

**DETERMINANTS OF MATERNAL CHILD HEALTH SERVICE QUALITY IN
TIER THREE PUBLIC HEALTH FACILITIES, KISUMU COUNTY, KENYA**

BY

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DEGREE OF DOCTOR OF PHILOSOPHY IN PUBLIC HEALTH**

SCHOOL OF PUBLIC HEALTH AND COMMUNITY DEVELOPMENT

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to my wife Anne and my children Ivan, Vince and Michaela.

ABSTRACT

Compromised Maternal Child Health (MCH) service quality is increasingly being linked to failure to attain expected healthcare improvements in Low and Middle-Income Countries. Kenya's Free Maternity Services (FMS) (*Linda Mama*) initiative removed user fees for MCH services with the aim of increasing service uptake and improving MCH service quality. This led to increased patient load, as a result, overstressing health facilities resources. There were concerns of declining service quality and hence, the need to identify the determining factors. Service quality is complex but is conventionally considered in terms of structure (facility characteristics, equipment and human resources); process (provider-patient interaction) and outcomes (users' perspectives) dimensions. The study focused on tier three public health facilities of Kisumu County. Specifically, it assessed the mothers' socio-economic and demographic characteristics associated with MCH service quality; healthcare workers' characteristics associated with MCH service quality; healthcare service delivery processes associated with MCH service quality and healthcare structural factors associated with MCH service quality. Through analytical cross-sectional design, facility-level data were collected from a sample of 334 mothers, 81 healthcare workers using structured questionnaires and 7 Key Informant Interviews. Variable characteristics were summarized descriptively. The association of healthcare structural aspects and MCH service quality was assessed through Principal Component Analysis. About 52% of mothers were aged between 20 and 29 years, 71.9% were married and 64% had achieved post-primary education while about half lived below poverty line. Mothers of para 1 (aOR= 2.29, 95%CI=1.04-2.05, p-value= 0.040) or para 2 (aOR= 3.22, 95%CI=1.54-2.70, p-value=0.002); rural residence (aOR=2.24, 95%CI=1.05-2.79, p-value= 0.037) perceived services to be of quality. About half (49.4%) of healthcare workers were aged between 20 – 29 years. Of these, 46.3% were Nursing Officers of whom 57.5% were Diploma holders and 28.4% were university graduates. Being a university graduate (aOR= 21.29, 95%CI=1.15 - 2.16, p-value=0.04) and deployment in a department for six months (OR=7.22, 95%CI= 1.3-2.22, p-value=0.024) were healthcare workers' characteristics associated with MCH service quality. Healthcare service delivery processes associated with MCH service quality were clinical examination (OR=11.33, 95%CI=2.55-3.35, p-value=0.001); laboratory malaria investigations (OR=3.21, 95%CI=1.71-2.03, p-value=<0.001); child immunization (OR=1.82, 95%CI=0.62-1.30, p-value=0.027); health education and mentorship (p-<0.001). Having the 5 listed staff cadres [aOR 2.16, CI=1.15-4.05 & p=0.016) was associated with MCH service quality. Facilities with antenatal ward (0.3189), Medical Officer (0.3189) and a suction machine (0.2867) had higher factor loading. This study result indicated older mothers had low perception of MCH service quality while those with low parity and residence of rural areas were more likely to report having received MCH service quality. Healthcare workers with Higher National Diploma (HND) were less likely to offer MCH service quality while being deployed in a department for 6 months was more associated with MCH service quality. Received Syphilis test was less associated with MCH service quality. Having Medical Officer, Nursing Officer, Nutritionist, Obstetrician/gynaecologist, Pharmaceutical Technologist) contributed more to MCH service quality as compared to physical structures and equipment. The study will help in designing and implementation of MCH programs and training of healthcare workers for improvement of MCH service quality in Kisumu County.

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LIST OF ABBREVIATIONS AND ACRONYMS

aOR	Adjusted Odds Ratio
ANC	Ante Natal Clinic
AN Ward	Antenatal ward
CI	Confidence Interval
COR	Crude Odds Ratio
CRH	County Referral Hospital
DHIS2	District Health Information System
FBO	Faith Based Organizations
FP	Family Planning
IMR	Infant Mortality Rate
JOOTRH	Jaramogi Odinga Oginga Teaching and Referral Hospital
KDHS	Kenya Demographic Health Survey
KIHBS	Kenya Integrated Household Budget Survey
KII	Key Informant Interview
LMIC	Low- and Middle-Income Countries
MDGs	Millennium Development Goals
MNCH	Maternal, Newborn and Child Health
MCH	Maternal Child Health
MMR	Maternal Mortality Rate
MOH	Ministry of Health
MUAC	Mid Upper Arm Circumference
OR	Odds Ratio
PCA	Principal Component Analysis
PC	Principal Component
PN Ward	Post Natal ward
SCRH	Sub-County Referral Hospital
SDGs	Sustainable Development Goals
UTI	Urinary Tract Infection
URTI	Upper Respiratory Tract Infection
Referral hospitals	All Tier three public County and sub-County health facilities
RMNCAH	Reproductive, Maternal, Newborn, Child and Adolescent Health

OPERATIONAL DEFINITIONS

Deployment place: Department or section where the staff is attached.

Education: Level of formal training attended.

Healthcare service delivery processes: these are the healthcare service delivery procedures and practices towards the mother e.g., clinical and laboratory examination, health education, supplement provision etc.

Healthcare structural aspects: these are physical infrastructure, equipment and human resources for health at the health facility.

Healthcare workers' characteristics: these are healthcare workers demographic and environmental factors e.g., age, sex, level of education, patient workload, deployment area etc.

Healthcare workers: Medically trained staff offering health care services in the health facilities e.g., Nurses, Doctors, Clinical Officers, Lab Tech, Pharm Tech.

Maternal Child Health services: Maternal Child Health (MCH) services refer to an integrated set of care services that provide childbearing women with skills and treatments at critical points during pregnancy, childbirth and the postnatal period (WHO 2016).

Maternal Child Health service quality: it's the degree to which Maternal Child Health services (for individuals and population) increase the likelihood of timely, appropriate care for the purpose of achieving desired outcomes that are both consistent with current professional knowledge and considers the preferences and aspirations of individual women and their family. Its having adequately available and functioning structures, service delivery process that adhere to set standards, skilled healthcare workers who are correctly deployed and working optimally and increased client satisfaction/happiness to services offered (WHO 2016).

For this study Maternal Child Health quality services is services that makes client satisfy/happy.

Mother: A mother in this study was contextualized as a woman who is already parenting, pregnant or delivered.

Poor: insufficiency or not meeting set national standards or norms of a quality, that is lower than expected.

Poor MCH service quality: it is service offered to the mother and the child that does not increase the likelihood of improved health outcome and clients are not satisfied with (WHO, 2016: MOH, 2016).

Socio-economic and demographic Factors: Are personal characteristics used to collect and evaluate data on people in each population e.g., age, gender, marital status, race, education, income, religion etc.

Tier three health facilities: all public county and sub-county referral hospital

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Maternal Child Health (MCH) services quality is a critical dimension of the Sustainable Development Goal (SDG) 3: to ensure healthy lives and promote wellbeing for all at all ages (WHO, 2019a; UNICEF, 2020). The World Health Organization (WHO) defined MCH quality services as “the degree to which maternal child health services (for individuals and population) increase the likelihood of timely, appropriate care for the purpose of achieving desired outcomes that are both consistent with current professional knowledge and take into account the preferences and aspirations of individual women and their family”. Service quality indicates the capacity to which institutions can provide care that meets their health needs. The WHO developed a framework with global standards for health system to guide on MCH service quality assessments and improvement. This framework is organized into quality measures according to the three categories: (a) inputs of care (structure factors), (b) the process of service delivery, and (c) the outcome of care (client satisfaction) (WHO, 2016).

According to this study quality is services offered to mothers that meets mother’s expectation and they express satisfaction to the MCH services.

In the framework (Figure 1.1) strengthening healthcare systems inputs is expected to improve process dimensions of quality, including not only delivery of care and the experience of care by users but also efficiency of human resources functioning as well as other capital resources. The delivery of care includes the use of evidence-based practices and routine MCH services. The experience of care on the other hand consists of ensuring effective communication with mothers and their families on their care

provision, the rights and expectations of mothers while respecting the preservation of their dignity and providing them with access to emotional and social support of their choice.

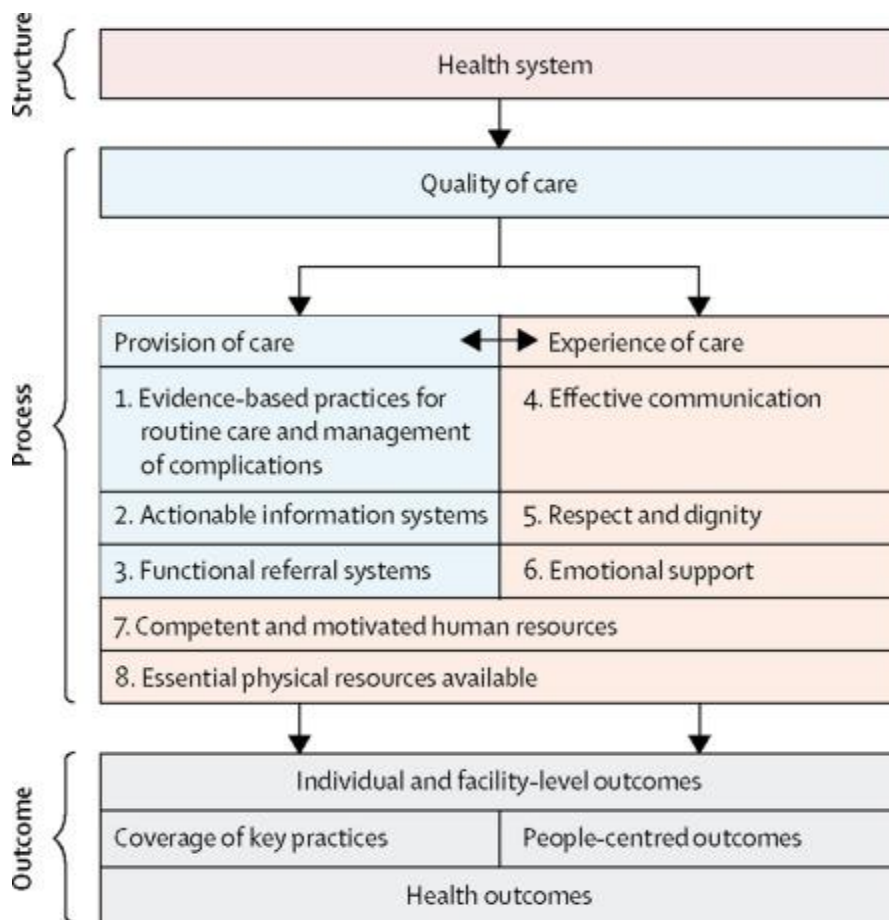


Figure 1. 1 WHO’s Quality Care Framework for Maternal Child Health (WHO 2016)

Kenya’s MCH quality indices for pregnancy-related and neonatal deaths have only minimally improved but more gradually than expected following multipronged improvement interventions to address factors associated with adverse pregnancy and infant related outcomes. Kenya National Maternal Mortality ratio at 355 per 100,000 live births and Infant Mortality at 35.5 per 1000 births. While Kisumu County has higher Maternal Mortality ratio at 495/100,000, Infant mortality at 39.1 per 1000 live and immunization coverage of 78.9% (KDHS 2014), which does not meet the SDG

recommendation of less than 70 maternal deaths per 100 000 live births and immunization coverage of at least 90% (UNICEF, 2019). Furthermore, Kisumu has performed poorly as compared to the neighboring counties whereby Nandi County has MMR of 344/100,000 live births and immunization coverage of 94.4%, while Vihiga County has MMR 300/100,000 live births and immunization coverage of 96.3%. (KDHS 2014). Kisumu County is also identified as one of the regions under USAID's global initiative to improve MCH service quality (USAID, 2020).

MCH services quality is vital in reducing the burden of morbidity and mortality associated with pregnancy, childbirth and in the postnatal period, and safeguarding the dignity and equity of mothers and children (WHO, 2019b). By improving access to MCH services as well as quality of services it is estimated that all Countries will have reached the global target of 12 or less newborn deaths per 1000 live births by 2030. At the same time, this is expected to result in a reduction of an estimated 2.9 million neonatal deaths, stillbirths and maternal deaths annually in 81 high-burden Countries (UNICEF, 2020).

Whereas continual assessment of MCH service quality is needful, it has been difficult to have one agreed way/method for doing this. Different developing countries have customized the WHO framework to develop policies and strategies to ensure improved service quality and client centered outcomes (Tama *et al.*, 2018). Kenya has developed several policies in line with WHO framework with the aim of improving service quality and they include: Free Maternity Services, Kenya Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH) Investment Framework and the National Reproductive Health Policy (2022-2032). Kisumu County has worked together with the

National Government to implement these policies since the County does not have a different MCH policy from the National one. All these policies have not yield significant reduction in MCH service quality indices in the Country which remain high (Mbugua *et al.*, 2018).

Free Maternity Services (Linda Mama) was started in 2013 aimed at increasing access to and uptake of quality MCH services by addressing cost barriers. This involved abolition of maternity charges in all public health facilities to ensuring pregnant mothers received healthcare at no financial cost from the beginning of pregnancy till delivery to postnatal period (FMS, 2013). FMS led to an increase in MCH service uptake without corresponding improvement in health facility infrastructure and organizational set up to support increasing patient load causing an overstretch of the health sector resources leading to compromised MCH service quality (Kisiangani *et al.*, 2020).

Access to MCH service quality remains a persistent challenge across all levels of care in Kenya (MOH, 2022). A Study done in Kenya showed decreased MCH service quality majorly compounded by FMS's hurried implementation across health facilities in the Country and pointed out that although the FMS policy created an incentive for increased service uptake, it led to compromised service quality (Lang'at *et al* 2019). Subsequent studies underpin a gradual decrease in MCH service quality despite the introduction of FMS in the Country (Lusambili *et al* 2019), this is noted in the devolved healthcare system; tier 1 (community units); tier 2 (Primary Care level); and tier 3 (County/Sub- County level) which handle majority of the population seeking healthcare. These health facility levels are essentially set up as hierarchical referral

units such that complicated cases are referred to a higher level of care. Therefore, tier three facilities would ideally handle patients with more complicated cases than the lower-level health facilities. However, they are often most vulnerable to adverse systemic effects on service quality, effectiveness and patient safety resulting to failure in quality care observed in majority of the sub-county hospitals in Kenya, especially with increased demand (Orangi *et al.*, 2021).

Lack of information on how mothers socio-economic and demographic factors affect MCH service quality in tier three public health facilities makes it difficult to plan and organize for MCH quality services (Gitobu *at el.*, 2018). Despite the use of different strategies by the National and County governments to improve implementation of MCH services, quality indicators remain poor. There was need to comprehensively assess interactions among multiple components of service delivery to identify key components and potential pathways or mechanisms of impact on the service quality. In addition, previous studies have not addressed the beneficiaries' specific needs, or when considered, it is often studied independently. Tier three public health facilities are especially vulnerable and sensitive to adverse systemic changes in service quality because they handle the bulk of MCH services in the County (Sharma *at el.*, 2017; Sadoon *et al.*, 2020). In view of these heterogenous findings, the first specific objective of this study sort to find out how mothers' socio-economic and demographic characteristic (user/demand side characteristics) may respond to or perceive MCH service quality in tier three public health facilities.

Whereas it is known that Healthcare worker characteristics (skills and competence) contribute to healthcare service quality previous studies do not identify more clearly

specific healthcare workers characteristics and potential variable interactions by which they could be influencing MCH service quality in the context of high service demand with possible resource constrains. Healthcare workers are crucial process inputs in MCH service quality (WHO, 2016; Simson *et al.*, 2019) thus, understanding how they might influence MCH quality especially in tier three public health facility will enable more appropriate planning and designing improvement strategies for MCH service quality (Lekhuleni *et al.*, 2019). Hence the second objective of the study that sort to assess healthcare workers characteristic (supply side characteristics) impact on the MCH service quality in tier three public health facility.

Healthcare service delivery processes measures of quality evaluates the manner of service delivery and entail the sum of all actions that make up healthcare (Donabedian 1980). Service delivery processes includes the clinical examination, prophylactic, health education and investigative medicine. (Baschieri *et al.*, 2019). Previous studies have shown these basic factors if conducted to mothers and children on routine basis should contribute to MCH service quality. Despite this, the Country continues to experience deteriorating MCH service quality in tier three public health facilities (Khatri, *et al.*, 2021), posing the question if these factors really contribute to MCH service quality. Therefore, it was important to understand how these factors influenced MCH service quality in the tier three public health facilities; hence the third specific objective which sort to determine healthcare service delivery processes associated with MCH service quality in tier three public health facilities.

The healthcare structural factors assessment is concrete, and it encompasses a review of the (a) physical aspects, (b) equipment and (c) human resources for health at the health

facilities. Significant gaps in healthcare physical structure have continued to affect service quality and uptake; as a result, the Counties are busy building the physical structures (Bolan *et al.*, 2021). How these three structural factors interplay to contribute to MCH service quality is yet to be understood, (Bergerum *et al.*, 2020) especially in the context of the introduction of free maternity services in Kenya. Hence the fourth specific objective sort to assess healthcare structure factors associated with MCH service quality in tier three public health facility.

The study adopted a policy maker perspective with focus on enhancing universal access to equitable, affordable and quality healthcare to all citizens. This in line with tenets of vision 2030. This study finding will help address policy and social value issues associated with implementation of MCH service quality in tier three public health facilities, particularly those occasioned by the introduction of Free Maternity Services (Linda Mama) to improve access to care and social protection. The interplay of values (as entailed in assessing client satisfaction was a critical aspect of this study, to inculcate client perspectives and value judgement, an approach not often considered in healthcare delivery research.

1.2 Statement of the Problem

Kenya's MCH quality indices have been worsening in recent times with National Maternal Mortality ratio at 355 per 100,000 live births and Infant Mortality at 35.5 per 1000 births. Whereas the Free maternity access policy led to increased utilization of skilled care at health facilities, the decline in mortality ratios were considerably low at less than 12% but varying across health facilities and by county. Kisumu County has higher Maternal Mortality ratio compared to the National at 495/100,000 and Infant

mortality at 39.1 per 1000 live births against SDG target of less than 70 maternal deaths per 100 000 live births. Furthermore, Kisumu has the worst MCH service quality indicators compared to the neighboring counties whereby Nandi has MMR of 344/100,000 live births and Vihiga County has MMR 300/100,000 live births. Most of maternal mortality and infant mortality occur in tier three public health facilities which handle the bulk of MCH cases and are the main referral point for peripheral facilities making them the most vulnerable to systemic constrains. Compromised MCH service quality is increasingly being linked to failure to attain expected healthcare improvements in Low- and Middle-Income Countries. The Sustainable Development Goals (SDGs) and the Global Strategy for Women's, Children's, and Adolescents' Health (2016–30) have identified issues of MCH service quality as an inherent problem in resource-limited settings. Kenya's Free Maternity Services (Linda Mama) initiative removed user fees for MCH services with the aim of increasing service uptake and improving MCH service quality. Whereas this led to increased access to MCH services at tier three health facilities, there had not been corresponding improvement in health facility infrastructure and organizational set up to support increasing patient load and, as a result this caused an overstretch of health facilities resources. A recent time series analysis study only showed a small improvement of the MCH service quality indices. However, there has been limited systematic studies to clarify systems issues that continue to drive poor MCH service quality outcomes. There was further need for information on the determinants of MCH service quality in the tier three public health facilities of Kisumu County expected to ensure quality services. The current study sought to understand factors associated with MCH service quality in line with WHO

framework focusing on health structure (physical structures and human resources for health), service delivery processes and outcome (client satisfaction).

1.3 Objectives

1.3.1 Broad Objective

To assess the determinants of MCH service quality in tier three public health facilities of Kisumu County.

1.3.2 Specific Objectives

1. To determine mothers' socio-economic and demographic characteristics associated with MCH service quality in the tier three public health facilities of Kisumu County.
2. To determine healthcare workers' characteristics associated with MCH service quality in tier three public health facilities of Kisumu County.
3. To determine healthcare service delivery processes associated with MCH service quality in tier three public health facilities of Kisumu County.
4. To assess healthcare structural factors associated with MCH service quality in tier three public health facilities of Kisumu County.

1.4 Research Questions

1. What are the mothers' socio-economic and demographic characteristics associated with MCH service quality in the tier three public health facilities of Kisumu County?
2. What are the healthcare workers' characteristics associated with MCH service quality in tier three public health facilities of Kisumu County?

3. What are the healthcare service delivery processes associated with MCH service quality in tier three public health facilities of Kisumu County?
4. What are the healthcare structural factors associated with MCH service quality in tier three public health facilities of Kisumu County?

1.5 Justification of the Study

MCH service quality has far reaching implications for the care of mothers and children which if compromised can increase Infant and maternal morbidity and mortality ratios. Improving MCH service quality could prevent 1 million newborn deaths and half of all maternal deaths each year (WHO, 2020). There is need for quality, timely and reliable MCH data and information that will help in the development, refinement and implementation of MCH quality policies and strategies for an integrated approach to quality health services in Kisumu County tier three public health facilities.

1.6 Significance of the Study

I believe that the quality of services that focus on the care of mothers and children needs major consideration and should be part of every programme that addresses people's health. It was anticipated that the study would provide information that will lead to improvement of MCH service quality at tier three public health facilities. Therefore, understanding factors which influence quality of MCH services will go a long way in improving the health of both mother and child. The study findings highlighted the need to include in the RMNCAH Investment Framework promotional messages that are mother's age specific, messages that focus on different parities and those targeting mothers based on their place of residence. This finding is likely to change how MCH program is designed and implemented if service quality is to be

achieved that will lead to reduction in Maternal mortality to 365/100,00 live births (CIPD 2018-2022).

The study also showed that healthcare workers who had HND are less likely to provide MCH service quality, this has an implication on healthcare workers training with the question being, does the government still need to continue training HND healthcare workers or just focus on Diploma and Degree level.

1.7 Scope of the Study

This study focused on assessing determinants of MCH service quality in tier three public health facilities in Kisumu County, Kenya using WHO's standard of quality that is based on structure, process and outcome factors. The tier three levels of health facilities in the Country handle large number of patients with complicated MCH requirements in comparison to the lower-level health facilities.

1.8 Study Limitations

Several limitations might have influenced the results of this study i.e., social desirability bias, sponsor prejudice, cultural bias and recall bias. Social-desirability bias is a type of bias where respondents answer questions in a manner that will be viewed favorably by others. This bias was mitigated by framing questions in a manner that reflects respondent's feelings which allows them to express their emotions while giving truthful information.

When respondents are aware of the sponsors for the research, they are likely to be biased when giving feedback, this was reduced by explaining the objective of the study, maintaining a neutral position and assuring respondents there is no monetary gains in this study.

Cultural bias is an assumption about motivation and influence that are based on researcher cultural lens. Understanding the culture of the target population and communicating in a culturally accepted way was used by the researcher to mitigate this bias.

Recall bias which is a systematic error that occurs when respondents fail to remember previous events or experiences accurately or omit details. This was minimized by standardizing sampling methods.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter the literature review was done and organized according to study objectives to assess: (a)mothers' socio-economic and demographic characteristics associated with MCH service quality in tier three public health facilities; (b)healthcare workers' characteristics associated with MCH service quality in tier three public health facilities; (c)healthcare service delivery processes associated with MCH service quality in tier three public health facilities and (d)healthcare structural factors associated with MCH service quality in tier three public health facilities.

2.2 Mothers' socio-economic and demographic characteristics associated with MCH service quality in tier three public health facilities

According to Brizuela *et al.*, (2017), mothers' characteristics could be influencing MCH service quality in tier three public health facilities. The study highlighted that MCH service quality is not only dependent on factors that affect healthcare workers, but mothers too, however this study did not investigate specific mother's characteristics that could be affecting MCH service quality in tier three public health facilities.

Similarly, there were significant variations to access of MCH service quality between developed and developing countries, but also within countries with maternal and child mortality rates differing by geographic location and socio-economic status. The challenge is having a unified approach of assessing MCH quality in tier three public health facilities across different countries and environments (Vogel *at el.*, 2018).

A study done in Nepal using secondary data from Nepal Demographic and Health Survey to assess the socio-demographic correlation with the quality of antenatal care in tier three health facilities in the country. The findings showed mother's education interact differentially to determine service quality by influencing mothers' ability to utilize ANC services, predisposing them to illness and affect mothers' health seeking behaviour. The study did not consider primary data and MCH in general but narrowed to ANC (Adhikari *et al.*, 2021).

In low-income Countries the researchers found that educated mothers and mothers with wealthy indices had a higher likelihood of receiving a higher number of ANC visits. This data was compared to rural mothers, and those with more than two children who were identified to be less likely to receive the required number of ANC visits. It will be important to assess how mothers access ANC services regardless of their parity and how this compares to the Kenyan context especially Kisumu County tier three public health facilities (Sheffel *at el.*, 2019). However, a study by Carvajal-Aguirre *et al.*, (2017), systematically reviewed evidence of the association between healthcare quality and cost, showed inconsistent evidence on the association between healthcare cost and service quality in tier three public health facilities. They established that the association between cost and quality MCH services is small to moderate, regardless of whether the direction is positive or negative. These results indicate that direct MCH services costs may be largely synergistic to other factors. It will be important to assess how mother's income relate to MCH services quality in tier three public health facilities (Sharma *et al.*, 2017).

A community-based study done in Nigeria, Myanmar, Guinea and Ghana examined mothers' experiences on MCH services in tier three public health facilities, found that

mothers with richer spouses at the health facility were more likely to report having received good quality of MCH services (Maung *et al.*, 2021). This study did not determine the spouses age in relation to MCH service quality.

In attempt to address these socio-economic and demographic gaps existent in MCH service quality, Howard-Grabman *et al.*, (2017) explored the role of community in MCH services to improve the quality of the outcomes of interventions. The researchers noted that mother's economic empowerment helped in improving access to MCH service quality in tier three public health facilities. The findings underlined that mother's economic improvement improved the use of skilled care during pregnancy, childbirth and the postnatal period for mothers and newborns. The study however did not look at the economic empowerment in the context of tier three public health facilities but rather focused on the community.

In a study done in South Africa which aimed at finding out the social factors that influence the provision of MCH services in tier three public health facilities, established that young mothers were at a much higher risk for maternal mortality compared to mothers aged 20 years and above. The researchers established that newborns born to young mothers were also more likely to have low birth weight, with the risk of long-term effects such as early onset of adult diabetes than newborns of older mothers. The data from the study reiterates the significance of understanding mothers age in relation to their influence MCH services quality in tier three public health facilities (Jonas *et al.*, 2016).

A study conducted by Asratie *et al.*, (2020) that sought to assess the continuum of MCH services in Ethiopia tier three public health facilities showed that parity and

educated mothers were more likely to receive all the elements of the continuum of care. Although this study did not highlight the number of pregnancies that is related to MCH services quality.

Likewise, a study conducted in rural western Kenya, sought to evaluate the uptake of skilled attendance along the MCH continuum of care in tier three public health facilities, found that factors such as mother's level of education and mode of transport significantly affected overall service uptake besides a drastic decline in service uptake observed from antenatal to the postnatal periods, however it did not assess other characteristics from the mother side like age, parity, religion, income and how these affects MCH service quality in tier three public health facilities (Mwangi *et al.*, 2018).

A study in Kenya found the need for analysis of the health system factors and how they contribute to MCH service quality if significant achievement is to be released in improving the MCH service quality in the tier three public health facilities (Adde *at el.*, 2020; Mbugua *at el.*, 2018).

In study done in Kisumu County demonstrated that perceived MCH service quality by the mothers was the most important determinant of service utilization at MCH clinics in tier three public health facilities. However, it was important to assess how individual mothers characteristic influence MCH service quality in tier three public health facilities of Kisumu County (Escamilla *et al.*, 2018).

These studies demonstrated the need to establish the mother's socio-economic and demographic factors associated with MCH service quality in tier three public health facilities. Some of the studies have tried to examine socio economic and demographic

factors but still their individual contributory nature to quality services in tier three public health facilities is not well understood (Jalali-Farahani *et al.*, 2017). Gaining more in-depth knowledge on factors influencing MCH service quality in tier three public health facilities will help in improving wellbeing of mothers and the children hence reducing mortality and morbidity rates (Yaya *et al.*, 2019).

2.3 Healthcare workers' characteristics associated with MCH service quality in tier three public health facilities

Healthcare workers could be key determinant to quality of care provided at the tier three public health facilities (Chichirez *et al.*, 2018). According to WHO's standard framework of quality care, healthcare workers are key elements that needs structured evaluation to establish their effect on MCH service quality (Sudhinaraset *et al.*, 2017; WHO, 2016).

A study conducted in Bangladesh to assess the process factors that influence the quality of care during childbirth at 15 tier three public health facilities using Donabedian's three-dimensional conceptual framework to measure MCH services quality across the hospitals. The researchers evaluated the attention provided by healthcare workers to newborns; the responsiveness and attitude of the healthcare workers in the duration of mothers stay in health facilities. The findings showed most service providers lacked the responsive ability towards mothers with some mothers citing older healthcare workers being responsive (Kanyangarara *et al.*, 2017). These results highlighted the need to investigate the influence of healthcare workers age towards MCH service quality in tier three public health facilities.

Another cross sectional, community-based study conducted in Lao PDR, a rural district in Khammouane Province, used the modified composite coverage index (CCI) to

examine the outcome of quality of care in ten MCH services in tier three public health facilities with the aim of identifying challenges to the continuum of care that mothers receive in the hospitals in rural Lao PDR. The findings revealed inadequate service providers' practical experience influencing the outcome of quality services in tier three public health facilities. The study also made suggestions for further analysis of the service providers working hours and how this could be affecting MCH services quality (Sakuma *et al.*,2019).

A study done in Sub Saharan established that service providers behaviour especially respect, politeness and technical competence are more important predictors of MCH services quality, it however did not classify the health service providers' level of competences in the tier three public health facilities (Mekbib *et al.*, 2020).

In LMICs, especially in sub-Saharan Africa studies have shown poor knowledge and skills among service providers together with other factors affecting MCH service quality. It was noted most service providers had inadequacy of skills on basic emergency obstetric care (EmOC) and there is a need to have a structured staff capacity building program (Egieyeh *et al.*, 2021). The study did not look at the different cadres of healthcare services providers that is applicable in the Kenya tier three public health facilities but focused mainly on pharmacists and pharmacy students.

Similarly, in survey conducted in seven countries in sub-Saharan Africa to examine the association between service providers in-service training and quality antenatal and sick childcare. The findings revealed that in-service training courses was among the most common interventions to improve the quality of health care in low and middle-income countries. The study emphasized the need for service providers training in order to

improve their competencies and skills for the achievement of MCH service quality, it did not assess how healthcare worker's basic education affects MCH service quality in the tier three public health facilities (Leslie *et al.*, 2016).

A study done in developing countries to identify determinants of quality maternity care services showed quality improvement efforts in developing countries which focused on strengthening healthcare workers' capability to offer services. The researchers emphasized that special attention is needed to improve interpersonal behavior, as evidence from the review points to the importance mothers attach to being treated respectfully, irrespective of socio-cultural or economic context. Moreover, the researchers found that experienced service providers and those working in better managed health facilities in Eastern, Western and South Africa provided quality maternal and childcare services with no difference between better and less equipped health facilities. They recommended on further research to establish healthcare workers' inherent characteristics associated with MCH service quality in the tier three public health facilities (Lythgoe *et al.*, 2021).

In a study done in Nigeria, healthcare workers heavy workloads in the provision of maternal health care resulted in complaints from service providers, evidence of stress and strain in care provision by service providers and the sheer numbers of patients that are left unattended to in public health facilities. Insufficient time to carry out necessary investigations on patients featured as a challenge with secondary result that mothers are reluctant to seek care in the public health facilities. The study recommended a further evaluation on the association of service providers' workload and MCH service quality in tier three public health facilities in LMICs (Ogu *et al.*, 2018).

Similarly, a study done in Ethiopia established that healthcare workers' prior and current MCH practical experiences gained from working longer in a public health facility influenced their ability to offer quality MCH services (Emiru *et al.*, 2020; Karim *et al.*, 2019). It will be interesting to find the significant work duration in a department that affects MCH service quality in tier three public health facilities.

A study conducted in 2020 across a set of four districts in Tanzania's Mtwara region in the south-eastern section of the Country sought to identify the determinants of MCH service quality in tier three public health facilities. The findings emphasized on the need to strengthen healthcare workers' skills, attitudes and interpersonal behaviours to improve MCH service quality. Evidence highlighted those mothers attach significance to respectful treatment irrespective of their socio-cultural or economic contexts with preference to older healthcare workers. It will be important to determine how this plays out in Kenya tier three public health facilities where majority of healthcare workers are of young generation. (Day *et al.*, 2021).

A study done in Uganda showed clinicians' level of education and competencies play a key role in improving MCH service quality in the tier three public health facilities. The study focused on one cadre of healthcare workers, and it will be important to assess how other cadres affect MCH service quality in tier three public health facilities (Kabatooro *et al.*, 2016).

Based on these studies, it is evident that there is need to evaluate how healthcare workers' characteristics influence MCH service quality in tier three public health facilities in the context of Kenya particularly Kisumu County. Moreover, the analyzed studies recommend for further study to establish how healthcare workers characteristics effect MCH service quality in tier three public health facilities.

2.4 Healthcare service delivery processes associated with MCH service quality in tier three public health facilities

Healthcare service delivery processes measures of quality on the other hand evaluate the manner of service delivery and entail the sum of all actions that make up healthcare. Service quality was long categorized by Donabedian, (1980) into three categories: “structure,” “process,” and “outcomes.” i) Structure refers to the context in which care is delivered, including hospital buildings, staff, financing, and equipment, ii) process refers to the transactions between patients and providers throughout the delivery of healthcare, iii) outcomes indicates the effects of healthcare on the health status of patients and populations which comprises indicators such as client satisfaction as shown in Figure 2.1.

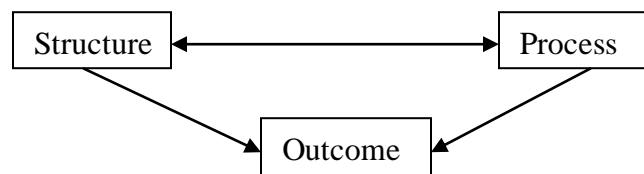


Figure 2. 1 Donabedian model for measuring quality (1980)

Based on WHO’s standard framework of care quality, the quality of the process of MCH service can be evaluated by looking at: a) the provision of care, and b) the experience of care. To begin with, evaluating the provision of care requires the examination of the use of: (1) evidence-based practices (EBPs) for emergency and routine MCH services; (2) information systems for record keeping allowing for reviews and audits, and (3) functioning referral systems across different levels of care. Examining the experience of care on the other hand entails examining:(4) the use of effective communication with clients and their families on their care provision, (5) the respect of the rights and expectations of clients (mothers and children) to preserve their dignity, and (6) the provision of access to emotional and social support to mothers. In

addition, other process indices occasion the examination of availability of: (7) skilled and motivated human resources and (8) vital physical resources needed for good quality of care in health facilities (WHO, 2016).

Information about process indices can be obtained from medical records, interviews with mothers and service providers, or direct observations of healthcare visits. The technical aspects of MCH service quality are measured by assessing input attributes using related technical tasks such as assessing patient's history and the diagnostic approaches done on the patient such as blood pressure measurement; checking for haemoglobin and checking urine for albumin (Jolivet *et al.*, 2018). Other technical attributes that can be evaluated include the provision of prophylactic drugs as well physical examinations of mothers; and the provision of health education on important maternal health services (Vogel *et al.*, 2018). Often, healthcare workers skip these process tasks because of competency issues, work-related burnout, lack of equipment and supplies, staff behaviours and other factors that largely require healthcare worker's compliance.

Research conducted across tier three public health facilities in Southeast Asia adopted the use of WHO's 'Every Newborn Action Plan' as a conceptual framework to measure MCH service quality in the region. Some of the process indices that were evaluated included: evidence-based practices (EBPs) around childbirth and postpartum care. These were evaluated by watching the care given to pregnant mothers along the continuum of MCH services and examining the delivery facility records. Most hospitals had inadequate staffing with vital measurements including blood pressure not done in majority of mothers. The findings helped to establish significant gaps in MCH service quality in the affected health facilities and influence proposals for systematic

implementation of appropriate quality standards to equip the hospitals with better capacity to provide MCH service quality. Assessment of these factors in the context Kenya tier three public health facilities will be important (Baschieri *et al.*, 2019).

A study by Chichirez *et al.*, (2018) underlined that interpersonal communication skills are a key determinant of healthcare worker-client interactions. The study found that clinicians' level of satisfaction, and their ability to build rapport as well as to express care and warmth with mothers, conduct well-structured interview of disease history are positively associated with MCH service quality, it however did not assess client satisfaction in the context of tier three public health facilities

Moreover, a study done in Nigeria, indicated that obstetric examination of mothers increased MCH service uptake in the tier three public health facilities. Having a singular assessment of MCH services might not give clear picture of the required quality outcome, hence the recommendation for assessing obstetric examination together with other components of MCH services like laboratory investigations and vaccination in tier three public health facilities (Ogbuabor *et al.*, 2018).

A study done in 5 countries in East and Southern Africa demonstrated that efforts to increase use of facility-based maternity care in low-income countries are unlikely to achieve desired gains if there is no improvement in MCH service quality, especially elements of respectful care. The analysis identified insufficient communication and information sharing by service providers as well as delays in care and abandonment of laboring mothers and recommends for a further study to establish if communication and information sharing influenced MCH service quality in tier three public health facilities

(Kruk *et al.*, 2017). It will be important to look at health education which is the main form of information sharing in Kenya tier three public health facilities.

A study in Tanzania found that structured and more skilled approaches to communication between healthcare workers and their clients considerably improve MCH service quality delivery although the design focused on healthcare workers there is need to investigate client's feedback for MCH service quality in tier three public health facilities (Baker *et al.*, 2018; Coles *et al.*, 2020).

2.5 Healthcare structural factors associated with MCH service quality in tier three public health facilities

The structural quality assessment is concrete and easy to assess, and encompasses a review of the structural and systematic resources within a healthcare facility i.e., the physical health environment, the basic and specialized services provided, the available medical drugs, equipment, and facilities used (such as diagnostic laboratories and emergency care units), the human resources factors such as staffing, training and payment, and the use of hospital systems such as referral systems and information technology.

A cross-sectional study was conducted in Bangladesh to assess the quality of care during childbirth at 15 tier three public health facilities. The research adopted the use of Donabedian's three-dimensional conceptual framework to measure the structural quality of MCH services across the hospitals. Subsequently, the researchers examined the following structural indices of quality in the hospitals: the hospitals' physical environment and essential amenities in the maternity wards such as water, sanitation and hygiene. In addition, they assessed the availability of vital facilities and equipment such as neonatal stabilization units (NSU), special care newborn units (SCANU), and

essential drugs. Furthermore, they reviewed the organizational structure in terms of staffing, the availability of human labor, staff payment, and staff training. Consequently, the results of the assessment found significant gaps in MCH services quality in terms inefficiencies in the provision, readiness and experience of care across the structural quality index. The study did not consider systemic evaluation of specific structural factors and their contribution to MCH service quality in tier three public health facilities (Billah *et al.*, 2019).

Another study carried out across 12 Countries in Africa and Asia as part of the WHO's (Every Newborn Action Plan) ENAP sought to identify the specific challenges that affect structural scaling up to improve MCH service quality for the sick and new-born infants at the time of birth. The results of the study found significant gaps in the structural quality of health facilities that affected the timely care of mothers. The study emphasized on the need for targeted and systematic structural review before scaling up interventions that address the challenges in the MCH service quality in tier three public health facilities (Bolan *et al.*, 2021).

A study done in Madagascar to guide the structural quality improvement at health facilities in the country with respect to enhancing interventions to MCH complications such as pre-eclampsia/eclampsia (PE/E) and postpartum hemorrhage (PPH). The results showed that the main barriers to MCH services quality were inadequate physical structures. The study focused on the National level health facilities as compared to the tier three public health facilities which could yield different results (Marks *et al.*, 2016). In addition, there were inadequate emergency transport and communication equipment in half of the facilities, as well as limited supply of safe water within 500 meters of hospitals. It will be important to assess this in Kenya's tier three health facilities.

In another study by Benzer *et al.*, (2018) which designed a structural readiness matrix to examine facility readiness to administer a package of inpatient MCH services aimed at improving MCH services quality. The matrix assessed structural quality indicators and the finding showed quality gaps in specialized staff and thermoregulation. The matrix however does not conform to WHO or Donabedian's quality frameworks; it will be important to assess this using WHO MCH quality framework in the context of tier three public health facilities (Bergerum *et al.*, 2020).

However, another study carried out in Kenya and Namibia found parallel insights showing that better structures did not translate to better service delivery process or greater client satisfaction in tier three public health facilities. The study utilized Donabedian's three-dimensional conceptual framework to assess the quality of antenatal care (ANC) in hospitals. The results showed that a wide variation in structural and process attributes of MCH quality of care existed in several facilities offering ANC. The study also indicated that the health facility structural preparedness may not be sufficient to provide good-quality services (Do *et al.*, 2017). The data highlighted that despite better structural quality of the tier three public health facilities, common problems in service delivery such as laboratory tests could still be posing more serious quality concerns and there is need to have an integrated evaluation of structural and process factors in MCH services quality in the tier three public health facilities (Dalinjong *et al.*, 2018).

Based on these studies on structural factors associated with MCH service quality, findings demonstrate lack of a concise analysis of structural factors in relation to MCH service quality in tier three public health facilities and the inadequacies point towards

the need for a further analysis of the structural factors influence on MCH service quality that ensure optimum MCH services for all mothers and children in the tier three public health facilities.

2.6 Summary of Literature review

The reviewed studies largely focused on mothers socio-economic and demographic characteristics in terms of access and service utilization in one or two components of MCH service quality. This has led to lack of all-inclusive evidence, including service inputs, process factors and output factors as well as user characteristics, especially mothers' characteristics that are more related to MCH services quality in tier three public health facilities e.g., parity (Sheffel *et al.*, 2019).

Studies done on healthcare workers' characteristics targeted either qualified or intern nurses in a general context of healthcare and not MCH services quality. Moreover, the analyzed studies recommended for further study to establish healthcare workers effect on MCH service quality (Sakuma *et al.*,2019). This is crucial in the Kenya's context which has different cadres of healthcare workers that provide MCH services ranging from Doctors, Clinical Officers, Nurses, Laboratory, Pharmaceutical Technologists and especially in tier three public health facilities which handle the bulk of MCH services.

The reviewed studies on healthcare service delivery processes and healthcare structural factors associated with MCH service quality points towards the need for a further analysis to establish how these factors associated with MCH service quality that will ensure optimum MCH services quality for all mothers and children (Baschieri *et al.*, 2019; Bolan *et al.*, 2021). There was no literature that assessed MCH service quality in the context of Kisumu County tier three public health facilities.

2.7 Conceptual Framework

The Framework is borrowed from WHO's Quality Care Framework for MCH and modified according to the study objectives. It identified independent variables which entailed mothers socio-economic and demographic characteristics, healthcare workers characteristics, healthcare service delivery processes and healthcare structural aspects with outcome variable being MCH service quality measured as client satisfaction in the tier three public health facilities of Kisumu County. The study envisaged that the proximate factors would have a modifying and / or mediating effect in the interaction between independent and dependent variables, rather than confounding e.g., poor medical practice and lack of appropriate knowledge on MCH might modify the perception of MCH service quality received by the mothers.

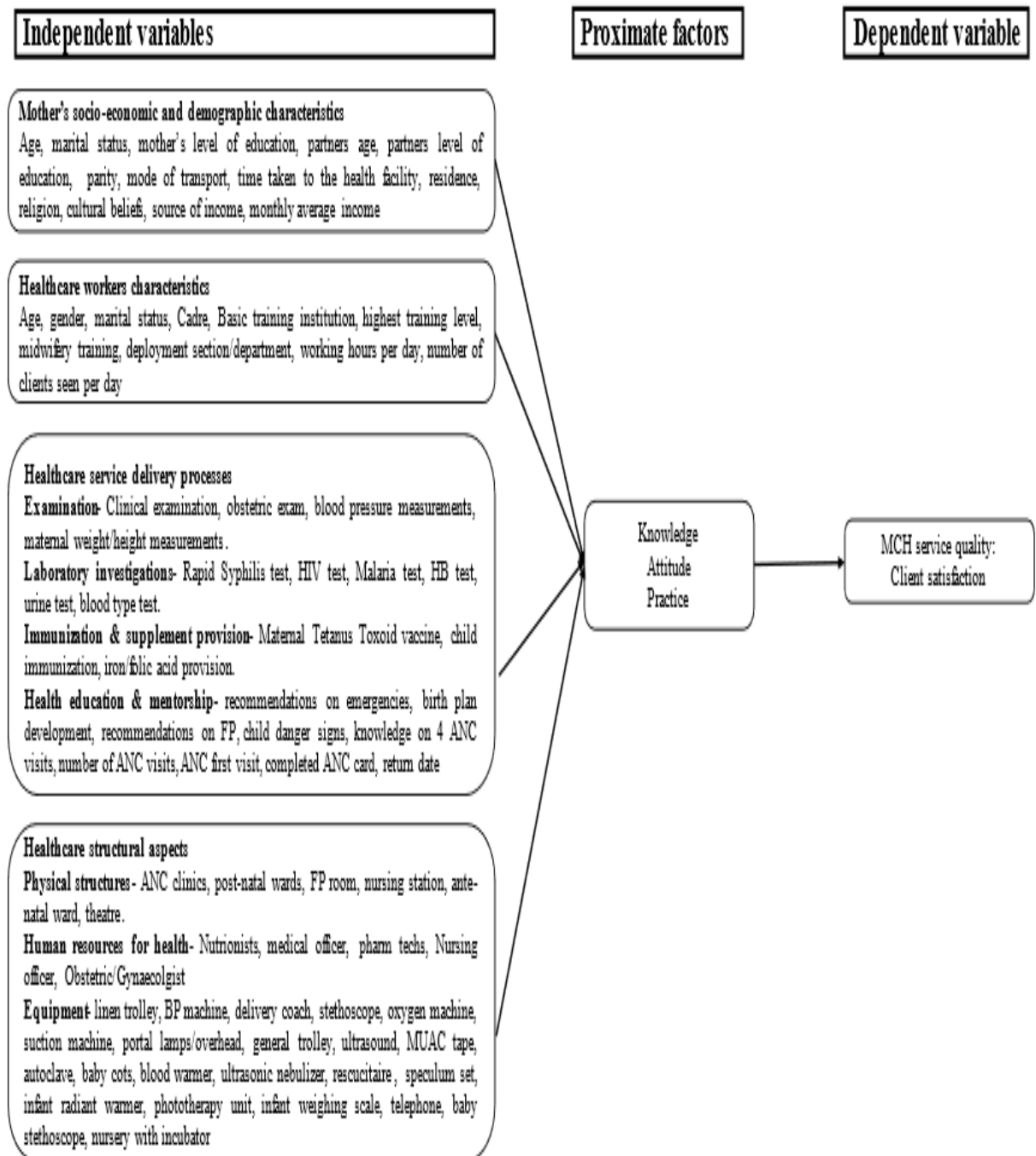


Figure 2. 2 Conceptual framework

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter is a description of the study site, study design and study population. It also includes a description of the sampling procedure, data collection methods and data analysis methods that was used in the study.

3.2 Study Area

Kisumu County covers 0.36% of the total land mass in Kenya. It is located between longitudes 35° 28' and 35° 36' and latitudes 0° 12' and 1° 10' South. It is bordered by Counties of Vihiga and Nandi to the North, County of Kericho to the East, Homa Bay County to the South, and Siaya County to the West (Appendix 1). Kisumu County has 210 health facilities, seven of which are classified as tier three public health facilities previously level IV according to Kenya Essential Package for Health (*KEPH*) (Kisumu CIDP, 2018-2022). The top 10 health problems facing children in this County include Malaria, URTIs, diarrhoeal diseases, other diseases of respiratory system, diseases of the skin, fever, pneumonia, Ear infection, eye infection and UTI (Kisumu CIPD, 2018-2022).

3.3 Study Design

This was an analytical cross-sectional study using a mixed methods study design which adopted a both quantitative and qualitative data.

3.4 Target population

Women of reproductive age.

3.5 Study Population

Mothers seeking MCH services in the tier three public health facilities of Kisumu County.

3.6 Sample size Determination and Sampling Techniques

3.6.1 Sample size determination

There were 4713 mothers who attended MCH services monthly in Kisumu County tier three public health facilities, this is an average figure after comparing MOH 711 data for six months (DHIS 2019). The desired sample size for mothers seeking MCH services was determined using Cochran's (1977) sample size determination formula:

$$n_0 = \frac{z^2 \times p \times (p-1)}{e^2} \quad n_0 = \text{sample size}$$

n_0 = unadjusted sample size

n = adjusted sample size

N = population size

z = z-score (1.96. Confidence level 95%)

e = margin of error (0.05)

p = the (estimated) proportion of the population which has the attribute in question is (30%) based on DHIS data 2019.

$$n_0 = \frac{1.96^2 \times 0.3 \times 0.7}{0.05^2} = 322.6944 \cong 323$$

Sample size was adjusted according to the formula below since target population was less than 10,000. N in the formula is the population size, which is 4713

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

$$n = \frac{323}{1 + \frac{323 - 1}{4713}} = 302.343396 \cong 303$$

Assuming a 10% loss to follow up, the number was adjusted to: $303 + 10\% = 334$ mothers.

All the 81 healthcare workers offering MCH services were included in the study together with 7 Key Informant Interviews from health facility RMNCAH in-charge.

3.6.2 Sampling procedures

All the seven tier three health facilities were purposively selected because: i) they are equally distributed across the county, each being in every sub-county and as such giving a clear representation of the County populace ii) are referral centers for the Primary Health Care facilities iii) they also provide primary health care services and iv) handle the bulk of MCH services.

The 334 sampled mothers were distributed proportionately across all the seven tier three public health facilities according to the average monthly MCH workload data for each health facility as shown in Table 3.2. The mothers who met the inclusion criteria were randomly selected with every 14th mother identified from a sample frame of 4713.

Table 3. 1 Average Monthly Workload and sample size distribution

Sub-County	Health Facility Name	Monthly workload (x)	Sample size(x/N*n)
Seme	Kombewa Sub-County Hospital	578	41
Kisumu East	Kisumu County Referral Hospital	1137	81
Kisumu West	Chulaimbo Sub-County Hospital	934	66
Kisumu Central	Nyahera Sub-County Hospital	543	38
Muhoroni	Muhoroni Sub-County Hospital	322	23
Nyando	Ahero Sub-County Hospital	774	55
Nyakach	Nyakach Sub-County Hospital	425	30
	Total workload (N) 4713	4713	334
Total sample size (n) 334			

Source for monthly workload data: DHIS2, 2019

All the healthcare workers offering MCH services in all the seven tier three public health facilities of Kisumu County were included in the study. The healthcare workers were interviewed in the evening and at their convenience in order not to interrupt service delivery. The staff availability per facility is as per Table 3.3.

Table 3. 2 Staff availability per health facility

Health facility	Number of service providers
Kisumu county referral Hospital	20
Chulaimbo sub-county Hospital	11
Ahero sub-county Hospital	14
Kombewa sub-county Hospital	17
Nyahera sub-county Hospital	6
Nyakach sub-county Hospital	8
Muhoroni sub-county Hospital	5
Total	81

3.6.3 Inclusion criteria

1. Mothers attending MCH/post-natal services and must be residence of Kisumu County for minimum of 6 months.
2. 18 years and above mothers and emancipated minors

3. All healthcare workers deployed to MCH clinics.
4. Those who consent for the study
5. Tier three health facility RMNCAH in-charges

3.6.4 Exclusion criteria

1. Mothers who attended MCH clinics for the first time were excluded from the study since their first visit would not have allowed them to give a satisfactory evaluation of the services offered at the health facility.
2. Post-natal mothers attending Tier 3 clinics but who had delivered from health facilities outside the study sites.

3.7 Data Collection tools

The study used closed ended questionnaires and KII for data collection. The closed ended questionnaires were physically administered to sampled mothers and all the 81 healthcare workers deployed to offer MCH services in the 7 tier three public health facilities of Kisumu County. Seven Key Informant Interviews was administered to all the tier three health facilities RMNCAH in-charges. The tool in appendix three was used to collect data for objective one, the tool in appendix four was used to collect data for objective two, the tool in appendix five was used to collect data for objective three and the tool in appendix six was used to collect data for objective four.

3.7.1 Recruitment of research assistants

Three research assistants were recruited for the study. These included two nurses and one Clinical Officer students who had experience in conducting interviews using questionnaires.

3.7.2 Training of research assistants

The three research assistants were trained for four days on the study objectives: questionnaire administration through mock administration as well as extraction of information from structured observation.

3.7.3. Reliability and Validity Test of the Instruments

Validity is the extent to which the research results can be accurately interpreted and generalized to the population. It is the extent to which research instruments measure what they are intended to measure while Reliability is the extent to which a research instrument can yield similar results on repeated trials, thus ensuring possible replication of the study (Polit and Beck, 2017). The tool was pre-tested in Siaya County Referral Hospital which had similar characteristics with the study area. 10% of the participants from the parent sample size (10% of 334) which was 34 mothers and (10% of 81) which was 9 healthcare workers were purposefully selected for pilot testing with the assistance of research assistants. Questionnaire was administered to those participants and after one week, the same questionnaires were again administered to the same group of respondents and the responses scored manually. The study looked at how consistent the results were for different items for the same construct within the measure. To test for reliability, Cronbach's alpha was used which is a measure used to assess the reliability and internal consistency of a set of test items and a reliable data collection tool should have Cronbach's alpha (α) of at least 0.6 to 0.9. In this study, the tool had an overall Cronbach's (α) score of 0.7 hence it was reliably acceptable tool.

3.7.4 Facility service quality assessment

The stated variables in table 3.3, 3.4 and 3.5 were measured based on the constructs provided by the Kenya Quality Model for Health, Human resources for health Policy, MCH Standard operating procedures, Kenya Health Sector Strategic and Investment plan 2018-2022.

Table 3. 3 Health facility quality Assessment

Components type	Source of Component Measures
Mother’s socio-economic & demographic characteristics	Interviews
Healthcare workers characteristics	Interviews Kenya Quality Model for Health (MOH, 2018b) Human resources for health Policy (MOH 2019) Licensing -Regulatory boards.
Healthcare service delivery processes	Interviews MCH National checklist (MOH, 2016) Kenya Quality Model for Health (MOH, 2018b) MCH Standard operating procedures (2020)
Healthcare structural aspects	Kenya Quality Model for Health (MOH, 2018b) Kenya Health Sector Strategic and Investment plan (MOH, 2018a)
Outcome	Client satisfaction

3.7.5 Study variables

The study variables were mothers’ socio-economic and demographic characteristics, healthcare workers’ characteristics, healthcare service delivery processes and healthcare structural variables as shown in Table 3.5 and Table 3.6.

Table 3. 4 Study variables for objective 1,2, and 3

Objective 1: Mother's socio-economic and demographic factors	Objective 2: Healthcare worker's characteristics variables	Objective 3: Healthcare service delivery process variables
Age	Age	Examination <ul style="list-style-type: none"> • Clinical examination • Obstetric examination • Blood pressure measurements • Maternal weight/height measurements Laboratory Investigations <ul style="list-style-type: none"> • Rapid Syphilis Test • HIV Test • Malaria test • HB test • Urine test • Blood type test Immunization & supplement provision <ul style="list-style-type: none"> • Maternal TT • Child immunization • Iron/folic acid provision Health education & mentorship <ul style="list-style-type: none"> • Recommendation on emergencies • Birthplan development • Recommendation on FP • Child danger signs • Knowledge on 4 ANC visits • Number of ANC visits • ANC first visit • Completed ANC card • Return date
Marital status	Gender	
Mother's level of education	Marital status	
Partner's age	Cadre	
Partner's level of education	Basic training Institution	
Parity	Highest training level	
Mode of transport	Midwifery training	
Time taken to health facility	Deployment	
Residence	section/department	
Religion	Duration in the	
Cultural beliefs	section/department	
Source of income	Working hours per day	
Monthly average income	Number of clients seen per day	

Table 3. 5 Study variables for objective four

Healthcare structural aspects	Measure reference
Physical structural aspects (7 items)	Recommended Kenya Quality Model for Health: A – Not available at time of visit. B – Available: functionality (1 – adequate; 2 – not adequate)
ANC Clinic	
Post-natal Ward	
FP Room	
Nursing station	
Ante-natal Ward	
Theatre	
Toilets	
Human resources for health (5 items)	Recommended Kenya Quality Model for Health and Kenya human resources for health strategy: A – Not available at time of visit. B – Available: functionality (1 – adequate; 2 – not adequate)
Nutritionist	
Medical Officer	
Pharm Technologists	
Nursing officer(midwife)	
Obstetrician/Gynaecologists	
Equipment (22 items)	Recommended Kenya Quality Model for Health: A – Not available at time of visit. B – Available: functionality (1 – adequate; 2 – not adequate)
Linen trolley	
BP Machine	
Delivery coach	
Stethoscope	
Oxygen machine	
Suction machine	
Portal lamps/overhead	
General trolley	
Ultrasound	
MUAC tape	
Autoclave	
Baby cots	
Blood warmer	
Ultrasonic Nebulizer	
Resuscitaire	
Speculum set	
Infant radiant warmer	
Phototherapy unit	
Infant weighing scale	
Telephone	
Baby stethoscope	
Nursery with incubator	

Data was collected using structured questionnaires administered to mothers and healthcare workers with the aim of getting more information on the determinants of MCH service quality. The questions assessed different dimensions of mothers' socio economic and demographic characteristics, healthcare workers' characteristics, healthcare service delivery processes and healthcare structural aspects as shown in Table 3.6. The entire data collection process was done with the assistance of three research assistants; and the units of observation were mothers seeking MCH services and healthcare workers providing MCH service.

3.8 Data Analysis

Quantitative data arising from the study was managed using the Stata version 16. Data cleaning entailed coding values for categorical variables as well as renaming and aligning variable labels to those in the questionnaire. The outcome variable, that is MCH quality services, a question asked in the questionnaire as "Were you satisfied with the services you received?" with two possible choices of "yes", and "no" was binarized by coding "no" = 0 and "yes" = 1. This was necessary because binary logistic regression demands that the dependent variable must be dichotomous and with 0 and 1 values only.

All variables were categorical in nature and as such, descriptive statistics involved counts and percentages, reported to assess patterns of responses to the assessed factors. Pearson's Chi-square test was used to assess whether there was a significant association between MCH service quality and the independent variables, rejecting the null hypothesis of "no association" at the confidence level of 95%, equivalent to α 0.05, before a bivariate logistic regression was run to measure the size of this association by way of odds ratios. The same level of statistical confidence was employed to determine

factors that would significantly influence MCH service quality; that is, a factor would be regarded to be a significant if the associated p-value from the binary logistic regression was less than the threshold of 0.05 (Krippendorff *et al.*, 2018).

Because of the numerous independent variables, a stepwise variable selection technique was performed to select only a few but relatively important factors, where the significance level for removal from the model was set to be 0.1. These fewer factors would then go into the final binary logistic regression models where factor levels are important for odds ratios. All binary logistic regressions estimated robust standard errors; that is standard errors that are less biased because of the use of scaled variance matrix. Four reduced binary logistic regressions were performed in total, that one for each objective. The overall model is given in the equation below.

$$y_i = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \sum_{j=1}^n \beta_j X_j$$

Where:

y_i = the quality of MCH services and $i = 0$ or 1

X_j = the vector of covariates and $j = 1, 2, 3, \dots, n$ for n covariates

β_j = the vector of regression coefficients and $j = 1, 2, 3, \dots, n$ for n covariates.

The β_0 is not interpreted in a logistic regression, and after exponentiating the RHS of the model, the β_j will be interpreted as the odds ratio for covariate the X_j .

Healthcare structural aspects data was analyzed descriptively and by using Principal Component Analysis (PCA) which is a factor analysis model (a type of regression model) for data reduction and to maximize variability in the data based on the amount of variability accounted for by the listed items.

The model as shown

$$PC_1 = \alpha_{11}x_1 + \alpha_{12}x_2 + \alpha_{13}x_3 + \dots + \alpha_{1n}x_n$$

where PC_i is principal component i ; α_{ik} represents the weight for the k^{th} variable for the i^{th} principal component. Principal component is a linear combination of optimally weighted observed variables which are extracted in decreasing order of importance so that the first PC accounts for as much of the variation as possible hence PC_1 selected, PCA generates. The variables were first cleaned into binary forms and coded such that yes = 1 and no = 0. Because PCA works best for correlated variables that necessitate dimensionality reduction, the variables were subjected to Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy to ensure PCA is appropriate for them. The test returned a KMO score of 7.2, indicating that the sampling is adequate for PCA on these variables. The PCA was then run and the factor loadings were rotated by the varimax method. Individual indicators were weighted independently to measure the amount of their contribution to MCH quality services. The indicators were then grouped into three blocks (physical structures, human resource and equipment) which were then put into a binary logistic regression where the outcome variable was MCH quality services. Qualitative data was audio recorded, the transcripts cleaned and uploaded to the NVivo® software. The data was re-organized and coded according to relevant information then arranged as per the emerging themes. The quotes included in the results were typical views expressed by the respondents and were used to exemplify emergent themes.

3.9 Ethical Considerations

Ethical approval was obtained from Maseno University Ethics Review Committee (MUERC) (Appendix 9) and authority to conduct this study was obtained from National Commission for Science, Technology and Innovation (NACOSTI) (Appendix 10). Kisumu County Health department was informed and permission was granted to proceed with the study (Appendix 12). Prior to enrolment in the study, all potential participants were informed on the aim, process, benefits and duration of the study in which they were free to choose whether to participate or not. Those willing to participate signed a written informed consent form to show acceptance for inclusion into the study. Participants' anonymity was observed through coding of clients and confidentiality was assured using none-identifiers instead of names of participants. The rights of the study participants were guaranteed by explaining to them that they were free to withdraw from the study at any stage and that they stand risking nothing by doing so. The principal researcher maintained sole access to all information collected and this information was stored under lock and key. Procedural bias was minimized by administering the questionnaire during mothers relaxed moments i.e., at the waiting bay and in the evening for healthcare workers when workload is low.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the findings of this study in line with the study objectives outlined in chapter one. There was 100% response rate for both the mothers 334(100%), healthcare workers 81(100%) and KII 7(100%).

4.2 Mothers' socio-economic and demographic characteristics associated with MCH service quality in tier three public health facilities of Kisumu County

This objective assessed how the mothers' characteristics are associated with MCH service quality in Kisumu tier three public health facilities. The assessed characteristics included: age, number of pregnancies, marital status, mothers' level of education, partners age, partners level of education, residence, mode of transport, time taken to health facility, religion, cultural beliefs, source of income and monthly income. About half (51.2%) of the mothers were aged between 20-29 years while those aged 30-39 years comprised (31.4%), this is supported by KII.

“Majority of the mothers visiting this hospital are young in their 20's” (KII-001 Kisumu Country Referral Hospital)

Among all mothers, (53.9%) lived below two dollars per day, (42.9%) resided in the rural areas and (18.3%) in slums; (41.6%) had at least secondary level education, while (71.9%) were married and only (17.4%) had had >3 pregnancies. At least (55%) of mothers reached the health facilities within 30 – 60 minutes. (Table 4.1).

Table 4. 1 Mothers' socio-economic and demographic characteristics

Variable	Category	n=334	%
Age (years)	10-19	40	12.0
	20-29	171	51.2
	30-39	105	31.4
	40-49	18	5.4
No. of pregnancies	>3	58	17.4
	3	80	23.9
	2	118	35.3
	1	78	23.4
Marital status	Single (never married)	46	13.8
	Married	240	71.9
	Divorced	28	8.3
	Widowed	20	6.0
Mothers' Level of education	None	12	3.7
	Primary	108	32.3
	Secondary	139	41.6
	College/Tertiary	75	22.4
Partner's age	10-19	2	0.6
	20-29	67	19.9
	30-39	162	48.6
	40-49	98	29.4
	>50	5	1.5
Partner's level of education	None	6	1.7
	Primary	62	18.5
	Secondary	135	40.5
	College/Tertiary	131	39.3
Residence	Town Centre	61	18.3
	Slums	61	18.3
	Outskirts of town	69	20.5
	Rural	143	42.9
Time taken to health facility	<30 minutes	106	31.8
	30-60 minutes	186	55.6
	>1hrs	42	12.6
Religion	Protestant	158	47.2
	Catholic	122	36.6
	Muslim	31	9.3
	Others	23	6.9
Cultural beliefs	No	311	93.2
	Yes	23	6.8
Source of income	Salary	75	22.4
	Business	145	43.4
	Remittances	52	15.5
	Farming	38	11.4
	Others	24	7.3
Monthly Income	<Ksh 6000	180	53.9
	>Ksh 6000	154	46.1

Mothers aged 30-39 years were less likely to report having received MCH service quality compared to those aged 10-19 years (aOR=0.52, 95%CI=0.28-0.96, p-value=0.035). Mothers who had had 1 previous pregnancy (aOR=2.29, 95%CI=1.04-2.05, p-value=0.040) and those with 2 earlier pregnancies (aOR=3.22, 95%CI=1.54-2.70, p-value=0.002) were more likely to report having received MCH service quality. This was also noted in KII.

“We try to offer equal quality services to all mothers but sometimes we pay more attention to para 1 and prim gravidas just because of risk that may follow them” (KII-006 Chulaimbo Hospital).

Similarly, those who resided in rural areas (aOR=2.24, 95%CI=1.05-2.79, p-value=0.037) were more likely to report having received MCH service quality. Mothers who had partners aged 40-49 years were more likely to report of having received MCH service quality as compared with other age groups (OR=2.63, 95%CI=0.66-1.45, p-value=0.004). However, there was no significant association between marital status, partner’s level of education, mothers’ level of education, duration of visits, cultural beliefs, source of income, monthly average income and MCH service quality in tier three public health facilities as seen in Table 4.2.

This was seen in KII: *“Over time I have noticed mothers who are escorted by older partners to the MCH clinics be more receptive to health advise and education. The younger partners are always in a hurry and some feel shy to support their wives” (KII-003 Nyakach Hospital)*

Table 4. 2 Association of MCH service quality and mothers' socio-economic and demographic characteristics

Variable	Category	n=334	%	aOR	95% CI	P-value
Age category	10-19	40	12.0	Ref		
	20-29	171	51.2	0.77	0.32-1.81	0.544
	30-39	105	31.4	0.52	0.28-0.96	0.035*
	40-49	18	5.4	0.47	0.14-1.57	0.220
Marital status	Single	46	13.8	Ref		
	Married	240	71.9	1.60	0.73-3.51	0.240
	Divorced	28	8.3	0.73	0.22-2.39	0.599
	Widowed	20	6.0	0.82	0.21-3.16	0.769
Mothers' level of education	None	12	3.7	Ref		
	Primary	108	32.3	0.64	0.14-2.86	0.555
	Secondary	139	41.6	0.80	0.18-3.55	0.769
	Tertiary	75	22.4	0.65	0.14-3.04	0.586
Partner's age	15-19	2	0.6	Ref		
	20-29	67	19.9	3.34	0.80-13.94	0.098
	30-39	162	48.6	2.77	0.75-10.23	0.127
	40-49	98	29.4	2.63	0.66-1.45	0.004*
	>50	5	1.5	N/A		
Partner's level of education	None	6	1.7	Ref		
	Primary	62	18.5	2.00	0.16-24.48	0.588
	Secondary	135	40.5	3.44	0.30-39.89	0.323
	Tertiary	131	39.3	2.89	0.25-33.48	0.396
No. of pregnancies	>3	58	17.4	Ref		
	3	80	23.9	1.93	0.82-4.52	0.130
	2	118	35.3	3.22	1.54-2.70	0.002*
	1	78	23.4	2.29	1.04-2.05	0.040*
Time taken to health facility	<30 minutes	106	31.8	Ref		
	30-60 minutes	186	55.6	0.84	0.46-1.51	0.554
	>1hrs	42	12.6	0.83	0.33-2.09	0.697
Residence	Town Centre	61	18.3	Ref		
	Slums	61	18.3	0.58	0.24-1.44	0.243
	Outskirts of town	69	20.5	0.67	0.28-1.58	0.356
	Rural	143	42.9	2.24	1.05-2.79	0.037*
Religion	Protestant	158	47.2	Ref		
	Catholic	122	36.6	0.63	0.35-1.16	0.137
	Muslim	31	9.3	0.49	0.19-1.30	0.153
	Others	23	6.9	0.16	0.04-1.63	0.068
Cultural beliefs	No	311	93.2	Ref		
	Yes	23	6.8	0.74	0.26-2.11	0.572
Source of income	Salary	75	22.4	Ref		
	Business	145	43.4	0.95	0.37-4.35	0.468
	Remittances	52	15.5	1.13	0.47-2.71	0.793
	Farming	38	11.4	1.27	0.48-3.36	0.627
	Others	24	7.3	0.67	0.21-2.16	0.500
Monthly average income	<6000	180	53.9	Ref		
	>6000	154	46.1	1.03	0.60-1.77	0.916

aOR=adjusted odds ratio; *Significant at $p \leq 0.05$

4.3 Healthcare workers' characteristics associated with MCH service quality in tier three public health facilities of Kisumu County

The study looked at the healthcare workers' characteristics: age, gender, marital status, education level, cadre, experience in the department and workload. Almost half of the healthcare workers were young between 20-29 years (49.4%). Most of the healthcare workers were females (65.4%) and those married were (63.0%). Among the healthcare workers offering MCH services (46.7%) were Nursing officer; most of the healthcare workers had Diploma level of education (58.0%) while (3.7%) had master's degree. More than half (66.7%) of all healthcare workers were graduates from KMTC as seen in Table 4.3.

Table 4. 3 Healthcare workers' characteristics

Attributes	n=81	%	p-value
Age			0.754
20-29 yrs.	40	49.4	
30-39 yrs.	31	38.3	
40-49 yrs.	7	8.6	
50-59 yrs.	3	3.7	
Gender			0.519
Male	28	34.6	
Female	53	65.4	
Marital Status			0.001*
Married	51	63.0	
Not Married	30	37.0	
Cadre			0.342
Clinical officer	13	16.0	
Medical officer	5	6.2	
Nursing officer	37	46.7	
Nutritionist	6	7.4	
Pharm Technologist	6	7.4	
Lab Technologist	5	6.2	
Others	9	11.0	
Basic Training Institution			0.003*
KMTC	54	66.7	
University	19	23.4	
Others	8	9.9	
Highest training level			0.019*
Masters	3	3.7	
BSc	20	24.7	
Higher National Diploma	7	8.6	
Diploma	47	58.0	
Certificate	4	5.0	
Midwifery training			0.594
Yes	40	49.4	
No	41	50.6	
Deployment section			0.487
ANC	23	28.3	
FP	6	7.4	
Maternity	18	22.2	
CWC	21	26.0	
Others	13	16.1	
Duration in the section			0.028*
0-6 Months	46	56.8	
>6 Months	35	43.2	
Working hours/Day			0.817
8 hours	54	66.7	
>8 hours	27	33.3	
Number of clients/Day			0.004*
5-10 clients	24	29.6	
11-20 clients	28	34.6	
>20clients	29	35.8	

*Significant at $p \leq 0.05$

Healthcare workers' marital status could be influencing MCH service quality with those not married less likely to offer quality services as compared to their married counterparts (OR=0.160, 95%CI=0.036-0.711, p-value=0.016). University level graduates were 10 times more likely to offer MCH service quality as compared to KMTC graduates (aOR=9.693, 95%CI=1.153-2.162, p-value=0.042). Having Higher National Diploma (HND) qualification was less likely to be associated with MCH service quality as compared to Diploma level education (aOR=0.032, 95%CI=0.981-1.072, p-value=0.036). These findings were supported by KII: *"I can tell you there are graduate staff here from one of the University which I don't what to name here but they offer good services to mothers. I know some of us went back to school to do Higher Diploma course unfortunate there is very little change seen in their practice"* (KII-005 Nyahera Hospital)

Healthcare workers deployed in one section/department for 6 months are 7 times more likely to offer MCH service quality (OR=7.220, 95%CI=1.296-2.215, p-value=0.024). Attending to 5-10 numbers of clients a day was significantly associated with MCH service quality (aOR=2.047, 95%CI=2.074-2.625, p-value=0.021) as compared with those attending to 11-20 clients as shown in Table 4.4. this is also seen I response from KII: *"There has been Increased workload because of linda mama, this has really affected how we attend to patients, we rush mothers through to clear the line instead of taking time to properly attend to them"* (KII-002 Ahero Hospital)

Table 4. 4 Association of healthcare workers' characteristics and MCH service quality

Factors	Adjusted Odds Ratio	p-value	[95% Confidence Interval]	
			Lower CI	Upper CI
Age				
20-29 yrs.	Ref	Ref		
30-39 yrs.	1.048	0.926	1.042	1.859
40-49yrs	0.260	0.078	0.058	1.165
50-59yrs	0.250	0.326	0.015	3.962
Gender				
Female	Ref	Ref		
Male	2.540	0.242	0.533	12.089
Marital Status				
Married	Ref	Ref		
Not married	0.160	0.016*	0.036	0.711
Cadre				
Nursing Officer	Ref			
Clinical officer	0.525	0.479	0.025	11.029
Medical officer	1.742	0.773	0.039	76.273
Nutritionist	0.082	0.223	0.001	4.561
Pharm Tech	0.039	0.162	0.001	3.659
Lab Tech	0.452	0.702	0.007	26.202
Others	1.112	0.960	0.018	68.594
Basic training Institution				
KMTC	Ref	Ref		
University	9.693	0.042*	1.153	2.162
Others	0.335	0.400	0.026	4.275
Highest training level				
Diploma	Ref	Ref		
HND	0.032	0.036*	0.981	1.072
BSc	0.743	0.831	0.048	11.392
Masters	0.441	0.560	0.028	6.870
Certificate	1.801	0.680	0.110	29.367
Midwifery training				
No	Ref	Ref		
Yes	0.165	0.195	0.010	2.516
Deployment section				
ANC	Ref	Ref		
FP	2.866	0.443	0.194	42.34
Maternity	0.169	0.118	0.018	1.571
CWC	0.455	0.441	0.061	3.370
Others	0.253	0.363	0.013	4.890
Duration in the section				
0-5 Months	Ref	Ref		
6 Months	7.220	0.024*	1.296	2.215
Working hours/Day				
8 hours	Ref	Ref		
>8 hours	1.149	0.883	0.178	7.390
Number of client/ Day				
5-10	2.047	0.021*	2.074	2.625
11-20	5.131	0.061	0.853	6.575
>20	2.254	0.407	0.330	15.363

aOR= adjusted odds ratio; *Significant at p≤0.05

4.4 Healthcare service delivery processes associated with MCH service quality in tier three public health facilities of Kisumu County

This study sort to determine healthcare service delivery processes associated with MCH service quality. This was done by gathering mothers' feedback on healthcare service delivery processes based on WHO checklist and the information verified using MCH records and Mother and Child Health Handbook. The focus was on clinical examination, laboratory tests, provision of supplements, immunizations, ANC visit and health education. The findings showed that clinical examination was conducted to majority of clients (91.3%) with blood pressure measurement done to (98.5%). Laboratory investigation was done in majority of mothers with rapid syphilis test at (93.7%), blood type test at (79.3%), malaria test at (74.0%) and urine test at (57.8%). Health education and mentorship on how to develop individual birth plan was given to (82.9%) as shown in Table 4.5.

Table 4. 5 Healthcare service delivery processes

Variables		n=334	%	P-value
Examination:				0.021*
Clinical exam	Yes	305	91.3	
	No	29	8.7	
Obstetric exam	Yes	330	98.8	
	No	4	1.2	
Blood pressure	Yes	329	98.5	
	No	5	1.5	
Maternal Weight/Height	Yes	332	99.4	
	No	2	0.6	
Laboratory investigation				0.004*
Rapid syphilis test	Yes	313	93.7	
	No	21	6.3	
HIV test	Yes	319	95.5	
	No	15	4.5	
Malaria test	Yes	247	74.0	
	No	87	26.0	
HB Test	Yes	330	98.8	
	No	4	1.2	
Urine test	Yes	193	57.8	
	No	141	42.2	
Blood type	Yes	265	79.3	
	No	69	20.7	
Immunization and supplement provision				0.061
Maternal Tetanus toxoid	Yes	282	84.4	
	No	52	15.6	
Child immunization	Yes	288	86.0	
	No	46	14.0	
Iron/folic acid provided	Yes	260	77.8	
	No	74	22.2	
Health education and mentorship				<0.001*
Recommendation for emergencies	Yes	181	54.2	
	No	153	45.8	
Instruction for delivery/Birth plan	Yes	277	82.9	
	No	57	17.1	
Recommendation for lactation/contraception	Yes	288	86.2	
	No	46	13.8	
Child danger signs	Yes	264	79.0	
	No	70	21.0	
Knowledge on 4 ANC visits	Yes	250	74.9	
	No	84	25.1	
No. of ANC visits	1	33	10.0	
	2	70	21.0	
	3	91	27.2	
	4	140	41.8	
ANC first visit	1 st trimester	161	48.2	
	2 nd trimester	143	42.8	
	3 rd trimester	30	9.0	
Complete antenatal card	Yes	312	93.4	
	No	22	6.6	
Return date	Yes	326	97.6	
	No	8	2.4	

*Significant at $p \leq 0.05$

This study showed that performing clinical examination was more associated with MCH service quality (OR=11.33, 95%CI=2.55-3.35, p-value=0.001) as compared to not performing one. In support of this, respondent at key informant interview indicated thus; *“Most mothers are happy when you conduct a full clinical examination and recommend laboratory test, they feel they have been serviced well”*. (KII-006 Chulaimbo Hospital)

Conducting laboratory investigations: malaria (OR=3.21, 95%CI=1.71-2.03, p-value=<0.001), urine (OR=3.15, 95%CI=1.81-2.47, p-value=<0.001 and blood type test (OR=2.3, 95%CI=1.18-1.94, p-value=0.015) were more associated with MCH service quality while conducting syphilis test contributed less in MCH service quality (OR=0.17, 95%CI=0.04-0.80, p-value=0.025). Mothers receiving iron/folic supplements (OR=2.36, 95%CI=1.23-3.54, p-value=0.010) and child immunization (OR=1.82, 95%CI=0.62-1.30, p-value=0.027) were more associated with MCH service quality. Being offered health education and mentorship on: Recommendation for emergencies (OR=1.72, 95%CI=1.01-2.93, p-value=0.046), Instruction on delivery/Birth plan (OR=4.68, 95%CI=2.10-3.46, p-value=<0.001), Recommendation for lactation/contraception (OR=4.8, 95%CI=1.97-2.68, p-value=<0.001), child danger signs (OR=1.79, 95%CI=0.31-1.47, p-value=<0.001), knowledge on 4 ANC visits (OR=2.47, 95%CI=1.33-4.60, p-value=0.004) was more associated with MCH service quality as seen in Table 4.6. This is also seen in KII: *“I have seen health education help mothers especially on contraceptive use and development of their individual birth plan, but we no longer conduct this as required because of increased workload and shortage of staff”*. (KII-004 Muhoroni Hospital)

Table 4. 6 Association of service delivery processes and MCH service quality

Variables		N=334	%	aOR	95% CI	P-value
Examination						
Clinical exam	Yes	305	91.3	11.33	2.55-3.35	0.001*
	No	29	8.7	Ref		
Obstetric exam	Yes	330	98.8	1.15	0.07-18.55	0.924
	No	4	1.2	Ref		
Blood pressure	Yes	329	98.5	2.29	0.20- 5.67	0.500
	No	5	1.5	Ref		
Maternal Weight/Height	Yes	332	99.4	0.41	0.94 – 1.28	0.387
	No	2	0.6	Ref		
Laboratory investigation						
Rapid syphilis test	Yes	313	93.7	0.17	0.04-0.80	0.025*
	No	21	6.3	Ref		
HIV test	Yes	319	95.5	1.76	0.48-6.42	0.392
	No	15	4.5	Ref		
Malaria test	Yes	247	74.0	3.21	1.71-2.03	<0.001*
	No	87	26.0	Ref		
HB Test	Yes	330	98.8	1.15	0.07-1.55	0.924
	No	4	1.2	Ref		
Urine test	Yes	193	57.8	3.15	1.81-2.47	<0.001*
	No	141	42.2	Ref		
Blood type	Yes	265	79.3	2.3	1.18-1.94	0.015*
	No	69	20.7	Ref		
Immunization and supplement provision						
Maternal Tetanus toxoid	Yes	282	84.4	1.9	0.91-3.96	0.088
	No	52	15.6	Ref		
Child immunization	Yes	288	86.0	1.82	0.62-1.30	0.027*
	No	46	14.0	Ref		
Iron/folic acid provided	Yes	260	77.8	2.36	1.23-3.54	0.010*
	No	74	22.2	Ref		
Health education and mentorship						
Recommendation for emergencies	Yes	181	54.2	1.72	1.01-2.93	0.046*
	No	153	45.8	Ref		
Instruction for delivery/Birth plan	Yes	277	82.9	4.68	2.10-3.46	<0.001*
	No	57	17.1	Ref		
Recommendation for lactation/contraception	Yes	288	86.2	4.8	1.97-2.68	<0.001*
	No	46	13.8	Ref		
Child danger signs	Yes	264	79.0	1.79	0.31-1.47	<0.001*
	No	70	21.0	Ref		
Knowledge on 4 ANC visits	Yes	250	74.9	2.47	1.33-4.60	0.204
	No	84	25.1	Ref		
No. of ANC visits	1	33	10.0	Ref		
	2	70	21.0	3.57	1.11-11.47	0.632
	3	91	27.2	3.1	1.00-9.64	0.050
	4	140	41.8	4.89	1.63-14.62	0.815
ANC first visit	1 st trimester	161	48.2	Ref		
	2 nd trimester	143	42.8	0.91	0.52-1.58	0.728
	3 rd trimester	30	9.0	0.35	0.12-1.00	0.05
Complete antenatal card	Yes	312	93.4	1.33	0.46-3.81	0.591
	No	22	6.6	Ref		
Return date	Yes	326	97.6	1.71	0.28-10.42	0.562
	No	8	2.4	Ref		

aOR= adjusted odds ratio; *Significant at $p \leq 0.05$

4.5 Healthcare structural factors associated with MCH service quality in tier three public health facilities of Kisumu County

The study sought to establish the healthcare structural aspects that are associated with MCH service quality. The specific structural aspects were grouped into 3 blocks: equipment (22 items), physical structures (7 items) and human resource for health (5 items). This was assessed for availability and adequacy (adequate-good quality or inadequate-poor quality) based on the recommended WHO standards, the Kenya Quality Model for Health framework (KQMH) and Kenya Health Sector Human Resources Strategy as seen in (Table 4.7).

Table 4. 7 Proportion of healthcare structural aspects

Structural components	n=7	Proportion of health facilities with	
		Adequate (%)	Not adequate (%)
Physical structural aspects			
ANC Clinic	6	85.7	14.3
Post-natal Ward	6	85.7	14.3
FP Room	6	85.7	14.3
Nursing station	6	85.7	14.3
Ante-natal Ward	5	71.4	28.6
Theatre	3	42.9	57.1
Toilets	3	42.8	57.2
Human resources for health			
Nutritionist	6	85.7	14.3
Medical Officer	5	71.4	28.6
Pharm Technologists	3	42.8	57.2
Nursing officer(midwife)	1	14.3	85.7
Obstetrician/Gynaecologists	1	14.3	85.7
Equipment			
Linen trolley	6	85.7	14.3
BP Machine	5	71.4	28.6
Delivery coach	5	57.1	42.9
Stethoscope	5	57.1	42.9
Oxygen machine	5	57.0	43.0
Suction machine	5	57.0	43.0
Portal lamps/overhead	3	42.9	57.1
General trolley	3	42.9	57.1
Ultrasound	3	42.9	57.1
MUAC tape	3	42.9	57.1
Autoclave	3	42.8	57.2
Baby cots	3	42.8	57.2
Blood warmer	2	28.6	72.4
Ultrasonic Nebulizer	2	28.6	72.4
Resuscitaire	2	28.5	71.5
Speculum set	2	28.5	71.5
Infant radiant warmer	1	14.3	85.7
Phototherapy unit	1	14.3	85.7
Infant weighing scale	1	14.3	85.7
Telephone	1	14.3	85.7
Baby stethoscope	1	14.3	85.7
Nursery with incubator	1	14.3	85.7

Because PCA works best for correlated variables that necessitate dimensionality reduction, the variables were then subjected to Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy to ensure PCA is appropriate for them, the test returned a KMO score of 0.72, indicating that the sampling is adequate for PCA on these variables. The PCA was then run and the factor loadings were rotated by the varimax method to get a clearer pattern. Results from factor analysis shown in Table 4.8 demonstrates that all listed items under respective structural blocks (physical structure, human resource for health and equipment) had absolute values <0.4 . Antenatal ward (0.3189), Medical Officer (0.3189), suction machine (0.2867) had the highest weights in their respective blocks followed by nursing station (0.2079), Nutritionist (0.2719) and ultrasound (0.2093) while most of the variables with least weights were from equipment block as shown in Table 4.8.

Table 4. 8 Factor weights for healthcare structural factors

Structural aspects		
A	Physical structural aspects	Factor weights
	Antenatal ward	0.3189
	Nursing station	0.2079
	Family Planning Room	0.2003
	Postnatal ward	0.1979
	Theatre	0.0484
	Toilets	-0.2090
	ANC Clinic	-0.2294
B	Human resources for health	
	Medical officer	0.3189
	Nutritionist	0.2719
	Obstetrician/Gynaecologists	0.0210
	Pharm Technologists	-0.0456
	Nursing officer(midwife)	-0.1299
C	Equipment	
	Suction machine	0.2867
	Ultrasound	0.2093
	General trolley	0.2001
	Resuscitaire	0.1970
	Speculum set	0.1715
	Portal lamps/overhead	0.1618
	Oxygen machine	0.0765
	Nursery with incubator	0.0354
	Baby stethoscope	0.0318
	BP Machine	0.0294
	Linen trolley	0.0277
	MUAC tape	0.0234
	Phototherapy unit	0.0210
	Blood warmer	0.0177
	Ultrasonic Nebulizer	-0.0545
	Infant radiant warmer	-0.2130
	Baby cots	-0.2262
	Stethoscope	-0.2273
	Telephone	-0.2273
	Infant weighing scale	-0.2289
	Autoclave	-0.2294
	Delivery coach	-0.2590

Performance of healthcare structural blocks using Factor Weights

Figure 4.1 shows that among the healthcare structural blocks in this study, human resources had the highest mean weight (0.087) which was the best performing health structural blocks as compared to the other two. Physical structure was second with a mean of (0.076).

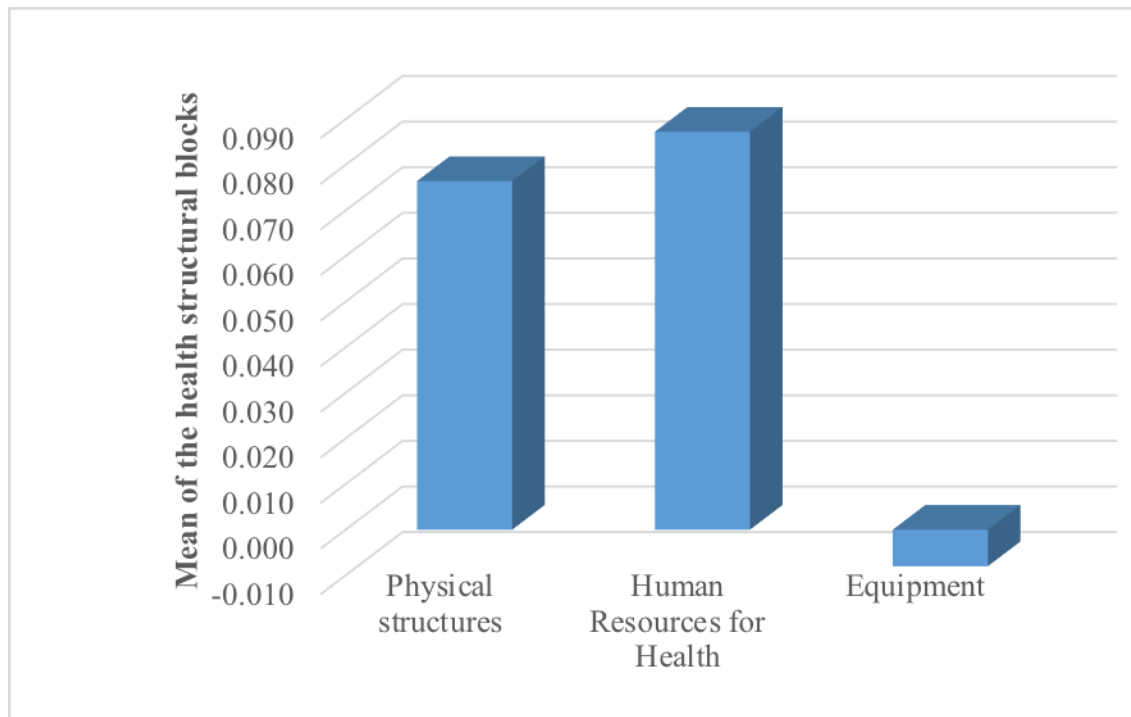


Figure 4. 1 Mean of the health structural blocks

Health facilities with all the listed human resource personnel (i.e. Medical Officer, Nutritionist, obstetrician/ gynaecologists, nursing officers and pharmaceutical technologists) are twice more likely [aOR 2.16, CI=1.1548-4.0481 & p=0.016) to provide quality services compared to facilities without. In agreement with this a KII said:

“I still believe havng the right and adequate number of healthcare workers is the most critical thing the government can do if quality services is to be achieved.” (KII-001 Kisumu County Referral Hospital)

“Staffing is the main thing in quality services, we have seen health facilities with good infrastructure with very few or wrong combination of staff and they have performed dismally in terms of service delivery”.(KII-007 Kombewa Hospital)

Table 4. 9 Logistic Regression with structural blocks (Physical aspect, Human Resource and Equipment)

Factors	Adjusted Odds Ratio	p-value	[95% Confidence Interval]	
			Lower CI	Upper CI
Structural factors				
Equipment	Ref			
Physical structures	0.5891	0.1020	0.3127	1.1099
Human Resource	2.1621	0.0160*	1.1548	4.0481

aOR= adjusted odds ratio; *Significant at $p \leq 0.05$

CHAPTER FIVE

DISCUSSION

5.1 Mothers' socio-economic and demographic characteristics associated with MCH service quality in tier three public health facilities, Kisumu County.

The findings showed that mothers aged between 30-39 years were less likely to report having received MCH service quality. Whereas evidence for the role of ageing as a determinant of differential access to quality healthcare is still weak. Mothers older than 30 years have consistently report decreased MCH service quality and low service uptake (Sadoon *et al.*, 2020). Another study finding done in Ghana similarly showed that age of expectant mother influences the utilization of ANC services whereby the older the pregnant mother, the more unlikely she is to report having received MCH service quality (Akowuah *et al.*, 2018).

Findings of this study also showed mothers that had one and two pregnancies (para 1&2) were more likely to report of having received MCH service quality. This agrees with a study done by Kifle *et al.*, (2017) which showed mothers who had given birth six or more times were less likely to report having received MCH service quality as compared to those with 1st pregnancy or those who had one child. A study done in Kwale revealed similar results with multiparous mothers being more likely to initiate MCH services earlier compared to grand multiparous mothers (Wekesa *et al.*, 2018). This could be because of higher expectation by grand multiparous mothers from the healthcare system having visited health facilities severally in their previous pregnancies.

In this study women who had partners aged 40-49 years were more likely to report of having received MCH service quality as compared with other age groups. This finding

is contrary to a study done by Odeny *et al.*, (2019) which found out that a mother having a male partner who was younger increased the male partner's likelihood of attending MCH clinics or offering necessary support that might influence mother's uptake of services. The differences in findings could be because the study population in Odeny *et al* study was mothers visiting MCH at week 6/month 9 and the study site was northern Kenya which faces difficult environmental, social and infrastructural challenges. This is the same with another study done in Kenya which showed older partners may influence the quality of MCH services negatively (Mochache *et al.*, 2018). According to the current study findings, mothers residing in rural areas were more likely to report having received MCH service quality as compared to those in Urban centers. This finding is consistent with a study done by Sun *et al.*, (2019) which showed that more than half of the rural residents preferred primary care facilities as their initial contact for medical care services as compared with the urban residents. Generally, the County Health referral system and linkages between the lower and higher levels of care are weak, consequently more patients seeking care bypass the lower-level health facilities due to perceived lower quality services (Kamau *et al.*, 2017). This could also be because rural folks prefer the main referral facilities and hence frequently bypass the lower facilities, while urban dwellers have other options to compare with (Akwanalo *et al.*, 2019).

Mothers who used motorized means of transport to the health facility were more likely to report of having received MCH service quality as compared to those who used bicycles to the health facility. Similar findings have shown that using faster means of transport i.e., vehicles/motorbikes increase like hood of mothers receiving MCH service quality (Tanou *et al.*, 2021; Sacks *et al.*, 2016).

5.2 Healthcare workers' characteristics associated with MCH service quality in tier three public health facilities of Kisumu County.

According to the study findings, healthcare worker's marital status was associated with MCH quality services, with those not married being less likely to offer MCH service quality as compared to their married counterparts. This finding is contrary to a study done by Rana *et al.*, (2021) which showed married healthcare workers might not be providing quality services since most of their time is spent on family issues hence affecting their ability of self-skills capacity building and commitment to the patients. This difference in findings could be because Rana study focused only on nurses and the Country's top referral hospital while this study looked at other cadres of healthcare workers and middle level referral hospitals.

University graduate's healthcare workers were likely to provide quality services as compared to Diploma graduates from KMTTC. This could be informed by the scope of training at the universities. However, there is still limited consensus across studies on reasons for variance in health practice due to background training. A study done by Couper *et al.*, (2018). which showed professional qualification of healthcare workers is important, with highly trained personnel more likely to perform better in the technical aspects of quality healthcare. Another study done by Christiansen *et al.*, (2018) also showed that university level training and certification of skilled personnel, positively affected MCH service quality across the continuum, however it disagrees with a study done in South Africa which showed mentorship among nursing graduates improved their skills in management of MCH emergencies, research aspects and organizational management regardless of the level of education (Lekhuleni *et al.*, 2019). The disagreement could be because Lekhuleni study focused on fourth year nursing students

and nurses on internship who were on practical attachment. In a systematic review and meta-analysis of randomized, quasi-randomized controlled trials, interrupted time series studies, Patel *et al.*, (2017) showed better medical practice among staff with less medical qualifications as compared to those with high academic qualifications. Improved work performance among healthcare workers with less educational qualification could also be attributed to work experience, exposure to the right equipment and work environment in terms of building individual capacity to provide quality service since medicine is an art and one perfects his/her skills through practice.

Healthcare workers' workload influenced MCH service quality. Those attending to between 5 -10 clients in a day were more likely to offer quality services as compared with those having higher workload. Similar findings were observed in a study conducted in Kenya and Namibia which showed higher workload was consistently associated with service quality, largely because of psychological pressure (Do *et al.*, 2017). On the other hand, this study demonstrated that healthcare workers working in a section/department for over 6 months were more likely to offer MCH service quality. This is similar to a study done in Ethiopia which showed increased effectiveness in healthcare workers who have worked in a department for longer periods (Merga *et al.*, 2019). This could be because of mastery on art of service delivery and understanding the mothers and the requirement of the department in service delivery.

5.3 Healthcare service delivery processes associated with MCH service quality in tier three public health facilities of Kisumu County.

The findings showed that clinical examination of mothers enhanced MCH service quality. This finding is consistent with a study done by Goyet *et al.*, (2020) which

showed clinical competencies and performance of maternity and new-born care services among providers positively influences the quality of healthcare. In a study done by Asif *et al.*, (2017) clinical examination was one of the main determinants of MCH service quality. Similarly, a study done in Mozambique suggested service providers need to equip themselves with the necessary clinical examination skill if MCH service quality is to be achieved (Pires *et al.*, 2020). Another study using mixed methods design however, indicated that the outcome of clinical examination is dependent on clients' perception (Magge *et al.*, 2017).

Laboratory investigations – rapid syphilis test, blood type test, malaria and urine tests but not HIV and HB testing were significantly associated with MCH service quality. This is similar to a study done by Plebani *et al.*, (2019) which showed that conducting laboratory investigations to mothers is associated with improved MCH service quality. But the significant lower odds for syphilis test in this study was unexplained. This finding could be attributed to the complementary part played by laboratory investigation in supporting mothers' treatment.

This study also showed that provision of iron/folic acid supplements, immunization and health education were consistent with MCH service quality, similar to Adamu, *et al.*, (2019); Frage, *et al.*, (2019) and Khatri, *et al.*, 2021). This could also be because of the trust and confidence developed between the healthcare worker and the mother because of one-on-one communication and/or differential client inclinations to preventive services

5.4 Healthcare structural factors associated with MCH service quality in tier three public health facilities of Kisumu County.

The study examined healthcare structural aspects to enable objective evaluation of MCH service quality in tier 3 public health facilities of Kisumu County. This was necessary since the mothers' viewpoint only is less likely to reflect accurately on structural aspects of service provision functions as examined in this study.

This study has shown that most of the tier three health facilities of Kisumu County still lack structural aspects. A deeper analysis revealed having adequate human resources for health contributed twice more to MCH service quality as compared to equipment. This could be because human resources health interacts directly with clients providing the necessary human touch and feelings that is required (Saw *et al.*, 2019). Having the correct and adequate human resources for health interventions is more productive in ensuring improvement of quality of maternity services and provision of service providers' allowances and incentives including strengthening of other components of healthcare to support human resources (Negero, *et al.*, 2021). Engagement with healthcare workers is particularly important for mothers from economically poor households, whereas having a stable human resource for health and avoiding high staff turnover improves staff ability to provide optimal care. (Rammohan *et al.*, 2021). However, there are concerns about using human resources for health as a measure of MCH service quality and instead a multi-dimensional approach into health system quality measurement of processes and outcomes is desirable (Leslie, *et al.*, 2017). Having sufficient and equitably distribution of human resources for health to match the increasing demand plays an active role in ensuring efficiency and accountability which are essential in realizing MCH service quality.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of findings

6.1.1 Mothers' socio-economic and demographic characteristics associated with MCH service quality in tier three public health facilities, Kisumu County

Older mothers aged between 30-39 years and multiparous were less likely to report having received MCH service quality. Mothers residing in rural area were likely to report having received MCH service quality compared with those in urban setting. Mothers with older partners (40-45 years) were more likely to report having received MCH service quality compared with those who had young partners. This could be because of the nature of support provided by these partners to the mothers.

6.1.2 Healthcare workers' characteristics associated with MCH service quality in tier three public health facilities of Kisumu County.

The healthcare workers with university degree as basic training were more likely to offer MCH service quality compared with those with Diploma qualifications. Having HND did not contribute to service quality despite them being specialist. Healthcare workers that have worked in one section/department for 6 months were more likely to offer MCH service quality as compared to that had worked for less than 6 months.

6.1.3 Healthcare service delivery processes associated with MCH service quality in tier three public health facilities of Kisumu County.

Clinical examination, child immunization, health education and mentorship (Child danger signs, birth plan development, emergencies, knowledge about ANC, contraception) were more associated with MCH service quality. Mothers reported laboratory investigation specifically Syphilis test not to have contributed to MCH service quality.

6.1.4 Healthcare structural factors associated with MCH service quality in tier three public health facilities of Kisumu County.

This study showed that most of the tier three health facilities of Kisumu County still lack structural aspects. It also revealed having adequate and correct mix of Medical Officer, Nutritionist, obstetrician/gynaecologist, nursing officer and pharmaceutical technologist contributed more to MCH service quality as compared to equipment and physical structures. However Antenatal ward, suction machine and ultrasound had higher factor weights and compared to theatre.

6.2 Conclusions

1. Older mothers 30-39 years were less likely to rate to have received MCH service quality while low parity and rural place of residence acknowledge to have received MCH service quality. This finding will have an implication on MCH program implementation with strategies developed to target older mothers, multiparous and those from urban areas with promotional messages.
2. The healthcare workers with university degree were more likely to offer MCH service quality as compared to Diploma holders, this is contrary to previous studies which showed Diploma healthcare workers provided quality services. Also, this study showed having Higher National Diploma did not make one offer quality services which again contradicts previous studies and the believe that HND healthcare workers who are specialist offer quality services. This study affirms that experience contributes to MCH service quality, but it however lowers the threshold from previous studies of 2-3years to 6 months which is likely to change how staff are recruited based on work experience.

3. Performing clinical examination, laboratory investigations, providing child immunization and health education services were more associated with MCH service quality. This study identifies laboratory investigations i.e Syphilis test as one perceived by mothers not to have been associated with MCH service quality. This might explain why the Country has low Syphilis testing coverage which might require MCH program strategic interventions to educate mothers on the importance of this test.
4. Having Human resource for health specifically Medical Officer, Nursing Officer, Nutritionist, Obstetrician/gynaecologist, Pharmaceutical Technologist) contributed more to MCH service quality as compared to physical structures and equipment. This finding will help investors and County government re-think on health investment from the rampant physical buildings to Human resource. Availability of Antenatal ward, suction machine and ultrasound had higher factor weights as compared to Theatre which is popularly known to contribute to MCH service quality. This study findings goes against the popularly known believe that for quality service to be achieved physical buildings is required.

As Kisumu County is implementing her County Integrated and Development plan (2018-2022) this study findings can guide on healthcare structural investment that can be undertaken to achieve MCH service quality.

6.3 Recommendation for programmatic and strategic actions

1. Have a targeted approach in MCH service quality for individuals at the tail-end of the reproductive age-groups who also represent a high-risk group since their low valuation or satisfaction with MCH services quality needs attention.
2. The County government of Kisumu and other stakeholders need to put in place strategies to encourage Health care workers to seek higher education/upgrade through in-service trainings including provision of scholarships and study leaves.
3. Have health education on the importance of Syphilis testing and ensure this is provided to mothers in a professional and acceptable way. The County government should not relent but upscale health education in tier three public health facilities.
4. The County government should ensure adequate and correct mix of human resources for health (Medical Officers, Nursing Officer, Nutritionist, Obstetrician/gynaecologist, Pharmaceutical Technologists) at tier three public health facilities. Implementation of the Kisumu CIDP on healthcare investment should focus more on human resources for health, Antenatal wards, suction machines and ultrasound.

This study finding can provide the basis for the Country/Counties to start thinking about development MCH service quality policies/strategies targeting the tier three public health facilities which is nonexistence at the moment instead of having generalized policies, yet tier three public health facilities have unique challenges since they are referral health facilities and handle the bulk of MCH services.

6.4 Recommendations for Future Studies

1. It could be of interest to examine factors influence MCH service quality uptake among older women, those at tail end of reproductive age.
2. To have a comprehensive view of MCH service quality, further study can be done to assess the community determinants of MCH service quality.

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APPENDIX 2: CONSENT LETTER

Dear Participant,

I invite you to participate in a research study entitled: The determinants of quality of maternal child health services in the tier 3 public health facilities of Kisumu County after the declaration of free maternal health care.

I am currently enrolled in Maseno University School of Public Health and am in the process of writing my PhD Thesis. The purpose of the research is to determine of Maternal Child Health (MCH) service quality in Kisumu County and the enclosed questionnaire has been designed to collect this information.

Your participation in this research project is completely voluntary. You may decline altogether or leave blank any questions you don't wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the questionnaire as best you can. It should take approximately 30 minutes to complete.

If you have any questions about this project, feel free to contact the Principal Investigator on 0721421125.

CONSENT

I have read, and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

APPENDIX 3: MOTHER'S SOCIO-ECONOMIC AND DEMOGRAPHIC QUESTIONNAIRE

a) Socio-economic and demographic aspects (tick appropriately)

1. What is your age or date of birth?

10-19yrs =1, 20-29yrs =2, 30-39yrs =3 40-49yrs =4

2. How many pregnancies have you ever carried?

One =1, Two =2, Three =3, more than three =4

3. What is your marital status?

Single never married =1, Married =2, Divorced =3,

Widowed =4

(ii) If married what is your partner's age (yrs):

10-19 =1, 20-29 =2, 30-39 =3, 40-49 =4, >50 =5

(iii) What is your partner's level of education?

None =1, Primary =2, Secondary =3, College/tertiary =4

4. Where do you live?

Town centre =1 Slums =2 Outskirts of town =3 Rural =4

5. Which mode of transport do you use routinely from your house to health facility?

Walking =1 Bicycle =2 Vehicle =3 Motorbike =4

6. How long do you take from your house to the health facility?

<30 minutes =1, 30 – 60 minutes =2, >1hrs =4

7. What is your level of education?

None =1, Primary =2, Secondary =3, College/tertiary =4

8. What is your religion or which church do you go to?

Protestant =1, Catholic =2, Muslim =3, others =4 specify.....

9. Do you have any cultural beliefs/practices that are related to maternal and child health?

Yes =1

No =2

10. Where do you get money for your daily upkeep?

Salary =1, Small scale business =2, Large scale business =3,

Remittances =4, farming =5, others =6 specify.....

11. What is your average monthly household income (yours and your spouse)

Less than KES 6,000 =1

More than KES 6,000 =2

APPENDIX 4: HEALTHCARE WORKERS CHARACTERISTICS QUESTIONNAIRE

b) Healthcare workers' characteristics

1. What is your age?

20-29yrs =1, 30-39yrs =2, 40-49yrs =3, 50-59yrs =4,

2. What's your gender?

Male =1 Female =2

3. Are you married?

Yes =1 No =2

4. What is your cadre?

Clinical officer =1, Medical officer =2, Nursing officer =3,
Nutritionist =4, Pharm Tech =5, Lab Tech =6,
Others =7 specify.....

5. What is your basic training institution?

KMTC =1 University =2 others =3

6. What's your highest level of training?

Masters =1 BSc =2 HND =3 Diploma =4 Certificate =5

7. Do you have training in midwifery?

Yes =1 No =2

8. Which section do you work in Maternal Child Health?

ANC =1, FP =2, Maternity =3, CWC =4, others =5

(ii) For how long have you worked in this section?

0-6 Months =1 6-12months =2 >1 yr =3

9. How many hours do you work in a day?

8hrs =1 >8hrs =2

10. How many clients do you see in a day?

5-10 =1, 11-20 =2, >20 =3

11. Do you make referrals to other hospitals for either patients or specimens?

No =0 Yes =1

12. What is the reason for the referrals.....

.....
.....

13. Have you had any maternal death in the last one year?

(i) Yes =1 No =0

(ii) If yes how many?.....

14. What do you think can be done to improve maternal and child health service quality in this section?

.....
.....

APPENDIX 5: SERVICE DELIVER PROCESSES QUESTIONNAIRE

c) Health services delivery processes

Components received during Antenatal period:

MODIFIED New WHO antenatal care model basic component checklist

Note: Mark the activities carried out as appropriate (Use the closest gestational age at the time of visit.)

	Yes=1	No=2
Clinical examination		
Hb test		
Obstetric exam: gestational age estimation, uterine height		
Blood pressure taken		
Maternal weight/height		
Rapid syphilis test performed, detection of symptomatic sexually transmitted infections		
Blood type and Rh requested		
HIV test		
Malaria test		
Tetanus toxoid given		
Iron/folic acid supplementation provided		
Recommendation for emergencies / hotline for emergencies		
Complete antenatal card		
Urine test for protein		
Instructions for delivery/plan for birth		
Recommendations for lactation/contraception		
Return date		

1. Have you heard about the 4 ANC visit? (explain)

Yes =1

No =2

2. How many times have you visit ANC with this pregnancy?

1 =1

2 =2

3 =3

4+ =4

3. When did you visit ANC for the first time in this pregnancy?

First 3 months of pregnancy =1 4-6 months =2 7-9 months =3

4. Were you happy with the way the staff receive you in this hospital?

Yes =1 No =2

(ii) If no, why.....
.....

5. Were you satisfied with the services you received?

Yes =1 No =0

6. Any additional comments/recommendations (both positive and negative)

.....
.....
.....
.....

APPENDIX 6: HEALTHCARE STRUCTURAL ASPECTS QUESTIONNAIRE

d) Healthcare structural aspects observation tool

Materials& equipment	Available	Adequate number	Not adequate	Remarks	Materials& equipment	Available	Adequate number	Not adequate	Remarks
Laboratory					Fetoscope				
CWC					Speculum set				
Theatre					Baby stethoscope				
AN ward					Linen trolley				
Labor ward					General trolley				
PN ward					Phototherapy unit				
ANC					Autoclave				
FP room					Resuscitaire				
Toilets					BP machine				
Bad cots					Blood warmer				
Oxygen machine					Infant weighing scale				
Exam coaches					Adult weighing scale				
Delivery coach					Ultrasonic Nebulizer				
Fridge					MUAC tape				
Ultrasound					Wheelchair				
Infant radiant warmer					telephone				
Portal lamps/ Overhead					Suction machine				
Nursery with incubators					stethoscope				
Equipped emergency tray					Nursing station				
Personnel									
Name	Available	Adequate number	Not adequate	Remarks	Name	Available	Adequate number	Not adequate	Remarks
Obstetrician/ Gynecologists					Nursing Officer (midwife)				
Medical Officers					Nutritionists				
Clinical Officers					Medical Lab Tech				
Nursing Officers					Pharm Tech				

APPENDIX 7: KEY INFORMANT INTERVIEW GUIDE

General Information

These will be conducted with health facility RMNCAH in-charges or health facility RH coordinators or health facility in-charges. Depending on the health facility designated staff responsible for MCH services.

1.	Title	
2.	Role in MCH	
3.	Gender	
4.	Time interview started	
5.	Time interview ended	
6.	Name of the interviewer	

1. Can you please tell me about your experience with mothers/clients seeking MCH services and what could be their contribution in MCH service quality?
2. What role do you think healthcare workers play in ensuring MCH service quality in the health facility?
3. How can the processes of service delivery improve MCH service quality?
4. What else can be done to improve maternal and child health service quality in this health facility?

APPENDIX 8: PROPOSAL APPROVAL



MASENO UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Office of the Dean

Our Ref: PG/PHD/00028/13

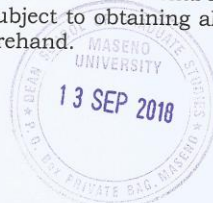
Private Bag, MASENO, KENYA
Tel:(057)351 22/351008/351011
FAX: 254-057-351153/351221
Email: sgs@maseno.ac.ke

Date: 13th September, 2018

TO WHOM IT MAY CONCERN

**RE: PROPOSAL APPROVAL FOR VINCENT IBWORO —
PG/PHD/00028/2013**

The above named is registered in the Doctor of Philosophy Programme in the School of Public Health and Community Development, Maseno University. This is to confirm that her research proposal titled "Determinants of Quality of Maternal Child Health Services in the Tier 3 Public Health Facilities of Kisumu County after the Declaration of Free Maternal Health Care" has been approved for conduct of research subject to obtaining all other permissions/clearances that may be required beforehand.




for Prof. J.O. Agure
DEAN, SCHOOL OF GRADUATE STUDIES

Maseno University

ISO 9001:2008 Certified



APPENDIX 9: ETHIC APPROVAL



MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622 Ext: 3050
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Private Bag – 40105, Maseno, Kenya
Email: muerc-secretariate@maseno.ac.ke

FROM: Secretary - MUERC

DATE: 26th March, 2019

TO: Vincent Okitoi Ibworo
PG/PHD/FA/00028/2013
Department of Public Health
School of Public Health and Community Development
Maseno University
P. O. Box, Private Bag, Maseno, Kenya

REF: MSU/DRPI/MUERC/00655/19

RE: Determinants of Quality of Maternal Child Health Services in the Tier 3 Public Health Facilities of Kisumu County after the Declaration of Free Maternal Child Health Care. Proposal Reference Number MSU/DRPI/MUERC/00655/19

This is to inform you that the Maseno University Ethics Review Committee (MUERC) determined that the ethics issues raised at the initial review were adequately addressed in the revised proposal. Consequently, the study is granted approval for implementation effective this 26th day of March, 2019 for a period of one (1) year. This is subject to getting approvals from NACOSTI and other relevant authorities.

Please note that authorization to conduct this study will automatically expire on 25th March, 2020. If you plan to continue with the study beyond this date, please submit an application for continuation approval to the MUERC Secretariat by 15th February, 2020.

Approval for continuation of the study will be subject to successful submission of an annual progress report that is to reach the MUERC Secretariat by 15th February, 2020.

Please note that any unanticipated problems resulting from the conduct of this study must be reported to MUERC. You are required to submit any proposed changes to this study to MUERC for review and approval prior to initiation. Please advise MUERC when the study is completed or discontinued.

Thank you.


Dr. Bernard Guyah
Ag. Secretary,
Maseno University Ethics Review Committee.



Cc: Chairman,
Maseno University Ethics Review Committee.

MASENO UNIVERSITY IS ISO 9001:2008 CERTIFIED



APPENDIX 100: NACOSTI AUTHORIZATION



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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Ref. No. **NACOSTI/P/19/63963/29680**

Date: **6th May 2019**

Vincent Okitoi Ibworo
Maseno University
Private Bag
MASENO.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Determinants of quality of maternal child health services in Tier 3 Public Health facilities of Kisumu County after the declaration of free maternal Health Care.*" I am pleased to inform you that you have been authorized to undertake research in **Kisumu County** for the period ending **3rd May, 2020**.

You are advised to report to **the County Commissioner and the County Director of Education, Kisumu County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.


DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kisumu County.

The County Director of Education
Kisumu County.

National Commission for Science, Technology and Innovation (S) ISO 9001:2008 Certified

APPENDIX 111: COUNTY APPROVAL

COUNTY GOVERNMENT OF KISUMU

Telegrams: "PRO.(MED)"
Tel: 254-057-2020105
Fax: 254-057-2025176
E-mail: kisumucdh@gmail.com



County Director of Health,
Kisumu.
P.O. Box 721-40100,
KISUMU.

DEPARTMENT OF HEALTH

REF: GN.133.VOL.III/511

Date: 25/04/2019

To: All MOHs & Med. Supts. – Kisumu County

RE: APPROVAL TO CONDUCT RESEARCH

We are in receipt of your request for research approval.

The purpose of this letter is to grant you approval for the study on '**Determinant of Quality of Maternal Child Health Services in the Tier 3 Public Health Facilities of Kisumu after the Declaration of Free Maternal Child Health Care.**' (Approval No MSU/DRPI/MUERC/00655/19)

The Department of Health has reviewed your proposal to conduct the above study and support its implementation.

I therefore grant him permission to undertake this research

Dr. Onyango D. O.
County director of Health
Kisumu County

COUNTY DIRECTOR
OF HEALTH
KISUMU

From the County Director of Health office