and childbirth achieved increased from five to eight out of the twelve observed in Embu hospital, indicating a 25.0% increase. In Meru hospital, the standards achieved were

static at five in the post intervention phase. After the intervention, the healthcare providers successfully assessed for danger signs, performed a proper examination of the mothers, and practiced active management of the third stage of labor as per the protocol. Standards on physical examination of the mother, use of partograph in the management of labor, ensuring a clean and safe delivery, as well as on clearing of used instruments and disposing of wastes were not achieved. The additional three standards were easily achieved in Embu after the training since the interventions that were not achieved at the baseline wholly depended on knowledge and skills of the nurse-midwife, which were imparted in the training. In Meru hospital where training was not conducted there was no change since the nurse-midwives lacked the necessary knowledge and skills. Four standards were not achieved in Embu despite the training due to some of the actions not being carried out or incorrectly carried out by the nurse-midwives due to lack of a supply, equipment, or time despite the nurse midwife's awareness of what should be done. This corroborated the information from the focus group discussion that inadequate supplies and staffing levels are pertinent barriers to successful implementation of QoC standards. This result confirms a finding by Oliveira *et al.* (2021) and Weldearegay *et al.* (2020) that adherence to guidelines on routine childbirth care was hampered by a shortage of midwives and an inadequate supply of medicines, necessary types of equipment, and other inputs. Since the devolution of health services, public hospitals have become seriously underfunded as broached in the focus group discussion. This has been worsened by the withdrawal of the 75% of the cost sharing money from the hospital implying that the hospitals depend wholly on the allocation from the county government which is mainly marred by delays in the release of funds to the facility level (Nyawira *et al.*, 2021).

Two performance standards concerning the prompt management of mothers with pre-eclampsia or eclampsia were observed. At baseline, none of the standards was adhered to. However, the

two standards were achieved in Embu hospital following the training, representing a 100% increment. In Meru hospital, they were still not achieved. The low score before the training and the improvement in Embu after the training and not in Meru indicate that possibly, the nurse-midwives had inadequate knowledge on the management of PIH and the training enhanced the achievement of the standards. This affirms findings by Confidence *et al.* (2022) and Stan *et al.* (2023). However, this finding is in disharmony with that by Dartey *et al.* (2022) which reported that despite the nurse-midwives not adhering to the standards, they had adequate knowledge about the PIH guidelines, implying the possibility of other hindrances to adherence to the protocols.

During the two phases of the study, four performance standards were observed relating to the management of PPH. At baseline, two standards (50%) were achieved. After the training intervention, all 4 were achieved (100%) in Embu hospital. However, only two were achieved in Meru hospital. Lack of knowledge or outdated knowledge on PPH has been associated with poor adherence to PPH guidelines (Ramavhoya *et al.*, 2021; Clarke- Deelder *et al.*, 2021; Donati *et al.*, 2023). Therefore, this improvement may be as a result the training intervention since the gaps identified during the baseline were addressed in the training. This finding agrees with Siaulys *et al.* (2019), Baumgartner *et al.* (2021) and Donati *et al.*, (2023) who established that a training intervention improved the management of PPH.

One performance standard for diagnosing and managing puerperal sepsis was evaluated in pre and post-intervention phases. The standard was not achieved in the pre-intervention phase in both hospitals but was achieved in Embu Hospital but not in Meru Hospital after the training. The achievement of this performance standard may be because incorrect diagnosis and improper management of puerperal sepsis during the baseline were mainly related to knowledge

and skills gaps that may have been dealt with during the training. This finding is congruent with Siaulys *et al.* (2019) and Luwaga *et al.* (2022) findings that education provision resulted in incremental improvement in diagnosing puerperal sepsis. Similarly, van den Broek *et al.* (2019) and Siaulys *et al.* (2019) established that training increased the number of health providers who could diagnose and manage postpartum sepsis.

This study identified several hindrances to the implementation of maternal health QoC standards during the pre-and post-intervention phase. These ranged from inadequate resources to ineffective supervision. Several barriers that were rated important in Embu Hospital in the pre-intervention phase received low ratings after the training. These included a lack of the QoC standards, inadequate knowledge about the standards, and the standards were difficult to use. There was no difference in the rating of the standards in Meru hospital between the pre-and post-intervention phase. Three barriers that were still rated important in Embu hospital after the training include inadequate resources, a heavy workload, and a lack of incentives to implement the standards. The number of participants who indicated that inadequate resources were an important barrier in Embu decreased from 97.8% to 88.3% after the training. In Meru Hospital, over the same period, the rating decreased from 92.7% to 86.5 %. This slight decrease may be attributed to improved supply of drugs and pharmaceuticals, following the assumption of office of new county government after the August 2022 elections. The funding of health facilities was devolved to the Counties following the promulgation of the 2010 Constitution of Kenya (Njuguna *et al.*, 2017). Alternatively, it may be attributed to the participants gaining insight that most of the standards were about knowledge and skills with minimal resource requirements. Inadequate supplies have been associated with decreased adherence to quality standards. It has been noted elsewhere that when essential supplies are lacking, the nurse-midwives did not carry

out some interventions or they carried them incorrectly (Fischer *et al.*, 2016; Oliveira *et al.*, 2021).

Heavy workload also received a high rating as an important barrier with those rating it as so in Embu increasing from 82.3% to 93.0% after the training. This may be due to the nurse midwives gaining knowledge about the requirements of quality of care performance standards. The standards require that the nurse-midwife carries out specified interventions and documents what has been done providing little room for “short cuts.” In the FGD, there was consensus that severe shortage of midwives was making it difficult for the nurse-midwife to carry out all activities outlined in the QoC standards due to overwhelming workload. This finding mirrors that of Weldearegay *et al.* (2020). The participants in the FGD vented that shortage of staff was attributable to among other factors outmigration of nurse-midwives to European countries and the USA in search of greener pastures. This confirms similar findings by Wakaba *et al.* (2014) and Wamalwa *et al.* (2015).

Another barrier receiving high rating after the intervention was lack of incentives. The rating of this barrier increased from 84.1% and 70.6% at baseline to 86.0% and 83.8% in the Embu and Meru respectively at the end-line. This rating could be due to the fact that when people feel that work has increased, they expect the compensation level to increase which did not happen. Several studies have indicated that even though improvement in knowledge and skills is noted after a training intervention, adherence to standards of care may not be achieved due to among other factors overwhelming workload coupled with lack of adequate motivation schemes (Weldearegay *et al.*, 2020; Iravani *et al.*, 2016; Oliveira *et al.*, 2021). Therefore, to enhance compliance, implementation of quality standards ought to be linked to a recognition or reward

system for those individuals and facilities that achieve an acceptable level of performance (Necochea *et al.*, 2015).

This study adopted a training intervention. This is because training is recognized as a viable strategy for improving adherence to maternal health care interventions (Varghese *et al.*, 2016; Ameh *et al.*, 2019). Participants' reaction to the training was assessed using a questionnaire. In this training there was a high level of acceptance with 86.0% (n=37) rating the training as very good. Most participants strongly agreed that the content of the training was useful and applicable in improving the quality of care. Identical findings were established by Ameh *et al.* (2019). In this training, only 25.6% of the participants strongly agreed that the time allocated for the training was sufficient. Possibly this is because the participants related the duration of training to EmOC training which takes two weeks. Similarly, Ameh *et al.* (2019) in their study found that one of the requests by the attendees was for the training to last longer. The other aspect that less than half of the participants (46.5%) strongly agreed with was the venue of the training. This may be due to the fact that the training was conducted within the health facility rather than away from the facility.

Attainment of knowledge and skills during the training was assessed through a pre and post-test. The pretest mean score was 49.53 (SD 9.73) whereas the post- test mean score was 93.1(SD± 6.27). This implies that the participants acquired knowledge during the training. Other studies have shown that training resulted in a change in performance between the pretest and post-test (Shimpuku *et al.*, 2021; Ameh *et al.*, 2019).

This study set out to test the null hypotheses that there is no significant relationship between a training intervention and nurse-midwives' knowledge, attitude and use of maternal health

quality of care standards. Paired samples t test was used to test the relationships at 95% CI. The null hypothesis that there is no significant relationship between training intervention and midwives' knowledge of maternal health quality of care standards was tested. The results obtained were $t=3.774$, $df=42$, $p<0.001$. Therefore, the relationship is significant hence the null hypothesis is rejected. A second null hypothesis tested was that there is no significant relationship between the training intervention and attitude of nurse-midwives towards maternal quality of care standards. Results obtained were $t=1.775$, $df=42$, $p=0.083$. Based on these results, the relationship is not significant hence the null hypothesis is accepted. Finally, a null hypothesis that there is no significant relationship between the training intervention and reported use of maternal quality of care standards was tested. The results obtained were $t=12.287$, $df=42$, $p<0.001$. This implies that the relationship is significant hence the null hypothesis is rejected.

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary

Nurse-midwives in Embu and Meru hospitals had inadequate knowledge about maternal health QoC standards prior to the training but the level improved in Embu hospital after the training. The nurse-midwives had a favorable attitude towards using maternal health QoC standards before and after the training. Though the nurse-midwives reported using the standards, observation of practice established that adherence to the standard was low before the intervention. However, this improved after the training, though some gaps in the implementation persist. These gaps are attributable to systemic barriers such as inadequate resources, heavy workload due to staff shortage, and lack of incentives for implementing the standards, which persisted even after the training.

6.2 Conclusion

From the findings of this study, it is concluded that training intervention enhances nurse-midwives' knowledge and skills, improving adherence to maternal health QoC standards, which results in improved quality of care. However, there remains system barriers to adherence to the standards that cannot be addressed by a training intervention and thus require the health care system managers to address. Only then will the quality of maternal care in health facilities envisaged by the WHO (2016) standards be fully realized.

6.3 Recommendations

From the findings of this study, it is recommended that:

- i) In-service education and training should be provided to all nurse-midwives at all health facility levels to equip them with the knowledge and skills required to implement

maternal health QoC standards, specifically the WHO (2016) standards for improving the quality of maternal health care.

- ii) Maternal health QoC standards should also be added as content to the obstetric nursing/midwifery training curricula at all training levels.
- iii) The supply management system should be streamlined, and more resources should be availed for adequate resources.
- iv) More financial resources need to be availed for employment of more nurse- midwives to ease the staff shortage being experienced in the health facilities and thus reduce the workload burden, and provide staff motivation.
- v) Further research is recommended to determine the effect of utilization of Maternal QoC standards on maternal mortality; satisfaction of mothers and their companions on maternal health Quality of service following the implementation of QoC standards. Finally, it is recommended that this study is carried out on a large scale, especially in level one to four health facilities, which are the first to come into contact with expectant mothers before referring them to level 5 health facilities.

6.4 Contribution of the Study to the Body of Knowledge of Nursing Leadership and Management, and Midwifery

From the findings of this study, Quality Maternal Care frame-work is proposed. The framework is shown in figure 22 below:

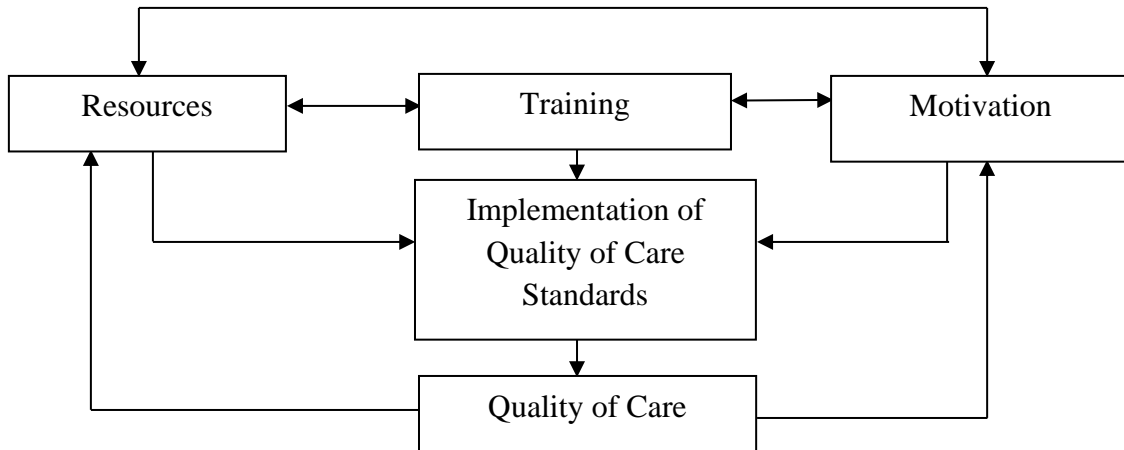


Figure 22: Quality Maternal Care Framework (Author, 2023)

The components of the framework are:

Resources: Implies having adequate equipment, pharmaceuticals and non- pharmaceuticals necessary to the implementation of the quality standards. Clinical guidelines, educational materials and job aids are also important resources. Having adequate resources will enhance the use and adherence to quality of care standards

Training: Process of imparting knowledge required to effectively and safely implement the quality of care standards. This can be undertaken through workshops, seminars on job training. To successfully implement training on quality of care standards, resources are required.

Motivation: provision of incentives necessary for the implementation. These may include provision of performance feedback, training, financial and non- financial incentives. Understanding the importance of providing high quality maternal care may also act as a drive for adherence to quality of care standards. Improving the quality of maternal health care offered may increase the number of mothers being attended in the facility. This results in greater resources for the hospital. These resources will then be used for training and implementation of quality of care standards

Implementation of quality of care standards: implies using the standards and compliance with the same. The use and compliance requires adequate resources, knowledge acquired through training and incentives for implementation.

Quality of care: This is the result of application of the standards. Implies that the care provided is effective, safe and client centered resulting in favorable maternal and newborn outcomes.

This framework is suggested as an improvement of other quality improvement models already present. Among these are:

i) **Standards Based Management and Recognition(SBM-R)**

Standards based management and Recognition (SBM-R) is a tool for quality improvement developed by JHPIEGO following a series of studies (Nechochea *et al*, 2015). It was developed to help health systems in low resource setting to improve performance in delivering maternal health care (Nechochea *et al* 2015). Its main goal is to standardize care through four steps: setting of standards of care as point of reference for improvement, implementing the standards through systematic methods, measuring progress and recognizing achievement of the standards (Nechochea & Bossemey, 2005).

Whereas SBM-R focuses on adherence to standards, Quality maternal care framework emphasizes a holistic approach integrating resources, training and motivation to achieve maternal quality care. Quality maternal care frame work offers flexibility by incorporating motivation, continuous training and diverse resources to adapt to evolving health care practices. This is in contrast to SBM-R which may have a rigid structure relying more on established standards with less room for adaptation to emerging practices. Lastly, the new framework encourages a comprehensive implementation strategy encompassing motivation, training and resource utilization contrary to SBM-R which primarily focusses on the implementation of predetermined standards as the key driver of quality care.

ii) Plan-Do-Check-Act(PDCA) Cycle

PDCA cycle also called the Deming cycle is a quality management method used for continual improvement of service (Tague, 2005). The framework has four stages namely plan, do, check and act (*Pan et al, 2022*). In the “plan” stage, standards and processes required to deliver results are established. In the “Do” stage the set objectives and standards are implemented. In the “Check” Phase data collected in the plan and do phases is evaluated by comparing the actual performance with the desired performance. Lastly, in the “Act” stage, interventions are implemented to improve the process. Data from the do and Check phases help identify problems that need redress (Tague, 2005). PDCA cycle centers on a cyclic process of planning, implementing, checking and acting to continuously improve processes. On the contrary, Quality maternal care framework brings together diverse elements with a focus on maternal health outcomes and patient centered care. Unlike the PDCA cycle Quality maternal care framework emphasizes ongoing learning and adaptation for better maternal care outcomes. The implementation of PDCA cycle is structured with four steps unlike the Quality maternal care framework which is comprehensive involving motivation, training and resource integration for continuous improvement of maternal health care. Lastly, PDCA cycle focuses on meeting client needs but may not specifically address healthcare patient-centeredness. This is in contrast with the Quality maternal care framework which prioritizes client’s needs and preferences especially in the context of maternal care.

iii) Client – Oriented Provider Efficient (COPE®) framework

Client – Oriented Provider Efficient (COPE®) was developed by EngenderHealth to provide a means for reproductive health care staff to assess and improve the quality of care provided in hospitals and clinics. The framework was tested in Kenya and Nigeria before being rolled out in other countries in Africa and Asia (EngenderHealth, 2003).

The COPE[®] process comprises of a number of tools designed to be utilized together for quality improvement. These include: The self -assessment guides to help staff assess the way services are provided; client interview guide consisting of a series of questions that seek to find out the client's opinions regarding the services offered at the facility. The interview guide is used to carry put informal interview with the clients who have finalized their clinic visit (EngenderHealth, 2003). The other tool is a client flow analysis (CFA) which is a way of following clients through the facility from the time they arrive at the facility until they exit the facility. The persons carrying out the analysis record the client's contact with the providers and the duration each contact. Lastly there is an action plan which is a plan developed by the staff to help address the problems identified during the COPE[®] exercise (EngenderHealth, 2003).

Both Quality Maternal Care framework and COPE[®] emphasize on continuous improvement in service delivery. Whereas Quality Maternal Care framework is specifically tailored for maternal health and especially during labor and delivery, COPE[®] is more applicable for outpatient services. In addition, Quality Maternal Care framework places greater emphasis on training which is not emphasized in COPE[®]. Finally, COPE[®] places greater emphasis on client satisfaction. This is different from Quality Maternal Care framework which focuses on the maternal outcomes as a measure of quality.

In conclusion, the proposed maternal care quality framework offers advantages over other models in that it emphasizes the holistic approach in ensuring care provided to the mother is effective and safe. It also integrates evidence based practice with continuous learning and support which may result in improved outcomes for the mother and the baby. It is recommended that the framework be tested in different set-ups to determine its effect on the quality of maternal health care.

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APPENDICES

Appendix 1: Publication on Knowledge and Attitude of Nurse-Midwives Regarding Maternal Health Care Quality Standards in Two Regional Teaching and Referral Hospitals in Kenya



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Knowledge and Attitude of Nurse-Midwives Regarding Maternal Health Care Quality Standards in Two Regional Teaching and Referral Hospitals in Kenya

Domisiano Koome Impwii¹, Lucy Kivuti-Bitok², Anna Karani²

¹School of Nursing and Public Health, Chuka University, Chuka, Kenya

²School of Nursing Sciences, University of Nairobi, Nairobi, Kenya

Email: koomeimpwii@gmail.com

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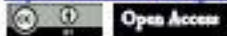
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Abstract

Introduction: Maternal mortality remains a major health concern in Sub-Saharan Africa and Kenya in particular. Providing quality maternal health care has the potential of preventing over 75% of maternal deaths. The quality of maternal health care requires the utilization of maternal health care quality standards. **Objectives:** The objective of this study was to determine the nurse-midwives knowledge and attitude toward the use of maternal health care quality standards. **Methodology:** This study was a descriptive cross-sectional survey carried out at Embu and Meru teaching and referral hospitals in Kenya, between August and December 2021. Eighty-five nurse-midwives working in the maternity unit participated in the study. Data was collected using a self-administered semi-structured questionnaire and analyzed using SPSS version 27.0. Pearson's correlation coefficient and Chi-square at Alpha level of 0.05 were used to test the relationship between the variables which were the nurse-midwives knowledge, attitude, and use of the quality standards. **Result:** Most (84.7%, n = 72) nurse-midwives were female and 44.7% (n = 38) were aged 20 - 29 years. Majority (64.7%, n = 55) were diploma holders and almost half (44.7%, n = 38) had practiced for 1 - 9 years. The average score for knowledge was 5.0 with 69.4% (n = 59) having a score of <7. Most nurse midwives (88.2%, n = 75) supported the use of the standards even though only 67.1% (n = 57) indicated that they use them. The support for the standards is significantly related to the gender of the respondents and their duration in maternity. There was no significant association between knowledge and use of maternal health care quality standards ($X^2 = 0.433$, $r = -0.085$). There is no association between support for the standards and their

use ($X^2 = 0.008$). Knowledge and attitude toward the maternal health care quality standards are not significantly associated ($X^2 = 0.156$). **Conclusion:** The knowledge and attitude of the nurse-midwife neither influence each other nor do they influence the use of maternal health care quality standards.

Keywords

Maternal Health Care, Quality, Standards, Nurse-Midwife, Kenya

1. Introduction

World Health Organization (WHO) defines maternal death as “a death occurring in a woman during pregnancy or within 42 days after delivery or miscarriage the location and gestation notwithstanding, as long as it is due to factors that are related to or worsened by pregnancy or its management but not due to accidental or incidental causes” [1]. In 2017, 295,000 maternal deaths occurred globally out of which about two-thirds (66%) occurred in sub-Saharan Africa [2].

Although there has been a reduction in maternal mortality ratio (MMR) over the years since the year 2000, the level is still below that envisioned in the sustainable development goal target 3.1 of reducing MMR to less than 70 per 100,000 live births by 2030 [2]. In Kenya, the current MMR is 362 maternal deaths per 100,000 live births, which is way below the target of 147 maternal deaths per 100,000 live births [3]. More than half of the maternal deaths arise from hemorrhage, hypertensive disorders, and sepsis which are preventable through use of appropriate strategies [4].

One of the strategies that have been adopted in Kenya is increasing access to skilled attendants through the introduction of maternity services free of charge by the government in June, 2013. This covered all public health facilities across the country and increased the number of facility based deliveries by 26.8% [5] [6]. However, increasing access alone may not be adequate in achieving the desired maternal health outcomes [7]. Indeed, a review of 2014 maternal death case notes in Kenya found that in 75.4% of the cases one or more health worker-related factors were to blame [8].

Quality maternal health care can be accomplished through the use of maternal and newborn care guidelines detailing best practices that are known to produce desirable outcomes [9]. One such guideline is the “Standards for Improving Quality of Maternal and Newborn Care in Health Facilities” developed by WHO in 2016 [10]. This document has a set of standards containing eight domains of quality of care to guide health facilities in assessing and continually improving the quality of care provided [10].

In Kenya, 61% of the deliveries occur in a health facility and 46% occur in a public sector facility. Targeting the nurse-midwives is likely to produce favorable outcomes in maternal health care since they conduct seventy percent of delive-

ries in public sector facilities [3]. This study thus sought to determine the knowledge and attitude of nurse-midwives regarding the use of maternal health care standards and guidelines which are some of the factors that may influence their utilization.

2. Materials and Methods

2.1. Study Design

This study was a descriptive cross-sectional survey that was carried out between August and December 2021 at the Maternity units of Embu and Meru Level 5 Teaching and referral hospitals in Kenya.

2.2. Study Population

Participants were all nurse-midwives who were currently working at the maternity units and had been working there for at least six months. At the time of the study, there were a total of fifty-five and fifty nurse-midwives in Embu and Meru Teaching and referral hospitals' maternity units respectively.

2.3. Sample Size and Sampling Procedure

Cochran's (1967) formula for proportions was used to calculate the sample size resulting in a target of 83 nurse-nurse midwives. Ten percent of the participants were added to cater for non-responses taking the sample size to 93. Stratified random sampling was used to select the sample representatives.

2.4. Research Instruments

A quantitative, self-administered semi-structured questionnaire was developed and administered to assess the knowledge and attitude of Nurse-midwives regarding the WHO/national maternal health care quality standards. Questions on knowledge focused on infection prevention practices, and active management of the 3rd stage as well as management of postpartum hemorrhage and hypertension in pregnancy. Attitude questions focused on the support for the use of the standards and the reasons for or against their use. The questionnaire was pre-tested at Chuka level 4 Hospital and adjustments made as per the findings.

2.5. Data Analysis

Data analysis was carried out using Statistical Package for Social Sciences (SPSS) version 27.0. Nurse-midwives level of knowledge, attitude, and use of maternal health care quality standards were determined. Knowledge scores for each participant were calculated. Those who scored 7 and above were considered to have adequate knowledge and those who scored < 7 were grouped as having inadequate knowledge. Those who supported the use of maternal health care quality standards were considered to have a positive attitude. Association between variables was tested using Pearson correlation analysis and a Chi-square test at Alpha level of 0.05 (5%).

2.6. Scope of the Study

The study focused mainly on the WHO (2016) Standards for Improving Quality of Maternal and Newborn Care in Health Facilities. Out of these, the study concentrated on the standards that apply to labor, delivery, and the immediate postpartum period.

2.7. Ethical Approval and Permission

Ethical approval was granted by Kenyatta National Hospital and the University of Nairobi ethics and research committee vide KNH- ERC/E/468 as well as National Commission for Science, Technology, and Innovation (NACOSTI). Administrative approval was given by the County Health Committee. Written approval was sought from the Health facility managers. The participants were requested to fill in a consent form before participating in the study.

2.8. Abbreviations and Acronyms

KNH: Kenyatta National Hospital

MMR: Maternal Mortality Ratio

NACOSTI: National Commission for Science, Technology and Innovation

SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

3. Results

3.1. Demographic Characteristics

Ninety-three nurse-midwives were recruited for the study out of which 85 participants responded, a response rate of 91%. Out of these participating nurse-midwives, forty-five (52.9%) and forty (47.5%) were working at Embu and Meru level 5 Teaching and referral hospitals respectively. Most (84.7%, $n = 72$) nurse-midwives were female, 44.7% ($n = 38$) were aged 20 - 29 years and 57.6% ($n = 38$) were married. The majority (64.7%, $n = 55$) of nurse-midwives were protestants and 64.7% ($n = 55$) were diploma holders with only two participants having a certificate qualification (Table 1). Almost half (41%, $n = 35$) were working in the labor ward and most (44.7%, $n = 38$) had practiced for 1 - 9 years (Table 2).

3.2. Nurse Midwives Use of Maternal Health Care Quality Standards

Fifty-seven (67.1%) nurse-midwives indicated that they used maternal health care quality standards in their practice (Figure 1). There was no significant association between the nurse-midwives' demographic characteristics and the use of the standards (Table 3).

3.3. Nurse-Midwives Knowledge about Maternal Health Care Quality Standards

Only 42.4% ($n = 36$) of nurse-midwives indicated correctly that quality maternal

Table 1. Nurse-midwives demographic characteristics.

Socio-demographic Characteristics of Nurse Midwives	Category	Frequency	Percent	Cumulative Percent
Gender	Male	13	15.3	15.3
	Female	72	84.7	100.0
Age	20 - 29	38	44.7	44.7
	30 - 39	20	23.5	68.2
	40 - 49	15	17.6	85.9
	50 - 59	12	14.1	100.0
Marital Status	Never married	32	37.6	37.6
	Married	49	57.6	95.3
	Divorced/separated/widowed	4	4.7	100.0
Religion	Catholic	29	34.1	34.1
	Protestant	55	64.7	98.8
	Muslim	1	1.2	100.0
Qualification Level	Certificate	2	2.4	2.4
	Diploma	55	64.7	67.1
	Degree and above	28	32.9	100.0
Facility	Embu	45	52.9	52.9
	Meru	40	47.1	100.0

Table 2. Nurse-Midwives years of experience.

Nurse-midwives Years of Experience	Frequency	Percent	Cumulative Percent
Less than 1 year	17	20.0	20.0
1 - 9 years	38	44.7	64.7
10 - 19 years	15	17.6	82.4
20 - 29 years	9	10.6	92.9
30 years and above	6	7.1	100.0

Table 3. Relationship between nurse-midwives' demographic characteristics and use of maternal health care quality standards.

		Nurse-midwives' use of maternal health care quality standards
Gender	Pearson Correlation	0.119
	Sig. (2-tailed)	0.276
	N	85

Continued

Highest qualification level	Pearson Correlation	0.168
	Sig. (2-tailed)	0.124
	N	85
Years of experience	Pearson Correlation	0.167
	Sig. (2-tailed)	0.127
	N	85
Period in maternity	Pearson Correlation	0.119
	Sig. (2-tailed)	0.278
	N	85
Training on maternal health care standards	Pearson Correlation	0.51
	Sig. (2-tailed)	0.647
	N	84

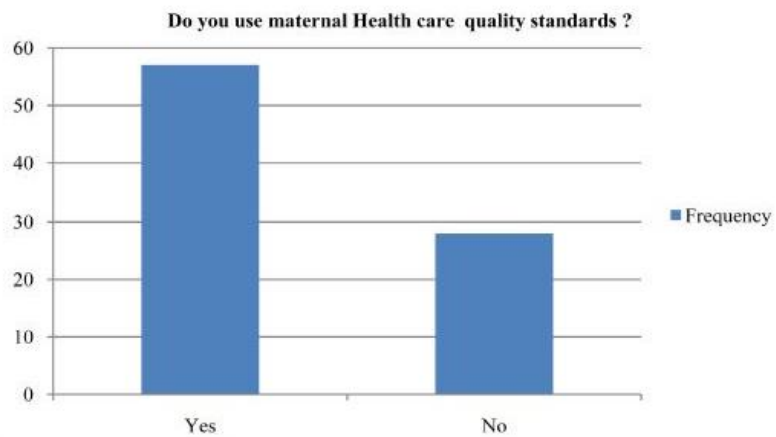


Figure 1. Use of maternal health care standards by the nurse-midwives.

health care is the care that meets the health care standards. Most (61.2%, $n = 52$) midwives had not been trained on maternal health care quality standards. Out of those trained, 39.4% ($n = 13$) were trained in college (Table 4). The average knowledge score for the maternal health care quality standards was 5.0 though individual average scores varied from between 4 and 8. Most (69.4%, $n = 59$) had a score of <7 (Table 3). The association between the participants' socio-demographic characteristics and their knowledge of the standards was not significant (Table 5).

3.4. Relationship between Knowledge and Use of Maternal Health Care Quality Standards

There was no significant relationship between nurse-midwives knowledge and use of maternal health care quality standards ($X^2 = 0.433$) (Table 6).

Table 4. Knowledge about maternal health care quality standards.

Variable	Category	Frequency	Percent	Cumulative Percent
What is quality maternal health care?	Care that makes the clients happy	7	8.2	8.2
	Care that delivers value for money	2	2.4	10.6
	Care that meets the needs of the clients	40	47.1	57.7
	Care that meets the laid down standards of care	36	42.3	100.0
Have you ever been trained on the use of maternal health care standards?	Yes	33	38.8	38.8
	No	52	61.2	100.0
Trainer	College	13	39.4	39.4
	NGO	5	15.2	54.6
	Hospital Management	9	27.3	81.9
	County Health Team	4	12.1	94.0
	Other	2	6.0	100.0
Maternal health care quality standards knowledge scores	4 - 6	59	69.4	69.4
	7 - 10	26	30.6	100

Table 5. Relationship between knowledge of maternal health care quality standards and participants' demographic characteristics.

		Knowledge about maternal health care standards
Gender	Pearson Correlation	0.101
	Sig. (2-tailed)	0.509
	N	85
Highest qualification level	Pearson Correlation	0.048
	Sig. (2-tailed)	0.664
	N	85
Years of experience	Pearson Correlation	0.032
	Sig. (2-tailed)	0.774
	N	85

Continued

	Pearson Correlation	0.137
Period in maternity	Sig. (2-tailed)	0.0211
	N	85
	Pearson Correlation	0.362
	Sig. (2-tailed)	0.001
	N	85

Table 6. Relationship between knowledge and use of maternal health care quality standards.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.614 ^a	1	0.433		
Continuity Correction ^b	0.284	1	0.594		
Likelihood Ratio	0.627	1	0.428		
Fisher's Exact Test				0.466	0.300
Linear-by-Linear Association	0.607	1	0.436		
N of Valid Cases	85				

3.5. Nurse-Midwives' Attitude towards Maternal Health Care Quality Standards

Majority (88.2%, $n = 75$) of the participants indicated support for the use of maternal health care standards with only ten participants (11.8%) not supporting (Figure 2). Among those supporting, half (50.7%, $n = 38$) did so since the maternal health care standards standardize the care provided. Out of the ten participants who don't support the use of maternal health standards, seven (70%) indicated that the standards would be time-consuming (Table 7).

3.6. The Relationship between Nurse-Midwives' Attitude towards the Use of Maternal Health Care Quality Standards and Demographic Characteristics

There is a significant association between nurse-midwives gender, the period in maternity, and support for the use of maternal health care standards at $r = 0.251$ and $r = -0.242$ respectively. The other demographic characteristics are not significantly associated (Table 8).

3.7. Relationship between Nurse-Midwives Knowledge, Attitude, and Use of the Maternal Health Care Quality Standards

Support for the standards is not significantly influenced by the nurse-midwives knowledge about the standards ($X^2 = 0.156$) (Table 9). There was no relationship between the support for and use of the standards ($X^2 = 0.008$) (Table 10).

Table 7. Nurse-midwives attitude toward the use of maternal health care quality standards.

Variable	Category	Frequency	Percentage	Cumulative Percentage
Do you support the use of Maternal health care standards?	Yes	75	88.2	88.2
	No	10	11.8	100.0
Reason for supporting the use of maternal health care standards	Care standardization	38	50.7	50.7
	Makes work easier	5	6.7	57.4
	Ensure quality of care	32	42.6	100.0
Reasons for opposing the use of maternal health care standards?	Time-consuming	7	70.0	70.0
	staff are highly qualified	2	20.0	90.0
	Requires a lot of resources	1	10.0	100.0

Table 8. Relationship between nurse-midwives' attitude towards the use of maternal health care standards and demographic characteristics and knowledge.

		Nurse midwives support for use of maternal health care standards
Gender	Pearson Correlation	0.251*
	Sig. (2-tailed)	0.021
	N	85
Age	Pearson Correlation	0.205
	Sig. (2-tailed)	0.060
	N	85
Marital Status	Pearson Correlation	0.046
	Sig. (2-tailed)	0.676
	N	85
Period in Maternity	Pearson Correlation	0.242*
	Sig. (2-tailed)	0.026
	N	85
Length of Practice	Pearson Correlation	0.162
	Sig. (2-tailed)	0.139
	N	85
Training on Maternal Health Care Standards	Pearson Correlation	0.026
	Sig. (2-tailed)	0.812
	N	84

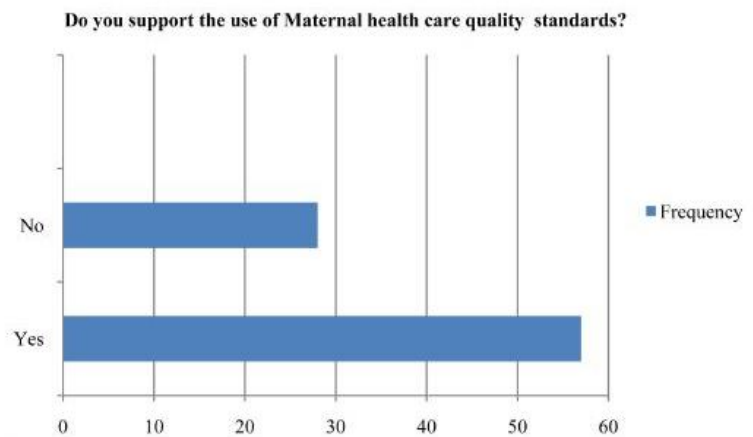


Figure 2. Nurse-midwives support for the use of maternal health care quality standards.

Table 9. Relationship between nurse-midwives' knowledge and attitude toward the use of maternal health care quality standards.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.011 ^a	1	0.156		
Continuity Correction ^b	1.109	1	0.292		
Likelihood Ratio	1.874	1	0.171		
Fisher's Exact Test				0.271	0.146
Linear-by-Linear Association	1.988	1	0.159		
N of Valid Cases	85				

Table 10. Relationship between nurse-midwives attitude and use of maternal health care quality standards.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.046 ^a	1	0.008		
Continuity Correction ^b	5.273	1	0.022		
Likelihood Ratio	6.579	1	0.010		
Fisher's Exact Test				0.013	0.013
Linear-by-Linear Association	6.963	1	0.008		
N of Valid Cases	85				

4. Discussion

In this study, majority of the participants (84.7%) were females and most of them were married. This finding may be because nursing originated as a caring

profession. In most cases, it is the women who are involved in caring for the sick. This is consistent with a study finding by Ndirangu *et al.* that the majority of the nurse-midwives are female [11]. Regarding the age of the participants, the majority of the participants were aged between 20 - 29 years. This might be due to the deployment pattern in the hospital. Maternity being a labor-intensive department the management tends to place younger nurses there since they are considered more energetic. However, this finding differs from the findings of Gitonga which showed that the majority of the nurse-midwives in maternity are aged 30 - 35 years [12]. Most of the participants in this study were diploma holders. This can be explained by the fact that the number of certificate training programs in Kenya decreased as up-grading programs from certificate to diploma were being introduced as well as the presence of many medical training colleges offering diploma training as opposed to those offering degree-level training. This finding is in tandem with that by Tallam *et al.* who in their study on Midwives' self-perceived confidence in their knowledge and skills in Kenya indicated that the majority of the participants were diploma holders [13]. Most of the participants had practiced for between 1 - 9 years. This may be because most of the nurse-midwives deployed in maternity are young.

Only 42.3% of the participants correctly specified that quality maternal health care is care that met the laid down standards with the majority indicating it refers to care that responds to the needs of the client. This could be due to the lack of training of nurse midwives on maternal health care quality and quality standards. Training in-service nurse-midwives is an important undertaking to ensure that they are abreast with the best practices. Incidentally, this study identified that only 38.8% of the nurse-midwives are trained on the maternal health care standards and most of these were trained in college. Furthermore, only 30.6% demonstrated adequate knowledge about maternal health care standards. This finding concurs with the assertion by WHO *et al.* that only 18.5% of health care workers are equipped with the necessary knowledge and skills to provide quality obstetric care [14]. Most of the in-service training is carried out by Non-Governmental Organizations which has dwindled since the inception of devolution in Kenya [12].

The majority of the nurse-midwives interviewed in this study supported the use of maternal health care standards since they standardized the quality of maternal care. This finding is consistent with several other studies such as those by Wahabi *et al.*, Melanie, and Hendaus *et al.* [15] [16] [17]. Most of the participants who do not support the use of the standards indicated that it would be time-consuming. This is maybe because a nurse-midwife is required to follow every step as stipulated in the guidelines. With the current nurse-to-patient ratio of 25:10,000 as opposed to the required ratio of 83:10,000, this becomes an issue. This finding is different from that of Zheng *et al.* [18].

5. Conclusion

The level of knowledge about maternal health care quality standards among

nurse-midwives is inadequate though their attitude towards them is positive. There is a need to carry out in-service education and training on maternal health care quality standards and specifically on the use of WHO (2016) standards for improving the quality of maternal health care. Maternal health care standards for quality improvement should also be added as content to the training curricula for diploma and bachelor nursing students.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix 2: Publication on Adherence to labor and delivery care quality standards and associated factors among nurse-midwives in two public teaching and referral hospitals in Kenya: a cross-sectional survey

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Adherence to labor and delivery care quality standards and associated factors among nurse-midwives in two public teaching and referral hospitals in Kenya: a cross-sectional survey

 Domisiano Koome Impwii, Lucy Kivuti-Bitok, Anna Karani

Corresponding author: Domisiano Koome Impwii, School of Nursing and Public Health, Chuka University, Chuka, Kenya. koomeimpwii@gmail.com

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Adherence to labor and delivery care quality standards and associated factors among nurse-midwives in two public teaching and referral hospitals in Kenya: a cross-sectional survey

Domisiano Koome Impwii^{1,8}, Lucy Kivuti-Bitok², Anna Karani²

¹School of Nursing and Public Health, Chuka University, Chuka, Kenya, ²School of Nursing Sciences, University of Nairobi, Nairobi, Kenya

⁸**Corresponding author**

Domisiano Koome Impwii, School of Nursing and Public Health, Chuka University, Chuka, Kenya

Abstract

Introduction: maternal mortality is a major health concern, especially in low and middle-income countries. In Kenya, about 362 maternal deaths occur in every 100,000 live births. Seventy-five percent of these deaths can be prevented through the provision of quality care, especially during labor and delivery as per the quality standards. The objective of this study was to establish the level of adherence to labor and delivery care quality standards among nurse-midwives, and the factors hindering the adherence. **Methods:** a descriptive, cross-sectional survey was carried out in the

maternity units of Embu and Meru Teaching and Referral hospitals in Kenya. A total of 51 Nurse-midwives were involved in the study. Data on adherence was collected through direct observation using an observation checklist, whereas that of factors hindering adherence was collected through face-to-face interviews using a semi-structured questionnaire. Data were checked, coded, and entered into EPI Info version 7.1.2. SPSS Version 25.0 was used to analyze data. Associations between variables were tested using Pearson correlation and Fisher's exact tests at 95% CI. **Results:** most of the participants (60.7%, n=31) were diploma holders, and a half (51%, n=26) were aged 20-29 years. About half (51%, n=26) had practiced for between 1 and 9 years and 43.1% (n=22) had worked in the maternity unit for more than a year. Out of the 12 quality standards assessed, only 5 (41.7%) were adhered to. Major implementation challenges include unavailability of standards (n=98.0%, n=50), inadequate supplies (96.1%, n=49), inadequate knowledge (88.2%, n=45), and an overwhelming workload (86.3%, n=44). There is a significant correlation between the highest level of qualification and lack of knowledge of quality standards ($r=-0.279$, $p=0.05$). **Conclusion:** adherence to labor and delivery care quality standards is low among nurse-midwives. Stakeholders must allocate more resources for training and the provision of adequate supplies. The facilities should also source for and customize the quality standards to promote greater adherence.

Introduction

Maternal mortality remains a major health concern bedeviling many countries globally with about 295,000 mothers dying due to pregnancy-related complications each year [1]. In sub-Saharan Africa, it is estimated that 196,000 maternal deaths occur annually accounting for 66% of the global maternal deaths [1]. In Kenya, the current maternal mortality ratio (MMR) is 362 deaths per 100,000 live births which is way above the global level of 211 [2]. Hemorrhage, hypertensive disorders, and sepsis remain the most common direct causes of maternal

mortality, especially in sub-Saharan Africa [3,4]. In Kenya, obstetric hemorrhage and hypertensive disorders account for most of the direct causes of maternal deaths [5-7]. These occur mainly during labor, delivery, or in the immediate postpartum period. Due to this fact, it has been argued that most maternal deaths can be reduced if mothers are delivered under the care of medically trained and licensed healthcare personnel. To this end, many countries in Africa, Kenya included, have either waived or decreased delivery fees in public health facilities to promote their use by mothers. In Kenya, the waiving of delivery fees saw public health facility-based deliveries increase by 26.8% [8-10].

However, studies have shown that increasing accessibility does not significantly reduce the National MMR due to the poor quality of maternal health care [3, 11-13]. A confidential inquiry into maternal deaths carried out in 2017 in Kenya revealed that about 50% of maternal deaths were a result of substandard care and 92.4% received sub-optimal care during labor and delivery [7]. From the foregoing, it can be deduced that to reduce maternal mortality it is fundamental that quality of care is addressed [9]. Maternal health quality of care standards such as those developed by WHO (2016) are required to be utilized by health facilities to measure and continually improve quality of care [9]. Twelve of these standards relate to evidence-based practices for routine care and seven relate to the management of complications which have a greater impact in drastically reducing MMR if adhered to [9].

Adhering to quality of care standards improves quality of maternal health care provided. This in turn has the capacity of reducing maternal mortality by three quarters. Unfortunately, there are very few documented studies, if any, on the extent of adherence to quality of care standards by health facilities. Due to this, the quality of maternal health care being provided in the health facility cannot be stated with certainty. Therefore, the findings of this study will provide much needed information on the extent to which the health

facilities are adhering to maternal health quality of care standards and any challenges that could be hindering the adherence. This will help the policy makers and program supervisors to come up with strategies to improve adherence, which would eventually improve quality of care and reduce maternal mortality.

Objectives: this study was carried out to 1) evaluate the extent to which labor and delivery care quality standards are adhered to, and 2) the challenges hindering compliance. Specifically, the study sought to determine the level of adherence on performance standards related to history taking and examination of mother in labor, appropriate care of mother during labor as well as assisting the mother have a clean and safe delivery. Additionally, the study sought to find out the level of adherence to standards on active management of third stage of labor, management of mothers in the immediate post partum period as well as instrument processing and waste management after delivery. This information is useful to all the stakeholders involved in ensuring that high-quality care is provided to mothers during labor, delivery and the immediate postpartum period thus reducing the risk of maternal mortality.

Methods

Study design: a descriptive cross-sectional survey was carried out in Embu and Meru Teaching and Referral hospitals in Embu and Meru County respectively between December 2021 and March 2022.

Study setting: the study targeted nurse-midwives working in the maternity units of the Embu and Meru level five teaching and referral hospitals. Embu hospital is the largest referral hospital in the eastern south region serving Embu county and the surrounding counties of Tharaka Nithi, Kitui and parts of Machakos and Kirinyaga. It is located in Embu County at Latitude: 0° 31' 52.03" N and Longitude: 37° 27' 2.20" E coordinates. It has a 166-bed capacity maternity unit. Approximately 3,100 deliveries and 1,200 caesarian sections are

conducted annually. In 2022, seven maternal deaths and forty two fresh still births occurred. Meru hospital is the largest referral hospital in the Eastern North region. It serves Meru county and the surrounding counties of Isiolo, Marsabit and Samburu. It is located in Meru County within Meru Municipality at latitude 0° 02' 46.54" N and Longitude: 37° 39' 21.13" E coordinates. It has a 128 bed capacity maternity unit. Approximately 3,300 deliveries and 1,700 caesarian sections are conducted annually. In 2022, six maternal deaths and thirty-four fresh still births occurred.

Participants: the study involved nurse-midwives specifically in the antenatal and labor wards. Only nurse midwives who had worked in the unit for a period of six months or more and who consented were included in the study.

Variables: adherence to labor and delivery care standards refer to the extent to which the nurse midwives followed the laid down procedure during admission and management of the mother during admission, labor, delivery, and the immediate postpartum period. Each standard has specific actions referred to as the verification criteria (Table 1). Challenges refer to factors that prevent the nurse-midwife from carrying out an action as specified in the verification criteria or make the nurse-midwife carry out the action incorrectly. The potential confounders were the age and experience of the midwives. Training on basic and comprehensive essential obstetric care was considered to be an effect modifier.

Data sources/measurements: data on adherence to care standards were collected through direct observation of midwives through an observation checklist as they admitted and cared for the mother during labor, delivery, and the immediate postpartum period. Data on challenges hindering the use of standards was collected through face-to-face interviews using a semi-structured questionnaire. The observation checklist was adapted from an assessment tool for measuring quality using the Standard based management - Recognition (SBM-R) quality improvement strategy

by the ministry of health -Tanzania, 2011. The questionnaire was developed by the authors. The validity of the study instruments was tested by using carefully selected experts who examined the contents of the study instruments to determine whether the test was valid. A test-re-test method was used to ensure reliability, where the participants completed the same instruments at two different times. This method was used since the characteristic that was being measured does not change over time. The correlation coefficient(r) was then calculated, and a score of 0.82 was obtained, which is within the > 0.70 - 0.90 range, which is considered high. To avoid contamination the study instruments were tested in Chuka level 4 hospital and adjustments were made based on the findings of the pretest.

Bias: Hawthorne effect could influence nurse-midwives practice. To control this, nurse midwives were not informed of the specific variables being observed. Additionally, the participants were observed first and interviewed later.

Study size: a census was used to select the participants from the two health facilities. The sample size comprised 56 nurse-midwives, of which 29 and 27 were from Embu and Meru teaching and Referral hospitals respectively.

Quantitative variables: a standard is considered either adhered to or not. A standard is considered adhered to if all the nurse midwives observed carries out correctly all the actions as indicated in the verification criteria.

Data analysis: data collected were checked for completeness and consistency at the end of each day. Analysis of the data was done using Statistical Package for Social Scientists (SPSS) version 25.0 Descriptive statistics were used to present participants' characteristics, nurse-midwives compliance with standards guidelines as well as the compliance challenges. Pearson's correlation and Fisher's exact tests were used to test the relationships between variables at 95%CI. Both tests were selected since the data was quantitative.

Fisher's exact test was used as it is recommended for testing relationship between quantitative variables when the sample is small. Pearson's correlation was used in order to determine the strength of relationship between variables. The relationship between compliance with the standards, socio-demographic characteristics, and barriers to compliance were tested.

Ethical considerations: ethical clearance to carry out the study was obtained from KNH/UON Ethics and Research Committee vide license no. KNH-ERC/A/468. Authorization to conduct the study at the two hospitals was given by the Medical Superintendent following perusal and approval of the research proposal by the research committee of the facility. Recruitment of the study participants was voluntary as no coercion or inducement was used. Informed and written consent was obtained from each participant after explaining the purpose of the study to each participant. Confidentiality of the information obtained was maintained by ensuring that no personal identifier is indicated in the questionnaire.

Results

Participants: a total of 51 nurse midwives participated in the study out of 56 sampled, translating into a 91.1% response rate. Out of these, 52.9% ($n=27$) and 47.1% ($n=24$) were from Embu and Meru teaching and referral hospitals respectively. Out of those sampled, two nurse-midwives from Embu and two from Meru Hospital did not participate because they were on annual leave. Additionally, one nurse-midwife from Meru did not participate since she was on long sick leave during the period of study.

Characteristics of participants: most of the participants, 90.2% ($n=46$) were female and 60.7% ($n=31$) were diploma holders. Half of the participants (51%, $n=26$) were aged between 20 and 29 years. Regarding the experience of the respondents, the majority of the respondents, 51% ($n=26$) had practiced nursing for 1-9 years and 43.1% ($n=22$) had worked in the maternity unit for

between six months and 1 year (Table 2). There is a positive correlation between experience and duration in the maternity unit ($r=0.303$, $p=0.05$).

Nurse-midwives adherence to standards of care during labor and delivery: the study sought to determine the extent to which the nurse-midwives were implementing the standards. Each of the nurse mid-wife admitted, assessed, and managed a mother in labor from the first stage of labor up to the immediate postpartum period. An observation checklist was used to assess whether the stipulated action is carried out and if it is carried out correctly. A total of 12 performance standards were observed out of which only 41.7% ($n=5$) were adhered to (Table 3). There was no correlation between nurse-midwives demographic characteristics and adherence to the standards of care.

Challenges hindering adherence to standards of care during labor and delivery by nurse-midwives: the study sought to determine the challenges preventing nurse-midwives from complying with standards of care during labor and delivery. All the respondents, 100% ($n=51$) indicated that they were facing compliance challenges. The participants were then given several challenges and were asked to indicate whether they were important, undecided, or not important. Challenges indicated as important by a majority of the respondents include the unavailability of quality standards (98.0%, $n=50$) and inadequate supplies (96.1%, $n=49$). Other challenges include overwhelming workload (86.3%, $n=44$), lack of knowledge of standards (88.2%, $n=45$), and lack of incentives (82%, $n=41$) (Table 4). There is a significant correlation between the highest level of qualification and lack of knowledge of quality standards ($r=-0.279$, $p=0.05$).

Discussion

Demographic characteristics: most of the participants in this study were females aged between 20-29 years and had practiced for between 1-9 years. This could be attributed to the common practice in the deployment of nurse-

midwives in most hospitals in Kenya, where younger nurses tend to be deployed in the maternity department. These findings disagree with others that assert that most of the nurses in Kenya are aged 31-40 years and 40-49 years respectively [10,11]. A majority (60.8%) of the nurse-midwives in this study were diploma holders. This could be explained by the fact that Kenya has more diploma training institutions and most of the certificate nurses have undertaken an upgrading program as directed by the Nursing Council of Kenya (NCK). This concurs with findings in other studies that most of the nurses in Kenya are diploma holders [10,11].

Adherence to standards: out of the 12 standards of care observed, only 41.7% ($n=5$) were adhered to. Low scores in adherence to performance standards have been reported in other countries. In Afghanistan and Ethiopia for instance, before the introduction of a Standards-based management program, the adherence to standards was 26% and 28% respectively [12]. However, this contradicts findings from studies in Brazil where higher compliance scores were attained [13].

Challenges hindering adherence: lack of standards of care was an important compliance challenge, according to 98% ($n=50$) of the respondents. This was confirmed during the observation since the nurse-midwives could not produce a copy of the quality of care standards and guidelines. A copy of the standards acts as a resource for the nurse midwife. In its absence, the nurse-midwives may not be aware of what is expected of them. These findings agree with the findings by Babiker *et al.* and Fischer *et al.* that the absence of quality standards is a major impediment to their use [14,15].

Most of the participants, 96.1% ($n=49$) also cited inadequate supplies as an important challenge which was also noted during the observation. Some actions were not carried out or were carried out incorrectly because of a lack of essential supplies. These findings concur with those by Fischer *et al.*, Wamalwa, and Zheng *et al.* [14,16,17]. Inadequate

supplies may be due to inadequate funding by the national government since the management of hospitals was transferred to the county government following the promulgation of the 2010 Constitution of Kenya [8,18].

A majority of the respondents (86.3%, n=44) reported that they are unable to adhere to the standards because of the overwhelming workload. This may be attributable to severe staff shortages. This was noted during the study period where in many instances there were only two nurse-midwives per shift. This finding is identical to that of Wamalwa [16]. Staff shortage may be explained by high staff turnover due to natural attrition and the out-migration of nurses to European countries coupled with a moratorium on employment [10].

Inadequate knowledge of the standards was also reported by a majority of nurse-midwives (88.2%, n=45). This was also noted during the observation where some nurse-midwives were not aware of some of the actions that needed to be undertaken especially during the management of labor. This may be due lack of training and updates attributable to inadequate resources for training by the county and hospital management coupled with the withdrawal of donors who carried out most of the in-service training. Furthermore, there was no evidence that the ministry of health adapted and disseminated the WHO maternal health care standards at the health facility level. These findings agree with the findings in other studies [14,15,19]. This study enables the stakeholders to understand the quality of care being provided and the challenges thereof. This will enable them to come up with measures to address the challenges to improve quality. This study also has limitations that should be noted. Firstly, only a small sample was involved from only two health facilities all of which are public. Expanding the study to involve more facilities and also a comparison with private health facilities could be advantageous. Causation also cannot be established since the study utilized a cross-sectional approach.

Conclusion

Adherence to the standards of care during labor and delivery amongst nurse-midwives is low. This is attributable to compliance challenges including lack of the standards, inadequate supplies, inadequate knowledge of the standards, and overwhelming workload. It is recommended that stakeholders need to allocate more resources for in-service training or update, and the provision of adequate supplies. The facilities should also source for and customize the quality standards to promote greater adherence. Further studies need to be carried out on the knowledge and skills level of the nurse-midwives in the management of obstetric emergencies especially postpartum hemorrhage and pregnancy-induced hypertension.

What is known about this topic

- *The maternal mortality ratio is high in Kenya;*
- *Quality maternal care especially during labor, delivery, and immediate post-natal period can reduce maternal deaths by about 75%;*
- *Quality can be improved if health care providers adhere to standards of care.*

What this study adds

- *Adherence to standards of care during labor and delivery by nurse-midwives is low;*
- *Nurse-midwives are facing major compliance challenges such as the unavailability of the standards, inadequate knowledge about the standards coupled with inadequate supplies, and an overwhelming workload that hinders adherence.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Domisiano Koome Impwii conceptualized the study, sought ethical approval, and collected data. Domisiano Koome Impwii and Lucy Kivuti-Bitok analyzed and interpreted the data and drafted the manuscript. Anna Karani critically revised the manuscript for important intellectual content. All authors read and approved the final version of the manuscript.

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Tables

Table 1: an example of a standard with verification criteria

Table 2: demographic characteristics of the participants

Table 3: nurse-midwives' adherence to standards of care during labor and delivery

Table 4: challenges hindering adherence to standards of care by nurse-midwives during labor and delivery

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Table 1: an example of a standard with verification criteria

Performance standards	Verification criteria	Yes, No, Not Applicable	Comments
9. The provider adequately performs active management of the third stage of labor	Observe if the nurse-midwife: palpates the mother's abdomen to rule out the presence of a second baby (without stimulating contractions)	/	/
	Tells the woman that she will receive an injection of oxytocin	/	/
	Administers 10 IU of oxytocin IM within 1 minute of birth	/	/
	Performs controlled cord traction	/	/
	After the expulsion of the placenta, massages the uterus with one hand on a clean/sterile cloth over the abdomen, until the uterus contracts firmly	/	/
	Examines the placenta and membranes to check if complete	/	/
	Measures blood loss; if the woman's condition is affected by the blood loss, decides immediate action	/	/

Table 2: demographic characteristics of the participants

Variable	Category	Frequency	Percentage	Cumulative percentage
Gender	Male	5	9.8	9.8
	Female	46	90.2	100.0
Age	20 - 29 years	26	51.0	51.0
	30 - 39 years	16	31.4	82.4
	40 - 49 years	6	11.7	94.1
	50 years and above	3	5.9	100.0
Marital status	Never married	22	43.1	43.1
	Married	27	53.0	96.1
	Divorced/separated/widowed	2	3.9	100.0
Highest academic qualification	Certificate	1	2.0	2.0
	Diploma	31	60.7	62.7
Length of practice	Degree and above	19	37.3	100.0
	Less than 1 year	14	27.4	27.4
	1 - 9 years	26	51.0	78.4
	10 - 19 years	5	9.8	88.2
	20 - 29 years	6	11.8	100.0
Duration in maternity	<6months	13	25.5	25.5
	6months-1 year	16	31.4	56.9
	>1 year	22	43.1	100.0

Table 3: nurse-midwives' adherence to standards of care during labor and delivery

Standard of care	Verification criteria achieved	Verification criteria not achieved	Standard of care adhered to? (Yes, No, NA)
The nurse midwife: undertake a quick general assessment of the expectant mother in labor to identify signs of complications to prioritize care	9	2	N
Properly gathers and correctly documents the clinical history of the mother in labor	10	0	Y
Properly carries out physical examination between contractions	4	3	N
Properly conducts the obstetric examination	6	0	Y
Properly conducts a vaginal examination	8	0	Y
Plans and implements appropriate care during labor based on the history and physical examination results/findings	4	2	N
Uses the partograph to monitor labor and make adjustments to care	3	4	N
Assists the mother to have a clean and safe delivery	8	3	N
Correctly carries out active management of the third stage of labor	7	0	Y
Adequately performs immediate postpartum care	6	2	N
Properly clears the used instruments and disposes of medical waste after delivery	4	4	Y
Closely monitors the mother for at least two hours after delivery	0	5	N
Total number of performance standard			5(40.7%)

Table 4: challenges hindering adherence to standards of care by nurse-midwives during labor and delivery

Variable	Category	Frequency	Percentage	Cumulative percentage
Standards not available	Important	50	98.0	98.0
	Undecided	0	0	98.0
	Not important	1	2.0	100.0
Inadequate supplies	Important	49	96.1	96.1
	Undecided	0	0	96.1
	Not important	2	3.9	100.0
Overwhelming workload	Important	44	86.3	86.3
	Undecided	2	3.9	90.2
	Not important	5	9.8	100.0
Inadequate knowledge of standards	Important	45	88.3	88.3
	Undecided	4	7.8	96.1
	Not important	2	3.9	100.0
Lack of incentives	Important	37	72.5	72.5
	Undecided	5	9.8	82.3
	Not important	9	17.3	100.0
Lack of management support	Important	6	11.8	11.8
	Undecided	30	58.8	70.6
	Not important	15	29.4	100.0

Appendix 3: Consent Form

Title of Study: **Impact of a Training Intervention on Nurse-midwives' Utilization of Maternal Health Quality of Care Standards in Selected Regional Referral Hospitals in Kenya.**

Principal Investigator: **Koome Domisiano Impwii of Chuka University; PhD student of University of Nairobi, School of Nursing Sciences.**

Introduction:

I would like to tell you about a study being conducted by the above listed researcher. The purpose of this consent form is to give you the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. You should understand the general principles which apply to all participants in a medical research: i) Your decision to participate is entirely voluntary ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal iii) Refusal to participate in the research will not affect the services you are entitled to in this health facility or other facilities. We will give you a copy of this form for your records.

May I continue? **YES / NO**

This study has approval by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee protocol No. KNH-ERC/A/468.

WHAT IS THIS STUDY ABOUT?

The researcher listed above is interviewing individuals who are nurses/midwives working in Maternity Unit. The purpose of the interview is to find out the extent to which maternal health care standards are being implemented and factors that may be facilitating or hindering their implementation. Participants in this research study will be asked questions about maternal health care standards in midwifery practice. Participants will not be required to undergo any tests. There will be approximately 83 participants in this study randomly chosen. We are asking for your consent to consider participating in this study.

WHAT WILL HAPPEN IF YOU DECIDE TO BE IN THIS RESEARCH STUDY?

If you agree to participate in this study, the following things will happen: You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately 10 minutes. The interview will cover topics such as what maternal care standards are, whether you use them in your practice as well the challenges you encounter in implementing them among others. At the end we will ask for a telephone number where we can contact you if necessary. If you agree to provide your contact

information, it will be used only by people working for this study and will never be shared with others. The reasons why we may need to contact you include in case we need to get additional information from you and/or share our findings with you.

ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?

Medical research has the potential to introduce psychological, social, emotional and physical risks. Effort should always be put in place to minimize the risks. One potential risk of being in the study is loss of privacy. We will keep everything you tell us as confidential as possible. We will use a code number to identify you in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study and could find out information about you. Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview. It may be embarrassing for you to answer some questions. We will do everything we can to ensure that questions are asked in private. Furthermore, all study staff and interviewers are professionals with special training in these interviews.

ARE THERE ANY BENEFITS BEING IN THIS STUDY?

You may benefit by receiving free training and latest materials on maternal and New-born care that will sharpen your knowledge and skills. Also, the information you provide will help us better understand issues related to the quality of maternal health care. This information is a contribution to science, obstetrics nursing and health care management.

WILL BEING IN THIS STUDY COST YOU ANYTHING?

Participating in this study has no cost implication.

WHAT IF YOU HAVE QUESTIONS IN FUTURE?

If you have further questions or concerns about participating in this study, please call or send a text message to the study staff at the number provided at the bottom of this page. For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email uonknh_erc@uonbi.ac.ke. The study staff will pay you back for your charges to these numbers if the call is for study-related communication.

WHAT ARE YOUR OTHER CHOICES?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits.

CONSENT FORM (STATEMENT OF CONSENT)

Participant’s statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw any time. I freely agree to participate in this research study. I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study. I agree to participate in this research study:

I agree to provide contact information for follow-up: Yes/ No.

Participant printed name: _____.

Participant signature / Thumb stamp _____ **Date** _____

Researcher’s statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

Researcher’s Name: _____ **Date:** _____ **Signature** _____

Role in the study: _____

For more information, contact **Koome D. Impwii** at **0720 833 787** at any time of the day

Appendix 4: Questionnaire for Nurse-Midwives

Questionnaire number.....Facility.....ward.....

PI/Designee initials.....

INSTRUCTIONS

Please do not write your name anywhere in the questionnaire

Put a tick in the box next to the right response

Where no responses/ choices are provided, please write the response in the spaces provided

PART 1: Socio-Demographic Characteristics

1. What is your gender?

Male []

Female []

2. How old are you in completed year? _____years

3. Which is your current marital status?

[] Never Married

[] Married

[] Divorced/separated/widowed

4. Which religion do you subscribe to?

[] Catholic

[] Protestant

[] Muslim

[] Hindu

[] Other (please specify).....

5. Which is your highest qualification?

[] Certificate

[] Diploma

[] Degree and above

6. For how long in completed years have you practiced as a nurse/midwife? _____

7. In which ward are you currently deployed?
- Labor ward
 - Antenatal
 - Post- natal
 - New-born Unit
8. For how long have you been in maternity department? _____
9. What is your major responsibility?
- Staff nurse
 - Nurse- manager
 - Nurse counselor
 - Nurse trainer
 - Other (Please specify)

PART 2: Level of Knowledge about Maternal Health Care Standards

10. Have you ever been trained on how to ensure quality of maternal health care?
- Yes
 - No
11. If yes, how long ago?.....
12. In your own opinion what do you consider to be quality maternal health care? (Please tick one)
- Care that makes the clients happy
 - Care that delivers value for money
 - Care that responds to the needs of the clients
 - Care that meets the laid down standards of care
13. Have you ever heard about maternal health care standards?
- Yes
 - No
14. If yes, from who?
- In college
 - Mass media
 - NGO
 - Hospital management
 - County health team
 - Other (specify).....

15. Have you ever been trained on the use of maternal health care standards?

Yes

No

16. If yes, by who?

In college

NGO

Hospital management

County health team

Other (specify).....

17. Have you ever seen the maternal health care standards in this facility?

Yes

No

For questions 18 to 27, indicate if the statement is True (T) or False (F)

	Question	True(T)	False(F)
18.	The midwife should ask the mother about history of diarrhea and vomiting on admission		
19.	A mother should be encouraged to have a birth companion during labor		
20.	The level of engagement and degree of moulding should be assessed during a vaginal examination		
21.	Uterine contractions should be palpated over a 5 min period		
22.	Temperature and blood pressure should be assessed 2hourly during labor		
23.	The fetal heart should be auscultated every 15 min in the second stage of labor		
24.	Used equipment should be decontaminated in 0.5% chlorine solution before cleaning in soap and water		
25.	Magnesium sulfate should be initiated immediately the blood pressure is >150/100		
26.	Signs of magnesium toxicity include respiration and urine output should be documented hourly until the condition improves		
27.	Blood for culture and sensitivity should be taken for a patient with suspected puerperal sepsis		

PART 3: Attitude of Nurse-Midwives towards Use of Maternal Health Care Standards

28. Do you think your facility is offering quality maternal health care to expectant mothers?

- Yes
- No
- Not sure

29. If yes, why do you think so?

- Mothers are attended promptly
- Maternal deaths are few
- Many mothers deliver here
- The staffs are highly qualified
- The standards of care are followed
- Other (specify).....

30. Do you use maternal health care standards in delivering care to expectant mothers in this facility?

- Yes
- No

31. If yes, why?

- Requirement by the management
- Standardization of care
- Makes work easier
- Ensure quality of care provided
- Other specify (specify).....

32. If no, why?

- They are not available
- I don't see the need since I know what should be done
- Time consuming referring to them
- Disagree with their suggestions
- Other (specify).....

33. Do you support the use of maternal care standards provision of maternal in this unit?

- Yes

No

PART 4: Barriers to the Use of Maternal Health Care Standards

34. Is there a copy of maternal and New-born care standards by WHO or any other body/organization in this department?

Yes

No

35. If there is by other organizations other than WHO, which one?

JHPIEGO

APHIA

County

Training institutions

Other (please specify.....)

36. Is there a policy on the use of standards and guidelines in this facility?

Yes

No

37. How do you rate the management/ supervisor's concern for the use of standards and guidelines?

High

Average

Low

38. How do you rate the following as barriers that hinder or may hinder your use of maternal health care standards?

	Important	Undecided	Not important
Standards not available			
Standards not easily accessible			
Lack of knowledge on how to use them			
The standards are difficult to use			
Inadequate resources for their utilization			
Lack of incentives for their use			
Heavy workload			
Other (specify).....			

Thank you for your participation

Appendix 5: Focus Group Discussion Guide for a Discussion with Nurse-midwives In-charges

1. The facilitator will introduce him/herself and then request the members present to introduce themselves
2. Do you consider maternal mortality to be a problem in this facility? For- example how many maternal deaths in the last one year?
3. What could be contributing to the maternal deaths? **Probe more on these factors and especially on quality?**
4. Do you think that the facility is offering quality maternal and New-born care? **Probe more on the reasons for the answer**
5. Several organizations have come up with standard and guidelines of maternal new-born care such as the regulatory bodies, NGO and most recently the WHO. Have you availed these documents I this facility? If no, why?
6. If yes, are you monitoring their implementation? **probe on how often and the methodology; find out if there is any documentation.**
7. What is the attitude of the staff towards these documents? positive or negative; **Probe the reason for this?**
8. What measures do you think should be implemented to promote the use of the maternal care standards in the provision of maternal and new-born care in this facility?
9. What are some of the challenges are you experiencing or anticipating in implementing the standards of maternal care? probe their suggestions on how these challenges can be addressed.
10. Find out if there is anything the participants would wish to add.
11. Thank the participant for their time

Appendix 6: Observed Practice Checklist

(Adapted from “Assessment tool for measuring quality using the SBM-R Quality improvement strategy by the Ministry of Health-Tanzania; 2011:

Quality statement1: Women are assessed routinely on admission and during labour and childbirth and are given timely, appropriate care					
Performance Standards			Y,N,NA	Comments	Score
1. The nurse/midwife undertake a quick general assessment of the expectant mother in labour to identify signs of complications so as to prioritize care		Observe if the nurse/midwife assesses each expectant mother at the admission desk as follows:			
	1.	Assesses signs imminent delivery such as desire to bear down and strong uterine contractions.			
		Inquire from the expectant mother on admission if she has or has had any of the following danger signs:			
	2.	Vaginal bleeding			
	3.	Severe difficulty breathing			
	4.	Fever			
	5.	Severe abdominal pain or looks very ill			
	6.	Convulsions or unconscious			
	7.	Severe headache/blurred vision			
2. The nurse/midwife properly gathers and correctly documents the clinical history of the mother in labour	8.	Takes appropriate immediate action in case any of the above signs is present			
	9.	Records the information on woman’s clinical history			
	1.	Gathers and records the mother’s clinical history in a private area			
	2.	Asks for client’s biographical and social information			
	3.	Asks about the last menstrual period (LMP, calculates the expected date of delivery(EDD) and maturity by dates			
	4.	Asks about the woman’s obstetric history			
	5.	Asks the woman about her current labour			
6.	Asks about general medical and surgical history				

	7.	Inquire whether the mother is allergic to any food and/or drugs			
	8.	Ask if the mother is on any medications including natural and herbal remedies			
	9.	Check if the mother has signs and symptoms or a diagnosis of sexually transmitted infections, HIV and TB			
	10.	Documents the information in the appropriate record			
3. The nurse/midwife properly carries out physical examination between contractions.	1.	Conducts the examination in a private environment without exposing the mother.			
	2.	Informs the mother and her companion about the procedure and encourages her to ask questions			
	3.	Asks the woman to urinate and tests urine for albumin			
	4.	Performs hand hygiene			
	5.	Takes or delegates taking of vital signs to assistant			
	6.	Examines the conjunctiva and palms of hands for pallor. If the mother is pale the midwife takes a blood sample for hemoglobin levels			
	7.	Documents the findings in the appropriate records			
4. The nurse/ midwife properly conducts the obstetric examination	1.	Inspects the abdominal shape and size and also notes the presence of scars and other skin lesions Avoids examining the woman during a contraction			
	2.	Determines foetal lie and presentation			
	3.	Assesses the degree of engagement of the fetal head by abdominal palpation (from five to zero fingers above the pubis)			
	4.	Palpates uterine contractions to determine the number and strength over a 10- minute period			
	5.	Auscultates foetal heart rate (FHR)			
	6.	Documents all the findings in the mother's file and in the partograph			

5. The nurse/midwife properly conducts a vaginal examination	1.	Explains the procedure to the mother in a simple language and encourages her to ask questions.			
	2.	Performs hand hygiene			
	3.	Puts sterile examination gloves on both hands			
	4.	Sensitively conducts a vaginal examination			
	5.	Without withdrawing the fingers, the nurse/midwife determines the cervical dilatation, effacement, position, moulding and station of the presenting part			
	6.	Washes hands after removing gloves			
	7.	Covers the, ensures she is comfortable and then explain findings and their meaning to her.			
	8.	Records the findings of the vaginal examination on the mother's file and partograph.			
6. The nurse/midwife plans and implements appropriate care during labour based on the history and physical examination results/findings	1.	Confer with the mother (and her companion if possible) about the care decisions.			
	Explain to the mother the importance of:				
	2.	Emptying her bladder regularly.			
	3.	Taking liquids and light foods whenever she wants			
7. The nurse /midwife uses the partograph to monitor labour and make adjustments to care	4.	Ambulating freely and regularly changing positions according to her desire and comfort			
	1.	Records patient information on partograph			
	2.	Records required partograph information every half hour			
	3.	Assesses and documents temperature and blood pressure four hourly.			
	4.	Performs and documents in the partograph vaginal examination every four hours or less according to labour progress.			
	5.	Records input and output			
Modifies the care according to the findings:					

	6.	If the findings are normal, continues the care as earlier planned. OR			
	7.	If the findings are abnormal, identifies complications, records the diagnosis and modifies the care in line with the diagnosis			
8. The nurse/midwife assists the mother have clean a safe delivery		Observe the nurse/midwife as she assists TWO women in labour and determine whether the he/she undertakes the following:			
	1.	Auscultate or requests the assistant to auscultate, foetal heart rate every 5 minutes as second stage progresses.			
	2.	Puts on personal protective equipment			
	3.	Cleans hands with soap and running water and dries them with a sterile towel, or applies alcohol-based hand sanitizer.			
	4.	Puts on two pairs of sterile gloves			
	5.	Cleanses the perineum using sterile cotton balls and an antiseptic solution			
	6.	Encourage the mother to bear down when she feels the desire during contractions and rest in between contractions			
	7.	Performs an episiotomy only if necessary			
	8.	Allows spontaneous crowning of the head while supporting the perineum			
	9.	After the emergence of the head, request mother to avoid bearing down and encourages to breath with her mouth			
	10.	Cleans the mouth and nose of the baby using a sterile gauze			
	11.	Assists in delivering the baby			

9. The nurse /midwife correctly carries out active management of the third stage of labour *	1.	Palpates the mother's abdomen to determine the possibility of a second baby (without stimulating contractions)			
	2.	Informs the mother she will be given oxytocin injection.			
	3.	Administers or instructs the assistant to administer on the thigh 10 IU of oxytocin within 1 minute of birth			
	4.	Performs controlled cord traction			
	5.	After the placenta is delivered, massages the uterus with one hand on a clean/sterile cloth over the abdomen while expelling the clots until the uterus contracts firmly			
	6.	Examines the placenta and membranes to check if complete			
	7.	Estimates the blood loss; and takes immediate action if the blood loss affects the woman's condition.			
10. The provider adequately performs immediate postpartum care	1.	Notifies the mother that she wants to examine the birth and canal and the cervix and then carefully and gently examines the vagina and perineum for any tears and /or lacerations.			
	2.	Gently cleanses the vulva and the perineum with sterile gauze and an antiseptic solution.			
	3.	Sutures tears, if necessary			
	4.	Palpates the abdomen to determine if the uterus is well contracted and if not, massages fundus			
	5.	Applies a clean sanitary pad on the perineum.			
	6.	Ensures that the mother is clean, hydrated and warmly covered.			
	7.	Covers the baby, adequately and gives the baby to the mother and requests her to initiate breastfeeding within an hour of birth			

	8.	Registers findings and events in clinical record			
11. The nurse /midwife properly clears the used instruments and disposes off medical waste after delivery	9.	Uses appropriate gloves while clearing used instruments and disposing off waste.			
	1.	Disposes the placenta in a leak-proof red coloured container with a red coloured plastic liner			
	2.	Discards medical waste (gauze, etc.) in inappropriate colour coded plastic bins with similar colour coded plastic bin liners.			
	3.	Places the used linen in a plastic container containing 0.5% chlorine solution ensuring they are fully immersed.			
	4.	Opens up all hinged instruments and puts them in a plastic container with 0.5% chlorine solution for 10 minutes			
	5.	Puts used needles and syringe in a tamper proof container /safety box.			
	6.	Cleans all the surfaces using 0.5% chlorine solution			
	7.	Removes the gloves and discards then in a bin with a yellow coloured a plastic bin liner			
	8.	Performs hand hygiene after removing gloves			
12. The nurse/midwife closely monitors the mother for at least two hours after delivery	1.	Retains the mother labour ward/delivery room or transfers her to the postnatal ward and ensures that her vital signs an bleeding is checked two hourly			
	2.	Assesses in the mother every quarter hourly in the first hour specific parameters including: Uterine tone , per vaginal bleeding, Bladder distension as well as Blood pressure, Pulse rate			
	3.	Checks specific parameters in the mother every half hourly in the second hour			
	4.	Asks the woman if she has passed urine within the two hours after delivery and encourages her to do so whenever she wishes			

	5.	Writes down the information on the woman's notes.			
Total Performance standards			12		
Total Observed					
Total achieved					
Mothers with pre-eclampsia or eclampsia managed promptly according to WHO guidelines					
The nurse/midwife correctly manages severe pre-eclampsia and/or eclampsia (if a case is not observed check patient records)	1.	Check if there is chart or any other document with basic information helps nurses/midwives diagnose severe pre-eclampsia and/or eclampsia			
	2.	There is a record that treatment with magnesium sulfate was immediately commenced If BP is >160/110 mmHg or more, or in cases of eclampsia			
	3.	IV line was established and saline or Ringer's lactate solution infused			
	4.	An anti-hypertensive was administered if the BP is >160/110 mmHg or more.			
	5.	Correctly administers the initial dosing of magnesium sulfate			
	6.	Correctly administers the maintenance dose of magnesium sulfate			
The nurse/midwife correctly provides follow up care to a mother with severe pre-eclampsia and /or eclampsia	1.	Signs of magnesium sulfate toxicity are assessed and documented hourly until the patient improves			
	2.	Administration of magnesium sulfate is stopped in case the respirations are less than 16/minute, patellar reflexes absent, or urinary output is less than 25 ml/hour			
	3.	If urine output is less than 25 ml/hour, one litre of IV fluids is infused in eight hours and signs of pulmonary edema monitored.			
	4.	In the event of respiratory arrest, appropriate procedures were performed			

	5.	A single dose of furosemide 40mg IV was given to manage pulmonary edema if it developed.			
Total Performance standards		2			
Total Observed					
Total achieved					
Women with postpartum haemorrhage are managed appropriately , according to WHO guidelines					
The nurse/midwife promptly carries out general interventions to manage postpartum haemorrhage (PPH)	1.	The nurse/ midwife checks for and appropriate documents signs of PPH			
	2.	Vital signs are immediately measured and recorded			
	3.	Seeks assistance if shock develops or is suspected.			
	4.	Administers intramuscularly 10 IU of oxytocin and massages uterus until it is well contracted.			
	5.	Covers the woman and elevates feet higher than heart			
	6.	Starts oxygen at 6–8 litres/minute			
	7.	Establishes two IV lines			
	8.	Collects a blood specimen for haemoglobin levels grouping and cross-matching and clotting studies			
	9.	Replaces fluids as appropriate			
	10.	Monitors vital signs every 15 minutes (Performs bladder catheterization)			
	11.	Monitors fluid intake and output			
The nurse / midwife properly carries out specific intervention to manage the cause of the PPH	1.	Identifies the cause of bleeding and immediately commences specific interventions depending on the cause.			
	2.	Uses appropriate interventions such as manual removal to stop bleeding if it is due to retained placenta or placental fragments			
	3.	Uses appropriate interventions such as massaging the uterus, administering oxytocin to manage bleeding if it is due to uterine atony.			

	4.	Uses appropriate procedure such as packing or suturing to stop bleeding if it is due to perineal or cervical tears			
The nurse/midwife properly performs follow up of PPH	1.	Assesses uterine contraction, blood pressure and pulse as well as bleeding quarterly during the first two hours then half hourly for four hours			
	2.	Measures intake and output hourly			
	3.	Performs clotting test if haemorrhage persists			
	4.	Replaces volume and transfuses if necessary			
	5.	Manages coagulopathy as appropriate			
	6.	Takes blood sample for measurement haemoglobin 24 hours after bleeding is stopped			
	7.	Prescribes 120 mg of iron sulfate and 400 mcg of folic acid orally three months if haemoglobin is less than 8.5g/dl,			
	8.	Records all information in the patient's chart			
The nurse/midwife correctly manages secondary PPH	1.	Establishes a line and commences IV infusion of 0.9% Sodium Chloride or Ringers lactate or a Plasma Expanders if the mother has signs of shock			
	2.	Conducts catheterization procedure			
	3.	Check the presence of and remove any retained placenta, placental fragments and/ or membrane and massages the uterus			
	4.	Check for pack or suture cervical, vaginal and /or perineal tears.			
	5.	Measures blood pressure and pulse rate quarter hourly and temperature four hourly.			
	6.	Administers broad spectrum antibiotics in case infection is present.			
	7.	Collects a blood specimen for haemoglobin estimation. If HB <8.5g/dl gives Ferrous sulfate			

		200mg orally for one month then review and if < 5g/dl transfuses whole blood			
Total Performance standards			4		
Total Observed					
Total achieved					
Women with or at risk for infection during labour, childbirth or the early postnatal period receive prompt interventions according to WHO guidelines					
1. The provider correctly manages puerperal sepsis	1.	Diagnoses puerperal sepsis based on clinical criteria			
	2.	Requests laboratory tests such as full hemogram, high vaginal swab and urinalysis.			
	3.	Undertakes appropriate nursing care measures including isolation and bed rest upright position			
	4.	Monitors vital signs and fluid balance			
	5.	Checks uterus for involution			
	6.	Administers IV fluids and broad spectrum antibiotics for seven days as prescribed			
	7.	Provides perineal care			
Total Performance standards			1		
Total Observed					
Total achieved					

Appendix 7: Training Curriculum for Nurse Midwives on WHO (2016) Maternal Health Quality of Care Standards

TRAINING CURRICULUM FOR NURSE MIDWIVES ON WHO (2016) MATERNAL HEALTH QUALITY OF CARE STANDARDS

KOOME DOMISIANO IMPWII (MScN, BScN)

**PREPARED FOR A TRAINING AS AN INTERVENTION PHASE OF A RESEARCH CONDUCTED IN FULFILMENT OF THE REQUIREMENTS FOR AWARD OF DOCTOR OF PHILOSOPHY IN NURSING OF THE UNIVERSITY OF NAIROBI
AUGUST 2022**

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PREAMBLE

A baseline survey was carried out in Embu and Meru level 5 teaching and referral hospitals to establish the adherence to selected WHO(2016) maternal health quality of care standards. Specific objectives of the study were to:

- Assess the knowledge of the nurse-midwives regarding selected maternal health quality of care standards
- Measure the attitude of nurse-midwives on the use of maternal health quality of care standards
- Establish the extent to which the nurse midwives were implementing maternal health quality of care standards
- Identify barriers to the implementation of maternal health quality of care standards by nurse-midwives.

The results indicated that the only 29.6% had adequate knowledge about the quality of care standards. Despite the nurse-midwives having favorable attitude towards the quality of care standards, adherence to the standards was only 41.7%. Furthermore, 85.9% of the participants indicated that lack of knowledge is an important hindrance to the implementation of maternal health quality of care standards.

RATIONALE

The findings from phase one of the study indicated that the care that is being provided in the health facilities is sub-optimal compared with the WHO (2016) quality of care standards. A major factor contributing to this is may be inadequate knowledge of contents of the quality standards. This could be due to lack of training opportunities as most nurse-midwives indicated that they have not been trained or were trained in college. Additionally, despite BEmOC training being conducted regularly in the facilities, disconnect appears between the training and the implementation of the content in the standards. It is on this basis that a curriculum is developed in order to train the nurse-midwives involved in the care of pregnant women during labor, delivery and post partum period to equip them with targeted knowledge and skills to implement selected WHO (2016) quality of care standards

PROGRAMME GOAL

The goal of this training programme is to equip nurse-midwives with knowledge, attitude and skills on maternal health quality of care standards so as to enable them provide quality of maternal health care to mothers during labor, delivery and post partum period thus improving maternal and newborn outcomes.

LEARNING OUTCOMES

Upon the completion of this course, the participants will be able to:

1. Effectively assess a woman during labor, delivery and post partum period
2. Effectively manage a woman during labor, delivery and post partum period
3. Promptly diagnose and manage a woman who develop pre-eclampsia and/or eclampsia according to WHO guidelines
4. Prevent, diagnose and promptly manage a woman who develop post partum hemorrhage according to WHO guidelines
5. Prevent, diagnose and promptly manage a woman who develop puerperal sepsis according to WHO guidelines

TEACHING/LEARNING METHODS

Illustrated lecture, group discussion, role play, case studies, Demonstrations, practicals

TEACHING/ LEARNING RESOURCES

Laptop, projectors, anatomic models, flip charts, note books, pens, pencils, rubber, fetoscope, charts, delivery pack, suturing packs, vaginal examination packs, antiseptic and lotion: sodium hypochlorite, hibitane; non-pharmaceuticals: Gynecologic gloves, syringes, needles, canula, sutures, cotton balls, gauze, sanitary pads; copy of WHO (2016) standards.

TRAINEE SELECTION

All Nurse-midwives in the Maternity Unit

DURATION OF THE TRAINING

Five days: Three- days theory and classroom practicum; two- days clinical area practicum.

MODE OF EVALUATION

Pre-test and post test

Skills assessment

COURSE STRUCTURE

MODULE ONE: Maternal Health Quality of Care Management

UNIT 1: Quality Management

1.1. Unit learning objectives

1.2. Definition of quality maternal health care

1.3. Domains of quality health care

1.4. Quality standards

1.5. Overview of WHO (2016) maternal health quality of care standards

MODULE TWO: Introduction to Maternal Health

UNIT 1: Global and National and National Maternal Mortality Situation

1.1. Definition of maternal mortality

1.2. Maternal mortality situation globally and Nationally

1.3. Causes of maternal mortality

1.4. Current strategies for reducing maternal mortality

MODULE THREE: Assessment of a Woman during Labor and Delivery

UNIT 1: Clinical History

1.1. Unit learning objectives

1.2. Purpose of clinical history

1.3. Components of clinical history

UNIT 2: Assessment A Woman in Labor

- 1.1. Unit learning objectives
- 3.1. General assessment
- 4.1. Physical examination
- 4.2. Vaginal examination

MODULE FOUR: Care of the Mother during Labor, Delivery and Postpartum

UNIT 1: Care of the Mother during Labor

- 1.1. Unit learning objectives
- 1.2. Stages of labor
- 1.3. Signs of active stage of labor
- 1.4. Supportive care of a woman in labor
- 1.5. Use of partograph to monitor labor

UNIT 2: Care of the Mother during Delivery

- 2.1. Unit learning objectives
- 2.2. Signs of imminent delivery
- 2.3. Mechanisms of labor
- 2.4. Basic care during second stage
- 2.5. Assisting normal delivery

UNIT 3: Active Management of Third Stage of Labor

- 3.1. Unit learning objectives
- 3.2. Definition
- 3.3. Signs of third stage of labor
- 3.4. Active management of third stage of labor
- 3.5. Manual removal of placenta

UNIT 4: Care during the Postpartum Period

- 4.1. Unit learning objectives

4.2.Management during the immediate postpartum period

4.3.Follow-up care

MODULE FIVE: Infection Prevention and Control

UNIT 1: Used Linen and Equipment Handling

1.1.Unit learning objectives

1.2.Commonly used decontaminants

1.3. Instrument decontamination and cleaning procedure

1.4.Used linen decontamination procedure

UNIT 2: Waste Management

2.1.Unit learning objectives

2.2. Definition of medical wastes

2.3.Categories of medical waste

2.4.Waste segregation and handling

MODULE SIX: Management of Obstetric Emergencies

UNIT 1: Management of Pre-Eclampsia and Eclampsia

1.1.Unit learning objectives

1.2.Definition of pre-eclampsia and eclampsia

1.3.Signs of eclampsia

1.4.Signs of impending eclampsia

1.5.General management of eclampsia

1.6.Magnesium sulfate in the management of eclampsia

1.7.Anti-hypertensives in the management of eclampsia

UNIT 2: Management of Postpartum Hemorrhage

2.1.Unit learning objectives

2.2.Definition of postpartum hemorrhage

2.3.Signs of postpartum hemorrhage

- 2.4. Classification of postpartum hemorrhage
- 2.5. General management of postpartum hemorrhage
- 2.6. Specific management of postpartum hemorrhage
- 2.7. Follow-up care of postpartum hemorrhage
- 2.8. Prevention

UNIT 3: Management of Puerperal Sepsis

- 3.1. Unit learning objectives
- 3.2. Definition of puerperal sepsis
- 3.3. Signs and symptoms of puerperal sepsis
- 3.4. Predisposing factors
- 3.5. Medical management
- 3.6. Nursing management
- 3.7. Preventive measures

COURSE DESCRIPTION

Specific Objectives	Content	Duration	Teaching /Learning Activities	Teaching/ Learning Resources
Module One: Maternal Health Quality of Care Management				
By the end of the module, the participants will be able to:				
<ul style="list-style-type: none"> • Define quality maternal health care • outline the domains of quality health care • define quality standards 	Definition of quality maternal health care domains of quality health care quality of care standards WHO(2016) quality of care standards	1 hour	Illustrated lecture Discussion	Books WHO standards Handout
Module Two: Introduction to Maternal Health				
<ul style="list-style-type: none"> • Define maternal death • Appreciate the magnitude of maternal mortality 	Definition of maternal mortality Global and national maternal mortality ratio	1 hour	Illustrated lecture Discussion	Books WHO standards Handouts Charts

<p>globally and Nationally</p> <ul style="list-style-type: none"> outline major causes of maternal mortality state the current strategies for reducing maternal mortality 	<p>Major causes of maternal mortality current approaches in reducing maternal mortality- FANC, skilled attendance, BEmOC</p>			
Module Three: Assessment of a Woman during Labor and Delivery				
<ul style="list-style-type: none"> Describe the components of clinical history Correctly collect clinical history from a patient Explain the components of general examination describe the components of physical examination correctly carry out general and physical examination outline the components of a vaginal examination correctly carry out a vaginal examination 	<p>components of clinical history Clinical history taking procedure Components of a general examination of a mother in labor components of a physical examination examination procedure for a woman in labor components of a vaginal examination Vaginal examination procedure</p>	4 Hours	<p>Illustrated lecture Role play Demonstration</p>	<p>Books WHO standards Handouts Anatomic models Flip charts vaginal examination packs Urine dipsticks</p>
Module Four: Care of the mother during labor, Delivery and postpartum				
<ul style="list-style-type: none"> Outline the stages of labor Name signs of different stages of labor Describe the components of the partograph provide basic care during second stage of labor 	<p>Stages of labor Signs of labor components of a partograph Basic care of the mother and fetus during second stage of labor</p>	6 hours	<p>Illustrated lecture Discussion Demonstration</p>	<p>Books WHO standards Anatomic models Fetoscope Delivery packs Non-pharmaceutical Disinfectants Copies of partograph</p>

<ul style="list-style-type: none"> • correctly conduct a delivery procedure • carry out active management of third stage of labor • demonstrate manual removal of placenta 	<p>The delivery procedure</p> <p>Active management of third stage</p> <p>Procedure for the manual removal of placenta</p>			
Module Five: Infection Prevention and Control				
<p>list the commonly use decontaminants</p> <p>correctly dilute the decontaminants</p> <p>properly clean delivery equipments</p> <p>correctly demonstrate the decontamination procedure</p> <p>identify different types of waste</p> <p>correctly segregate different types of waste</p>	<p>common decontaminating agents</p> <p>dilution ratio for common decontaminating agents</p> <p>decontamination procedure</p> <p>types of waste</p> <p>waste segregation procedure</p>	2 hour	<p>Illustrated lecture</p> <p>Discussion</p> <p>Demonstration</p>	<p>Books</p> <p>WHO standards</p> <p>Charts</p> <p>Decontamination agents</p> <p>soap</p> <p>color coded buckets with lids</p> <p>Hand brushes</p> <p>Heavy duty gloves</p> <p>color coded bins and bin liners</p> <p>safety boxes</p>
Module six: Management of selected obstetric emergencies				
<ul style="list-style-type: none"> • state signs of pre-eclampsia/eclampsia • describe the general management of pre-eclampsia • state the indication, dosage magnesium sulfate • outline the signs of magnesium toxicity • enumerate the anti-hypertensive used in the management of pre-eclampsia • state signs of PPH • give the causes of PPH 	<p>signs of pre-eclampsia and eclampsia</p> <p>general management of eclampsia</p> <p>magnesium sulfate in the management of pre-eclampsia ad eclampsia</p> <p>management of magnesium sulfate toxicity</p> <p>Commonly use anti-hypertensive in the management of pre-eclampsia and eclampsia</p>	7 hours	<p>Illustrated lecture</p> <p>Discussion</p> <p>Demonstration</p>	<p>Books</p> <p>WHO standards</p> <p>Charts</p> <p>Anatomic models</p> <p>Catheters</p> <p>Patella hammers</p>

<ul style="list-style-type: none"> • describe the management of PPH • describe the follow-up care of PPH • describe the preventive measures of PPH • state the predisposing factors to Puerperal sepsis • signs of Puerperal sepsis • management of puerperal sepsis • measures to prevent puerperal sepsis 	<p>signs of PPH causes of PPH General and specific management of PPH Follow-up management of PPH Measures for preventing PPH</p> <p>Predisposing factors to Puerperal sepsis</p> <p>Signs of puerperal sepsis Medical and nursing management of Puerperal sepsis Measures for preventing Puerperal sepsis</p>			
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References

1. Pregnancy, childbirth, postpartum and newborn care: A guide for essential practice
<https://www.who.int/publications/i/item/9789241549356>
2. Emergency obstetric care; quick reference guide for frontline worker
https://www.postabortioncare.org/sites/pac/files/JHPIEGO_Emergency_Obstetric_Care.pdf
3. Standards for improving the quality of maternal and newborn care in health facilities
<https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf>
4. Pregnancy, childbirth, postpartum and newborn care: A guide for essential practice
<https://www.who.int/publications/i/item/9789241549356>
5. A pocket guide for clinical management of obstetric and neonatal emergencies in Africa for health care provider 2nd edition
<https://www.afro.who.int/publications/pocket-guide-clinical-management-obstetric-and-neonatal-emergencies-africa>

Course Material for Training in Maternal Health Quality of Care Standards

Documents prepared in Advance

For participants	For facilitators
Course Schedule	Course outline and course schedule
Course pretest and post-tests	Pretest and post-tests, marking scheme
Work-plan template	

Training Materials Downloaded and sourced from DRH-Kenya and Internet Sources

For Participants	For Facilitators
Standard-based management and recognition field guide: A practical approach for improving the performance and quality of Health service https://pdf.usaid.gov/pdf_docs/Pnadf143	Standard-based management and recognition field guide: A practical approach for improving the performance and quality of Health service https://pdf.usaid.gov/pdf_docs/Pnadf143
Pregnancy, childbirth, postpartum and newborn care: A guide for essential practice https://www.who.int/publications/i/item/9789241549356	Pregnancy, childbirth, postpartum and newborn care: A guide for essential practice https://www.who.int/publications/i/item/9789241549356
Standards for improving the quality of maternal and newborn care in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf	Standards for improving the quality of maternal and newborn care in health facilities https://cdn.who.int/media/docs/default-source/mca-documents/qoc/quality-of-care/standards-for-improving-quality-of-maternal-and-newborn-care-in-health-facilities.pdf
Emergency obstetric care; quick reference guide for frontline worker https://www.postabortioncare.org/sites/pac/files/JHPIEGO_Emergency_Obstetric_Care.pdf	Emergency obstetric care; quick reference guide for frontline worker https://www.postabortioncare.org/sites/pac/files/JHPIEGO_Emergency_Obstetric_Care.pdf
A pocket guide for clinical management of obstetric and neonatal emergencies in Africa for health care provider 2 nd edition https://www.afro.who.int/publications/pocket-guide-clinical-management-obstetric-and-neonatal-emergencies-africa	A pocket guide for clinical management of obstetric and neonatal emergencies in Africa for health care provider 2 nd edition https://www.afro.who.int/publications/pocket-guide-clinical-management-obstetric-and-neonatal-emergencies-africa
Copies of maternal health Quality of care Standards	Guidelines for assessment of skilled providers after training in maternal and newborn health care https://www.healthynetwork.org/hnn-content/uploads/Jhpiego_Guidelines-for-Assessment-of-Skilled-Providers-After-Training-in-Maternal-and-Newborn-Healthcare_2004.p
Copies of unused Partograph	Copies of maternal Health QoC Standards Copies of unused Partograph

List of Anatomic Models, Videos and Presentations for Training on Maternal Health Quality of Care Standards

Anatomic Model	Use
Mama Natalie Birthing Simulator	Management of the first and second stages of labor and active management of the third stage (AMTSL)
Mama Natalie Postpartum Hemorrhage Simulator	Management of Postpartum hemorrhage
Postpartum Suturing Trainer	Suturing of episiotomy, perineal and cervical tears
Abdominal Palpation Model	Examination of an Expectant mother

List of Videos and Presentations for Training on Maternal Health Quality of Care Standards

Description	Source
Active management of the third stage of Labor (AMTSL)	Global Health Media Project https://globalhealthmedia.org/videos/managing-the-third-stage-of-labor/
Spontaneous Vertex Delivery (SVD)	MSD Manuals https://www.msmanuals.com/professional/multimedia/video/how-to-do-spontaneous-vaginal-delivery
Manual Removal of Placenta	MSD Manuals https://www.msmanuals.com/professional/SearchResults?query=manual+removal+of+placenta
Disinfection of Surgical Instruments	Laboratoire Huckert's International https://www.youtube.com/watch?v=p_52PvJVxG8&ab_channel=LaboratoireHuckert%27sInternational
Obstetric Examination	Medicine Decoded https://www.youtube.com/watch?v=rx_yn_cN8gg&ab_channel=MEDICINEDECOD ED

Appendix 8: Pre-Test/Post Test for Training on Maternal Health Quality of Care Standards

Pre-Test/Post Test for Training on Maternal Health Quality of Care Standards

Instructions:

- All questions are **COMPULSORY**
 - Choose only **ONE** correct answer per question
1. The first action you would take upon receiving a mother in labor is to:
 - a) Assess for signs of imminent delivery
 - b) Inquire about the danger signs
 - c) Take and record vital signs
 - d) Auscultate for the fetal heart
 2. Components of physical examination include:
 - a) Urine testing for albumin, auscultating for the fetal heart, palpating uterine contractions
 - b) Examining the conjunctiva for pallor, inspection of the abdomen, taking vital signs
 - c) Urine testing, taking vital signs, examining of the conjunctiva for pallor
 - d) Auscultating for the fetal heart, inspection of the abdomen, taking of vital signs
 3. The correct order of conducting an obstetric examination is:
 - a) Inspection of the abdomen, palpating for fetal lie& presentation, auscultating fetal heart, palpating for uterine contractions
 - b) Auscultating the fetal heart, inspecting the abdomen, palpating for fetal lie& presentation, assess the degree of engagement
 - c) Inspect the abdomen, palpate the uterine contractions, assess the degree of engagement, auscultate for fetal heart
 - d) Inspect the abdomen, determine the fetal lie& presentation, assess the degree of engagement
 4. Cervical dilation plotted to the right of the alert line implies that:
 - a) Labor progress is delayed
 - b) Labor is progressing well
 - c) Latent phase has ended
 - d) Delivery is imminent
 5. The correct order of steps in active management of third stage of labor is:

- a) Controlled cord traction, fundal massage, oxytocin
 - b) Cord clamping& cutting, controlled cord traction, oxytocin
 - c) Oxytocin, cord clamping and cutting, fundal massage
 - d) Oxytocin, controlled cord traction, fundal massage
6. Which of the following is NOT advisable for a mother in labor at 5 cm dilation:
- a) Emptying the bladder regularly
 - b) Taking of liquids and light foods
 - c) Ambulating freely
 - d) Lying on the bed in the left lateral position
7. Temperature and blood pressure for a woman in labor should be monitored and recorded in the partograph every:
- a) Two hours
 - b) 4 hours
 - c) 30 minutes
 - d) 15 minutes
8. During the second stage of labor, fetal heart is auscultated every:
- a) 5 min
 - b) 10 min
 - c) 15 min
 - d) 30 min
9. Which of the following is recorded in the partograph when perform a vaginal examination:
- a) Vaginal temperature and wetness
 - b) Cervical dilation
 - c) Degree of moulding
 - d) Position of the presenting part
10. During the first two hours after birth, the provider should:
- a) Take the woman's blood pressure and pulse once and then insert a catheter to empty the bladder
 - b) Assess uterine tone and blood pressure every quarter hourly
 - c) Check for bleeding and bladder distension every half hour

- d) Insert a catheter to empty the bladder if the mother has not passed urine within 30 min after delivery
11. Appropriate advice for a mother upon delivery include:
- a) Ambulating freely within the first hour
 - b) Urinating frequently to prevent bladder distention
 - c) Take foods rich in iron to replace lost blood
 - d) Check for pa vagina bleeding within the first hour
12. Contaminated equipment in the labor ward should immediately be:
- a) Washed with soapy water and boiled for 2 hours
 - b) Soaked in 0.5% chlorine solution for 10 minutes and then washed with soapy water
 - c) Soaked in 0.5% chlorine solution for 30 minutes and then washed with soapy water
 - d) Washed in soapy water and then soaked in 0.5% chlorine solution for 10 minutes
13. The waste that is correctly matched with the container is:
- a) Blood soaked gauze-red bin
 - b) Placenta-black bin
 - c) Used branula-safety box
 - d) Used gloves –yellow bin
14. Four phases of eclamptic fits in order of occurrence is:
- a) Premonitory, tonic, clonic, coma
 - b) Premonitory, clonic, tonic, coma
 - c) Clonic, tonic, coma, premonitory
 - d) Tonic, clonic, coma, premonitory
15. Magnesium sulfate is initiated if the blood pressure is more than:
- a) 160/100mmHg
 - b) 140/90mmHg
 - c) 200/110mmHg
 - d) 150/90mmHg
16. Magnesium sulfate should be discontinued if the mother develops all of the following **EXCEPT**:
- a) Respiratory rate of less than 16b/min

- b) Urinary output of less than 25 ml/hr
 - c) Absent patellar reflex
 - d) Urinary output of less than 50ml/min
17. Most common cause of PPH include:
- a) Uterine atony, perineal/cervical tears
 - b) Uterine atony, coagulopathy
 - c) Cervical tears, disseminated intravascular coagulation(DIC)
 - d) Antepartum hemorrhage, uterine atony
18. The initial steps you would take when a mother develops postpartum hemorrhage include:
- a) Take vital signs, give oxytocin, massage the uterus, administer oxygen
 - b) Take vital signs, establish two lines, take blood for grouping and cross matching, perform bladder catheterization
 - c) Take blood for grouping and cross-matching, catheterize the patient, administer oxytocin, administer oxygen
 - d) Perform bladder catheterization, administer oxytocin, removed retained POCs, take vital signs
19. Follow-up care of a mother following successful management of postpartum hemorrhage include:
- a) Performing clotting studies
 - b) Taking samples for measurement of HB 24 hours after cessation of bleeding
 - c) Transfuse two units of blood
 - d) Monitor input output every 4 hours
20. Puerperal sepsis should be suspected if the woman has:
- a) Temperature $> 37.5^{\circ}\text{C}$
 - b) BP $<100/60\text{mmHg}$
 - c) Vaginal discharge
 - d) Pelvic pain

Appendix 9: Course Evaluation Form for Training on Maternal Health Quality of Care Standards

Training On Maternal Health Quality of Care Standards Course Evaluation Form

Date of the training..... Venue of the training.....

Please indicate your level of agreement with the items listed below by placing a tick (✓) in the corresponding box.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The training met my expectations					
2. I will be able to apply the knowledge acquired					
3. The training objectives were indicated and achieved					
4. The content was organized and easy to follow					
5. The course materials were pertinent and useful					
6. The trainers were knowledgeable and well prepared					
7. Time allowed for the training was adequate					
8. The training venue was conducive for learning					
9. Group activities encouraged my participation					

How do you rate the training overall

[] Very good [] Good [] Neutral [] Poor [] Very poor

What aspects of the training could be improved?

.....

Other comments (if any)

.....

Thank you for your participation.

Appendix 10: Participant Work-plan Template for Training on Maternal Health Quality of Care Standards

PARTICIPANT WORK-PLAN

Name.....

Date of Training

Ward/department.....

Objective	Activity	By when	Resources required	Verifiers/indicators	Comments

**Appendix 11: Training on Maternal Health Quality of Care Standards Clinical Practicum
Log Book**

CLINICAL PRACTICUM LOG BOOK

Name..... Date of Training.....

	ANC/ Inpatient Number	Supervisor's sign
Take clinical history of two patients	1. 2.	
General and physical examination of two clients	1. 2.	
Carry out one vaginal Examination	1.	
Correctly fill three partograph	1. 2. 3.	
Conduct two normal deliveries	1. 2.	
carry out two active management of third stage of labor	1. 2.	
Carry out two cleaning and decontamination process of equipment and linen	1. 2.	

Appendix 12: Ethics Authorization



UNIVERSITY OF NAIROBI
FACULTY OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel: (254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: <http://www.erc.uonbi.ac.ke>
Facebook: <https://www.facebook.com/uonknh.erc>
Twitter: [@UONKNH_ERC](https://twitter.com/UONKNH_ERC) https://twitter.com/UONKNH_ERC



KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref. No. KNH/ERC/R/133

11th August 2023

Koome Domisiano Impwii
Reg. No. H80/56814/2020
Dept. of Nursing Sciences
Faculty of Health Sciences
University of Nairobi

Dear Domisiano,

Re: Approval of Annual Renewal- Effectiveness of selected Maternal Health Care Standards in Improving the Quality of Maternal Health Care in Embu and Meru Teaching and Referral Hospitals, Kenya (P546/07/2019)

Your communication dated 8th August 2023 refers.

This is to acknowledge receipt of the study progress report and hereby grant annual extension of approval for ethics research protocol P546/07/2019.

The approval dates are 13th December 2022 – 12th December 2023.

This approval is subject to compliance with the following requirements:

- a) Only approved documents (informed consents, study instruments, advertising materials etc.) will be used.
- b) All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH- UoN ERC before implementation.
- c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH- UoN ERC within 72 hours of notification.
- d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).

Protect to Discover

Appendix 13: NACOSTI Authorization

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 584068	Date of Issue: 08/February/2021
RESEARCH LICENSE	
	
<p>This is to Certify that Mr. Domisiano Koome Impwii of University of Nairobi, has been licensed to conduct research in Embu, Meru on the topic: EFFECTIVENESS OF SELECTED MATERNAL HEALTH CARE STANDARDS IN IMPROVING THE QUALITY OF MATERNAL HEALTH CARE IN EMBU AND MERU TEACHING AND REFERRAL HOSPITALS, KENYA. for the period ending : 08/February/2022.</p>	
License No: NACOSTI/P/21/8854	
584068 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application</p>	

Appendix 14: Meru Teaching and Referral Hospital Authorization

**COUNTY GOVERNMENT OF MERU
DEPARTMENT OF HEALTH**

Telegrams: "MEDICAL" Meru
Telephone: Meru 064-32370/1
Fax: 31242
Email: hospitalmeru@gmail.com
When Replying Address to:
Director



MERU TEACHING & REFERRAL HOSPITAL
P. O. BOX 8 – 60200
MERU

DATE: 22nd July 2021

Ref: MRU/MED/GEN/R.14

Koome Domisiano Impwi
University of Nairobi
P. O. Box 30197 – 00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Your request for permission to conduct a study within Meru Teaching & Referral Hospital on your topic "**The effectiveness of selected maternal health care standards in improving the quality of maternal health care**" is hereby granted.

Kindly ensure adherence to the ethical guidelines of your research and of the hospital.

You are required to share with my office the results of your research.

Also note that the hospital charges a research fee of Ksh.10,000/= which you are required to pay prior to commencing your study.


Dr. Joseph W. Mukundi
Director
Meru Teaching & Referral Hospital



Appendix 15: Embu Teaching and Referral Hospital Authorization

EMBU COUNTY GOVERNMENT DEPARTMENT OF HEALTH

Telephone : 068-2231055/56
Cell phone: 0704558949
Email: ceoembulevel5@gmail.com.



OFFICE OF THE
CHIEF EXECUTIVE OFFICER
EMBU TEACHING & REFERRAL
HOSPITAL
P.O. BOX 33
EMBU
Date. 23RD March 2021

When replying please quote our reference

Ref. NO.CEO/ETRH/VOL1

TO:
KOOME DOMISIANO IMPWII
P.O BOX 30197-00100
NAIROBI

**RE: APPROVAL TO CARRY OUT A RESEARCH STUDY IN THE
HOSPITAL**

This follows your request to conduct a study in our facility titled '**The effectiveness of selected maternal health care standards in improving the quality of maternal health care in Embu and Meru Teaching and Referral Hospitals in kenya.**'

I am pleased to inform you that the request has been granted. It is expected that you will observe the stipulated research ethics and that at the end of your study you will share the findings with the hospital.

I wish you all the best in your study.

CHIEF EXECUTIVE OFFICER
EMBU LEVEL 5 HOSPITAL
P. O. Box 33, EMBU
Tel: 068-2231055/56
Email: ceoembulevel5@gmail.com
SIMON NYAGA KARIUKI
CHIEF EXECUTIVE OFFICER
EMBU TEACHING AND REFFERAL HOSPITAL