

**A MODEL OF FOCUSED ANTENATAL CARE
DETERMINANTS THAT INFLUENCE DELIVERY BY
SKILLED BIRTH ATTENDANTS AMONG WOMEN
ATTENDING ANTENATAL CLINICS IN MBOONI SUB-
COUNTY, MAKUENI, KENYA**

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(Public Health)

**JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY**

2019

**A Model of Focused Antenatal Care Determinants that Influence
Delivery by Skilled Birth Attendants among Women Attending
Antenatal Clinics in Mbooni Sub-County, Makueni, Kenya**

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**A Thesis Submitted in Partial Fulfilment for the Degree of Doctor of
Philosophy in Public Health in the Jomo Kenyatta University of
Agriculture and Technology**

2019

DECLARATION

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

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DEDICATION

To my family for their support and encouragement

ACKNOWLEDGEMENT

I wish to appreciate my supervisors Prof Zipporah Ng'ang'a of JKUAT and Dr Peter Wanzala of KEMRI for the kind advice, support and guidance throughout the process of carrying out this research. I am also grateful to Women attending Antenatal Clinics in Mbooni Sub-County, Makueni who participated in the study during pregnancy and subsequent post-partum period in 2012. I am further grateful to the management of Makueni County Health Services for allowing me to carry out the study in the County. A lot of thanks go to the staff of Tawa, Kisau and Kikima health facilities for their support and patience during data collection. I appreciate the role of research assistants for meticulous work they did during the field work. I am grateful to staff of ITROMID for contributing in one way or the other to the success of my studies. I wish to thank you all from the bottom of my heart.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC	Ante Natal Care/Clinic
AOP	Annual Operations Plan for the Sub-County
CHV	Community Health Volunteer
CHW	Community Health Worker
CI	Confidence interval
COCC	Comprehensive Obstetric Care Centre
COHES	College of Health Sciences
CPHR	Centre for Public Health Research
CPR	Contraceptive prevalence rate
CS	Caesarian section
DEFF	Design effect
EDD	Expected Date of Delivery
EMOC	Emergency obstetric care
ERC	Ethics Review Committee
FANC	Focused Ante Natal Care
HIV	Human immunodeficiency virus

IBP	Individual birth plan
IMR	Infant mortality rate
IUCD	Intra Uterine Contraceptive Device
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KAP	Knowledge attitude and practice
KDHS	Kenya Demographic Health Survey
KEMRI	Kenya Medical Research Institute
LMICs	Low and Middle Income Countries
LMP	Last monthly period
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MgSO₄	Magnesium Sulphate
MOH	Ministry of Health
MOMS	Midwives and Others with Midwifery Skills
MMR	Maternal mortality ratio
MTCT	Mother to Child Transmission of HIV
NRHS	National Reproductive Health Strategy

NHSSP	National Health Sector Strategic Plan
OR	Odds ratio
Para	Parity
PhD	Doctor of Philosophy
PMTCT	Prevention of Mother to Child Transmission of HIV
PNC	Post Natal Care
PPH	Post-partum haemorrhage
PROM	Premature Rapture of Membranes
SBA	Skilled Birth Attendant
SES	Socio-Economic Status
SMI	Safe Motherhood Initiative
SPSS	Statistical Package for Social Scientists
SSA	Sub-Saharan Africa
STI	Sexually Transmitted Infection
TBA	Traditional Birth Attendant
UNFPA	United Nations Fund for Population Activities
VCT	Voluntary Counseling and Testing

WHO World Health Organization

WRA Women of Reproductive Age

ABSTRACT

Delivery by skilled birth attendants (SBA) improves the outcome of pregnancy during delivery and the postpartum period. Focused Antenatal Care (FANC) aims at providing individualized care to a woman attending ANC and preparing her for delivery. Main objective of this study was to determine the factors associated with choice of place of delivery among women attending ANC in Mbooni Sub-County. Three hundred and twenty four pregnant women were recruited to the study in Mbooni Sub-County at Tawa, Kisau and Kikima health facilities, which were randomly selected. The research determined how ante natal care, individual birth plan and birth preparedness affect delivery by skilled attendants and also identified the knowledge, attitudes and practices (KAP) of antenatal mothers that are associated with delivery by skilled birth attendants. The participants were followed during ante-natal period up to six weeks after delivery. The health promotion provided during different antenatal visits was recorded while knowledge, attitudes and practices regarding delivery by skilled birth attendants was elicited during six weeks postpartum visit. A questionnaire was used to collect data. Results of the study indicated that the following variables were significantly associated with choice of delivery by skilled birth attendants; age of respondents 20 - 24 years [OR = 1.4, CI: 0.53 - 3.86, P =0.03], 25 - 29years[OR = 2.4, CI: 0.87 – 6.65, P = 0.03]; high school level of education [OR = 1.6, CI: 1.02 – 2.58, P = 0.01]; College level of education [OR = 6.9, CI:1.84 – 26.46, P = 0.00]; being peasant farmer [OR = 0.07,0.015 – 0.38P< 0.01]; having a partner of college level education [OR = 6.1, CI: 1.91 – 19.93, P = 0.01]; using a vehicle as mode of transport [OR = 8.1, CI: 3.41 - 19.26, P = 0.00] and amount of money spent during delivery KShs 5370 (CI: 4918.14 - 5822.76) for health facility delivery versus KShs 2334 (CI: 2098.90 - 2570.69). It is recommended that these potentially modifiable determinants be addressed to increase delivery by skilled attendants through raising the economic and education status of women, male involvement during delivery; counseling mothers on need of skilled care during delivery especially the higher parity ones and making delivery by skilled birth attendants affordable. Health workers should improve services offered during delivery to reduce negative assessment by women who have utilized services of delivery in a health facility.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The health system in Kenya is organized in a pyramid form according to the National Health Sector Strategic Plan (NHSSP). It has four levels of health care. These include Tier I at community level, Tier II at dispensary and health center level, Tier III at Sub-County and County hospitals, Tier IV at specialized referral, teaching and national hospitals. There exists an inter-phase between community level and the other levels of health care delivery. At community level, health units are run by Community Health Volunteers (CHVs) and community health extension workers or officers. The CHVs are volunteer community members who donate their time to improve health status of their communities. Their effectiveness has been limited due to lack of training and clear health messages. Each community health worker serves twenty households within a community unit (CU). Each household is estimated to have five members. A group of fifty community health volunteers are supervised by two community health officers. Thus a community unit is made up of a thousand households with an approximate population of five thousand residents, served by fifty community health volunteers who promote delivery by skilled birth attendants (GOK, 2007).

World Health Organization (WHO) defines a skilled birth attendant as a person who is trained and acquires skills needed to manage normal (uncomplicated) pregnancies, childbirth and immediate postnatal period and in the identification, management and referral of complications in women and newborns (Harvey, 2007). This cadre of health workers is made up of nurses, midwives, doctors or clinical officers who are also called midwives and others with midwife skills. During delivery, a mother should be attended by a skilled birth attendant (SBA). The skilled birth attendants are found in health systems from level II upwards. Skilled attendance is a partnership of skilled attendants and enabling environment of equipment, supplies, drugs and transport for referral

(Graham *et al.*, 2001). The concept of skilled attendance means that the environment can be improved to increase the deliveries by the skilled attendants. The skilled birth attendance is also a measure on progress made towards achieving the Sustainable Development Goal on good health and well-being which has one of its targets to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030.

Various factors determine whether a pregnant mother will seek services of skilled birth attendant. These include socio-cultural factors, access to health services, cost of both transport and services, mode of transport, friendliness of service providers and the alternative traditional attendants. Referral to the facilities by opinion leaders, CHWs, and traditional attendants is thought to increase access to skilled birth attendants (Campbell & Graham, 2009). Offering a mode of transport can also increase the access to SBAs. This study assessed factors that determine delivery by skilled attendants. The decision to seek medical care is made at household level and mothers and their household members require the necessary knowledge to make such decisions. Thus knowledge on danger signs in pregnancy, labor and post-natal period was assessed among the women who attended ANC in Mbooni Sub-County.

Efforts to increase utilization of maternal services are associated with improved maternal and neonatal health outcomes (Bbalolos & Fatusi, 2009). Studies on the use of maternal services have largely overlooked community factors. Determinants of maternal services should focus on individual, household, community and state level factors. Delivery by a skilled birth attendant serves as an indicator of progress towards reducing maternal mortality worldwide (WHO/UNICEF, 2003). Presence of a skilled birth attendant at delivery is important in averting maternal and neonatal mortality and morbidity which traditional birth attendants cannot do effectively because they are unable to treat complications and are often unable to refer. Qualified midwives and doctors are often not available in the rural areas and community settings where most women reside in developing countries deliver (Carlough & McCall, 2005). Thus households should be prepared to seek care in their nearest facilities. Safe motherhood initiative has found that people's medical decisions are often based on non-medical reasons and cultural

appropriateness (Kwast, 1996). Cultural appropriateness can be a barrier to seeking delivery by skilled birth attendants and this study evaluated the acceptance of delivery by SBAs. Maternal and child survival are dependent upon recognition of the problem, decision making about the care, access to care and quality of care which has made the challenge of reducing maternal mortality be increasingly addressed by area based efforts to improve access to care of obstetric emergencies (Liljestrand, 2000).

The health system in Kenya has safe motherhood initiative (SMI) which aims at women being healthy during pregnancy and having the desired outcome of a live baby and a healthy mother. Unfortunately the health system often fails to deliver on its intended aim. A substantial proportion of ante natal care users do not deliver with the help of skilled attendant (Staton, 2007). In Kenya maternal mortality stood at 414 per 100,000 live births in 2003 but has since increased to 488 per 100,000 live births (KDHS 2003; 2008). Infant mortality rate as per KDHS 2009 has fallen slightly from 77 in 2003 to 52 per 1000 live births. The under-five mortality has fallen from 115 to 74 per 1000. Contraceptive prevalence rate (CPR) in Kenya is now at 46% (KDHS, 2008/2009). These poor indicators have led to attempts to improve maternal health by incorporating community health workers into the health systems to assist in referral of clients to level II with various degree of success. There are difficulties in organization of community health workers, difficulties in meeting their basic needs and remuneration and difficulties in retention after training. The factors that determine utilization of skilled care in such community is thus an important area of study.

Maternal morbidity is attributed to and/or aggravated by pregnancy and childbirth that has a negative impact on the woman's wellbeing (WHO). Maternal mortalities are as a result of complications during pregnancy and delivery and most of these are treatable or preventable. The major complications accounting for about 75% of maternal mortalities include: severe bleeding especially post-partum (24%), infections (15%), eclampsia and pre-eclampsia (12%), obstructed labor (8%) and unsafe abortions (13%). According to WHO, for every woman who dies, approximately 20 others suffer from serious infections, injuries or disabilities. In a study done in Olabasi Onabanjo University

Teaching Hospital (OOUTH) in Sagamu, Nigeria, it was found that obstetric emergencies were responsible for 70.6% of maternal mortality which showed that effective management of obstetric emergencies helps to reduce maternal mortality (Lamina, 2011). Maternal mortality remains a public health problem globally today. It's estimated that about 830 women die from pregnancy and child birth related complications daily. In 2015, an estimated 303000 women died during pregnancy and childbirth (Alkema *et al.*, 2016). Almost all maternal mortalities, that is 99%, occur in developing countries with more than half being in Sub-Saharan Africa. In West Africa, maternal mortality has been noted to be highest in rural areas where access to health care is hindered by the geographical terrain (Onwudiegwu & Ezechi, 2011).

The year 2015 marked the end of the millennium development goals period. MDGs 4 and 5, were related to maternal and child mortality and these saw the decline in global maternal mortality ratio by 44% which translates to a decline of only 2.3% per year from 1990-2015 (UN, 2011). With the advent of sustainable development goals, attaining SDG Target 3.1 which aims at reducing the global maternal mortality ratio to less than 70 per 100 000 live births, will require substantial reduction in maternal and neonatal mortality which is impossible without an effective referral system for complicated cases. Any interventions put in place to improve access to health services require consideration of multitude of factors including socio-economic and cultural factors, but one aspect involves establishing referral systems.

1.2 Statement of the Problem

Delivery by skilled attendants is low in sub-Saharan Africa and other marginalized areas despite being recognized as a method of preventing maternal mortality and morbidity. In the former Eastern Province of Kenya, KDHS estimates that only 37% of mothers access skilled attendance during delivery which is only higher than Western and North-eastern Provinces. The low prevalence of skilled birth attendance is as a result of interaction of various socio-cultural and behavior reasons. Approximately 18 million women in Africa currently do not give birth in health facilities which affects planning and implementation

of maternal health programs. Appropriate identification, management or referral is necessary to save mothers and babies in event of life threatening complications. The KDHS 2008/2009 shows that only 44% of women give birth with the help of skilled birth attendants in Kenya and which varies widely depending on the region. In rural areas, only 37% of women are delivered by SBAs as compared to 75% of urban women (KDHS, 2008/2009). Thus factors that lead to low delivery by skilled birth attendants should be studied with an aim of instituting interventions to increase the deliveries in health facilities in rural areas of Kenya. The maternal mortality ratio (MMR) has progressively increased from 414 to 488 per 100,000 live births between year 2003 and 2008 (KDHS 2008, 2014). Mbooni Sub-County in Makueni County in Kenya is an area with high maternal and child mortality as a result of low utilization of skilled birth attendants.

1.3 Justification

There is unacceptably high maternal mortality of 488 per 100,000 in Kenya despite the formal health system having the skilled attendants who are trained to handle cases that eventually result into maternal morbidity and mortality (KDHS, 2008). The percentage of deliveries assisted by a skilled birth attendant is a proxy indicator for reducing maternal mortality in developing countries (Harvey & Bucaqui, 2004). Thus documenting the deliveries by skilled attendants provides a measure of access to maternal health services at the time of most need. This study dealt with an area of Sustainable Development Goal on good health and well-being which has one of its targets to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030. Mbooni Sub-County was purposively selected because it has one of the lowest proportions of deliveries by skilled birth attendants in Kenya which was 802 out of 10,898 projected births in 2008/2009. This translated to about 10% of the deliveries (AOP; 2008). Tawa, Kisau and Kikima health facilities were selected because they have community health units which are implementing community referral model. In the model community health workers are trained on danger signs in pregnancy, child birth and postpartum period and the need of delivery by SBAs. Each CHW is responsible for

health of twenty households within which are some pregnant mothers. The opinion leaders who include chiefs and religious leaders were sensitized on the need of delivery by skilled attendants while Traditional birth attendants (TBAs) were requested to refer pregnant mothers for delivery by skilled attendants at Health Facilities. The health workers were taught on emergency obstetric care (EMOC) during delivery. The health workers teach pregnant women on danger signs in pregnancy, child birth and post-partum period, Individual Birth Plan (IBP), HIV and malaria in pregnancy. Prompt referral is envisaged between the community and health facility and to comprehensive obstetric care center when required.

1.4 Research Questions

1. What are the socio-demographic characteristics of women attending antenatal clinics in Mbooni Sub-County of Makueni County?
2. What proportion of women attending antenatal clinics in Mbooni Sub-County, upon follow-up, utilized skilled birth attendants during delivery?
3. Which logistics and economic factors affect delivery by skilled birth attendants among women who attend antenatal clinics in Mbooni Sub-County, Makueni County?
4. How does awareness on danger signs in pregnancy, child birth and post-natal period affect uptake of skilled birth attendant during delivery?
5. How does attitude towards delivery by skilled attendants affect uptake of skilled birth attendant during delivery?
6. Which antenatal care factors influencing birth attendants?

1.5.1 General Objective

To determine factors associated with delivery by skilled birth attendants among women attending antenatal clinics in Mbooni Sub-County, Makueni County, Kenya

1.5.2 Specific Objectives

1. To describe the socio-demographic characteristics of women attending antenatal clinics in Mbooni Sub-County of Makueni County
2. To determine the proportion of women attending ANC in Mbooni Sub-County that were eventually delivered by SBAs upon follow-up
3. To determine logistic and economic factors associated with delivery by skilled birth attendants in Mbooni Sub-County, Makueni County
4. To assess awareness on danger signs in pregnancy, child birth and post-natal period and its association with uptake of skilled birth attendance during delivery
5. To determine the attitude towards delivery by skilled attendants and its association with utilization of skilled birth attendant during delivery
6. To model antenatal care factors influencing birth attendants

1.6 Theoretical and Conceptual Framework

The conceptual framework indicates that the delivery by skilled birth attendants is determined by factors within the pregnant woman's household, community, health system and the society. These include the cost, availability of health services, the knowledge, attitudes and practices within the households and the community. Health systems infrastructure, quality of care and women reluctance to use maternity care where there are high costs and poor services also determine the use of skilled care (Koblinsky, 2009). The conceptual framework was derived from literature describing the relationship between different variables that affect the delivery by skilled attendants. It describes the health system and how it is expected to intervene in a timely manner to avoid delays which lead to adverse health outcomes in a woman giving birth. In rural areas, certain organizational framework is required both to reach the target population with information necessary to make informed decision and also to reach the population with interventions like referral when need arises. The knowledge attitudes and practice (KAP) about delivery by SBAs has a central role in determining care seeking behavior as shown in Figure 1.1.

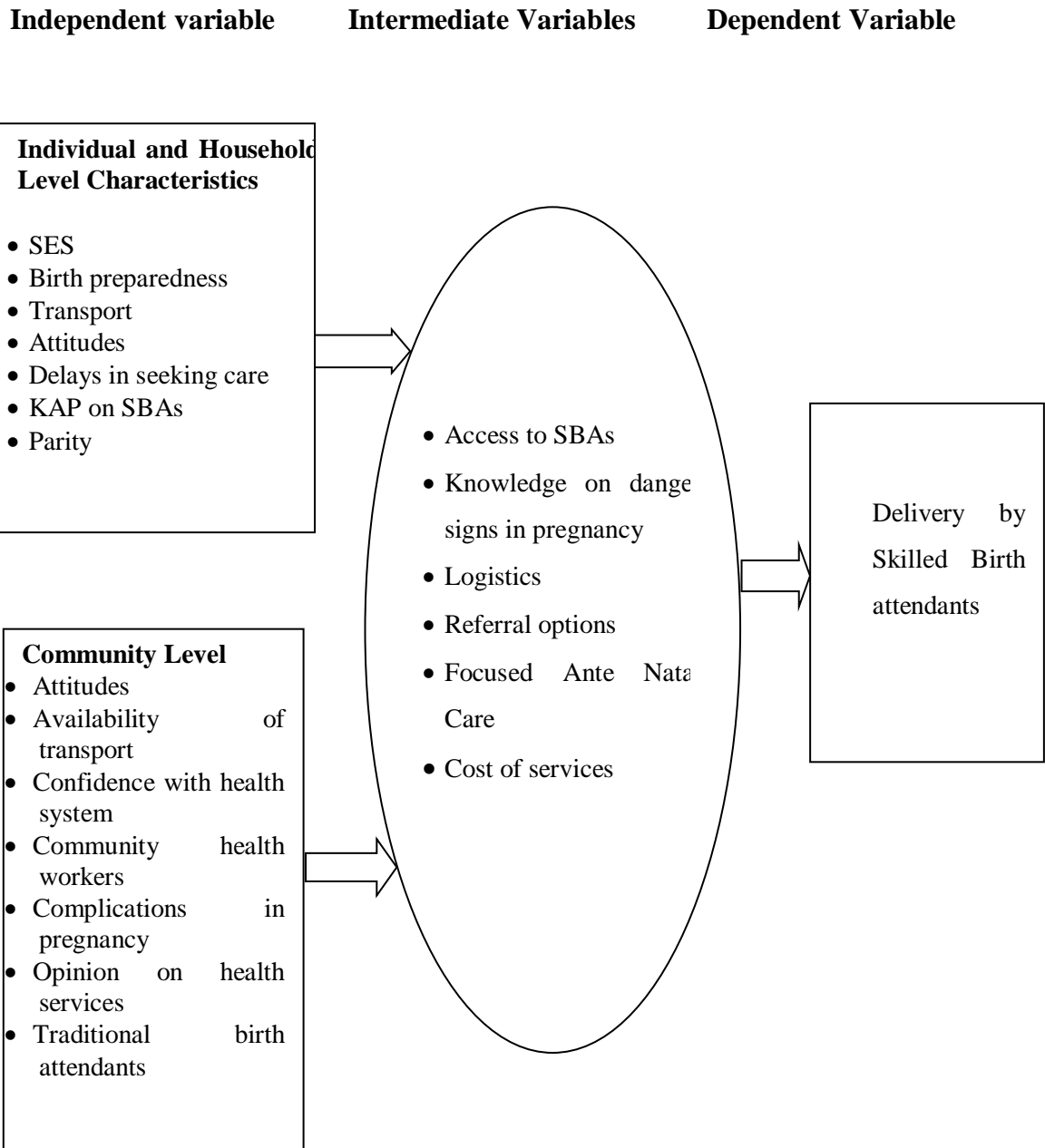


Figure 1.1: Conceptual framework of determinants of delivery by skilled birth attendants (derived from review of literature)

CHAPTER TWO

LITERATURE REVIEW

The chapter describes the need for delivery by skilled birth attendants and why it is important intervention to save lives of pregnant women in a resource poor setting. The causes of maternal mortality and morbidity are explained and why skilled birth attendants are essential to manage conditions that can result in poor outcomes for pregnant women. The focused ante natal care (FANC) services provided during ante-natal period is described and its association with utilization of SBAs. This includes prevention of mother to child transmission (PMTCT) of HIV. Gaps in knowledge attitudes and practice in utilization of skilled birth attendants is outlined as well causes of delay in seeking maternity care.

2.1 Models of Delivery Services for Pregnant Women

There are four basic models of delivering essential obstetric care (Koblinsky *et al.*, 1999).

Model 1: delivery takes place at home by traditional attendants;

Model 2: delivery takes place at home but conducted by a professional;

Model 3: delivery is performed by a professional in a basic essential obstetric care facility;

Model 4: All women deliver in a comprehensive essential care facility with the help of professionals.

Model 1 has shown no evidence of reducing MMR below 100 per 100,000 live births. Traditional attendants' training was commenced in many places in the non-western world in the 1970s supported by the WHO and other funding bodies (Kruske & Barclay, 2004). By 1997, policymakers decided to refocus priorities on the provision of skilled

attendants to assist birthing women. This is because no progress was made in reducing maternal and neonatal mortality and most traditional attendants offered poor quality services due to illiteracy, lack of supplies and absence of supervision (Bisika, 2008). Kenya has officially adapted the third model but with varying success. A few areas in Kenya like the former Western province have the second model of delivery by professionals at home. Despite this traditional attendants are still active in many countries including Kenya (Rowan *et al.*, 2009). Births at mid-level facilities like health centres and Sub-County hospitals appear to be a strategy that has been overlooked (Staton *et al.*, 2007). Thus a health centre based study will shed light on how to utilize these facilities to improve the community access to skilled birth attendance.

2.2 Skilled Birth Attendance during delivery

Each year obstetric complications are responsible for deaths of 500,000 women worldwide (Harvey, 2007). Skilled birth attendance during labor, delivery, and early postpartum period could prevent many of these deaths. The period of birth is critical in the life of the mother and baby. Ideally it needs to be assisted in a competent manner by a skilled birth attendant (SBA) supported by enabling environment. Another strategy is to implement suitable community based interventions to achieve the required behavior in family members, health workers and volunteers to improve newborn health. A critical period is during child birth or the intra-partum period and implementing an effective intra-partum care strategy is an overwhelming priority (Campbell & Graham, 2009).

Skilled birth attendants oversee follow-up care of a mother including routine preventive care, identification of danger signs and referral of mother to suitable unit. If the skilled attendant is working in an equipped facility to provide care he or she takes care of the mother during delivery and postnatal period. The proportion of births attended by skilled birth attendants has become an indicator for measuring efforts at maternal mortality reduction, including the 75% reduction called for by the fifth Millennium Development Goal (MDG-5). Complications occur in approximately 15% of all pregnancies and cannot be predicted (Anwar *et al.*, 2008). The leading direct causes of maternal death are

hemorrhage, pre-eclampsia, eclampsia and sepsis (Daly *et al.*, 1994). Indirect causes of maternal death include malaria, HIV, diabetes and chronic illnesses. The correlates of maternal mortality are health service factors, socio-economic factors and reproductive health factors. The leading cause of maternal mortality in Africa, accounting for 34% of deaths, is hemorrhage, the majority of which occurs during the first 24 hours after child birth (Dahne *et al.*, 1995). Lack of care during this time may result in death or disability. It is thus obvious that the burden of maternal complication and deaths is highest in the first days of delivery. The Inter-agency group for Safe Motherhood concluded that the single most critical intervention for safe motherhood is to ensure that a health worker with midwifery skills is present at every birth (Kristine *et al.*, 2006).

2.3 Maternal Mortality

International Classification of Diseases (ICD-10) defines maternal death as “Death of a woman while pregnant or within 42 days of the end of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes” (WHO). WHO meta-analysis show that the most important direct causes of maternal mortality are hemorrhage, hypertension, abortion, sepsis and obstructed labour; however, the proportion of deaths due to indirect causes is also increasing in most parts of the world. The global maternal mortality ratio (MMR) declined by 44 percent, from 385 maternal deaths per 100,000 live births in 1990 to 216 in 2015 but countries especially in Sub-Saharan Africa have made insufficient progress (Ahmed *et al.*, 2014). Major cause of hemorrhage is due to placental abruption, placenta previa, ruptured uterus, and other causes while hypertensive diseases of pregnancy is mainly preeclampsia/eclampsia. In a study conducted across 29 countries in Asia, Latin America and the Caribbean, the Middle East and North Africa, and Sub-Saharan Africa, PPH and preeclampsia/eclampsia each accounted for more than 25 percent of maternal deaths and near-misses; maternal sepsis accounted for approximately 8 percent (Souza *et al.*, 2013).

Available data showed that 73.0% of all maternal deaths between 2003 and 2009 were attributable to direct obstetric causes; deaths due to indirect causes accounted for 27% of all deaths (Say *et al.*, 2014). Direct causes included Hemorrhage, 27.1% of which more than 72.6% of deaths from hemorrhage were classified as postpartum hemorrhage; Hypertension, 14.0%; Sepsis, 10.7%; Abortive outcomes, 7.9% and Embolism and other direct causes, 12.8%. These are the conditions that Skilled Birth Attendants are trained to manage in obstetrics and mid-wifely training. Hemorrhage accounts for 36.9 percent of deaths in Africa, compared with 16.3 percent in developed regions. Indirect causes of maternal death, when combined, are the most common cause of maternal deaths. A breakdown of deaths due to indirect causes suggests that more than 70 percent are from preexisting medical conditions, including HIV/AIDS, exacerbated by pregnancy (Lewis, 2007). Other indirect causes include Malaria in pregnancy; Anemia; Tuberculosis; Diabetes and any other medical conditions that are aggravated by pregnancy.

2.4 Maternal Morbidity

WHO Maternal Morbidity Working Group defines maternal morbidity as “any health condition attributed to and/or aggravated by pregnancy and childbirth that has a negative impact on the woman’s wellbeing” (Firoz *et al.*, 2013). The negative impact of pregnancy-related ill health is on the basis of subsequent disabilities, including how severely the woman’s functional status is affected and for how long. The origins of maternal morbidity occur during pregnancy, but the sequelae might take several months to manifest themselves (Rosmans *et al.*, 1997). In a Nepal study, women reported, on average, three to four days per week with symptoms of illness during pregnancy (Christian *et al.*, 2000). The type of symptoms reported varied according to gestational age, with nausea and vomiting more common in early pregnancy, and swelling of the hands and face more common toward the end of pregnancy while self-perceived ill health is not simply a result of biological changes but also of social support and influences.

2.5 Interventions to reduce or manage causes maternal mortality and morbidity

The most effective intervention for preventing Post-Partum Haemorrhage (PPH) which is the major cause of maternal mortality is the use of uterotonics—drugs that contract the uterus— during the third stage of labor before the placenta is delivered. This is available for use during delivery by Skilled Birth Attendants in health facilities. Hypertensive disorders in pregnancy, particularly preeclampsia, complicate 2 percent to 8 percent of all pregnancies, accounting for estimated 76,000 annual maternal deaths occurring in developing countries (Duley, 2009). The etiology of preeclampsia is unknown though it is thought to arise from the placenta and is associated with malfunction of the lining of blood vessels. The clinical spectrum of disease in preeclampsia range from mild, asymptomatic disease, often occurring close to term, to severe, uncontrolled hypertension typically developing remote from term (less than 34 weeks). Generalized seizures (eclampsia) occur in up to 8 percent of women with preeclampsia (Stegers *et al.*, 2010). The only interventions that have shown clear benefit in reducing preeclampsia risk in selected populations are low-dose aspirin and dietary supplementation with calcium. Early detection is vital for timely intervention and prevention of progression to severe disease. Monitoring blood pressure and performing urinalysis are the cornerstones of antenatal screening, as are asking about symptoms that may suggest preeclampsia and noting if a fetus is smaller than expected. Detection of preeclampsia should prompt referral for specialist care by a trained health worker. The only definitive cure for preeclampsia is delivery of the baby, by induction of labor or by prelabor cesarean section (CS), to prevent progression of disease and related morbidity and mortality. The mainstays of treatment are antihypertensive drugs for blood pressure control and magnesium sulphate (MgSO₄) for eclampsia. This is offered specialist in a comprehensive obstetric care health facilities.

Obstructed Labor occurs when the presenting part of the fetus cannot progress through the birth canal despite strong uterine contractions. Obstruction usually occurs at the pelvic brim, but may occur in the cavity or outlet. Causes include cephalopelvic disproportion, shoulder dystocia when fetal shoulders trapped in the pelvis during

delivery, and fetal malposition and malpresentation. Obstructed labor accounts for an estimated 4 percent of maternal deaths (Lozano *et al.*, 2012) which are caused by ruptured uterus, hemorrhage and puerperal sepsis. Other outcomes, such as obstetric fistulas, lead to considerable long-term maternal morbidity. Women with obstructed labor are more likely to have stillbirths, neonatal deaths, and neonatal infections (Harrison *et al.*, 2012). Obstructed labor can only be alleviated by means of a CS or other instrumental delivery. A substantial proportion of maternal deaths in Sub-Saharan Africa is due to obstructed labor which occur in community settings, where women are unable to access assisted delivery at health facilities, either because they are disempowered to challenge existing social norms (for example, delivering alone or with traditional birth attendants), or because infrastructure is lacking (for example, roads, transportation, and health facilities). In addition, women may prefer to deliver in the community without skilled assistance because they are afraid of financial costs, low quality of care in health facilities, and disrespectful treatment (Stenberg *et al.*, 2013). The first priority for preventing poor outcomes related to obstructed labor is to create the demand for skilled birth assistance and to ensure that this demand can be met. Cesarean section which is performed in health facilities on recommendation of skilled birth attendants forms the backbone of the management of obstructed labor and saves many lives.

Maternal sepsis associated with pregnancy and childbirth is among the leading direct causes of maternal mortality worldwide, accounting for approximately 10 percent of the global burden of maternal deaths (Khan *et al.*, 2006). Most of these deaths occur in developing countries; 11.6 % of maternal deaths were due to sepsis (Saleem *et al.*, 2014). Efforts to reduce maternal sepsis have largely focused on avoiding the risk factors, with an emphasis on reducing the frequency of unsafe abortion, intrapartum vaginal examination, and prolonged or obstructed labor; providing antibiotic cover for operative delivery; and using appropriate hospital infection control. Maternal sepsis prevention is the use of stringent infection control measures to limit the spread of microorganisms, particularly within hospital environments. General measures, such as

hand washing with soap or other cleansing agents, are widely acceptable practices for preventing hospital transmissible infections. A study on prophylactic antibiotics compared with placebo after CS showed substantially lower risks of endometritis (infection of the lining of the womb) (62 percent reduction), wound infection (60 percent), and serious maternal infectious complications (69 percent reduction) (Small & Grivell, 2014).

2.6 Danger signs in pregnancy, delivery and post-partum period

Every year in Africa, at least 125,000 women and 870,000 newborns die during post-partum and perinatal period, yet this is when coverage by health programs are at their lowest along the continuum of care. During delivery the following are the danger signs for detection of complications: excessive bleeding, foul smelling vaginal discharge, fever with or without chills, severe abdominal pains, excessive tiredness or breathlessness, swollen hands or face with severe headache or blurred vision or convulsions, painful engorged breasts or sore, cracked bleeding nipples (Harvey *et al.*, 2004). When any of these signs appear corrective action should be taken immediately to safeguard life of the mother and the un-born child. This information should be given to mothers and the households to enable them make informed decisions on seeking care. Understanding the levels of knowledge, attitudes and practice enable more efficient process of awareness creation which allows program to be tailored towards community needs (Kaliyaperumal., 2004).

Immediate determinants of maternal mortality are: 1) exposure to pregnancy and 2) complications and their management (Daly *et al.*, 1994). Important program elements are services, skilled assistance, referral and communication. This study evaluated how these elements determined delivery by skilled birth attendants in Mbooni Sub-County. The safe motherhood initiative has successfully stimulated much interest in reducing maternal mortality. Three important dimensions of safe motherhood initiative are policy dialogue, improved services and behavior change. Effectiveness of SMI is severely curtailed by structural deficits in the health system, especially lack of skilled staff,

supervision and transport (Dahne *et al.*, 1995). In spite of these deficits the services available for delivery of mothers are not optimally utilized for reasons which this study will assess from the mothers.

In a Ugandan retrospective study in which women reported on their most recent pregnancy (Kizza *et al.*, 2007) it was shown that access to essential skilled birth attendants remain difficult especially for the less educated, poorer women. Eleven percent of women delivered at home with no skilled assistance and just under half of these reported financial/transportation difficulties as primary reason. In Tanzania more than 90% of all pregnant women attend ante natal care at least once and approximately 62% four times or more (Magoma *et al.*, 2010). Yet less than five in ten receive skilled delivery care at available health units. The scenario in the Eastern province of Kenya is similar but with lower deliveries by skilled attendants. Understanding factors influencing women's decision making process on where to deliver is important for determining how to improve services and the likelihood of seeking skilled delivery care which result to positive pregnancy experience and birth outcome. In developing world nearly 70% of pregnant women have at least one antenatal care visit and majority of women presenting for any antenatal care have at least four visits (Koblinsky *et al.*, 1999).

A research in Tanzania showed that 66.8% of respondents know vaginal bleeding, 29.4% reduced fetal movement and 23.9% swollen hand and face as danger sign of pregnancy (Declare, 2015).

2.7 Community strategy and delivery by skilled attendants

The community strategy model enables community health workers (CHWs) and skilled attendants to help women and their families become active participants in maintaining normal pregnancy and in seeking additional care when required (Graft-Johns, 2005). Transportation mechanism can be identified within communities to strengthen referrals for clients to the health facilities, particularly during emergency (Mwangi & Warren, 2008). Community members can be helped to make their own plans for

transport. The community health units in Mbooni are piloting such referral model to increase access to delivery by skilled attendants. This study examined whether knowledge on danger signs in pregnancy, delivery and child birth really increases the rate of deliveries by skilled attendants.

WHO has developed focused ANC package which has proven health benefits. The new approach to ANC emphasizes quality of care rather than quantity. For normal pregnancies WHO recommends only four antenatal visits. The goals of Focused ANC (FANC) include (WHO/UNICEF, 2003) identification of pre-existing conditions, early detection of complications arising during pregnancy, health promotion and disease prevention, birth preparedness and complication readiness planning. Safe motherhood covers health issues of a mother from preconception period to postnatal period. Addressing maternal health means ensuring that all women receive the care they need to be safe and healthy throughout pregnancy and childbirth.

Figures released by (Maternal mortality, 2005) reveal that women continue to die of pregnancy related causes at a rate of about one a minute. Every minute, the loss of a mother shatters a family and threatens the wellbeing of surviving children. Although maternal mortality ratios (the number of maternal deaths per 100,000 live births) are declining globally in all regions, the decline is too slow to meet the target of the Sustainable Development Goal on good health and well-being to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030. (Maternal mortality, 2005), Sub-Saharan Africa MMR is 900 per 100,000. Safe motherhood encompasses social and cultural factors as well as addresses health systems and health policy. Indicators used to measure maternal health include skilled attendance at birth, Contraceptive Prevalence Rate (CPR) and maternal mortality and morbidity. All events that make pregnancy unsafe irrespective of the gestation or outcome are part and parcel of safe motherhood. The strategies of accomplishing the safe motherhood goal include that all pregnant women have access to skilled care at the time of birth, all women have access to contraception to avoid unintended pregnancies, and all those with complications have timely access to quality emergency obstetric care.

This study will inform on the first strategy which also influences access to quality care. In conclusion, maternal mortality in Africa continues to be a serious problem (Abdoulaye; 2006). Due to combination of factors 60% of mothers in Sub-Saharan Africa (SSA) give birth without a health worker present which in turn heightens the risk of complications and contribute to greater maternal and child death and disability. Access to skilled care during delivery is key to saving women's lives and those of their children. The research literature shows that the single most important intervention for safe motherhood is to make sure that a trained provider with midwifery skills is present at every birth, transport is available to referral services and that quality emergency obstetric care is available. The three delays to providing adequate obstetric care are acceptability, accessibility and availability of skilled care during delivery.

2.8 Focused Antenatal Care (FANC)

Focused antenatal care is the integrated individualized care that a woman receives during pregnancy that helps to ensure healthy outcomes for women and newborns (WHO/UNICEF, 2003). Antenatal care is a key entry point for a pregnant woman to receive a broad range of health promotion and preventive health services, including nutritional support and prevention and treatment of anemia; prevention, detection and treatment of malaria, and sexually transmitted infections (STIs)/HIV/AIDS (particularly prevention of HIV transmission from mother to child); and tetanus toxoid immunization. Antenatal care is an opportunity to promote the benefits of skilled attendance at birth and to encourage women to seek postpartum care for themselves and their newborns. It is also an ideal time to counsel women about the benefits of child spacing.

Focused antenatal care (FANC) recommends that mothers should have birth companions during delivery. The companion help make decision on delivery, referral and use of scarce resources during labor. Majority of maternal deaths, stillbirths and neonatal deaths in developing countries is due to poor access to health services (O'Meara *et al.*, 2013). Early and consistent antenatal care attendance could reduce maternal and neonatal morbidity and mortality. Studies have shown that most Kenyan mothers start

ANC late in pregnancy and attend fewer than World Health Organization recommended four visits. According to WHO figures, only 75% of pregnant women worldwide received any antenatal care whereas those who received the recommended 4 ANC visit stands at 44% while in developed countries, more than 95% of pregnant women have access to antenatal care.

Latin America and the Caribbean have higher levels of ANC than women in other regions of the world, with Ethiopia recording the lowest level of ANC at only 22%. Antenatal care in other sub-Saharan countries ranges from 55-87%. A study done in China indicated that 90.1% of pregnant women made at least one antenatal care visit in which they are assessed of any pregnancy symptoms, confirmation of pregnancy and calculation of estimated date of delivery (EDD) on top of this a package of health education on their blood pressure, obstetrical status, importance of screening of various conditions such as haemoglobin and STIs, self-care, alcohol and tobacco use, nutrition, safe sex, rest, sleeping under insecticide treated net (ITN), birth and emergency plan is given to them. In line with this study 49.7% made the recommended number of antenatal care visits and received the wholesome package of examination, screening and tests, treatments, preventive measures like iron, tetanus toxoid, IPT and ARVs and the package of health education and counseling (Zhao *et al.*, 2012).

In Brazil, studies indicate that 61% of pregnant women received adequate antenatal care, 21% received inadequate care and 41% of them had had no antenatal care (Bassani *et al.*, 2010). Data from Indonesia Demographic and Health survey, 2007 indicated that only 66% of women attended the recommended four ANC visits and were taught on various topics such as alcohol and tobacco use, nutrition, safe sex, rest, sleeping under ITN, birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing with 95% only attending one visit to the health center in which they receive information on their pregnancy status and EDD, screened and tested for various conditions, treated and educated on birth and emergency plan, self-care, nutrition and sleeping under ITN.

In another study conducted in Bangladesh, the proportion of women who took any antenatal care by SBAs was 59.0%, which is higher than the earlier national estimates of 48.7% in 2007 and 46.4% in 2011 (NIPRT, Bangladesh, 2007; 2011). Also, approximately one-third (30.0%) of the participants had their last delivery by SBAs which is higher than the 2006 estimates of 14%, 2007 estimates of 13.2%, 2009 estimates of 19.2%, and 2011 estimates of 25.2%, but little less than another estimates of 35% in 2006 (Anwar *et al.*, 2008).

According to a research done in rural Tanzania on the key health education messages given to the mothers during ANC visits, 81.9% of the mothers who were on their first ANC visit indicated they had received and comprehensive package of minimal or no use of alcohol and tobacco, safe sex, birth and emergency plan, sleeping under ITN and nutrition, 91.2% of the women who were on their second and third ANC visit were taught on, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice and the women who were on their fourth ANC visit were just reinforce on the previous advice. (Moke *et al.*, 2013).

Although there is a potential for FANC being initiated early in pregnancy to improve the outcome of the pregnancy in terms of live births and good health of both the mother and the baby, only 85.8% of Kenyan women received any antenatal care from a skilled professional during their last pregnancy (Kenya Malaria Indicator Survey, 2010) and 40% attended their first ANC visit after 6 months gestation and less than half of women attended the recommended minimum 4 visits. According to the study done on 2013 in six Sub-counties in western Kenya, 59.4% of the studied women reported to have attended ANC care for their current pregnancy (O'Meara *et al.*, 2013).

According to the Kenya demographic and Health survey 2014, 58% of women reported having four or more antenatal visits for their most recent birth. Urban women are more likely to have four or more ANC visits compared with women in rural areas (68% and 51%, respectively). Both education and wealth are positively associated with receiving the recommended number of ANC visits. Only 43% of women with no education

attended four or more ANC visits compared with 69% of women with secondary or higher education, and 44% of women in the lowest wealth quintile attended four or more ANC visits compared with 75% in the highest quintile.

There are clear variations between ANC attendance in rural and urban areas. Urban women are twice as likely as rural women to report at least four antenatal visits (Abouzahr & Wardlaw, 2013). The urban women who are educated on the need to attend ANC as well as being more financially and strategically advantaged access services than their rural counterparts.

2.9 Factors affecting utilization of antenatal care and skilled birth attendants

Studies among the urban poor in Nairobi indicates that women with primary level education receive inadequate antenatal care compared with those with at least secondary level education (Magadi, 2014). Long distance, poor travel condition and high cost of transportation hinders most pregnant women from seeking ANC. Women living in households that fall within the poorest population quintile use antenatal services much less frequently than do those in the richest . Whereas some degree of wealth differential exists everywhere, the gap between the richest and the poorest in the use of antenatal care varies enormously. Thus, the proportion of inadequate ANC increases with decreasing socioeconomic status. Adherence to cultural and religious practices had an impact on antenatal care utilization by Asian and Muslim women. In a study conducted in Tunisia, found that women from higher wealth quintiles were more likely to be delivered by skilled attendants compared to less privileged women, may be due to the costs of SBAs during deliveries, which is difficult to manage for families with lower income. (Islam, *et al.*, 2014). Studies indicated that women sought care late because of shame about being undressed during consultations (Boerleider *et al.*, 2015). Attending ANC entails travel costs and Christopher *et al.* (2014) in their studies on factors affecting antenatal care attendance in Ghana, Kenya and Malawi the results indicate that, in northern Ghana, vehicles providing public transport were scarce, women mainly walked to the clinic and travel costs were minimal. In Kenya and Malawi, bicycle, taxis

were available, and in light of their pregnancy-related tiredness, women who could afford to pay, did so. Other women travelled on their husband's bicycle and, in Kenya, a minority of women used motorbike and taxis because of their greater comfort. In addition, a study in India where all women who were residing within one to two kilometers from a health institution preferred delivery at the health facility whereas this proportion was 94.1% among women who residing five and more kilometers away from health centers and they employed the help of traditional birth attendant. This therefore is an indication that the proportion of home deliveries increased when the distance of health facilities increased. (Rejoice & Ravishankar, 2014).

Pregnant women's interactions with healthcare staff at ANC vary as a study done in Indoneasia indicates that women reported to delay ANC until the third trimester, which led to chastisements from health workers; this was particularly the case if a woman arrived at a health facility to deliver without having previously attended ANC. Hence, as previously described, women's fear of chastisement from health workers sometimes prompted ANC attendance. In addition inadequate staffing and long hours of waiting to be served led to women skip attending all the ANC visits. (Myer & Harrison, 2011). This agrees to a study in Tanzania in which the ratio of doctor to patient was 1:35 discouraging women from accessing ANC services. (Moke *et al.*, 2013).

Knowledge of mothers regarding the dangers of pregnancy was at 59.3% in a study done in Malawi as compared to 82.4% of the women in Denmark and 31.6% of women in Congo knew of the danger sings (Pell *et al.*, 2014). This is directly related to the level of education held by the mothers as 35.1% of the mothers with primary level of education in Nigeria attended between 1-3 ANC visits, 28.9% and 15.5% of the women secondary and tertiary education attended the 4 ANC visits while 22 .5% of the women with no education only attended one ANC visit. (Chinedu, 2010). This concurs with a study done by (Christopher *et al.*, 2014) in Ghana, where 78.1% of the women who attended the 4 ANC, had tertiary education as compared to the 36.7% who had primary education and attended the four visits. Still on education, in a study conducted in Tamilnadu State in India shows that, the relation between women's education and place of delivery was

positively associated. All the women who had completed higher secondary and above level of education were preferred institutions for their delivery but at the same time home deliveries were more common (18.8%) among illiterates ($X^2= 23.46$ and $p= 0.00$). Delivery at the health facilities was quite common among women who were working in non-agricultural sector (100%) than non-workers (93.5%). (Rejoice & Ravishankar, 2014).

Majority of the women in their birth preparedness plan set aside Ksh. 5,000 to 7,000, according to a study done in Western Kenya and if she is married the husband pays the bill (Were, 2010). In Egypt 36.5% of the women set aside 100 \$ while 62.4% set aside 40\$ in regards to birth preparedness. This is unlike the U.S in which the bill is cut from the Medicare plan in which 2.9% is deducted on all your wage for salaried employees and a range of 5\$ - 50\$ (Maxwell, 2013).

Encouragement by village health volunteers, traditional birth attendants and health personnel contribute positively to ANC attendance. There's also an influential role of husbands and mothers-in-law in determining patterns of maternal healthcare. Their beliefs and opinions influenced whether the pregnant women sought adequate healthcare from trained providers or opted for other options (White & Nisar; 2013). A study in Uganda showed that the highest percentage of non-usage of ANC was between ages 15-19 and it stood at 17.9%, compared 11.6% among the women aged 20-24 years. Higher parity women have lower levels of ANC in all regions although the differences are small in Africa (Banda, 2013). In another study done in Nigeria, there is no significant association between parity and the utilization of ANC services (Onasoga *et al.*, 2012). In another study, The result shows that the younger women (18-20 age groups) were less likely than older women given birth at home. The women in the age group 18-20 were less likely to given birth at home (2.1%) than those aged 21-22 (5.2%) (Rejoice & Ravishankar, 2014).

2.10 HIV prevention services during ante-natal period

Perinatal Human immunodeficiency virus (HIV) transmission has been shown to be a major route of transmission in children and it accounts for over 90% of infection in children in Kenya (Carey *et al.*, 2014). The transmission from an HIV-positive mother to her child during pregnancy, labour, delivery or breastfeeding is called mother-to-child transmission. Though it can lead to HIV transmission, breast feeding boosts the infants immunity protecting the infant from other infections which would cause death (Christiane *et al.*, 2012).

In the absence of any interventions transmission rates range from 30-45% which can be reduced to levels below 5% with effective interventions. The global community has committed itself to accelerate progress for the prevention of mother-to-child HIV transmission (PMTCT) through an initiative with the goal to eliminate new paediatric infections by 2015 and improve maternal, newborn and child survival and health in the context of HIV (WHO). During pregnancy, 5-19% of all exposed fetuses will be infected. This is possible through placental tears, chorioamnionitis, cigarette smoking, and use of illicit drugs; which disrupt the placenta and cause micro-transfusions of maternal blood to the fetus. During labour and delivery additional 10-20% of all children will be infected. This is through direct contact with infectious maternal blood and genital secretions and absorption through fetal/neonatal digestive tract (Nduati *et al.*, 2010).

Awareness on MTCT and knowledge of its timing usually pose a direct effect on utilization of PMTCT services (mainly testing, infant feeding options and antiretroviral use). A study Southern Ethiopia conducted in 62 health centers in 2012 and whose objective was to assess pregnant women's knowledge on timing of MTCT among ANC attending women in Southern Ethiopia revealed that all interviewed pregnant women were aware of HIV/AIDS transmission, but only 833 (62.9%) were aware of the fact that HIV can be transmitted from an infected mother to her child. The possibility of MTCT during pregnancy, delivery and breastfeeding was known by 48.4%, 58.6% and 40.7% of the respondents, respectively. The proportion of women who were fully

knowledgeable on timing of MTCT was 11.5% (Anteneh & Habtamu; 2013). There was low awareness and knowledge on timing of MTCT in this Ethiopian study where awareness was associated with women's education level, occupation, estimated monthly income and number of ANC visits during the last pregnancy.

This was contrary to (Shitaye *et al.*, 2005) research in Northwest Ethiopia where the majority (92.5%) of women, both urban and rural, believed that a pregnant woman with HIV/AIDS can transmit the virus to her unborn child and 84.7% of women believed that a women can transmit the virus to her newborn child through breastfeeding. In a study conducted in Addis Ababa, 89.9% of respondents knew HIV could be transmitted from an HIV positive mother to her baby and 76.8% knew that transmission from mother to child is preventable (Jebessa & Teka, 2005). In a study looking at knowledge and attitudes towards MTCT, 82.6% of respondents knew about VCT and 76.8% believe pregnant women should have VCT to prevent HIV transmission to their infant, 82.3% of women agreed to have VCT in order to know their status. The seven percent of women who reject VCT testing did so because of fear of test results (Nekesa *et al.*, 2013). Key factors identified were low knowledge of mother to child transmission, lack of knowledge of the PMTCT services, inadequate community sensitization, and inadequate healthcare facilities.

(Aruloqun *et al.*, 2014). In 2004 a baseline survey utilizing ANC attendees, knowledge of PMTCT during pregnancy and breastfeeding was low, citing replacement feeding as the best way to prevent HIV transmission from mother to infant.

2.11 Effect of Attitudes on uptake of maternal health services

Studies reveal that the attitude of mothers has a bearing on the utilization of free maternal care. For example Salam *et al.* (2013) points out that mothers attitude towards the health care is determined by the experience of the women with the health care or what they observe other mothers going through in the maternal care. For example in the Canada, most mothers had a very good perception of the public maternal care financed

by Medicare (Bilszta *et al.*, 2011). This was because the policy focuses not just on providing free maternal care but also on strengthening primary care, and broadening the adoption of health information technology. With these good perceptions more mothers in Canada preferred the use of the public health maternal care service to the extent that two thirds of the mothers are using it compared to a third who are still using the private care system (Alter *et al.*, 2004). The rate of maternal mortality in Canada is also very low due to the proper adoption of the maternal care services to as low as 0.7% due to the good administration of the maternal care in Canada. Such facts have led to improved attitude and consequently utilization of the maternal care in Canada (Hogan *et al.*, 2010).

The positive relationship between attitude and utilization of maternal health care is also experienced Japan, Heneck (2003) explained that in Japan there was effective free 17 maternal care, proper management of maternal resources and well trained staff to administer the maternal care services, this has seen in improvement in the number of women preferring to use the free maternal care due to the good perception that has been created as a result of the good administration of the maternal care. The opposite is true, poor attitude by women translates to low utilization of the maternal care. In Bangladesh where there maternal mortality rate is the highest standing at 3.2 per 1,000 live births, there has been inadequate maternal healthcare services, poor awareness, improper maintenance and dysfunctional systems (Persson *et al.*, 2012). With these low levels of the indicators of health, the maternal health and reducing child mortality have been observed. This has led to poor attitude by the citizens and consequently low utilization of the maternal care services (Labrique, 2013).

Apart from having the knowledge about MTCT and PMTCT, application of the knowledge is more important. Numerous factors affect this and mostly consist of the attitudes and practices that revolve around pregnancy, delivery, care and feeding of the newborn and also how the community's perception which affects attitudes and practices. In Kisumu County it was found out that fears about HIV/AIDS held by both clients and health workers adversely affect both uptake of facility-based labor and delivery services and the quality of care provided on maternity units. This includes fears of being tested,

fears of being wrongly labeled HIV-positive, fears of facing one's positive status and fears of unwanted disclosure and resultant stigma (Cohen *et al.*, 2009).

Participants described women's fears of being forced to test or being tested without their consent as well as fear of the stress and shock that would come with a positive test result. Others spoke about fears that they would get a "wrong" test result and be incorrectly labeled as HIV-positive. There was also a lack of trust in confidentiality at health facilities that causes some women to choose to deliver at home. Related to this is unwanted disclosure of a HIV-positive result to a male partner and his negative reactions that could even lead to violence or even abandonment. As such women devise strategies to avoid HIV testing and unwanted disclosure included disposing of an ANC card with a HIV-positive test result and/or switching to another health facility, where the woman could decline to be tested especially private facilities where there is less pressure from the staff. (Cohen *et al.*, 2009). Due to this some women would even prefer delivering at home with the assistance of TBAs for instance in Uganda, (Barigye *et al.*, 2010) found that only 63% of mother-baby pairs delivered in a health facility.

In another study done in Burkina Faso, Kenya, Malawi and Uganda only 53% of the respondents had been tested more than once. Thus a good number of women conceive without knowing their status and 79% of HIV infected women kept their status secret not disclosing it to their partners (Hardon *et al.*, 2012). The other important factor is practices around infant feeding. This is especially exclusive breastfeeding for at least six months is recommended. Some women feel they should not breastfeed their babies at all while others feel that breast milk alone is not enough for the child and therefore add other feeds before six months are over.

A study in Nakuru County, Kenya showed that women believed that breast milk would be insufficient for 6 months and that women who EBF for 6 months would experience health or social problems (Webb-Girard *et al.*, 2010). This led to mixed feeding for both HIV-affected and HIV-status unknown mothers or no breastfeeding at all. However according to WHO 2010 guidelines on HIV and infant feeding, mothers should

exclusively breastfeed their infants for the first 6 months of life, introducing appropriate complementary foods thereafter, and should continue breast-feeding for the first 12 months of life in settings where national authorities recommend HIV-positive mothers to breastfeed and provide ARVs to prevent transmission.(WHO, 2010) Those not breastfeeding their children increase their likelihood to die from diarrhoea, malnutrition or pneumonia by up to six times though preventing HIV transmission after delivery (WHO, 2010). Therefore beliefs and practices affecting this contribute negatively. Defaulting is one of the negative practices and is rather common.

The ART defaulter rate was 27% among HIV positive women in the Ashanti Region, Ghana (Boateng *et al.*, 2013). With high dropout rates common increased male involvement and couples' joint counseling/testing during antenatal care (ANC) could improve PMTCT outcomes. A study in Tanzania showed that 81% of men thought that women did not need their involvement in health decision making (Kalembo *et al.*, 2012).

2.12 Three Delays Model for Maternal Health

At launch of the Safe Motherhood Initiative, maternal health experts discussed how long a woman would have to have a particular complication before she would die, if untreated. They agreed that for the most frequent complications, women with postpartum hemorrhage had less than 2 hours before death; for antepartum hemorrhage, eclampsia, obstructed labor, and sepsis, the times would be 12 hours, 2 days, 3 days, and 6 days, respectively (Thaddeus *et al.*, 1994). The model has three levels of delay: The first delay is the time between the onset of a complication and the recognition of the need to transport the patient to a facility. The second delay is the time between leaving the home and reaching the facility. The third delay is the time from presentation at the facility to the provision of appropriate treatment.

The determinants of the first delay are related to the individual circumstances of the women and their families, who must first recognize that care is needed and then be able to access transport or money to travel to facilities. Delay to seek care in a timely manner, can occur for a variety of reasons, mostly related to socio-cultural factors, scarcity of care providers, and poverty. Poor care or treatment in the hospital, whether actual or perceived, significantly alters the cost-benefit decision-making process about birthing in the home versus an institution. An expectation of poor care leads women to avoid an institutional setting unless absolutely necessary, which sometimes leads to laboring unattended at home until something catastrophic happens (Bossyns & Van Lerberghe, 2004).

The determinants of the second delay concern the physical environment, the type of transport, and the quality of the roads, as well as the performance of the referral system between facilities. Delay occurs when travelling to a facility where women can receive emergency obstetrical attention is unavailable. The second delay often results from insufficient transportation infrastructure and general poverty affecting ability to access transportation. The second delay also includes waiting in a rural health care center for transfer to a referral hospital with more advanced services. Not all facilities that offer antenatal care offer emergency obstetrical services, so care for a problematic birth may be many kilometers away. Travelling to 24-hour emergency obstetrical care facility can be complex and often involves paying for relatives' transport, food, and accommodation as well as that of the pregnant woman (Gabrysch & Campbell; 2009). Distance from a functioning health facilities plays a role in both the decision to travel to obtain medical assistance and the economic and physical ability to get there, and reflects poverty, communication problems, and strong adherence to traditional values (Barkat *et al.*, 2007).

The third delay occurs at the health care facility or hospital. There is some evidence that an emphasis on reducing the third delay would have the greatest impact on maternal mortality in developing countries. Delays typically occur when there is an incorrect diagnosis or inappropriate treatment on diagnosis (Weeks *et al.*, 2015). Women may

wait many hours before accessing caesarean section, blood transfusions, or treatment for hypertension and infections. The determinants of the third delay are related to quality of care, such as the number and training of staff members and the availability of blood supplies and essential equipment. Although the actions and characteristics of women and families can influence the length of the third delay, for example, by helping to mobilize elements of the surgical kits for cesarean delivery by purchasing missing supplies in pharmacies (Gohou *et al.*, 2014), most of the determinants of the third delay are related to service provision. The three delays model has weaknesses. It does not include the concept of primary prevention (avoid pregnancy) and secondary prevention (avoid complications once pregnant). It ignores family planning, non-communicable chronic diseases, antenatal care, and postpartum care. (Fillipi *et al.*, 2009).

Maternal mortality in developing countries has been attributed to the “The three delays”. The three delays model (Thaddeus and Maine) provides a framework of factors influencing timely arrival to appropriate care. Delays are influenced by external factors whereby Phase 1 is influenced by socioeconomic/cultural factors of the care seeker, the physical accessibility and affordability of health services and by the quality of care provided at home e.g. traditional birth attendant. The actual arriving at the health facility is influenced by the accessibility of the facility which in turn is affected by other external factors. When a woman arrives at the facility, the cumulative effect of the phase 1 and 2 delays contributes to the number of women that reach the facility in a serious condition (Pacagnella, 2012). The level of quality care provided at the health facility determines if the patient receives adequate and appropriate treatment in time. A poor referral system will lead to not only untimely access to healthcare and poor outcomes in the patients, but also to suboptimal utilization of hospital services leading to wastage of the already inadequate health resources. Some factors have been found to affect the referral services offered to a patient causing the delays found by Thaddeus and Maine. These include but are not limited to: lack of coordinated network of the healthcare levels, inappropriate referrals, non-compliance with referrals, delays in referral completion, and high numbers of self-referrals to higher-level referral

facilities/bypassing of lower level facilities, weak health information systems to capture referral data, inadequate communication and transport mechanisms for emergency referrals and inadequately resourced referral facilities.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Area

The study was carried out in Mbooni Sub-County within Makueni County in the former Eastern province of Kenya. In 2012 Mbooni Sub-County had an estimated population of 217,953 (GOK, 2012). The population of women of reproductive age (WRA) being 52,308 or 24% of the total population with 10,898 as estimated number of deliveries. The crude birth rate is 43 per 1000. The maternal mortality ratio (MMR) is estimated at 500 per 100,000 live births compared to 488 per 100,000 live births in Kenya (KDHS, 2009). Various challenges were experienced in reproductive health including cultural practices, presence of village midwives, and lack of equipped health facilities and organized referral services. The Sub-County had only one Sub-County level hospital, two sub-Sub-County hospitals, five health centers and sixteen dispensaries. The map of Mbooni Sub-County (Appendix III) is shown in relation to Makueni County and the rest of Kenya.

3.2 Study Design

The study adopted a longitudinal design that dealt with training of women during antenatal period on birth preparedness, danger signs in pregnancy, child birth and post partum period. The pregnant women were recruited during the routine antenatal clinic visits. They were followed up during the ANC until six weeks post-partum. The outcome of delivery by skilled birth attendant or not was recorded at six weeks post-delivery during the post-natal visit. The outcome of the study population was cross-tabulated to determine statistical significance association of factors with the place of delivery. Factors that were associated with the utilization of skilled birth attendance were evaluated. The data collected during six weeks postpartum period was used to provide information on knowledge, attitude and practice (KAP). The follow-up of the

pregnant women during ANC up to six weeks postpartum period enabled the research to examine all aspects of antenatal that could be associated with delivery by skilled birth attendants.

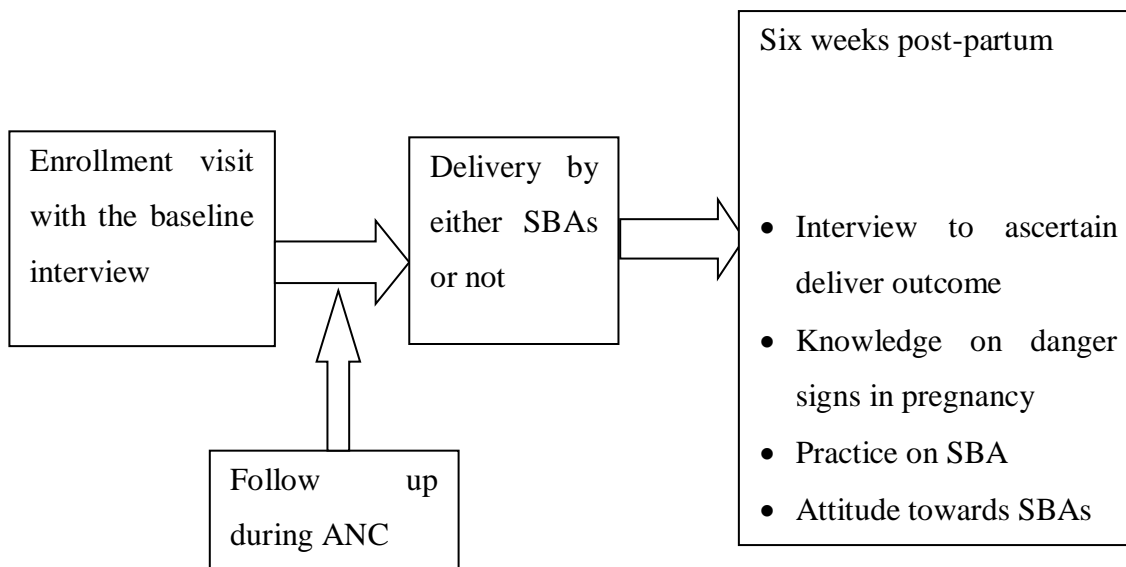


Figure 3.1: Schematic diagram of the study process

3.3 Study Population

The study population comprised of pregnant women attending antenatal clinic in Mbooni Sub-County. The women of reproductive age (WRA) who resided in Mbooni Sub-County. The women attended their Ante Natal Clinic (ANC) in the health facilities of Tawa, Kisau and Kikima. They were either in the first or second trimesters of their pregnancy. The presence of pregnancy was confirmed by both palpation and last monthly period (LMP) with expected date of delivery (EDD) being calculated. They were recruited during Ante-natal care visits and followed up to six weeks post-partum period. They were observed as they received focused ante-natal care (FANC) which included health promotion and individualized services during the WHO recommended

four visits. The health promotion done was on danger signs in pregnancy, childbirth and post-natal period and the need for delivery assistance by skilled birth attendants, birth preparedness, nutrition and hygiene and HIV prevention. The study population was followed up for the outcome of the place of delivery either in a health facility or at home. The target population of this study was pregnant women in any community in a resource poor setting to whom the study can be generalized. Communities that are implementing the community health strategy can also learn from the finding of the research. The external validity is limited to this type of communities.

3.3.1 Inclusion Criteria

- Pregnant women residing in Mbooni Sub-County.
- Women attending ANC in Kisau, Tawa and Kikima health facilities
- Pregnant women attending ante natal clinic (ANC) during first or second trimester of the pregnancy
- All mothers who consented to participate

3.3.2 Exclusion Criteria

Those who did not give consent to participate in the study or to be followed up

3.4 Sampling

3.4.1 Sampling procedure

Mbooni Sub-County was sampled from the Makueni County due to low utilization of delivery by SBAs. Tawa was sampled out of three health centers in Mbooni Sub-County. Kisau was sampled as Sub-County hospital in lower Mbooni region and Kikima was sampled as Sub-County Hospital in the Mbooni hilly area.

Table 3.1: Proportionate sampling per facility

Facility Name	No. of Women Attending ANC	No. of ANC women sampled
Tawa Health Centre	1551	98
Kisau Sub-County hospital	1458	92
Kikima Sub-County hospital	2115	134
TOTAL	5124	324

Proportionate number of mothers were recruited into the study and followed up at the three sites until desired sample size was attained. Mothers attending antenatal clinic were systematically enrolled into the study at the Maternal and Child Health (MCH) clinics. This was done by giving every pregnant woman who presented in the ANC and was willing to participate a chance to do so. There was no skip pattern and any pregnant woman who met the inclusion criteria in the study sites was consented to participate in the study.

3.4.2 Sample Size Determination

Sample size determination was done using Cochran formula. The calculator uses the following formula for the sample size n:

$$n = \frac{Z_{(\alpha/2)}^2 \times P \times (1 - P)}{e^2}$$

Where

$Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), e is the margin of error, p is the sample

proportion, and N is the population size. Note that a Finite Population Correction has been applied to the sample size formula.

$$x = \frac{1.96^2 * 0.9 * (1 - 0.9)}{0.0343^2}$$
$$= 294$$

To allow for non-responses a 10% increase was made to bring the sample to **324**.

3.5 Research Variables

The outcome variable was the delivery by the skilled birth attendants. The independent variables were age, marital status, knowledge, attitude and practices about skilled birth attendants, education level, socioeconomic status, parity, residence, distance from health services, practices of TBAs, and beliefs on TBAs.

3.6 Data Collection

Maternal and Child Health nurses working in the department and a nutritionist were trained on the study Standard Operating Procedures (SOPs) (Appendix IV). They informed the mothers about the study. The baseline socio-demographic and pregnancy related characteristics were collected during the first visit. In subsequent antenatal visits the health promotion session that the mother received were indicated in the questionnaire. Six weeks post-partum questionnaire was administered during the Post-Natal Clinic by trained research assistants.

Data was collected using a structured questionnaire (Appendix II). Bio-data collected included residential area, age, marital status, status of current pregnancy and previous pregnancies including parity. The follow up showed the antenatal health promotion activities and what aspects of focused ante natal care were done. At six weeks postpartum visit, knowledge and attitudes concerning delivery by skilled birth attendants was assessed. Awareness was assessed on danger signs in pregnancy, child birth and

postnatal period and also modes of HIV transmission during pregnancy. The women were asked about their opinion on SBAs and traditional attendants. Delivery outcome was noted including the place of delivery which was the dependent variable. The questions on knowledge about danger signs in pregnancy and child birth and post-natal period were either 'know' or 'do not know' for different danger signs. The questions on the attitudes on the skilled birth attendants and traditional attendants used Likert's scale using questions with five levels of choices.

3.7 Validity

Data was collected by trained nurses and nutritionists from Tawa, Kisau and Kikima health facilities MCH. The data collectors were trained for two days to ensure quality and reliability of the data collection tools. The questionnaires were pre-tested at the health facility outpatient department. Data collection session took between 30 to 45 minutes which did not interfere with service provision. The six weeks post-partum questionnaire was administered during PNC.

3.8 Data Analysis

The questionnaires were numbered and data entered in SPSS Version 17 software database where variables were labeled and analysis of the data done. During analysis of the data, characteristics of those delivered by skilled attendants were compared to those who did not. The data was presented in tables and graphs. Cross tabulation was done to detect difference between those who delivered with the help of skilled birth attendants compared to those who did not. The data was then exported to STATA and further analysis of inferential statistics, Odds Ratio (OR), t-test, and logistic regression analysis was done. Multivariate logistic regression was done by considering the statistically significant factors associated with delivery by skilled birth attendants. This was fitted stepwise through forwards inclusion. This estimated the contribution of each of these factors in the outcome of delivery by skilled birth attendants.

3.9 Ethical Considerations

Informed consent was sought from the study participants using a consent form (Appendix I). The participants were informed that all the information obtained during the research would be kept confidential. No names were used in the final write up. The questionnaires were coded and the original will be destroyed after five year. Any participant was at liberty to refuse to participate. Failure to participate was not penalized. No invasive procedure was done during this research thus study did not have a direct risk. The participants were informed that some discomfort could result from the sensitive nature of the reproductive health questions. The consent request made it clear that this was a research project which was for the benefit of science. Participation in the study was totally voluntary. The research was approved by KEMRI ethical review committee. (Appendix V).

3.10 Study Limitations and Delimitations

This study was limited by surveillance bias. The expectant mothers might have behaved differently on account of being under surveillance. Delimitations included minimizing loss to follow-up of recruited women by tracing them for six weeks post partum clinic using the detailed contact given during recruitment. Ten percent was added to the calculated sample size to take into account any loss to follow – up.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Characteristics of the Respondents

The total number of respondents for the study was three hundred and twenty four and had validly filled questionnaires. They consisted of women attending Ante Natal Clinic (ANC) in Mbooni Sub-County and their the age composition was 15-19 years 5.6%, 20-24 years(43.2%), 25-29 years 28.1% and above 30 years 23.1%. Most of the respondents were married (75.6%) while about a quarter of the women (23.5%) were single. Most respondents (59.0%) had primary level of education. The occupation of the respondents was mostly peasant farmers (72.2%) and most were of protestant denomination (75.5%) (Table 4.1a and b). The parity of the respondents ranged from 1 to 6 with those of first pregnancy being (44.4%), second pregnancy (26.6%) and third to sixth pregnancy (29%).

Table 4.1a: Social Demographic Characteristics of the women attending ANC in Mbooni Sub-County

Variable	Distribution	Frequency (n=324) (%)
Age	15-19 years	18 (5.6%)
	20- 24 years	140 (43.2%)
	25– 29 years	91 (28.1%)
	30 and above years	75 (23.1%)
Marital status	Married	245 (75.6%)
	Single	76 (23.5%)
	Widowed and divorced	3 (0.9%)

Table 4.1b: Social Demographic Characteristics of the women attending ANC in Mbooni Sub-County

Variable	Distribution	Frequency (n=324) (%)
Level of education	Primary	191 (59.0%)
	Secondary	118 (36.4%)
	College	15 (4.6%)
Religion	Protestants	251 (77.5%)
	Catholics	72 (22.2%)
	Muslim	1 (0.3%)
Occupation	Peasant Farmers	234 (72.2%)
	Housewife	63 (19.4%)
	Formally employed	15 (4.6%)
	Unemployed	12 (3.8%)
Parity	Para1	144 (44.4%)
	Para2	86 (26.6%)
	Para3	52 (16.0%)
	Para4	34 (10.5%)
	Para5	5 (1.6%)
	Para6	3 (0.9%)

Among the respondents who were married, their partners were mostly casual workers (68.6%), of primary level of education (50.2%) and residents in the study area (92.2%).

Table 4.2: Socio-Demographic Characteristics of Partners of Women attending ANC in Mbooni Sub-County

Variable	Characteristic	Frequency (%)
Occupation of partner	Casual workers	168 (68.6%)
	Peasant Farmer	41 (16.7%)
	Formally employed	30 (12.2%)
	Un-employed	6 (2.5%)
Education level of partner	Primary	123 (50.2%)
	Secondary	104 (42.4%)
	College	18 (7.4%)
Partner resident or not	Resident	226 (92.2%)
	Non-resident	19 (7.8%)

Among the N=324 mothers interviewed in the study, the mean number of topics taught in visit 1 was 4.0 compared to 3.5 and 3.4 in visit 2 and 3 respectively, with median number of topics taught being 4 in visit 1, three and four in visit 2 and 3 respectively. The maximum number of topics per visit was 6 in all the 3 visits of interest. The topics taught were the following: danger signs in pregnancy, individual birth plan, need for Skilled Birth Attendance, Post-natal care, HIV and Nutrition.

ANC topics taught during first ANC: Majority of the participants were taught 4 ANC topics at 105 (32.4%), 5 – 6 topics had 112 (34.6%), while the interviews taught 1 – 3 topics were 97 (30.0%) and respondents not taught any topic were 10 (3.0%) and participants taught maximum number of topics were 55 (17.0%).

ANC topics taught during second ANC: the participants taught 3 ANC topics during the visit at 105 (32.4%) were the majority, 159 (48.0%) were taught 4 – 6 topics, while the interviewees taught 1 – 2 topics were 38 (11.7%) and respondents taught no topic

during the visit were 22 (6.8 %) participants. The expectant mothers taught maximum number of topics (n=6) were 31 (9.6%).

ANC topics taught during third ANC: Most of the expectant mothers who participated in the study were taught 3 ANC topics at 90 (27.8%), and 4– 6 topics had 163 (50.3%) while the respondents taught 1 – 2 topics were 40 (12.3%) and respondents who were not taught a topic during their third visit were 31 (9.6 %) participants. The mothers who were taught 6 topics were 25 (7.7 %).

Table 4.3: Summary of ANC topics taught per visit

	Sample	Mean	Median	Min	Max
ANC topics taught during first ANC	324	3.9 ± 1.42	4	0	6
ANC topics taught during second ANC	324	3.5 ± 1.50	3	0	6
ANC topics taught during third ANC	324	3.4 ± 1.60	4	0	6

The third visit had a majority of the mothers taught ANC topics between 4 – 6 topics at 163 (50.3%), mothers taught 1 – 3 topics were 130 (40.1%) with 31 (9.6%) mothers not taught any topic during the visit. 181 (56%) mothers were attended by a health worker. The number of topics taught in the third visit by birth attendant had a statistically significant association at Pearson Chi-Square =6.5, df =2, sig=.039.

The ANC topics taught during first, second and third visit. The mothers who were taught 1 – 3 topics in the first visit had a majority of mothers taught 1 – 3 topics in second and third visits were 46 (68.7%). 116 (84.7%) were mothers taught 4 – 6 topics in the first second and third ANC clinic visits.

Table 4.4: First, second and third ANC clinic visits

		Number of ANC topics taught during third visit					
				0	1 - 3	4 - 6	
				n (%)	n (%)	n (%)	
Number ANC topics taught during first visit	0	Number topics during visit	ANC taught second	0	7 (70.0)	2 (20.0)	1 (10.0)
	1 - 3			0 (0.0)	0 (0.0)	0 (0.0)	
	4 - 6			0 (0.0)	0 (0.0)	0 (0.0)	
	1 - 3	Number topics during visit	ANC taught second	0	5 (62.5)	3 (37.5)	0 (0.0)
	1 - 3			11 (16.4)	46 (68.7)	10 (14.9)	
	4 - 6			1 (4.5)	13 (59.1)	8 (36.4)	
	4 - 6	Number topics during visit	ANC taught second	0	1 (25.0)	3 (75.0)	0 (0.0)
	1 - 3			6 (7.9)	42 (55.3)	28 (36.8)	
	4 - 6			0 (0.0)	21 (15.3)	116 (84.7)	

The means and medians for survival time table offers a quick numerical comparison of the times to effect the birth attendant's choice. Since there is a lot of overlap in the confidence intervals, it is unlikely that there is much difference in the "average" survival time.

Table 4.5: Means and medians for survival time

Birth attendant	Mean ^a		Median	
	95% CI		95% CI	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
TBA	1.951	2.108	1.857	2.143
HW	1.985	2.125	1.868	2.132
Overall	1.992	2.096	1.903	2.097

a. Estimation is limited to the largest survival time if it is censored.

Overall comparisons table provides overall tests of the equality of survival times across groups. Since the significance values of the tests are all greater than 0.10, you cannot determine a difference between the survival curves.

With the Kaplan-Meier Survival Analysis procedure examines the distribution of time to effect for two different birth attendants. The comparison tests show that there is not a statistically significant difference between them.

Table 4.6: Overall comparisons

	Birth Attendant	TBA		HW	
		Chi-Square	P-Value	Chi-Square	P-Value
Log Rank (Mantel-Cox)	TBA			1.455	0.228
	HW	1.455	0.228		
Breslow (Generalized Wilcoxon)	TBA			0.579	0.447
	HW	0.579	0.447		
Tarone-Ware	TBA			0.895	0.344
	HW	0.895	0.344		

The survival curves give a visual representation of the life tables. The horizontal axis shows the time to event. In this plot, drops in the survival curve occur whenever the ANC attending decides seeks a birth attendant services. The vertical axis shows the probability of survival. Thus, any point on the survival curve shows the probability that an expectant mother being taught ANC subjects will not have influenced on birth attendant choice by that time. The plot for the traditional birth attendant below that of the health worker throughout the cohort follow up, suggests that the traditional birth attendant may be preferred to a health worker.

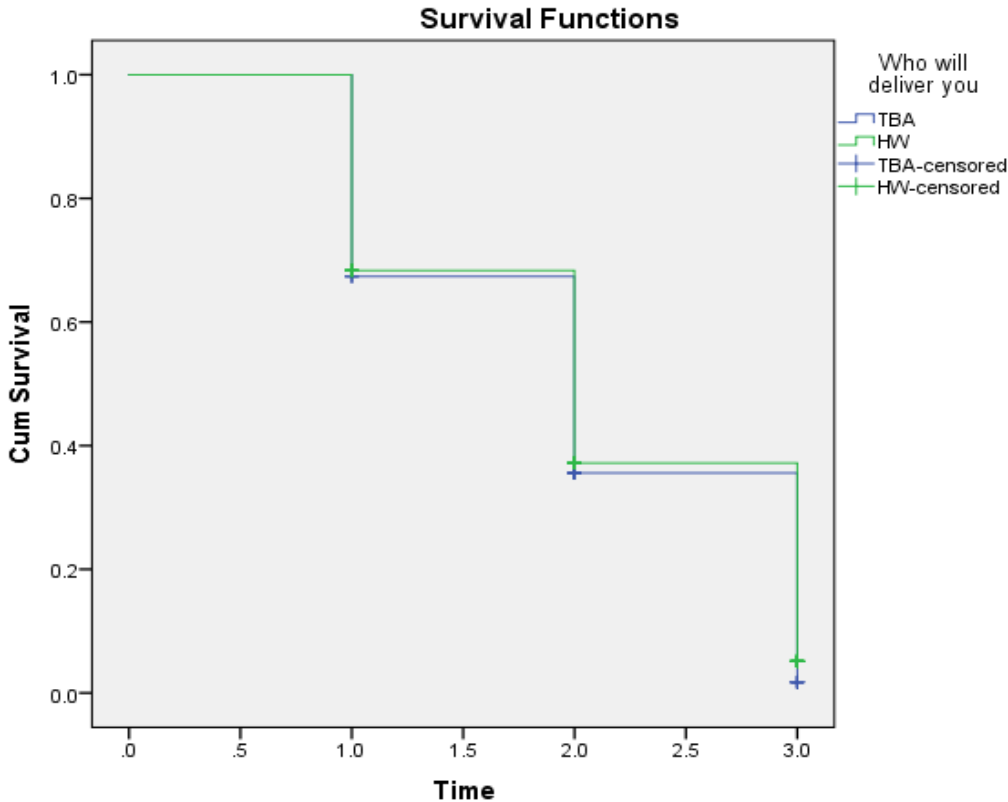


Figure 4.1: Survival curves of number of ANC topics during visits

Social demographic by birth attendant

Table 4.8a and b indicates that the mothers who had primary level of education and below were 59% and the mothers attended by traditional birth attendant were 44%. The level of education had a statistically Chi- square association at Pearson Chi-Square =9.7 df =1, sig =.002

Majority of the expectant mothers were accompanied by their mothers during delivery at 170 (52.5%) followed by expectant mothers accompanied by their husbands at 84 (25.9%) with mothers accompanied by their sisters having the majority of the mothers having traditional birth attendants during delivery at 21 (56.8%). The individual accompanying the mothers during delivery had a Chi- square statistical significant association Pearson Chi-Square=11.3 df =3, sig =.010

The amount of money set aside for delivery had a majority of the respondents set aside Kshs 1,001- 5,000 at 174 (54.4%). Among the expectant mothers who set aside Kshs 0 – 5,000 for delivery 239 (74%) of the interviewed mothers the majority had a traditional birth attendant during delivery at 137 (57%). A Chi-square statistical dependency was noted between the cost of delivery and the birth attendant at Pearson Chi-Square=67.2 df =3, sig <0.000

Mode of transport indicated that most the mothers who had no vehicle as mode of transport at 122 (79.2%) preferred traditional birth attendant, while majority of mothers who had vehicle as mode of transport at 149 (87.6%) preferred a health worker as a birth attendant. Mode of transport and birth attendant has a significant statistical chi-square relationship was noted at Pearson Chi-Square =146.5 df =1, sig <0.000

Table 4.7: Social demographic by birth attendant

	Birth attendant		
	Chi-Square	Df	P-value
Highest level of education	9.7	1	0.002
Accompanied	11.3	3	0.010
Money set aside for delivery (Cost)	67.2	3	<0.0001
Who will pay deliver bill?	2.3	4	0.678
Transport used during delivery	146.5	1	<0.0001
Danger signs knowledge	2.2	1	0.137
Staff shortage	0.9	1	0.340

4.2 Association between socio-demographics characteristics of respondents and the choice of professional delivery among women attending Ante-natal Clinic in Mbooni Sub-County

The study showed that 148 (46%) of the respondents delivered at home while 172 (54%) delivered at a health facility. The cross-tabulation of place of delivery and socio-demographic characteristics revealed that age and education level were significantly associated with the choice of place of delivery. Women who were of age group between 24-29 years were 2.4 times more likely to utilize SBA compared to those between 15-19 years. A significantly higher proportion of respondents who had secondary or college education delivered in a health facility compared to those who had primary education with those who had secondary level of education being 1.6 times more likely to deliver in health facility and women who had college level of education being 6.9 likely to utilize SBA compared to those of primary level of education. Marital status as well as religious affiliation had no significant statistical association to the place of delivery (Table 4.9a and b). Peasant farmer and house wives were less likely to deliver in health facility compared to the formally employed women (OR 0.07 and 0.06).

Table 4.8: Association between socio-demographic characteristics of women attending ANC and choice of place of delivery in Mbooni Sub-County

		Health facility	Home delivery	OR	95% Lower	CI Upper	P-value
Age	15 -19 years	8	10	1.00	Ref		0.031
	20 – 24 years	75	65	1.44	0.53	3.868	
	25 – 29 years	60	31	2.41	0.88	6.653	
	30 and above years	33	42	0.92	0.34	2.782	
Marital status	Married	131	114	1.00	Ref		0.378
	Single	43	33	1.13	0.673	1.906	
	Widowed or divorced	3	0	-	-		
Highest education level	Primary	92	99	1.00	Ref		0.004
	Secondary	71	47	1.62	1.022	2.587	
	College	13	2	6.99	1.849	26.464	
Religion	Catholic	41	31	1.00	Ref		0.570
	Protestants	134	117	0.86	0.510	1.470	
Respondents Occupation	Formally Employed	14	1	1.0	Ref		0.001
	Peasant Farmer	121	113	0.07	0.015	0.382	
	Housewife	29	34	0.0	0.012	0.32	
	Un-employed	12	0	-	-		

4.3 Association between parity; partner characteristics and the choice of place of delivery among attending Ante-natal Clinic in Mbooni Sub-County

There was a trend showing that the higher the parity of a woman the less likely that she would deliver in a health facility. This was however not statistically significant P = 0.1.

Women who were married to a spouse who was formally employed were more likely to deliver in a health facility compared to those who were not though not statistically significant. Education level of the spouse was statistically significantly associated with choice of health facility for delivery with an OR = 1.7 for secondary education and OR = 6.1 for college education (p<0.01). Whether a spouse was resident or not was not associated in choice of place of delivery (Table 4.10).

Table 4.9: Association between Parity; Partner Characteristics and the Choice of Place of Delivery by Women attending ANC in Mbooni Sub-County

		Health facility delivery	Home delivery	OR	95% CI Lower Upper	P-value
Parity	Para 1	88	56	1.000	Ref	0.109
	Para 2	48	38	0.804	0.467 1.383	
	Para 3	23	29	0.505	0.267 0.955	
	Para 4	13	21	0.394	0.185 0.839	
	Para 5	3	2	0.955	0.154 5.929	
	Para 6	1	2	0.318	0.032 3.210	
Occupation of the Partner	Formally	22	8	1.000	Ref	0.172
	Peasant	20	21	0.346	0.127 0.948	
	Casual	85	83	0.372	0.160 0.865	
	Un-employed	4	2	0.727	0.109 4.872	
Education level of Partner	Primary	55	68	1.000	Ref	0.009
	Secondary	61	43	1.754	1.035 2.972	
	College	15	3	6.182	1.917 19.93	
Partner residence	Resident	120	106	1.000	Ref	0.45
	Non Resident	11	8	1.215	0.471 3.135	

4.4 Association between Birth Companion during Delivery and the choice of place of delivery among women attending ANC in Mbooni Sub-County

The study showed that highest proportion of pregnant women had a birth companion as the mother-in-law 108 (33.3%) and husband 84(25.9%). A proportion of women 33 (10.2%) were accompanied by friends, neighbors, grandmothers, house helps, brothers, brother-in-law or even went to deliver by themselves (Table 4.11). The cross-tabulation did not show any statistically significant association between birth companion and choice of place of delivery though mother-in-law was less likely to accompany a woman for skilled delivery (OR = 0.8) compared to a husband (OR = 1.4) and other companions (OR = 2.0).

Table 4.10: ANC Women choice of place of delivery depending on the companion to delivery in Mbooni Sub-County

Birth Companion	Health facility delivery	Home delivery	N (%)	OR	95% CI		P-value
					Lower	Upper	
Mother	33	29	62(19.1%)	1.000	Ref		
Mother-in-law	53	55	108(33.3%)	0.847	0.452	1.585	
Husband	52	32	84(25.9%)	1.428	0.733	2.782	
Sister-in-law	6	13	19(5.9%)	0.406	0.138	1.191	
Sister	9	9	18(5.6%)	0.879	0.306	2.527	
Others	23	10	33(10.2%)	2.021	0.828	4.933	0.065

4.5 Mode of Transport and its Association to the Choice of Place of Delivery among Pregnant Mothers

During delivery, 170 (52.5%) of pregnant women used a vehicle to the place of delivery, 21 (6.5%) a motor-bike while 133 (41.0%) did not use any mode of transport (Table 4.12). The type of transport used to the place of delivery was statistically significantly associated with the choice of the place of delivery ($P < 0.01$). Use of a vehicle for transport at the onset of labor was 8.1 times more associated with utilization of health facility for delivery compared to a motorbike.

Table 4.11: Mode of transport and choice of place of delivery by women attending ANC in Mbooni Sub-County

Mode of Transport	Health facility delivery	Home delivery	N (%)	OR	95% CI Lower upper	P-value
Motorbike	9	12	21(6.5)	1.000	Ref	
None	21	112	133(41.0)	0.250	0.098 - 0.638	<0.0001

4.6 Knowledge about Danger Signs in Pregnancy and Choice of Skilled Birth Attendance among Women attending ANC in Mbooni Sub-County

Knowledge on danger signs in pregnancy (Table 4.13a and b) showed that the most recognized danger signs in pregnancy, childbirth and postnatal period were vaginal bleeding (97.5%) and cord presentation (89.8%). The least recognized danger signs were fever (61.7%) and convulsions (64.5%). Knowledge on danger signs in pregnancy, childbirth and postnatal period were not significantly associated with choice of place of delivery. Not knowing convulsions as a danger sign in pregnancy was statistically significantly associated with utilizing skilled birth attendants [OR = 1.69; 95% CI: 1.06299 - 2.68849][$P = 0.02$].

Table 4.12: Danger Signs in Pregnancy, Childbirth and Postnatal period and their relationship to the choice of place of delivery among Women attending ANC in Mbooni Sub-County

Awareness of Danger Signs	Health facility delivery	Home delivery	OR	95% CI	p-value
Knows Severe headache	155	131	1.000	Ref	
Don't Know	21	17	1.044	0.528 - 2.064	0.901
Knows Vaginal bleeding	171	145	1.000	Ref	
Don't Know	5	3	1.413	0.334- 5.988	0.639
Knows Swelling of face	149	116	1.000	Ref	
Don't Know	27	32	0.657	0.373 - 1.156	0.145
Knows Convulsions	104	105	1.000	Ref	
Don't Know	72	43	1.691	1.063-2.689	0.027
Knows Fever	103	97	1.000	Ref	
Don't Know	73	51	1.348	0.857-2.120	0.196
Knows Labored breathing	120	92	1.000	Ref	
Don't Know	56	56	0.767	0.484-1.214	0.257

Table 4.13: Danger Signs in Pregnancy, Childbirth and Postnatal period and their relationship to the choice of place of delivery among Women attending ANC in Mbooni Sub-County

Awareness of Danger Signs	Health facility delivery	Home delivery	OR	95% CI	p-value
Knows Reduced fetal movement	126	106	1.000	Ref	
Don't Know	50	42	1.002	0.616-1.628	0.995
Knows Premature labor	130	108	1.000	Ref	
Don't Know	46	40	0.955	0.582-1.568	0.857
Knows Prolonged labor	131	100	1.000	Ref	
Don't Know	45	48	0.716	0.442-1.160	0.174
Knows Prolonged Rupture of Membranes	132	108	1.000	Ref	
Don't Know	44	40	0.900	0.547-1.482	0.679
Knows Cord presentation	156	135	1.000	Ref	
Don't Know	20	13	1.331	0.639- 2.775	0.445

4.7 Opinions about TBAs and SBAs and its effect on choice of place of delivery among women attending ANC in Mbooni Sub-County

More mothers had positive opinion on TBAs (84.3%) than for skilled birth attendants (56.2%). The positive opinion on TBAs did not result in more deliveries at home (Table 4.8). Women who delivered by skilled birth attendants had less positive opinion about

them than those who delivered at home (OR = 0.1; P < 0.01). This showed that negative opinion about skilled attendants was more among women who had utilized skilled attendants.

Table 4.14: Opinion about Skilled Birth Attendants and TBAs and choice of place of delivery by Women attending ANC in Mbooni Sub-County

	Attitudes on birth attendants	Health facility Delivery	Home delivery	n (%)	OR	95% CI	P-value
SBA	Negative	51	10	61(18.8)	1.000	Ref	0.000
	Neutral	60	21	81(25.0)	0.560	0.243-1.294	
	Positive	65	117	182(56.2)	0.109	0.056-0.213	
TBA	Negative	17	13	30(9.3)	1.000	Ref	0.952
	Neutral	11	10	21(6.4)	0.841	0.271- 2.606	
	Positive	148	125	273(84.3)	0.905	0.422-1.939	

4.8 Role of Community Health Workers (CHW) in skilled birth attendance and its effect on Choice of Place of Delivery among Women attending ANC in Mbooni Sub-County

Fewer women attending ANC in Mbooni Sub-County knew a community health worker (CHW)[76 (23.5%)] and even fewer had utilized any services from CHWs [67 (88.1%)](Table 4.15).

Table 4.15: Role of Community Health Workers (CHW) and choice of place of delivery among women attending ANC in Mbooni Sub-County

	Health facility	Home delivery	N (%)	OR	95% CI	P-value
Delivery						
Knows a CHW	34	42	76(23.5)	1.000	Ref	
No	142	106	248(76.5)	1.654	0.988- 2.772	0.056
Received services from CHW	30	37	67(88.1%)	1.000	Ref	
No	4	5	9 (11.8)	1.542	0.379- 6.264	0.213

4.9 Reasons for home deliveries and recommended interventions

The women attending ANC gave reasons for home delivery in Mbooni Sub-County as the cost of health facility delivery 298(91.9%), long distances to health facility 295(91.1%) and being unprepared for delivery 262(80.8%). This was all the same not statistically associated with the choice of place of delivery (Table 4.16). Most women recommended that delivery should be made cheaper 304(93.8%) (Table 4.17).

Table 4.16: Reasons of home delivery among women attending ANC in Mbooni Sub-County

	Health facility delivery	Home Delivery	N (%)	OR	95% CI	P-value
Long Distance	157	138	295(91.1)	1	Ref	
No	19	10	29(8.9)	1.67	0.756 - 3.693	0.205
Staff Shortage	98	85	183(56.5)	1	Ref	
No	78	63	141(43.5)	1.07	0.690 - 1.670	0.752
Staff Attitudes	108	93	201(62.0)	1	Ref	
No	68	55	123(38.0)	1.06	0.678- 1.672	0.786
Home Comfortable	124	103	227(70.1)	1.00	Ref	
No	52	45	97(29.9)	0.96	0.595 - 1.548	0.867
Unprepared for delivery	137	125	262(80.8)	1	Ref	
No	39	23	62(19.2)	1.54	0.877 - 2.730	0.132
Expensive	160	138	298(91.9)	1.00	Ref	
No	16	10	26(8.1)	1.38	0.607- 3.136	0.442

Table 4.17: Recommendations for improving delivery by skilled attendants by place of delivery by women attending ANC in Mbooni Sub-County

Recommendation to increase SBA delivery	Health facility	Home delivery	N (%)	OR	95% CI	P-value
	Delivery					
Make it cheaper	163	141	304(93.8)	1.000	Ref	
No	13	7	20(6.2)	1.606	0.627-4.113	0.323
Transport mothers	123	112	235(72.5)	1.000	Ref	
No	53	36	89(27.5)	1.341	0.817 - 2.199	0.246
Build more facilities						
	159	135	294(90.7)	1.000	Ref	0.787
No	17	13	30(9.3)	1.110	0.520 - 2.371	
Improve referral	153	135	288(88.9)	1.000	Ref	
No	23	13	36(11.1)	1.561	0.763 - 3.192	0.222

Among the antenatal women 78(24.1%) had not used a family planning method before conception. The use of contraceptives before conception had no statistical significant association with the place of delivery. The most utilized FP method was injectables 114 (35.2%) followed by pills 93(28.7%). This did not have statistical significant association with choice of place of delivery (Table 4.18). The women attending ANC and who had not planned for the pregnancy were less likely to deliver with skilled birth attendants (OR =0.7) (Table 4.18).

Table 4.18: Use of Family Planning methods before conception and choice of place of delivery among women attending ANC in Mbooni Sub-County

		Health facility delivery	Home delivery	N (%)	OR	95% CI	P-value
Used FP before conception		131	115	246(75.9)	1.000	Ref	0.493
	No	45	33	78(24.1)	1.197	0.715 - 2.003	
Type of FP used	Pills	51	42	93(28.7)	1.000	Ref	0.812
	Condoms	12	4	16(4.9)	2.471	0.759- 8.046	
	Injectable	60	54	114(35.2)	0.915	0.528- 1.587	
	Implants	4	10	14(4.3)	0.329	0.099 - 1.086	
	I.U.C.D	2	4	6(1.9)	0.412	0.075- 2.271	
	Natural	2	1	3(1)	1.647	0.146-18.608	

4.10 Maternal Mortality in the Community

Women attending ANC in Mbooni Sub-County that knew of a mother who had died due to pregnancy complications were 58 (17.9%) though it was not associated with choice of place of delivery (Table 4.19).

Table 4.19: Maternal Mortality and its association with choice of place of delivery among Women attending ANC in Mbooni Sub-County

	Health facility	Home	N (%)	OR	95% CI	P-value
delivery						
Knows a woman who died during childbirth	31	27	58(17.9)	1.0	Ref	0.883
No	145	121	266(82.1)	1.04	0.590-1.846	

4.11 Health Promotion Activities during ANC

Health promotion topics taught during antenatal period were danger signs in pregnancy (90.7%), nutrition (71.6%), skilled birth attendance (69.7%), individual birth plan (61.7%), HIV (54.0%) and post-natal care (51.2%) (Table 4.20). The topic of need for skilled birth attendance was significantly associated with choice of place of delivery with women who delivered at home more likely to remember that they had been taught about the need SBA and which they had apparently ignored [OR = 1.9, CI: 1.17577 - 3.12215, p = 0.009].

Table 4.20: Topics covered during ANC and their association with choice of place of delivery among women attending ANC in Mbooni Sub-County

Topic Taught during ANC	Health facility delivery	Home delivery	N (%)	OR	95% CI	P-value
Danger signs in pregnancy	161	133	294(90.7)	1.000	Ref	
No	15	15	30 (9.3)	0.826	0.389-1.752	0.619
Individual Birth Plan	113	87	200(61.7)	1.000	Ref	
No	63	61	124(38.3)	0.795	0.507-1.247	0.318
Need for Skilled Birth Attendance	112	114	226(69.7)	1.000	Ref	
No	64	34	98(30.3)	1.916	1.176 -3.122	0.009
Post Natal Care	95	71	166(51.2)	1.000	Ref	
No	81	77	158(48.8)	0.786	0.507 -1.219	0.282
HIV	95	80	175(54.0)	1.000	Ref	
No	81	68	149(46.0)	1.003	0.647- 1.557	0.989
Nutrition	122	110	232(71.6)	1.000	Ref	
No	54	38	92 (28.4)	1.281	0.786- 2.089	0.320

4.12 Cost of Delivery

The difference in amount of money spent in home and facility deliveries is shown in the Table 4.21. There was statistically significant difference between the mean amount of money spent in home deliveries and health facility delivery ($P < 0.01$) with the mean of Ksh 2334 and Ksh 5370, respectively. Each group had some outliers for the amount of money spent. The husband met costs of delivery for 326 (72.8%) of respondents.

Table 4.21: Comparison of the amount of money spent during delivery in health facility and at home

Group	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	P-value
Home delivery	2334.797	119.366	1452.147	2098.903 - 2570.692	
Health Facility delivery	5370.455	229.180	3040.419	4918.142 - 5822.768	0.000

The box plots indicate that home deliveries are cheaper compared to health facility cost as home delivery median cost is Kshs 2,500 while that of facilities the median cost is Kshs 5,000 with outlier cost variation of up to Kshs 20,000 (Figure 4.2).

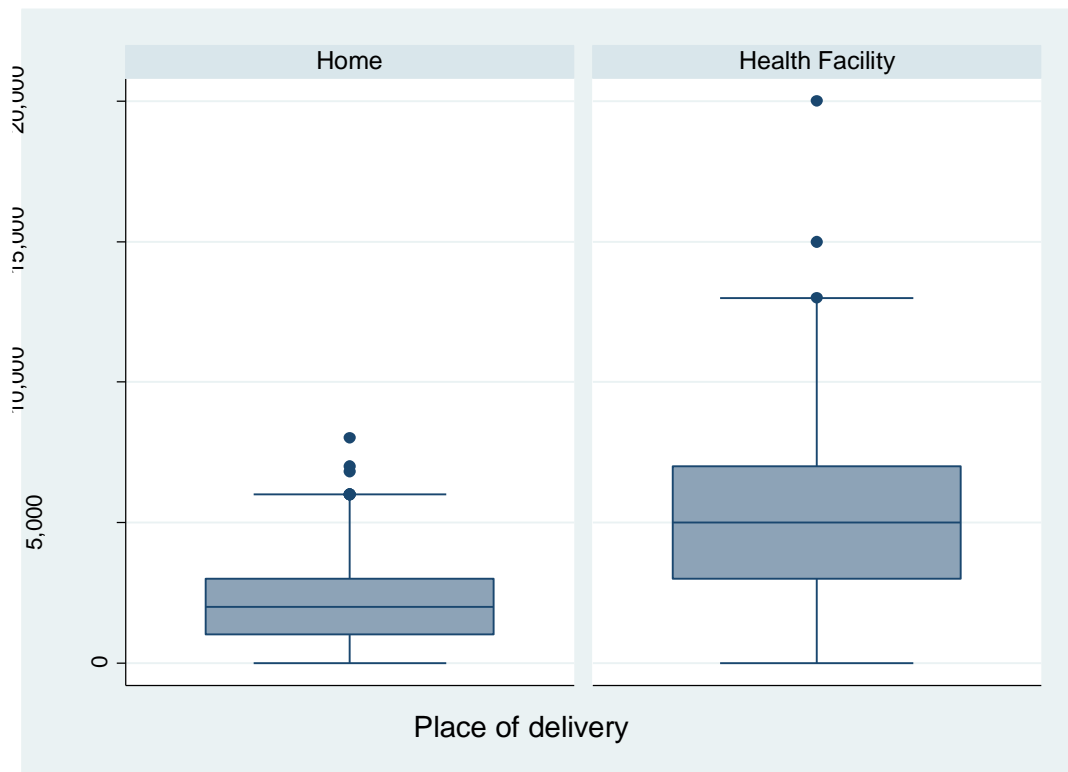


Figure 4.2: Amount of money used by respondents by place of delivery

4.13 Prevention of Mother to Child Transmission of HIV (PMTCT)

There was no knowledge on PMTCT that was statistically significantly associated with choice of place of delivery by women attending ANC in Mbooni Sub-County (Table 4.22).

Table 4.22: Association between knowledge on PMTCT and the choice of place of delivery among women attending ANC in Mbooni Sub-County

Knowledge on PMTCT	Health facility delivery	Home delivery	OR	95% CI	P-value
<hr/>					
Knows that HIV can be transmitted during pregnancy	166	142	1.000	Ref	0.501
Don't know	10	6	1.426	0.507 - 4.008	
Knows that HIV can be transmitted during labour	158	137	1.000	Ref	0.381
Don't know	18	11	1.419	0.649 - 3.103	
Knows that HIV can be transmitted through breast milk	174	146	1.000	Ref	0.862
Don't know	2	2	0.839	0.117- 6.034	
Knows MTCT can be prevented through taking ARVs	165	140	1.000	Ref	0.748
Don't know	11	8	1.167	0.456 - 2.983	
Knows PMTCT through exclusive breast feeding	159	138	1.000	Ref	0.347
Don't know	17	10	1.475	0.656 - 3.320	
Knows PMTCT through alternative feedings	142	125	1.000	Ref	0.374
Don't know	34	23	1.301	0.728 - 2.327	

4.14 Regression Analysis of Choice of Place of Delivery by Various Significant Variables

Multiple regression analysis utilized variables that were statistically significant during univariate analysis. The regression model (Table 4.23) showed that woman's level of education, her occupation, the mode of transport to the place of delivery, opinion on skilled birth attendance and being taught about skilled birth attendants remained statistically significantly associated with choice of place of delivery ($P < 0.05$).

Table 4.23: Multivariate regression analysis of place of delivery for the statistically significant variables

Variable	Estimate	Std. Err.	T-test	P	[95% C.I.]
Age category	.0449	.0262	1.71	0.088	-.0067 - .0966
Education level	.1015	.0378	2.69	0.008	.0272 - .1757
Occupation	.1279	.0315	4.06	0.000	.0659 - .1899
Partner level of education	.0068	.0071	0.96	0.337	-.0071 - .0207
Mode of transport to delivery	.4175	.0378	11.05	0.000	.3432 - .4919
Knows Convulsion as a danger sign	.0236	.0450	0.52	0.601	-.0650 - .1122
Opinion about SBAs	-.1623	.0285	-5.70	0.000	-.2184 - .1063
Taught about SBA	.1158	.0478	2.43	0.016	.0218 - .2096
Constant	-.8146	.1881	-4.33	0.000	-1.1850 - .4446

4.15 Predictors influencing Antenatal care influencing birth attendants

4.15.1 Variables in the Equation

The model was significant with Exp (B)=1.266, df=1 and sig. =0.035. Indicating that with all predictor variables included in the model are statistically significant to explain the model variation (Table 4.24)

Table 4.24: Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	.236	.112	4.436	1	.035	1.266

The model was significant with Exp (B)=1.266, df=1 and sig. =0.035. Indicating that with all predictor variables included in the model are statistically significant to explain the model variation

4.15.2 Model Summary

In the linear regression model, the coefficient of determination, R^2 , summarizes the proportion of variance in the dependent variable associated with the predictor (independent) variables, with larger R^2 values indicating that more of the variation is explained by the model, to a maximum of 1. The following methods are used to estimate the coefficient of determination.

Table 4.25: model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	244.449 ^a	.461	.618

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

4.15.3 Parameter estimates

The parameter estimates table summarizes the effect of each predictor. The ratio of the coefficient to its standard error, squared, equals the Wald statistic. If the significance level of the Wald statistic is small (less than 0.05) then the parameter is useful to the model. The predictors and coefficient values shown in the last step are used by the procedure to make predictions.

Exp (B) represents the ratio-change in the odds of the event of interest for a one-unit change in the predictor. The education level (Secondary and above) Exp (B)=0.421, significant at sig.=0.012 with df = 1, which means that the odds of an expectant mother who has secondary education and above being assisted by a health workers are 0.421 times the odds of an expectant mother who has primary level education and below.

The mode of transport (Vehicle) Exp (B)= 0.040, significant at sig. <0.0001 with df = 1, indicating that the odds of an expectant mother being assisted by a health worker is 0.04 times the odds of an expectant mother who has no access to vehicle transport.

The Cost (Kshs5,001 and above) Exp (B)= 0.162, significant at sig. <0.0001 with df = 1, indicating that the odds of an expectant mother who had set aside more than Kshs 5,000 being assisted by a health worker is 0.162 times the odds of an expectant mother who has who had set aside Kshs 5,000 or less.

Staff shortage (yes) was significant Sig. = 0.026 influence on the birth attendant with Exp (B)= 2.310 indicating that staff shortage at a facility had odds 2.310 times the odds on an expectant mother being assisted by a health worker. The table above shows us that the estimated model is now:

Table 4.26: model Summary

	B	S.E.	Wald	df	Sig.	Exp(B)
Education (Secondary and above)	-.864	.343	6.341	1	.012	.421
Birth companion (Family)			3.521	2	.172	
Birth companion (Husband)	-1.024	.577	3.152	1	.076	.359
Birth companion (Other)	-1.118	.632	3.127	1	.077	.327
Mode of transport (Vehicle)	-3.214	.373	74.423	1	.000	.040
Cost (Kshs5,001 and above)	-1.823	.521	12.260	1	.000	.162
Danger signs knowledge (aware)	.173	.365	.224	1	.636	1.189
Staff shortage (Yes)	.837	.377	4.947	1	.026	2.310
TopicsANC1 (4 – 6)	.669	.432	2.392	1	.122	1.952
TopicsANC2 (4 – 6)	.273	.410	.444	1	.505	1.314
TopicsANC3(4 – 6)	-.211	.435	.235	1	.628	.810
Constant	4.200	.858	23.990	1	.000	66.706

a. Variable(s) entered on step 1: Education level, Birth companion, Mode of transport, cost, danger signs knowledge, Staff short age, topics during ANC visit 1, topics during ANC visit 2, and topics during ANC visit 3.

Logistic regression equation model on the predictor variables influence on the birth attendant

$$\ln\left(\frac{p}{1-p}\right) = \ln\left(4.200 - 0.864x_{\text{Secondaryandabove}} - 1.024x_{\text{Husband}} - 1.118x_{\text{Other}} - 3.214x_{\text{vehicle}} - 1.823x_{\text{Kshs5,00landabove}} + 0.173x_{\text{aware}} + 0.837x_{\text{Staff shortage}} + 0.669x_{\text{1st ANC(4-6)}} + 0.273x_{\text{2nd ANC(4-6)}} - 0.211x_{\text{3rd ANC(4-6)}}\right)$$

$$= 66.71 + 0.421x_{\text{Secondaryandabove}} + 0.359x_{\text{Husband}} + 0.327x_{\text{Other}} + 0.040x_{\text{vehicle}} + 0.162x_{\text{Kshs5,00landabove}} + 1.189x_{\text{Kshs5,00landabove}} + 2.310x_{\text{aware}} + 1.952x_{\text{Staff shortage}} + 1.314x_{\text{1st ANC(4-6)}} + 0.810x_{\text{2nd ANC(4-6)}}$$

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Socio-demographic Characteristics, Logistics and the Choice of Place of Delivery among Pregnant Women in Mbooni Sub-County

Factors that were associated with choice of place of delivery were the maternal age, education level, occupation and partner's level of education. This finding was similar to those of a Tanzanian study that years spent in schooling had significant association with seeking SBA (50.4%) and being single (57.1%) compared to (41.8%) for married (Mpembeni *et al.*, 2007). My study showed that there was between 1.6 and 6.9 increase in use of SBA when the respondent had schooled to high school and college level respectively. This shows that education is an important factor for increasing utilization of skilled birth attendants in rural areas of Kenya.

Consistent with the findings of other studies in Nepal and Southern Asia, this report also showed that education was one of the most important factors influencing institutional delivery among women of all ages (Kamal, 2013). Women with a higher level of education (who were often wealthier) knew more about maternal health and were more aware of skilled maternal health services including institutional delivery. (Kamal, 2013) Also, a study conducted in Nepal showed that women with a higher level of education had greater decision-making autonomy concerning their health and well-being. (Situ, 2013) However, this study found that women's autonomy in household decisions was not significantly associated with the use of institutional delivery. This variation in results could be due to differences in the sample sizes of the studies. This study considered only young women (n=1662) while another considered women of all ages (n=4148).

Globally, approximately 830 women die daily from pregnancy and child related complications. This translates to one life lost every 2 minutes, of which 99 percent of these deaths occur in developing countries. This falls short of the sustainable development goals 3 (SDGs) target of reducing the global maternal mortality ratio to less than 70 per 100,000 live births with no country having a maternal mortality rate of more than twice the global average (Say *et al.*, 2016). In 2015, it was estimated that approximately 303,000 women died globally during and following pregnancy and child birth. In 2015, the global MMR in developing countries was 239 per 100,000 live births visa vie the ratio in developed countries which was 12 per 100,000 live births. In Sub-Saharan Africa, the MMR remains unacceptably high. Out of the 830 daily maternal deaths globally, 550 occurred in Sub Saharan Africa and 180 in Southern Asia. Fifty two percent of the maternal deaths were attributed to three leading preventable direct obstetric causes of haemorrhage, sepsis and hypertensive disorders while 28% of the maternal deaths resulted from indirect obstetric causes which were worsened by pregnancy such as malaria, diabetes, HIV, cardiovascular diseases and obesity while 8% is attributed to unsafe abortions (Chou *et al.*, 2015).

In Kenya, the burden of maternal mortality resulting from preventable conditions during pregnancy and childbirth is enormous. It is estimated that maternal conditions account for about 6 percent of the total burden of disease (WHO, 2014). Approximately 362 women die for every 100,000 live births per year out of complications during pregnancy and delivery (Kenya National Bureau of Statistics *et al.*, 2015). This is a decrease from the 520 women per 100,000 live births in 2008-2009 KDHS. According to KDHS 2014, maternal deaths account for 14 percent of all deaths to women age 15-49 years. This statistics present a big burden which can largely be prevented by adequate care. Both maternal mortality and morbidity are reduced by delivery by skilled birth ttendants in a health facility.

The age composition of the respondents according to our study, was 15-19 years 5.6%, 20-24 years (43.2%), 25-29 years 28.1% and above 30 years 23.1%. In a study done in Tamilnadu State in India indicates that, despite the fact that women of reproductive age attended ANC, the result shows that the younger women in the age group 18-20 were less likely to given birth at home (2.1%) than those aged 35-37 (5.2%), (Rejoice and Ravishankar, 2014). This is an indication that older women need more sensitization in regards to giving birth at the hospital during the ANC visits.

Partner's level of education was associated with choice of health facility for delivery. This is similar to finding of a study on male involvement in maternal health in Bungoma in Western province in Kenya which found 1.9 OR increase in delivery by skilled attendants when males were involved with partner level of education and employment being significant (Nekesa *et al.*, 2013). This study found a similar association of partner education of secondary level being associated with 1.7 times increase in delivery by skilled attendants while college level education was associated with 6.1 increase in uptake of skilled birth attendance but employment status of partner had no significant association. This emphasizes the role of men in maternal and reproductive health outcomes of their partners suggesting male involvement and education are important interventions. Still on education, in a study conducted in Tamilnadu State in India shows that, the relation between women's education and place of delivery was positively associated. All the women who had completed higher secondary and above level of education were preferred institutions for their delivery but at the same time home deliveries were more common (18.8%) among illiterates ($X^2= 23.46$ and $p= 0.000$). Delivery at the health facilities was quite common among women who were working in non-agricultural sector (100%) than non-workers (93.5%). (Rejoice & Ravishankar, 2014). This thus is in line with our study in which 59.0% and 36.4% had primary and secondary education respectively. Other factors associated with choice of delivery by skilled attendants were the parity of the mother with those beyond the first pregnancy being less likely to utilize skilled care at OR of between 0.8 and 0.3. This was

comparable to what was found in Burkina Faso that delivery by skilled attendance reduced by OR of 0.58 compared to first parity (Manuela *et al.*, 2009).

The birth companion was associated with choice of place of delivery with the mother-in-law less likely to accompany a woman to health facility (OR = 0.84) compared to the spouse (OR = 1.42). This suggests that mother-in-laws should be involved in the individual birth plan during ante natal period to be educated on the need of skilled care at delivery. The spouse should be encouraged to be the birth companion because their involvement is likely to increase delivery by skilled attendant. This finding is similar with the study in Western Kenya where male involvement was associated with increased delivery by skilled attendants (Nekesa *et al.*, 2013).

Transport preparedness was found to be associated with choice of delivery by skilled attendants because those who took a vehicle were 8.1 times more likely to deliver in health facilities compared to the other modes of transport. In this study 93% of those who delivered at home sited transport and cost of delivery as the cause. This was similar to findings in Western Kenya where 72.8% considered transport as a problem resulting to skilled delivery of 29.3% (Ngigi, 2009). In addition, this agrees to a study in India where all women who were residing within one to two kilometers from a health institution preferred delivery at the health facility whereas this proportion was 94.1% among women who residing five and more kilometers away from health centers and they employed the help of traditional birth attendant. This therefore is an indication that the proportion of home deliveries increased when the distance of health facilities increased (Rejoice & Ravishankar, 2014).

5.1.2 Delivery by Skilled Attendants in Mbooni Sub-County

The study showed that overall the delivery by skilled attendants was above the national average at 54% compared to national average of 46% (KDHS, 2008/2009). This was unlike a study in Kwale Sub-County of Coast Province in Kenya which showed low use of skilled attendants' delivery at 7.4% (Kristine *et al.*, 2006) which was attributed to

logistic barriers such as transportation and transportation costs. In another study conducted in Bangladesh, the proportion of women who took any antenatal care by SBAs was 59.02%, which is higher than the earlier national estimates of 48.7% in 2007 and 46.4% in 2011 (NIPRT, Bangladesh, 2007; 2011). Also, approximately one-third (30.06%) of the participants had their last delivery by SBAs which is higher than the 2006 estimates of 14%, 2007 estimates of 13.2%, 2009 estimates of 19.2%, and 2011 estimates of 25.2%, but little less than another estimates of 35% in 2006 (Anwar, *et al.*, 2008). The delivery by skilled attendants in this population is not sufficient to reduce maternal mortality and morbidity to targets set in SDGs. Despite the high maternal mortality ratios in many of the facilities in resource-poor settings, maternal deaths are rare in absolute numbers per facility. This does not allow detailed quantification of the associated risk factors and predictors that are equally important thus proportion of delivery by skilled attendants is considered a proxy indicator. In Kenya, the risk of MM is still high at 1 in 38 compared to 1 in 7,300 for women in the developed world. Maternal deaths in Kenya largely occur from preventable causes including hemorrhage (25%), sepsis (15 %), hypertensive disorders(12 %), complications of unsafe abortion (13 %t), and obstructed labor (8%), among other direct and indirect causes (Mumah *et al.*, 2014). Souza, Cecatti, Parpinelli, Serruya, and Amaral (2017), assert that delivery by skilled birth attendants enables pregnant women to survive a "near-miss" situation mainly because of the care provided and other institution related characteristics such as emergency preparedness of the institution. Since 'near-miss' is somewhat more frequent than maternal deaths, it is also used as an indicator of the quality of obstetric care provided.

5.2 Cost of delivery and Attitude on SBA among Pregnant Women and the Choice of Place of Delivery

The amount of money spent during delivery was associated with choice of the place of delivery. This is in line with what was found in a Bangladesh study that there is a tremendous in-equality in the use of maternity care which requires intervention to overcome financial barriers among poor people (Anwar *et al.*, 2008). The mean amount

spent for skilled delivery was Ksh 5370 which was high for most poor people in the study area. The attitude on skilled birth attendants among the women attending ANC in Mbooni Sub-County was less positive than for Traditional Birth Attendants (56.2% vs 84.3%) with health facility delivery having OR = 0.1 association with positive opinion on SBAs. In a study conducted in Tunisia, found that women from higher wealth quintiles were more likely to be delivered by skilled attendants compared to less privileged women, may be due to the costs of SBAs during deliveries, which is difficult to manage for families with lower income. (Islam, *et al.*, 2014). This suggests that health workers should improve their image so as their clients can appreciate the important work they do of delivering mothers. Health worker should be trained and encouraged to improve their rapport with pregnant women to achieve a positive rating. The skilled birth attendants should provide quality services to meet the expectations of their clients.

Maternal complications can directly inform about obstacles and attitudes that have to be overcome after the onset of an acute complication, hence providing valuable information on obstetric care. This allows for corrective action to be taken on identified problems to reduce related mortality and long-term morbidity (Souza *et al.*, 2007). Women knowledge and attitudes on complications during pregnancy, childbirth and the postpartum period serve as surrogates to help gain a better understanding of the set of conditions and preventable factors that contribute to maternal death. According to Souza, Cecatti, Parpinelli, Serruya, and Amaral (2017), near miss cases occur more often than maternal death and may generate more information because the woman herself can be a source of data.

In Kenya, obstetric complications are the major cause of maternal deaths that can be prevented with adequate medical care during and after delivery. These obstetric complications can have an impact on a woman both physically and mentally and may transfer to her baby and family. Additionally, women may not be able to work due maternal morbidity while this coupled with high costs for treatment may result in financial strain for the family. Many women develop severe maternal complications which is a hindrance to achieving SDG 3.1 (Say *et al.*, 2016). To achieve this goal, it is

therefore imperative to understand the predictors of skilled birth attendants (Temmerman, 2015). Postpartum period which is a period of transition as a woman move from pregnancy and child birth and back to reproductive potential has shown that a large proportion of deaths occur during this period (Chuma & Maina, 2014). In Kenya, studies among antenatal women have concentrated on HIV infection.

5.3 Awareness on Danger Signs in Pregnancy, Child Birth and Post-natal Period among the Women

Every pregnant woman is potentially at risk of developing obstetric complications. With the unpredictability of most obstetric emergencies, life threatening complications occur in 15 percent of all pregnancies (Campbell *et al.*, 2011). Complications related to pregnancy are the leading cause of death and disability in women in the world (Fillippi *et al.*, 2015). Most of these complications are preventable and treatable. According to WHO estimates, maternal conditions account for about 8 percent of the total global burden of disease (WHO, 2012). Amongst the study population, knowledge on some danger signs in pregnancy, childbirth and neonatal period was low for example fever (61.7%) and convulsions (64.5%). Bleeding which is the main cause of maternal death was recognized by majority of women (97.5%) as a danger sign as well as cord presentation (89.8%). This means that most women were aware the conditions that can result to the demise of babies and mothers. Knowledge on danger signs in pregnancy was not found to be statistically significant associated with choice of delivery with $P > 0.05$. This is unlike findings in Tanzania where the knowledge of risk factors for pregnancy increased SBA by OR of 2.95 (Mpembeni *et al.*, 2007). The difference may be due to the fact that the topic on danger signs in pregnancy was taught to 90.7% of pregnant women during Ante natal care in this study. Knowledge on family planning was not significantly associated with the place of delivery; neither was its use. This suggests that family planning is thought to be a separate reproductive health matter from delivery in the study population. Maternal health, delivery and family planning should be integrated in this population. In line with other studies showing low levels of awareness on danger signs during and after pregnancy, in Adigrat town, North Ethiopia,

52.86% (n=203) of the respondents were unaware of danger signs that could arise during pregnancy, 38.28% (n=147) were unaware of danger signs that could arise during delivery, and 43.00% (n=165) were unaware of danger signs that could arise after birth. (Hiluf & Fantahun, 2017). A research in Tanzania showed that 66.8% of respondents know vaginal bleeding, 29.4% reduced fetal movement and 23.9% swollen hand and face as danger sign of pregnancy. (Declare, 2015). Nevertheless, among the N=324 mothers interviewed in the study, the mean number of topics taught in visit 1 was 4.0 compared to 3.5 and 3.4 in visit 2 and 3 respectively, with median number of topics taught being 4 in visit 1, three and four in visit 2 and 3 respectively. The maximum number of topics per visit was 6 in all the 3 visits of interest. The findings indicate that despite the topic taught as per the above visits, there is inadequate emphasis on informing pregnant women about danger signs of obstetric complications during antenatal sessions where all of them should have the information about danger signs of obstetric complications. The fact that many of the respondents were not aware of danger signs that could occur during pregnancy, delivery and postnatal period could adversely affect their preparedness and readiness for pregnancy complications.

5.4 Expectant mothers ANC survival visits

The survival curve shows the probability that an expectant mother being taught ANC subjects will not have influenced on birth attendant choice by that time. The plot for the traditional birth attendant below that of the health worker throughout the cohort follow up, suggests that the traditional birth attendant may be preferred to a health worker. With the Kaplan-Meier Survival Analysis procedure examines the distribution of time to effect for two different birth attendants. The comparison tests indicated that there is not a statistically significant difference between them.

5.5 Model Summary

The paper provides results on determinants of skilled attendance in Mbooni Sub-County, in Kenya. Skilled birth attendant is important during pregnancy, at child birth as well as the post-natal period. The study demonstrates that 54% of births within Mbooni were attended by a skilled professional. These results are in line with the KDHS, whereby statistics for skilled attendants are 46% in Kenya (KDHS, 2008/2009).

Several factors have been identified as potential parameters of delivery by SBAs. In our study, education level, birth companion, mode of transport, cost, danger signs knowledge, staff short age, topicsANC1, topicsANC2, and topics ANC3 were statistically significant determinants of delivery by SBAs. The KDHS demonstrates that mothers with a higher education report higher rates of utilizing a skilled attendant at birth: 72.5% for women who have completed secondary school, 48.9% for those who have completed primary school, compared to 28.5% among those who failed to complete primary schooling and 19.2% with no education (KDHS, 2008/2009). The results from our analysis on the association between a woman's education level and the use of a skilled birth attendant are consistent with the KDHS study.

The mode of transport i.e vehicle, significant at sig. <0.0001 with $df = 1$, indicated that the odds of an expectant mother being assisted by a health worker is 0.04 times the odds of an expectant mother who has no access to vehicle transport.

The cost of delivery was significant only when it was more than Kshs5, 001 and above. Some of our findings are compatible with the findings from other studies while others are not. For example, knowledge of danger signs during pregnancy, were found to be significant determinants for delivery by SBAs.

While ANC attendance is high in the first visit, there is a clear disparity with the number of women who follow through the continuum of care to skilled attended delivery. This disconnect is also evident in other previous studies from Kenya (Cotter & Hawken,

2010). While it is recommended to begin ANC within the first trimester, only 15% of women in Kenya follow these guidelines (KDHS, 2008/2009). The trend in delaying ANC has been seen within other research studies in Kenya (Van Eijk *et al.*, 2006). It is plausible that the delay in ANC reflects the quality of care, the level of satisfaction with services provided and the behavioral attitudes towards the importance of ANC. Topics taught in ANC 1 have a significance level of 0.122 unlike topics taught in ANC visits 2 and 3 which have a significance level of 0.505 and 0.628 respectively. These topics positively influence the delivery by a SBA. The findings correspond to another study by (Chinedu, 2010; Christopher *et al.*, 2014) which indicates that ANC attendance influences skilled delivery since women are sensitized on the importance of skilled delivery during the ANC visits. When a woman decides to attend ANC, it also influences their decision whether to seek professional care during delivery.

According to Sustainable Development Goal (SDG) 3 on good health and well-being, section 3.2 aims that by 2030 we end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births, delivery by skilled birth attendants has to be increased to 50%, and antenatal care coverage has to be increased to 71.2%. However, if the government of Kenya has to achieve the SDG target of at least 50% deliveries by SBAs, either institutional delivery has to be increased or home delivery by SBA has to be increased. About 3 million births take place annually in Kenya. A 20% increase of institutional delivery means that at least an additional 600,000 deliveries need to be conducted at the health facilities. Though rural health facilities, in general, are under-utilized, despite the free maternity services. On the other hand, to promote home delivery by SBA, mass awareness of community and physical accessibility to CSBAs need to be considered. The findings from this study, supported by those from other studies, suggest that Mbooni Sub-County has to exert much concerted effort to meet the indicators of SDG-3.

5.6 Conclusions

There are various potentially modifiable determinants of delivery by skilled birth attendants in the rural area of Mbooni Sub-County in Makueni County, Kenya.

Objective on proportion of women attending ANC utilized skilled deliveries

- The utilization of skilled care was above national average but there was still room for increasing utilization.
- Provision of education beyond primary school level for women will enable them to make the wise choice of delivering under skilled care.
- The ANC women should be encouraged to make individual birth plan together with their spouse and birth companions so as to increase utilization of skilled care at delivery.

Objective on effect of socio-demographic characteristics of ANC women on delivery by skilled attendants

- The women of higher parity had fewer delivery in health facilities because they tend to believe the risk of their pregnancy was reduced by increased parity. Health workers should emphasize to the women of higher parity that every pregnancy has risks and can complicate despite previous pregnancies having being uneventful.
- Husbands of the married women tended to encourage their wives for delivery with skilled care compared to mother-in-laws. The birth companions are critical participants in choice of place of delivery of women attending ANC in Mbooni Sub-County. They should be incorporated in individual birth plan and asked to attend ante natal clinic to be educated on the need of skilled delivery.

Objective on effects of logistics and economic factors on skilled attendance during delivery

- Use of a vehicle to place of delivery was significantly associated with utilization of SBAs. Transport preparedness to a health facility for delivery can make a difference and health officials should consider introduction of community ambulance to improve access to skilled care.
- Amount of money used during delivery by skilled birth attendants was significantly higher than when a woman was attended to by traditional birth attendants. Effort should be made to reduce amount of money spent during labor in the health facility because mothers are spending an average of Ksh 5370 during such delivery. Subsidizing health facility deliveries which has been done by the new government can improve the uptake of skilled care.

Objective on attitude regarding delivery by skilled birth attendants

- Opinion on health workers was negatively associated with choice to deliver in a health facility with many women who delivered in health facility having negative opinion on SBAs. Health workers should be trained on proper care for women during health facility deliveries and good relationship with mothers during labour to earn a positive appraisal about their work from the women.

Objective on knowledge on danger signs in pregnancy, childbirth and post-natal period among the women

- All danger signs in pregnancy have not been taught to ANC women so as they can know the risks that can ensue in pregnancy. Such areas as febrile illness and signs of elevated blood pressure in pregnancy should be emphasized because at the moment they are least recognized as danger signs.

5.7 Recommendations

WHO should recommend to ministry of health to intensify Focused Ante Natal Care (FANC) services with emphasis on comprehensive birth plan involving pregnant women, their spouse and mother-in-law to increase delivery by skilled attendants. County of Makueni department of health should make its staff aware of the determinants of delivery by skilled birth attendants so as to further increase the uptake of services.

5.8 Recommendation for further studies

Further research should be done after instituting intervention of provision of transport and subsidizing delivery by skilled attendants.

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APPENDICES

Appendix I: Informed Consent (translated to Kikamba)

My name is -----and I am working with MOH - Mbooni. We are conducting this survey about the health of women in this village and we would very much like you to

participate. I would like to inform you about this study so as to get your consent to participate in this study.

Nitawa.....na nthukumaa na MOH Mbooni. Twiika ukunikili iulu wa uima wa mwii wa aka utuini uu na nitukwenda muno uusike. Nienda ukumanyithya iulu wa ukunikili uu nikenda nikwate luusa waku wa kuusika.

Title: The study is about health of mothers in Mbooni Sub-County.

Title: Kyongo kya kisomo kii ni iulu wa uima wa mwii wa aka ma Sub-County ya Mbooni.

Purpose of the study: This study aims at understanding which health systems exist in this community. We wish to learn how such systems assist mothers when pregnant to get assistance from skilled attendants. The study will also assess the knowledge, attitudes and practices regarding various issues on mothers' health from you the participant

Kieleelo kya kisomo: Kieleelo kya kisomo kii nikuelewa mipango ila yi utuini uu ikukonania na uima wa mwii. Nitukwendeew'a kumanya undu mipango isu itetheasya aka meaito kukwata utethyo kuma kwa aisikya ala masomeete uisikya. Vamwe na ou, kisomo kii kikasisya umanyi, mesilya na mikalile ila ikukonania na uima wa mwii wa aka kuma vala ui.

Procedures: This study is recruiting mothers who attend ANC for the first time in this clinic. You will be followed up until delivery. If you wish to participate, you are requested to give permission to be followed up to your home after delivery.

Mitalatala: Kisomo kii kikaandikithya aka ala mevika kiliniki kya aka aito yiala ya mbee. Ukaatiwa nginya utetheke. Wenda kuusika, nuukulwa unengane mwanya uatiiwe nginya musyi kwaku itina wa kutetheka.

Risks /Discomfort: This study does not have any direct risk. There may be some discomfort resulting from the sensitive nature of reproductive health question

Muisyo/Kulea kwianiwa: Kisomo kii kiina muisyo kwaku. Novethiwe na kulea kuanwa kumana na uko wa makulyo ala mekulwa iulu wa maundu ma usyai.

Benefits: This is a research project. It has no direct benefit to you as a participant. It will benefit science by informing the researchers on reproductive health challenges in this community and how they can be solved.

Mauseo: uu ni ukunikili. Ndwinna useo kwaku ta muusika. Ikethiwa na useo wa kumanyithya akunikili iulu wa mathina ma usyai utuini uu na undu matonya kuminwa.

Alternative to participation: The participant is free to refuse to participate in the research. Neither penalty nor loss will ensure from failure to participate.

Nzia ingi ya kuusika: Muusika ena uthasyo wa kulea kuusika na ukunikili. Vai wasyo kwa kulea kuusika.

Confidentiality: The answers you will give to the questions in this study will be kept confidential. No names will be used in the final write up. The questionnaires will be coded and original destroyed after one year. Neighbors may know that you have participated in the study but they will not know the answers that you gave to our questions

Kimbithi: Mausungio ala winengane kwa makulyo kisomoni kii makethiwa makimbithi. Masyitwa maikatumiwa kuandika lipoti. Mathangu ma makulyo makethwa na namba na ala makuu makaanangwa itina wa mwaka umwe. Atui nomamanye kana nuusikie kisomoni kii, lakini maikamanya mausungio maku.

Voluntariness: This study is totally voluntary. I will very much wish that you participate. You are entirely free to refuse.

Kwiyumya: Kisomo kii ni kya kwiyumya. Ngendeew'a muno uusike. Wimuthasye vyu kulea.

Are you willing to participate?

Nukwendeew'a ni kuusika?

1. Yes

2. No

Witness

Signature

1. Yii

2. Ayiee

Ngusi

Saii

Appendix II:-Questionnaire

Interviewer's name ----- Date of first interview -----/-----/---

Time interview started-----

Time interview ended -----

Full Names -----

Family name -----

Village -----

Nearest Primary School -----

Name of Village elder -----

Phone No -----

BIODATA

{Interview all pregnant women who come to the MCH for the first ANC visit irrespective of parity. They will be followed up in the subsequent visits. Each should fill a separate questionnaire}

1. What is your age?-----

Wina miaka yiana?-----

2. What is the highest level of formal school attended?

1. Primary 2.Secondary 3.College 4. None

Usomete mbaka va? 1.primary 2.secondary 3.college 4.ndyaa soma.

3. What religion do you belong to?

1= catholic, 2= protestant, 3 = Muslim, 4= others specify -----

Uthaithaa va? 1=Katoliki, 2= Makanisa angi, 3.Muisilamu, 4 =Vangi-----

4. What is your marital status?

1: Currently married 2: Widowed 3: Divorced/Separated/Deserted 4: Never married

Utwae waku ni? 1: Ni mutwae 2: Ni kiveti ndiwa. 3: Ni twataniisye
4: Ndyaa twawa

5. If married what was the date of marriage ----/----/---- How many years of marriage? -----

Ethiwa wi mutwae, watwaiwe matuku meana ?----/----/---- Myaka ya
utwae ni yiana? -----

6. What is your occupation?

1: Formally Employed 2: Peasant farmer 3: Housewife 4: Unemployed 5: Student

Uthukumaa wia mwau?

1: Nimuandike 2. Muimi 3: Wa nyumba 4: Ndimuadike 5: Musomi

7. Is your husband usual resident or works away from home? Yes ----- No ---
--- N/A-----

Wikalaa na mutumia waku kana athukumaa vaasa na musyi? Yii -----
Ayiee-----

8. What is the highest level of school he attended?

1. Primary 2. Secondary 3. College 4. None

Asomete mbaka va? 1. Primary 2.Secondary 3.College 4.Ndaasoma.

9. What is the occupation of your husband?

1: Formally Employed 2: Peasant farmer 3: Casual laborer 4: Unemployed 5:
Student

Mutumia waku athukumaa wia mwau?

1: Muandike 2: Muimi. 3: kivalua 4:Ndathukumaa 5: Nusomaa

10. Have you ever given birth? yes ----- No ----- Para-----+-----

Wasyaa? Yii -----Ayiee----- Masyaa-----

If yes please give details of all pregnancies (probe).

Codes

Column 3: 1: Live Birth 2: Still birth 3: Abortion 4: Others (specify)

1: Kaithau 2: Kathavevaa 3: Kuvuna 4: Angi (Vathukany'a)

Column 4: 1: Home 2: Government hospital 3: Private Hospital 4: Others(specify)

1: Musyi 2: Sivitali wa selikali 3: Sivitali wa mwene 4: Vangi (Vathukany'a)

Column 5: 1: Health worker 2: Traditional attendants 3: Doctor 5: Family members/Friends

1: Muthukumi wa sivitali 2: Aisikya ma musyi 3: Ndakitali

5: Andu ma musyi/Anyanyau

Column 7: M or F (Kamwana kana kelitu)

Column 8: 1: Yes; 2: No

1: Yii 2: Ayiee

Pregnancy details and plans

1. How many weeks pregnant are you?

Ivu yina syumwa siana?

--	--

L. M. P -----E. D. D -----

Nthakame ya mwiso ya mwai -----Taliki ula witetheka -----

2. Have you made individual birth plan (IBP) on

Muvango wa kusyaa naw’o nata thuilu wa:

a) Who will be your companion during labor?1)Yes 2)No

If yes who? -----

Ukethiwa na munyanyau ivinda ya kutetheka? 1)Yii 2)Ayiee.

Ethiwa yii evo nuu? -----

b) Who will deliver you? 1) Yes 2) No 3) Who? -----

Nuu ula wikwisikya? 1) Yii 2) Ayiee 3) Nuu?-----

c) Who will pay your delivery bill? -----

Nuu ula wiiva ngalama yaku ya sivitali watetheka? -----

How much will you set aside? -----

Ukaiya mbesa siana ata? -----

d) How you will get transport? Indicate method -----

-----ukaenda sivitali ata?- Weta niyiku-----

What role will the following play during pregnancy and child birth?

Andu aa me vaa itheo makathukuma wia mwau wi muto na watetheka?

1) Your husband or partner

Mutumia waku kana munyanyau-----

Your in laws

Athoni maku-----

3) Your neighbors

Atui maku-----

4) Traditional Birth attendant

Aisikya ma musyi-----

--5) Health worker

Muthukumi wa sivitali-----

HIV in pregnancy (UKIMWI mundu e muto)

1. Do you know your HIV status? 1. Yes 2. No 3. Don't know

Niwisi ali yaku ya Ukimwi? 1).Yiii 2.Ayiee 3.Ndyisi

2. If no would you like to know your HIV Status? 1. Yes 2.No

Ethiwa ndwisi nowende kumanya ali yaku ya Ukimwi? 1) Yiii 2) Ayiee

3. Should mothers be tested for HIV during pregnancy? 1.) Yes 2.) No

3) Do not know

Aka meaito nimaile kuthimwa Ukimwi? 1.)Yiii. 2.Ayiee 3.Ndyisi

4. How can a mother pass HIV virus from herself (if infected) to her baby? (More than one answer is possible. Do not read out).

Mundu muka tonya ata kukwatya mwana wake Ukimwi (ethiwa enaw'o)?

(Mausungio maingi nimatonyeka.)

- 1 at birth/ iasyawa
- 2 during labor/ ayauna
- 3 through breast milk/ kwisila kwonkya

5. For Mothers who test HIV positive during pregnancy, which recommendations are they given to prevent baby from getting HIV infected?

Aka ala methiawa mena Ukimwi me aito mataawa ata kusiiya mwana ndakakwatwe ni Ukimwi?

- 1 Given medicines to take before delivery and during labor

Manengawa ndawa matanamba kutetheka na mayaunya

- 2 Baby given medicines to prevent getting HIV infection

Mwana anengawa ndawa ndakakwatwe ni Ukimwi

- 3 Baby exclusively breast fed

Mwana ongw'e vate undu ungi.

- 4 Baby is not breast fed

Mwana ndakongw'e

- 5 Baby is given alternative feeds

Mwana anengwe maliu angi

Danger Signs in pregnancy and child birth

Wonanio wa mbanga mundu e muto na aisvaa

- 1) Which danger signs do you know that can occur during pregnancy (read out)

Wisi mbanga syiva sitonya kwikika mundu e muto?

1. Vaginal bleeding/ kuuw'a
2. Severe headache or blurred vision/ kwalw'a ni mutwe kana kwona nduma
3. Swelling of face and hands/ kwimba uthiu na moko
4. Convulsions or fits/ kuma kana kulitany'a
5. High fever/ uviuvu mwingi
6. Laboured breathing/ kuveva na vinya
7. Premature labour pains/ kwaunya matuku mate maviku

8. Baby moving less or not moving at all/ mwana aithauka vanini kana ateuthauka ona vamwe
9. Feeling very weak or tired/ minoo kana wonzu
10. Vaginal discharge/ kwona kiko
11. Abdominal pain/kuumwa ni ivu
12. Genital ulcers/ itau sya kimbithi
13. Painful urination/ kutemwa ni maumao
14. Persistent vomiting/ kutavika kwingi

Proportion of answers right ----- out of fourteen

- 2) Which danger signs do you know that can occur during childbirth? (read out)

Wisi mbanga syiva sitonya kwikika mundu aitetheka?

1. Severe headache/visual disturbance/kuumwa ni mutwe kana nthiuwa
2. Severe abdominal pain/ kuumwa ni ivu muno
3. Convulsion or fits during labour/ Kuma kana kulitany'a uyaunya
4. High fever with or without chills/ uviuvu Mwingi ve kana vatee kithilio
5. Foul vaginal discharge/ kwona kiko kiunyunga nai
6. Labour pains for more than 12 hours/ kwaunya mbee wa masaa 12
7. Ruptured membranes without labour for more than 12 hours/ kwitika kiw'u vate woo mbee wa masaa 12
8. Excess bleeding during labour/ kuuwa muno uyaunya
9. Cord prolapsed/ mukwa wa nzou kutongoesya
10. Arm or leg prolapsed/ kwoko kana kuu kutongoesya

Proportion of answers right ----- out of ten

- 3) Which danger signs do you know that can occur after delivery? (read out)

Wisi mbanga syiku itonya kwikika itina wa kutetheka?

1. Placenta not delivered within 30 minutes of baby's birth/ nzou kuselewa mbee wa ndatika 30 mwana asyawa
2. Excessive bleeding after delivery/ kuuwa muno itina wa kutetheka
3. Severe abdominal pains/ kuumwa ni ivu muno
4. Convulsions or fits/kuma kana kulitany'a
5. High fever with or without chills/ uviuvu Mwingi ve kana vate kithilio
6. Foul vaginal discharge due to infections/ kwona kiko kiunyunga nai

Proportion of answers right ----- out of six

4) In case of a complication during pregnancy and delivery, how are mothers referred to a bigger Centre.-----

Undu vaumbuka thina mundu muka emuito kana aitetheka, atwaawa sivitali nene ata-----

5) Is there a problem with this referral mechanism?

1. Yes. Which problem-----

Ni vethiwa na thina nziani isu ya uthi sivitali nene?

Yiii. Thina mwau-----

2. NoAyiee-----

Delivery and postnatal period (Ivinda ya kutetheka na watetheka)

In your opinion is it essential for women to deliver in health facilities?

Kwa woni waku, aka nimaile usyaia sivitali?

1. Strongly agree/ Kwitikila nene
2. Agree/ Kwitikila
3. Neutral/ ndwina muungamo
4. Disagree/ Kulea
5. Strongly disagree/ Kulea nene

In your opinion is the health facility prepared to deliver pregnant mothers?

Kwa woni waku, sivitali nitonyete kusyaithya

- 1 Strongly agree/ Kwitikila nene
- 2 Agree/ Kwitikila
- 3 Neutral/ Ndwina muungamo
- 4 Disagree/Kulea
- 5 Strongly disagree/ Kulea nene

3. Which are the main reasons why mothers in this area may not be delivering in health facilities? (More than one answer possible)

Ni itumi syiva sya vata ituma aka utuini uu maema kusyaia sivitali?

- a) Long distances/ mwendo muasa
- b) Facilities in the area are not conducting deliveries/ sivitali ila syi vakuvi iikwisikya
- c) Staff shortage/ sivitali iina athukumi eanu
- d) Staff attitudes/mesilya ma athukumi ma sivitali
- e) Home deliveries are comfortable/ aka ni meaniwe maitethekea musyi
- f) Labor came too fast/ kwaunya kwamituki
- g) Expensive? How much? -----/ Kwi vinya kii mbesa/? Ni siana? -----
- h) Not prepared/ ateyumbanitye

Any other reasons; specify/ Ve itumi ingi? Vathukany'a-----

What would you like to see being done for more women of your area to deliver in the health facilities?/ Ni maundu meva wendeew'a kwona mayikwa kutetheesya aka ma utui uu matonye kutethekea sivitali?

- a) Make it cheaper/ theesya ngalama
- b) Get mothers from their homes/ osa aka kuma musyi

c) Improve referral/ ailya nzia sya kutwawa sivitali nene

d) Have more health facilities/ kwitha na sivitali mbingi

Others; specify / angi; Vathukany'a-----

4. Do you know of community health workers in the area?

Niwisi ulu wa athukumi ma utheu ma misyi utuini uu wenyu? -----

5. Have you received any services from a community health worker? If yes which one?

Waatetheka kwisila uthukumini woo?-----

Watethekie ata?-----

2. What is your opinion on health workers who conduct deliveries in this health facility?

Woni waku ni mwau yiulu wa aisikya ma sivitali?

- I) Negative
- II) Neutral
- III) Positive

3. What is your opinion on Traditional birth attendants (TBAs) in your village who assist mothers to give birth?

Woni waku ni mwau yiulu wa aisikya ma musyi utuini waku kwa kutetheesya aka maitetheka

- I. Negative
- II. Neutral
- III. Positive

Maternal Health/ Afya ya mundu muka

1. Do you know any family planning methods? Which ones? (Read out)

Ni wisi iulu wa nzia sya kuvanga usyai? Wisi syiva?

1. Pills/ mbeke
2. IUCD/ coili
3. Injection/ sindano
4. Condoms/ mivila
5. Implants/ sindano ya miaka itatu na itano
6. Tubal ligation/ kwalyulwa
7. Natural method/ nzia sya wumbo
8. Breast feeding/ kwonja

- 9. Withdrawal/ kumya
- 10. Abstinence/ kwivetanga na maundu
- 11. Have you used any? 1. Yes 2. No

Waatumia nzia imwe? 1) Yii 2) Ayiee

If yes which one. -----

Ethiwa niwatumiie, watumiie nzia yiva?-----

Did you want to become pregnant at the time you did during the last pregnancy?

Niwendaa kuitava ivinda yila waitavie ivu yila yingi?

- a. wanted at that only time/ Wendaa o ivindani yiu
- b. Wanted a little later/ Wendaa wekalanga vanini
- c. Wanted no more children/ Ndwendaa syana ingi
- d. Cannot say/ Ndwamba kuweta

Community maternal death audit

1. In the last one year is there a mother who lost her life when expectant in your village? 1. Yes 2. No

If yes how many-----

Mwakani uu umwe muthelu ve mundu muka waaitwa e muto utuini uu wenyu?

i. Yiii 2) Ayiee Ethiwa evo mai meana?-----

Thank the respondent for her participation. (Check the questionnaire for completeness and accuracy. Store the completed questionnaire in a separate envelope).

Follow-up

2nd ANC Visit Date-----

Topics covered (can be more than one)

- 1) Danger signs in pregnancy
- 2) IBP
- 3) Need of SBAs
- 4) PNC

5) HIV

6) Nutrition

7) Others (indicate) -----

3rd ANC Visit Date-----

Topics covered 1) Danger signs in pregnancy

2) IBP

3) Need of SBAs

4) PNC

5) HIV

6) Nutrition

7) Others (indicate) -----

4th ANC Visit Date-----

Topics covered 1) Danger signs in pregnancy

2) IBP

3) Need of SBAs

4) PNC

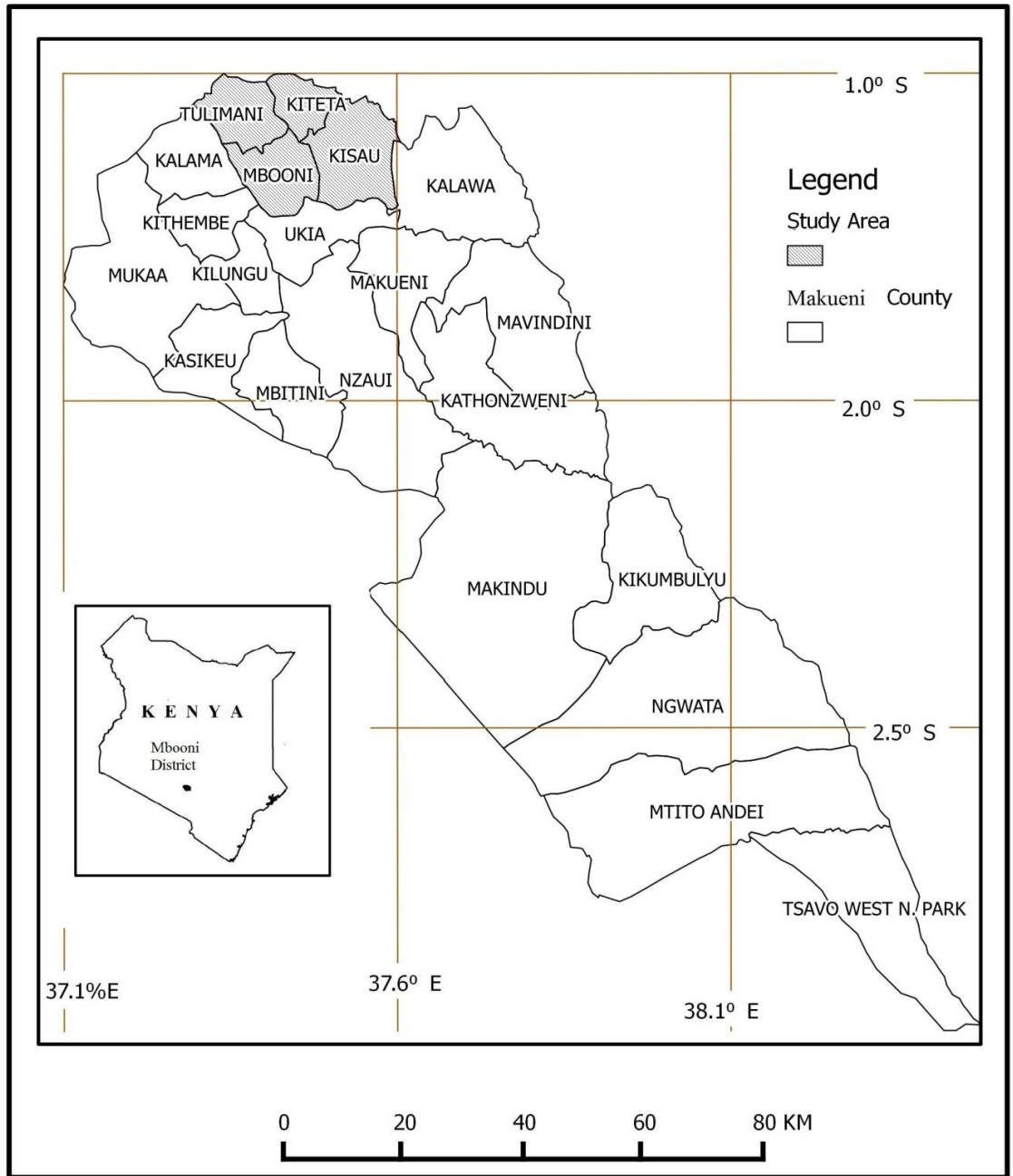
5) HIV

6) Nutrition

7) Others (indicate) -----

Other ANC visits and why?

Appendix III: Map of Mbooni Sub-County



Appendix IV: Standard Operating Procedures (SOP)

For Skilled Birth Attendants (SBA) Study

Principal Investigators:

HARUN M KIMANI

Co-Investigators

Zipporah Ng'ang'a

Peter Wanzala

Informed Consent

A. Purpose:

To ensure that any person participating in the Skilled Birth Attendants (SBA) study is appropriately consented prior to any study procedures being performed, and to define minimum requirements and procedures for obtaining and documenting the informed consent process. “Informed consent” means that the participant will be made fully aware, to the best ability of the study personnel, of the benefits, risks and consequences of participating in the study.

B. Scope:

This procedure applies to all participants who are screened and/or enrolled in Skilled Birth Attendants Study and all Study Staff involved in conducting SBA study recruitment and overseeing the informed consent process.

C. Responsibilities:

1. Study Assistants who conduct Skilled Birth Attendants study recruitment and who oversee the informed consent process are responsible for understanding and following this SOP.
2. Principal Investigator is responsible for training study staff to conduct the informed consent process in accordance with this SOP. He is ultimately responsible for ensuring that all applicable SBA staff members follow this SOP.

D. Procedures:

It is important to remember that the process of obtaining informed consent is a dynamic process that begins when the consent form is presented to the subject and continues as long as the subject remains enrolled in the study. Study procedures may not be conducted until the appropriate Informed Consent Forms are completed.

1. Screening Informed Consent Procedures:

- a. Potential antenatal client presents herself to receptionist during antenatal visit. Receptionist greets the client and invites the client to take a seat and assures her that a study staff will be with them shortly.
- b. The Consenter asks the clients for their ages to verify that they can legally give consent. If there is a concern about a potential participant not being of legal age, the Consenter will attempt to verify age by asking a participant to refer to his/her National ID card.

- c. The Consenter explains all aspects of the study in terms that the client can understand. The Consenter will make sure to outline the following:
 - 1. The purpose of the study
 - 2. Possible benefits and risks of the study
 - 3. Alternatives to participation in the study
 - 4. Discussion of sensitive nature of the study
 - 5. Participant confidentiality: participant information will be kept strictly confidential
 - 6. Expected duration of the client involvement
- d. The Consenter explains that the decision of whether to participate will be done individually.
- e. The Consenter asks the potential participant if they understand that participation is optional and that future care at the study site will not be affected if she chooses not to enroll.
- f. The potential participant will be asked to give consent

Eligibility

A. Purpose:

To define the steps involved in eligibility determination.

B. Scope:

This procedure applies to all staff involved in eligibility determination for the Skilled Birth Attendants Study.

C. Responsibilities:

1. All staff members involved in eligibility determination is responsible for understanding and following this SOP.
2. The Principal Investigator is responsible for ensuring that all applicable Skilled Birth Attendant staff members follow this SOP, and for ensuring that only participants who meet the eligibility criteria are enrolled in the study.

D. Inclusion and Exclusion Criteria for Potential Participants:

A. Inclusion Criteria

Potential participant must meet the following criteria in order to be eligible for inclusion in the study:

1. Of legal age to provide independent informed consent for research per regulations and guidelines.
2. Pregnant woman residing in the geographic area that is catchment for Kisau and Tawa and the Kikima health facilities
3. Woman attending ante natal clinic who is in the first or second trimester of pregnancy
4. Confirmed pregnancy by palpation and expected date of delivery (EDD).
5. Consent to participate in the study

B. Exclusion Criteria

Potential participant who meet any of the following criteria will be excluded from the study:

1. Below 18 years of age
2. Not pregnant
3. Woman in the third trimester of pregnancy.
4. Known plans to re-locate or travel away from the study site during the next 9 months.
5. Failure to give consent to participate in the study or consent to be followed up

Follow-up

A. Purpose

To define the proper way to conduct follow-up visits

B. Follow up

- Confirm the participant ID and visit date in the top section of the study tool.
- Document by writing the actual date of the follow up
- Document services provided to the client during the visit