

**DETERMINANTS AND OUTCOMES OF AN
INTEGRATED MATERNAL HEALTH INTERVENTION
ON UPTAKE OF SKILLED CARE DURING AND POST
DELIVERY IN MIGORI COUNTY, KENYA**

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**Determinants and Outcomes of an Integrated Maternal Health
Intervention on Uptake of Skilled Care During and Post Delivery in
Migori County, Kenya**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy in Epidemiology of the Jomo
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DECLARATION

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

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DEDICATION

I dedicate this work to all childbearing women in Kenya, especially those in resource poor setups who have to bear enormous childbirth challenges but continue to be hopeful of a better tomorrow.

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired immune deficiency syndrome
ANC	Antenatal care
CHEWs	Community health extension workers
CHVs	Community health volunteers
CORPs	Community's Own Resource Persons
COTR	College of the Rockies
DeKUT	Dedan Kimathi University of Technology
DFATD	Department of Foreign Affairs, Trade and Development
DHS	Demographic and health surveys
EmONC	Emergency obstetric and neonatal care
FANC	Focussed Antenatal Care
FBD	Facility based delivery
FEmONC	Focussed Emergency obstetric and neonatal care
FMS	Free maternity service
GOK	Government of Kenya
HIV	Human immunodeficiency virus
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KDHS	Kenya demographic and health survey
KEMRI	Kenya medical research institute

KII	Key informant interview
MAISHA	Maternal Access and Infant Survival for Health Advancement
MDGs	Millennium development goals
MMEIG	Maternal Mortality Estimation Inter-agency Group
MMR	Maternal mortality ratio
MNCH	Maternal-newborn and child health
MNH	Maternal-neonatal health
MOH	Ministry of Health
NDHS	National Demographic and Health Surveys
NHIF	National Hospital Insurance Fund
OR	Odds ratio
SBA	Skilled birth attendance
SDG	Sustainable Development Goal
STI	Sexually transmitted infection
TBA	Traditional birth attendant
UN	United Nations
UNFPA	United Nations population fund
WHO	World health organization

OPERATIONAL DEFINITION OF TERMS

Effectiveness of intervention	Refers to increase in proportion of women taking up skilled care during delivery and postpartum at a health facility.
Facility delivery	Refers to birth at a dispensary or health centre.
Postnatal care uptake	It is whereby a woman presents for care at a health facility after delivery, both on her behalf and for the newborn. The terms postnatal and postpartum care have been used interchangeably.
Quality of care rating	Refers to participating women perception of how well they and their newborn were treated during their most recent visit to health facility either for delivery or postnatal care, including staff and health facility related factors.
Skilled birth attendance	The use of delivery services from a health facility. Skilled birth attendance and uptake of health facility care have been used interchangeably.
Skilled health professional	Refers to a nurse, midwife or clinical officer.

ABSTRACT

Skilled care through antenatal, delivery and postpartum period, is essential for the mother-newborn health. Migori County in the Nyanza region had 53.4% births aided by a skilled health professional compared to an average nationally of 61.8%, while the region averaged 65% in the 2014 Demographic and Health Survey. To address the comparatively lower uptake of skilled care, a maternal-infant community-level health interventional project was instituted. This study assessed the effectiveness and determinants of the integrated maternal- infant health intervention on uptake of skilled professional services through birth and postnatal among reproductive age women in Migori County. A quasi-experimental, posttest only nonequivalent groups design was applied in this study. A sample of 590 reproductive age women, who gave birth after January 2014 in Rongo and Migori sub-county, were included in the study. Data were collected using interviewer administered questionnaire and key informant guides. Utilization of postpartum and delivery services in a health facility were the two main outcome measures of the study. Descriptive statistics reporting proportions, Chi square and *Fisher's exact* test at bivariate and odds ratio at multivariate analysis level were computed. The findings show a twenty seven percent (27.2%) increase in utilization of facility delivery for the intervention group, compared to 16.6% increase for the control ($\chi^2= 9.0$, $P= 0.003$). Participants who received the intervention had increased odds - AOR= 1.56, $p=0.048$, of having a health facility delivery and higher odds - AOR= 3.31, $p=0.016$, to using postpartum care services. Being in married union decreased the odds - AOR= 0.33, $p=0.006$, of seeking health facility delivery. Choice of health facility delivery was positively influenced by a mother having had attended at least four antenatal visits and having a birth companion ($p=0,000$), with ones mother as a birth companion (AOR 4.97, $p=0.000$). There were a higher proportion of complications necessitating attention by a health professional reported at 13.3% in the control group, compared to intervention at 2.9%. Having been sensitized on maternal-infant health by traditional birth assistant, cut down probability of uptake of delivery at health facility by 18.2 times (AOR= 0.055, $p=0.017$). At multivariate analysis, participants who had community health Volunteer referral for post natal care to a health facility, had greater odds - AOR= 2.72, $p=0.039$, of taking up the services, the odds declined for those taking between 30 to 60 minutes to health facility (AOR 0.166, $p=0.002$). From the key informants, lack of male partner support and 'feeling experienced' were cited as barriers to seeking skilled care at health facility. In conclusion, the intervention improved uptake of facility delivery and postpartum care. Availing health education and having ones mother as birth companion are two critical aspects that can improve uptake of skilled birth attendance and postpartum care. Study recommends appliance, and scaling up similar 'community-level' approaches in raising utilization of health facility care in the other Migori County, sub-Counties and in other places in Kenya where reduced uptake of SBA prevails. Further, more emphasis is needed on health education for the pivotal role played in influencing uptake of postnatal care.

CHAPTER ONE

INTRODUCTION

1.1 Background

WHO and other partners, in their year 2000 to year 2017 estimates, pointed out that enhanced access to skilled care and better care before, during and after childbirth was critical in lowering maternal mortality. They further indicated that, SSA was the only region with very high MMR for 2017, estimated at 542 maternal deaths per 100,000 live births. Overall lifetime risk of maternal death was 1 in 37 in SSA. Sub-Saharan Africa and Southern Asia accounted for approximately 254 000 (86%) of the estimated maternal deaths globally in 2017. Majority of these deaths [66% (196 000)] occurred in Sub-Saharan Africa (WHO & UNICEF, UNFPA, World Bank Group, 2019).

A recent meta-analysis utilizing Demographic and Health Surveys (DHS) conducted between 1990 and 2015 in 29 sub-Saharan African (SSA) countries, Kenya included, concludes that successful interventions in improving uptake of health facility delivery, should address key factors. They include; individual factors (for instance education level, age of the woman, parity), household factors (such as place of residence, family size and wealth level) jointly with factors related to availability of health facilities and access (Doctor *et al.*, 2018).

A substantive section of mothers in developing countries neither deliver nor utilize postnatal care with aid of a skilled birth attendant. The bulk of community-level deaths among mothers and neonates happen as a result of not having quality care all through labor and delivery (Lassi *et al.*, 2014). Provision of care by skillful professionals during childbirth and pregnancy, increasing women's awareness of the benefits of giving birth in a health facility, involvement of male partner in utilization of maternal health services, raising women decision-making power, addressing barriers of lack of transport are critical interventions for safe motherhood (Kifle *et al.*, 2018).

Determinants for the uptake of neonatal and maternal health (MNH) services include key services like antenatal care (ANC) uptake, delivery aided by skilled professional, and use of postpartum care services. These factors are correlated with decreased deaths and illnesses for the neonates and their mothers (Treacy & Sagbakken, 2015). Skilled health professional attendance of mother and neonate all through pregnancy, labor, birth and postpartum is key for timely identification of complications so that pertinent management is instituted, as well as requisite referrals where required. Additionally, uptake of postpartum care services inside 48 hours after giving birth is associated with better maternal-neonatal health outcomes by lowering mortality and incidence of illness. Nevertheless, in spite of these crucial services being accessible in facilities with skilled professionals and being reasonably priced, majority of less developed countries, SBA, antenatal care uptake, and postnatal care are still inadequate, especially the countries that are less developed (Thomsen & Hoa, 2011). In rural areas, determinants for use of maternal-health services range from individual to household to community level factors (Jat *et al.*, 2011; Worku *et al.*, 2013). Characteristics operating at individual as well as community level may lead to differences in utilization patterns on diverse maternal health aspects amongst population in rural areas (Jat *et al.*, 2011).

Although there is no particular, clear-cut intervention to considerably reduce maternal deaths, many studies reveal that the bulk of these problems with the mother and their neonate may be decreased if they obtained apt care postpartum (Blank *et al.*, 2013; Robert Pattinson, 2011; Singh *et al.*, 2013; WHO, 2010b). Postpartum care on mother-newborn health has proven advantages. Despite this, majority of neonates and mothers fail to obtain the service from trained healthcare professional during the initial days following birth; hence, this forms the main ignored time period for quality care provision. Correspondingly, to a large extent, skilled care provision during the postpartum period is lesser compared to ANC and skilled delivery utilization rates (WHO, 2013).

The proportion of health facility delivery in the Nyanza region was 43.1% in the KDHS 2008/09 (Kenya National Bureau of Statistics - KNBS *et al.*, 2010). The prevalence rose to 64.8% in the KDHS of 2014 (Kenya National Bureau of Statistics

et al., 2015). A study carried out in Nyandarua South sub-County; found that those with least knowledge were more liable to delivering unsafely. The odds of delivering unsafely increased with reduced knowledge on safe delivery (AOR 36.5) (Wanjira, 2011). In Kenya, there is significant variation in health facility delivery and skilled delivery attendance. Central Kenya counties achieved a minimum of 85% for the two indicators, whereas Migori County reported a lower proportion at 53.4 percent (Kenya National Bureau of Statistics *et al.*, 2015).

1.2 About the intervention: The MAISHA project

MAISHA stands for “maternal access and infant survival for health advancement”. MAISHA is also Swahili word for “life”. MAISHA was a maternal, newborn, and children’s health project funded by the Government of Canada and implemented in Migori County and Nyeri County, Kenya by College of the Rockies, Canada, in partnership with Kenya’s Dedan Kimathi University of Technology between 2012 and 2017.

MAISHA was an effort to contribute to the realization, in Kenya, of United Nations Millennium Development Goal number 4 – “reduce child mortality”, and Goal number 5 – “improve maternal health.” In conceiving MAISHA in 2011, Kimathi University College of Technology (KUCT) - now Dedan Kimathi University of Technology (DeKUT) , together with College of Rockies, Canada, drew from the Kenya’s Demographic and Health Survey of 2008-09, which noted that maternal death rate in Kenya remained “high”, at 448/100,000 live births. The Survey also reported that infant-mortality rate was 52/1,000 live births, under-five death rate at 74/1,000 live births, “implying that for every 19 children delivered in Kenya one dies prior to their first birthday, while for every 14, one does not live to past five years of age.”

MAISHA aimed at implementing strategies in response to two key observations made in the Kenya's Demographic and Health Survey of 2008-09:

- i. "Growing the percentage of newborns born in health-care facilities is a vital factor in lowering the health dangers to both mother and newborn."
- ii. "Besides place of delivery, support through childbirth is a key variable influencing birth outcome, the health of mother and their infant."

These two statements informed the project's two intermediate outcomes:

- a. Increased quality of gender-sensitive health-care available to maternal, newborn and infant clients.
- b. Increased use of quality maternal, newborn, and infant health care services.

MAISHA's approach was in contrast to development projects that focus on the overall system or on the construction of facilities, infrastructure improvements or the acquisition of high-tech, expensive and possibly not relevant equipment. Rather than focusing on things, MAISHA focused on enhancing human capacity, building knowledge, and changing behaviors. MAISHA operated at the community level and, as such, the community health strategy championed by the Kenyan government was the foundation of the implementation strategy, with the training of community health volunteers being the core. (COTR; MAISHA).

The MAISHA implementation approach was three pronged: first, MAISHA trained the staff attached to community health facilities to ensure that they have emergency obstetrics care skills so that they have the ability and confidence to intervene as necessary when complications arise, second, MAISHA provided the enabling environment for staff attached to community health facilities to exercise their skills by providing the simple, low-cost and context relevant equipment and supplies that they need, such as low-tech bag-and-mask resuscitators in a basic delivery kit, and third, MAISHA trained community health volunteers, including traditional birth attendants, on the importance of skilled birth attendance and ante- and post-natal care, and provided them with the skills to transmit these messages to community members. Using community health volunteers and 'reformed' traditional birth

attendants, MAISHA promoted behavioral change such that women, who might otherwise not have done so, would utilize enhanced community health services.

This project focused on improving Maternal, Newborn, and Child Health (MNCH) services in rural communities in Nyeri County in Central Kenya and Migori County in Nyanza region, by strengthening government facilities in rural areas and community health systems. Thus, identifying the effectiveness and outcomes of a rural maternal-health interventional project on utilization of skilled care all through pregnancy, labor, birth and postpartum could be crucial in informing policy.

1.3 Statement of the Problem

Despite existing legislation, diverse programs on Mother-Newborn and health policies, in Kenya, there exists only a few evidence based interventions and all-inclusive studies that put emphasis on and leverage on volunteers (CHVs) and community's resourceful persons (CORPs) in dealing with declined utilization of professional care all through labor, birth and postnatal. The preference of delivery place determines whether one obtains skilled care through labor, birth and postpartum, consequently impacting infant and maternal mortality. However, data on drivers of failure to utilize health facilities under the help of skilled attendants is limited, especially in rural areas where the utilization of these services is low.

There is a huge disparity between the proportion of women who seek antenatal care (ANC) and those who eventually turn up at a health facility for delivery and postpartum care. Though a high of 96% of the women sought antenatal care as per the 2014 Demographic and health survey, facility delivery and postnatal care uptake rates were significantly lower, at 61.8% for facility delivery, and 51% for postpartum check-up within two days after delivery. During the same survey, rural urban differences in uptake of postpartum care were notable. Sixty five percent of women in urban areas received a checkup compared to 43 percent among from rural backgrounds (Kenya National Bureau of Statistics *et al.*, 2015).

Skilled care by trained professional all-through labor and birth is crucial to lowering mortality among mother-neonate pair. Out of all maternal deaths in Kenya, 98.7%

occur among 15 highest burden counties, Migori County included. Almost the entire of these counties have faced insecurity, infrastructural challenges, inequity/marginalization, and high levels of poverty that has led to deplorable statistics for maternal-newborn health (UNFPA, 2014). This County reported merely above half (53%) deliveries as having been aided by skilled professional compared to national mean of 62% (Kenya National Bureau of Statistics *et al.*, 2015).

During birth, skilled professional assistance significantly influences maternal mortality. About 16 to 33% of maternal deaths are avoidable only if delivery is managed by skilled health professionals (Crowe *et al.*, 2012; Kenya National Bureau of Statistics - KNBS *et al.*, 2010; Ross & Blanc, 2012). Percentage of deliveries assisted by skilled professionals is a yardstick that can be used to examine gains in maternal-Infant health indicators and to the attainment of Millennium Development Goal (MDG) number 5 in post-2015 period (Ross & Blanc, 2012; Temmerman *et al.*, 2015). Numerous research investigations have looked at factors encouraging or hampering utilization of maternal-infant health services. Nevertheless, the research studies have a limitation since they were mostly conducted in Ministry of Health (MOH), GOK facilities (Gitimu *et al.*, 2015; Mason *et al.*, 2015; Yego *et al.*, 2013).

Therefore, understanding the factors influencing the place of delivery and postpartum care is vital in helping identify key priority areas in order to improve the proportion seeking assistance of a skilled health worker during and after delivery, hence this study sought to identify some of these factors. This current study at community-level in Migori County, Kenya, assessed the determinants and outcomes of the maternal-infant health intervention (MAISHA project) on utilization of skilled professional services through labor, birth and postnatal among reproductive age women 15-49 years.

1.4 Justification of the study

To ensure that there is safe motherhood, it is critical to make sure that skilled and qualified care personnel are utilized during pregnancy and childbirth (WHO, 2010a). By scaling up the competency of the caregivers, while uplifting the status of the birthing Centre's, and educating the public on the ills of some of their taboos and

traditions that hinders women from accessing healthcare, institutional delivery can be improved (Shah et al., 2018).

In Sub-Saharan Africa, most research to date on the drivers and barriers to facility delivery has for the most part been by cross-sectional studies analyzing household survey data. Consequently, studies are desirable that investigate variability within regions, examine longitudinal patterns, and assess impact of interventions in enhancing rates of facility delivery (Moyer & Mustafa, 2013). Analytical study designs would be more recommendable. A quasi-experimental, posttest only nonequivalent groups analytical design was applied in this study. This study assessed the determinants and outcomes of the maternal- infant health intervention on utilization of skilled professional services through labor, birth and postnatal among reproductive age women.

Kenyan government, through the Ministry of Health (MOH)-reproductive health division, together with other partners has various maternal-child health programs running. All these efforts are geared to improving indicators in maternal-child wellbeing. Though the national government and her partners have over the years heavily invested in this sector, there are widespread glaring differences in maternal-child indicators in the Counties. Presence of such disparities implies that within each of the Counties in Kenya, lays unique County-specific hindrances to improved maternal-child indicators. Hence the need to coin specific interventional programs to boost indicators in worse off performing Counties. This study implemented and evaluated a maternal-Infant wellbeing interventional project in Migori Sub-County.

1.5 Hypothesis

The primary outcome for the study was utilization of delivery services at a health facility. This forms the basis for hypothesis formulation.

- i. Null hypothesis: The integrated maternal-health intervention would not lead to an increase in utilization of delivery services at a health facility.

- ii. Alternate hypothesis: The integrated maternal-health intervention would lead to an 11.7% increase in uptake of delivery services at a health facility from a baseline of 53.3% to 65% after the intervention.

1.6 Research Questions

- i. What is the effect of the intervention on the utilization of intrapartum care among reproductive age women 15-49 years in Migori County?
- ii. What is the effect of the intervention on the utilization of postpartum care at a health facility among reproductive age women 15-49 years in Migori County?
- iii. What are the determinants for utilization of skilled care during delivery and postpartum among reproductive age women aged 15-49 years in Migori County?
- iv. What are the barriers for the utilization of skilled care during delivery and postpartum among reproductive age women 15-49 years in Migori County?

1.7 Main Objective

To establish the determinants and outcomes of the integrated maternal- infant health intervention on utilization of skilled professional care through labor, birth and postnatal among reproductive age women 15-49 years in Migori County, Kenya.

1.8 Specific Objectives

- i. To determine the effect of an integrated maternal- infant health intervention on the uptake of skilled care at birth among 15-49 years old women in Migori County.
- ii. To determine the effect of an integrated maternal- infant health intervention on the utilization of postnatal care services among women 15-49 years in Migori County.
- iii. To establish the determinants for the utilization of skilled care during delivery and postnatal among women aged 15-49 years in Migori County.

- iv. To explore barriers to utilization of health facility delivery and postnatal services among women aged 15-49 years in Migori County.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview on maternal mortality, utilization and determinants of uptake of skilled care

The WHO, in the world health statistics report, 2021, indicate that of all the SDG regions, SSA shoulders the highest burden of maternal deaths in the world, followed by Southern and Central Asia at a MMR of 542 and 151 deaths per 100,000 live births respectively. The report further points that increased global efforts are required to speed up progress and attain the global MMR- SDG target of not more than 70 maternal deaths for every 100,000 live births by 2030(WHO, 2021).

Each day in year 2017, about 810 women deaths occurred from avoidable causes associated to pregnancy and delivery. From 2000 to 2017, maternal mortality ratio recorded a decline of about 38% globally. Majority (94%) of maternal mortality happen in low-income countries and lower middle-income nations. Adolescents aged 10-14 years face greater danger of complications and mortality due to pregnancy compared to other reproductive age women. Skilled care prior to, during and post-delivery can contribute considerably to saving women and newborns lives(WHO & UNICEF, UNFPA, World Bank Group, 2019).

A 2013 study in Jiangsu province in China(Gu *et al.*, 2018), investigated uptake of Postpartum Family Visits (PFVs) which have been shown to improve outcomes for postpartum women together with their newborns. Only 23.4% of women sampled had not ever received PFV, while 40.4% had received more than 3 visits. Determinants of non-use of PFVs were; level of education, level of income, the nearest hospital distance and parity. Determinants for deficient PFVs use were among others; employment, the nearest hospital distance, birthing institution level, together with parity(Gu *et al.*, 2018).

Determinants of facility delivery are varied. In a study in Ethiopia, only 29.2% of women took up facility care. The study identifies travel time, residence, and mother's

education, couple agreement on delivery place, frequency of ANC visits, birth preparedness, awareness of danger signs and awareness of existence of waiting homes for mothers awaiting delivery(Ayele *et al.*, 2019). Similar findings can be found elsewhere in Africa. A study utilizing 2014 Ghana Demographic Health Survey data, established residence region, age, education, household wealth, parity, distance to health-facility, partner's education, religion, and ability to meet treatment cost were found to be associated with skilled delivery(Dickson & Amu, 2017).

There is low utilization of postpartum care in Ethiopia. In a systematic review in Ethiopia, mothers with high decision making power, those who had ever had ANC visit, had greater than two ANC visits, and had SBA were more likely to utilize postpartum care. Other factors increasing likelihood of postnatal care uptake were; mothers who delivered in health facility, was a middle income earner, the rich, those of urban residence, and with awareness of danger signs of pregnancy, childbirth and postpartum periods(Chaka *et al.*, 2019). A more recent multilevel analysis identified similar determinants(Tiruneh *et al.*, 2020).

2.2 Maternal mortality, utilization of skilled care and determinants of uptake in Kenya

Kenya's maternal mortality ratio remains high at 362/100,000 live births, while skilled professional care at birth being significantly lower than the 90% international target, in spite of a range of interventions adopted (Kenya National Bureau of Statistics *et al.*, 2015). Survival and health of Mothers, plus their Newborn is strongly associated to care provided to pregnant woman prior to, throughout pregnancy, delivery, and postpartum period. During this critical period, complications and lack of skilled care have consequences for mother and newborn. Nearly all women in Kenya (96%) receive some kind of antenatal care from a skilled professional, nonetheless, significantly high skilled care at birth has not been realized (Kenya National Bureau of Statistics *et al.*, 2015).

The KDHS, 2014 reported that 362 mothers die per 100 000 live births every year resulting from pregnancy associated causes. Despite the great risks associated with giving birth without assistance from a skilled professional, home delivery is still a

great challenge in Kenya. Rural-urban disparities were notable with 46.9% and 16.7% home deliveries recorded in rural and urban areas respectively (Kenya National Bureau of Statistics *et al.*, 2015). From this 2014 KDHS, only 61.8% of women gave birth in health facility way below the International Conference on Population Development (ICPD) target of at least 90% of deliveries to be in a health facility under assistance of skilled birth assistant(WHO & UNICEF, UNFPA, World Bank Group, 2019). Slightly above half (53%) of women who delivered two years prior to the 2014 KDHS got a postpartum checkup(Kenya National Bureau of Statistics *et al.*, 2015).

Kenya has made major strides in increasing access of delivery services for pregnant mothers. With the introduction of free services for maternity in MOH facilities, where mothers walk to a facility and give birth without any cost greatly are reducing mothers' cost burden. This is in attempting to raise the proportion of access to health facility delivery under assistance of a skilled birth professional. In spite of these efforts, a great proportion of mothers still give birth at home unaided by a skilled attendant. This practice puts mother-newborn at great risk(Kitui *et al.*, 2013).

A number of regions in Kenya still report low uptake of SBA. In a 2016 quantitative study, Bamba division in Kilifi County reported only 47.2% of women seeking health facility delivery. Factors found to be significantly associated with SBA in the study were distance, problems in pregnancy, use of mosquito net and labor that was prolonged(Mwinyikione *et al.*, 2017). A number of determinants seem common across several regions in the country. A 2012 study in Makueni County, more than half of the women delivered without skilled assistance at 59.7%. Factors identified to increase likelihood to uptake of SBA in this study included; women with tertiary education, partner with secondary education, ANC and being within 1- 5 kilometers distance to a health facility(Gitimu *et al.*, 2015).

Analysis of the 2008-09 KDHS data indicates only 47% of women received postnatal care. Factors significantly related to postnatal care utilization include; age of the mother, more than four ANC visits, residence in urban setting, and facility delivery. Conversely, not having some education and delivery via unskilled assistance were

related to low uptake of postnatal care at $p < 0.05$ (Akunga *et al.*, 2014). Increased women empowerment raised postnatal care utilization as reported in the 2014 KDHS (Kenya National Bureau of Statistics *et al.*, 2015).

2.3 Uptake of skilled care at delivery

Death among mothers and infants is a universal health concern (Black *et al.*, 2016; WHO, 2015). Various interventions have been found to be effective in addressing maternal-infant mortality and include appropriate skilled care during pregnancy (ANC) (Chou *et al.*, 2015). Other studies have included interventions like labor, delivery, and postnatal care (PNC) (Bustreo *et al.*, 2013; Chou *et al.*, 2015; You *et al.*, 2015).

The most distinct effective intervention in lowering perinatal and maternal mortality is care by a skilled attendant during delivery. The process, where pregnant women are offered sufficient care all through labor to delivery to early postnatal time is referred to as skilled birth attendance (Campbell & Graham, 2006). Ensuring that women are given fundamental interventions throughout pregnancy, delivery, postnatal and childhood periods by skilled attendants can significantly lower newborn and maternal deaths. Preventable maternal and infant deaths among needy rural households is hindered by poor access to effective interventions (Lawn *et al.*, 2009; WHO, 2012). Up to two-thirds of maternal and infant deaths can be reduced via universal access to maternal-newborn key health packages.

According to the Kenya National Bureau of Statistics, Kenya ranks among African countries with high maternal mortality with four hundred and eighty-eight deaths per 100,000 live births (Kenya National Bureau of Statistics - KNBS *et al.*, 2010) up from four hundred and fourteen deaths per 100,000 live births that had been recorded previously in 2003. The Ministry of Health tabulations estimate that 7,700 women die every year as a result of pregnancy related issues. This figure translates to about 21 women dying daily or almost one Kenyan losing life every hour (GOK, August 2010). The KDHS statistics show that the network coverage of skilled delivery attendance is 62% (Kenya National Bureau of Statistics *et al.*, 2015). Among the reasons leading to mother and child mortality in Kenya includes lack of utilization

and minimal availability of skilled delivery attendants, low network coverage of basic as well as normal birth services, low quality of the available services, and lack of political will that would help boost the working atmosphere of health facilities(GOK, August, 2010).

According to the Ministry of Public Health Services, women who are assisted by traditional birth attendants accounts to 28 percent, 21percent use the services of untrained relatives or friends while 7 percent of the births occur with no assistance (MoPHS, 2010).

A study that was done in Siaya County, in the rural western Kenya by the KEMRI/CDCs showed that antenatal clinic coverage was 97%. Despite this high ANC uptake, delivery at the health facility was 49% while skilled-birth assistance was at 52% which is far lower than the 90 percent proposed target through 2015(Mwangi *et al.*, 2018). These findings compare to other studies done showing minimal utilization of qualified birth attendance (Anyait *et al.*, 2012; Lawn *et al.*, 2011). The results from these surveys also confirmed trends that had been observed in some other African studies showing high ANC uptake but having low acceptance of subsequent skilled services during labor and delivery. Missed chances were observed in delivery of postpartum care, family planning, and new born services to women reporting for care in a medical facility(Mwangi *et al.*, 2018) .

One study undertaken within Kenya's-Nyandarua-south District, established that women who had wrong information on safe birth delivery were 94.4% and had obtained the information from older women who might have been in possession of wrong information thereby engaging in unsafe delivery practices compared to 18.5% of women who had the correct information. The more enlightened and knowledgeable a woman is on the information on safe delivery, the less the chances of her delivering unsafely. Knowhow of associated risks of home delivery was associated with the information source, in that ignorant sources could lead to errors that led to incorrect options regarding safe delivery (Wanjira, 2011).

2.4 Postnatal care utilization

Most maternal issues, morbidity and deaths in children can be prevented if post-natal care is applied effectively. According to the Ethiopia Demographic and health survey (EDHS), postpartum care greatly helps care givers to identify and understand post-delivery issues and provide timely treatment (EDHS, 2012). Absence of healthcare during postpartum could lead to ill-health, incapacities and death (EDHS, 2012). The world today loses about 830 women daily from difficulties relating to pregnancy or childbirth. Majority of these mortalities occur in low income populations segments and could be prevented (Alkema *et al.*, 2016). WHO highlights that 6.3 million youngsters aged less than 15 years died in 2017, comprising of 5.4 million under 5, while 2.5 million died in their first month. The figures translate to the fact that there are 15000 deaths of children under five years daily. Compared to the high income countries, the sub-Saharan African child is 15 times more likely to lose life before attaining the age of 5 (WHO, 2018). With sub-Saharan Africa taking up the lion share in maternal deaths compared to the rest of the world, the risk of a baby dying on its first day in Africa is nearly one in every 100 live births (Alvarez JL, 2009). In sub-Saharan Africa, little or no progress has been made as compared to other high income countries where remarkable progress has been made.

WHO indicates that the rate of provision for skilled health care is much lower at the time of PNC compared to ANC (2010b). Though there is no direct way to reduce maternal mortality, available research indicates that mother and child deaths could be reduced through PNC (Blank *et al.*, 2013; Robert Pattinson, 2011; WHO, 2013). Postnatal care has a lot of merits on maternal and neonatal health, but despite this, a lot of women and their babies do not receive postnatal care from skilled health professionals after giving birth, making it the most overlooked window during the provision of quality.

2.5 Factors associated with skilled care uptake during and after birth

Some of the factors that may encourage women to deliver at a health facility include complications that might occur during labor, supportive spouses and in-laws, means of transport availability, proximity to the birthing centres, availability of financial

incentives, presence of qualified midwives and hospitable care providers(Shah *et al.*, 2018). In a community-based study in Ethiopia, hospital delivery of last pregnancy, family income of above 1500 ETB monthly, planned and supported last pregnancy, a live birth of last pregnancy, and maternal educational status of at least secondary school, were positively associated with postnatal care utilization(Wudineh *et al.*, 2018). Similarly, a study done in TharakaNithi sub-county, Kenya concluded that determinants of the place of delivery include the woman's age, educational level, personal income, parity, ANC attendance (Gitonga, 2017).

A combination of training of Health workers, CHEWs and CHVs as well as availing basic delivery kit has been shown to boost maternal-infant indicators. Further, CHEWs can reach out to Traditional Birth Assistants (TBAs) as an approach to boosting uptake of facility delivery and postnatal care. An educated woman is well equipped to make apt decisions regarding pregnancy and childbirth as is on their general health. Further, a more knowledgeable woman is stands a higher probability of making appropriate resolution during obstetric emergencies (Jammeh A, 2011).

Maternal delivery behavior could be influenced by possession of right obstetric information. Increased utilization of facility delivery can be achieved through encouraging and persuading women of the benefits of skilled birth attendance as well as appraising them of consequences thereof, in case of failure to seek skilled professional care as observed in a Nepal study. In the study, women acknowledging that unforeseen problems could crop up during antenatal and delivery period had higher probability to take up health facility delivery than those oblivious of the potential consequences. Likewise, women who were familiar with at least one danger sign in pregnancy , a danger sign during labor and delivery and a postpartum danger sign , were more likely to take up facility delivery (Karkee *et al.*, 2014).

Other enhancers include nearness to a health care Centre, woman's condition, TBAs integration in health care system, and availability of health care information (Karanja *et al.*, 2018).

Postnatal care is linked to factors like the age of a woman, the level of education, location, means of delivery, past pregnancies, knowhow on obstetric related warning

sign and information on postnatal care. These determinants used in the utilization of the postnatal care are different between cultures and social economic settings(DiBari *et al.*, 2014; Jat *et al.*, 2011) . According to DiBari, in a multivariable analysis, done on women delivering in Los Angeles- California, the risk factors of PNC include low level of income, lack of prenatal care, being divorced and trying to get pregnant(DiBari *et al.*, 2014) .

A study undertaken in 2013 utilizing the NDHS data set, indicated that elements determining the utilization of MCH services include the level of education of spouse and the husband, residence of the patient, and the family income level. Antenatal care protocols advocate for delivery at a medical facility and postnatal care uptake ; implying that giving birth at a health facility determines postnatal care uptake (Tukur Dahiru, 2015). In a study done in DebreBerhan town-NE of Addis Ababa, factors that most significantly associated with PNC utilization were maternal educational level, parity as well as the method of delivery used. Increasing awareness about PNC, counselling and booking women using the PNC follow-up protocol enhances PNC utilization (Akibu *et al.*, 2018).

2.6 Factors hindering utilization of skilled care during and post delivery

A global meta review including 98 systematic reviews with 110 interventions to improve quality of care (QoC) applying the six domains of WHO's framework for organizational management strategies—information, patient–population engagement, leadership, regulations and standards, organizational capacity and models of care with addition of two new domains, ‘communication’ and ‘satisfaction’, identified key barriers including language barriers in information and communication; power difference between users and providers; health systems not accounting for user satisfaction; variable standards of implementation of standard guidelines; shortage of resources in health facilities and lack of studies assessing the role of leadership in improving QoC. These are common for pregnant women, newborns and children(Nair *et al.*, 2014).

DiBari *et al.*, concluded that among the barriers to postpartum care include not feeling sick, distraction by the child, household errands, and lack of necessity.

Educating the society and improving access to care can trigger the adaptability of postpartum visits thus contributing to the improvement of mother's health. (DiBari *et al.*, 2014). In the rural setting where the health systems are fragile and in the developing nations that lacks strong health systems, women are not able to access obstetric care easily (Golidie S J., 2010). The capability of women to access applicable, cost effective, and timely transport determines their ability to access preventive and emergency obstetric care necessary for survival.

Results on a research done by the Kenyan government, indicated slow progress in the achievement of maternal and newborn targets are attributed by factors including poor community involvement, limited availability of qualified/skilled birth attendants, poor accessibility of skilled delivery attendance, as well as childbirth and postnatal periods (GOK, August 2010). With shortage of facilities in the rural set up, women are forced to travel longer to look for delivery services and this is also complicated by scarcity of transportation.

Institutional deliveries that hinder women from accessing healthcare include societal taboos and beliefs that take childbirth as a normal life occurrence, the notion that children are cared for within the family setting by the family members, a friendly environment and young women's position in the family. Other barriers include ease of access to care, quality services, poor road network, limited financial incentives, incompetent midwives and poor infrastructure, equipment and tools at the birthing centers (Shah *et al.*, 2018). Similar findings from Magadi sub-county in Kenya showed women do not play a key role in determining a child's birth place. Barriers identified included unfamiliar birthing positioning, lack of respect and abuse by care givers, distance barriers, birth plan issues, and the lack of the necessary medication (Karanja *et al.*, 2018).

2.7 Interventions on Maternal-infant-health on utilization of skilled care

The World Health organization points out that for motherhood to be safe, it is critical that skilled and qualified care personnel are utilized during pregnancy and childbirth (WHO, 2010a). Further, Shah, 2018, indicate that institutional delivery can be improved by scaling up the competency of the caregivers, while uplifting the status

of the birthing Centre's, and educating the public on the ills of some of their taboos and traditions that hinders women from accessing healthcare (Shah *et al.*, 2018).

In Northern Uganda, there was a rise in key antenatal care and delivery indicators after the community was mobilized and the country's health facility better equipped making the first antenatal attendance increase from 56.0% of the women who attended ANC in 2009 to 93.7% in 2012 (Ediau *et al.*, 2013). Another study in Uganda, looking at determinants of early PNC uptake concluded that interventions should focus on women who have home deliveries, those who attend less than four ANC visits, and those with primary level education (Ndugga *et al.*, 2020).

Kenya has taken significant steps in addressing mother to child care as several reports and government documents have shown. These documents include, "Six Pillars of Kenya's Maternal neonatal and child health programme as well as the strategic framework that has been introduced by the first lady in Human immunodeficiency virus prevention and the promotion of MNCH in Kenya" (OfficeoftheFirstLady, 2013). The result of this intervention has led to all delivery services being free in Kenya's Public Health facilities thus reducing financial burden during delivery thereby promoting easier access.

According to the country's maternal and newborn health strategies, all level one facilities are expected to offer full range of normal delivery yet only twenty-one percent offer the services (GOK, August 2010; KSPA, 2010). The reduction of deaths in women and their infants depends on identifying and addressing those services that are key to women and girls in the community including ANC, obstetric care, postpartum care, FP, and sexually transmitted infections/HIV/AIDS services (Aisi, 2011). To increase the coverage of survival interventions, WHO advocates for the strengthening of healthcare system, and the integration of these interventions from home to care facility; during conception, ANC and PNC period (WHO, 2011).

2.8 Conceptual framework

In analyzing factors that affect the utilization of mother to child healthcare services, a framework addressing health utilization is important. The use of Andresen's phase

two model of Health Services Utilization has been employed (Andersen, 2005). This model assumes that skilled and qualified care, pre and post-delivery is as a result of thoughtful behaviour intention. Psycho-social, economic, and demographic attributes influence behavior. An individual's outlook towards a given conduct is as a result of the outcome that individual presumes from performing the act. This model shows the outcome of thoughtful adjustment of the prevailing independent variables via application of a community-level maternal-health-intervention to reproductive age women by enhancing or hindering usage of skilled professional care through pregnancy, labor, delivery and postpartum.

Independent variables for this study include socio-demographic, obstetric and health facility-related factors. The inter-play of these variables together with the intervention impact on the primary outcome – facility delivery and further on the secondary outcome – utilization of postnatal care.

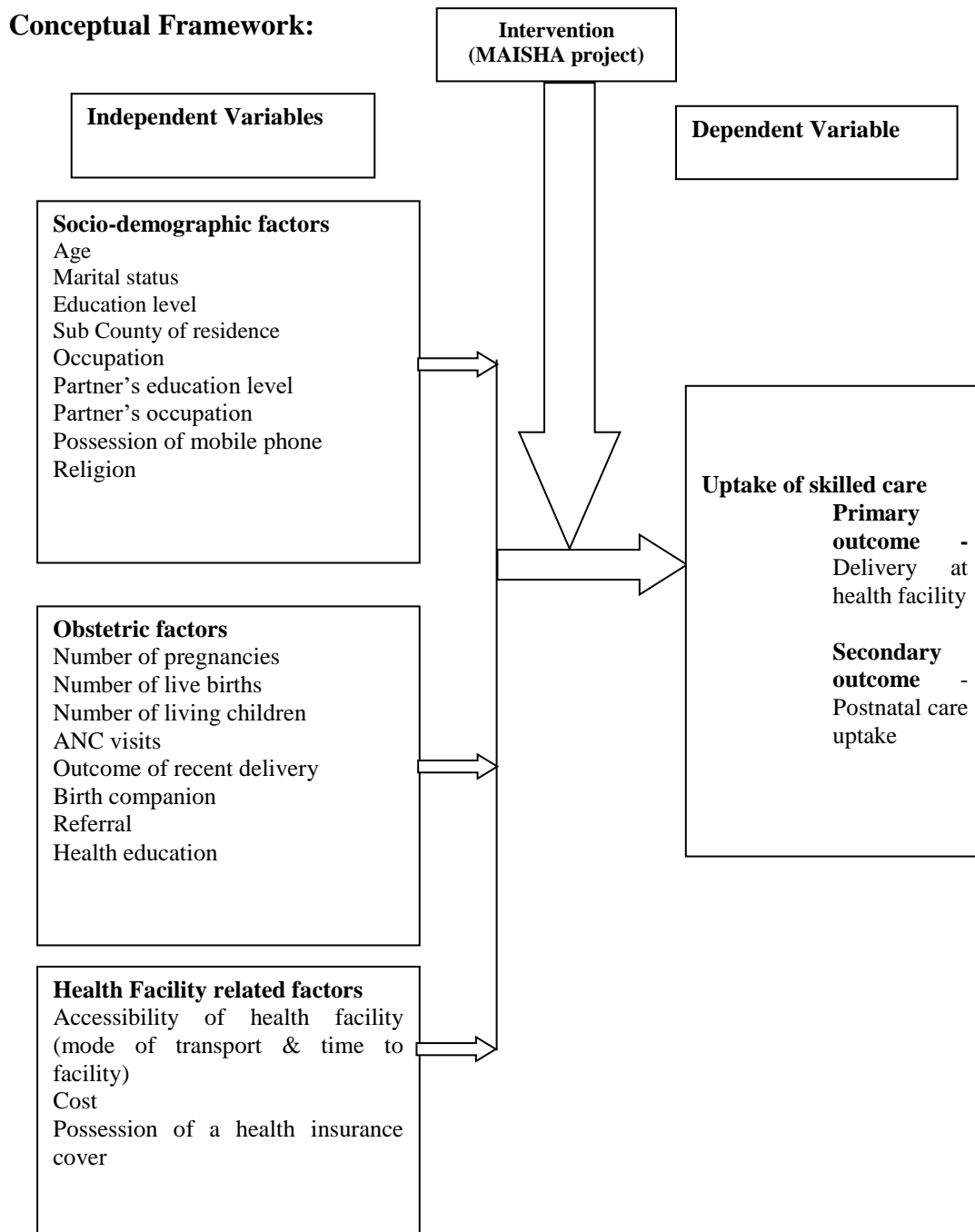


Figure 2.1: Conceptual framework

Source: Andersen's Phase 2 Model of Health Services Utilization (Andersen, 2005).

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study area and Study setting

This study was undertaken in Migori and Rongo sub-Counties in Migori County. Migori County borders the County of Homa Bay, Narok and Kisii. It also shares border with republic of Tanzania and Uganda via Lake Victoria. The county lies within the former Nyanza Province in the Southwestern Kenya. The County has a population of 1,116,436 and average household size of 4.6 persons as per the 2019 census. The setting for the study was rural health facilities within Migori County. The intervention was implemented in Migori sub-County (Migori East and Migori West). Women in Rongo sub-County (Control) received no intervention. This intervention is here referred to as ‘the MAISHA Project’.

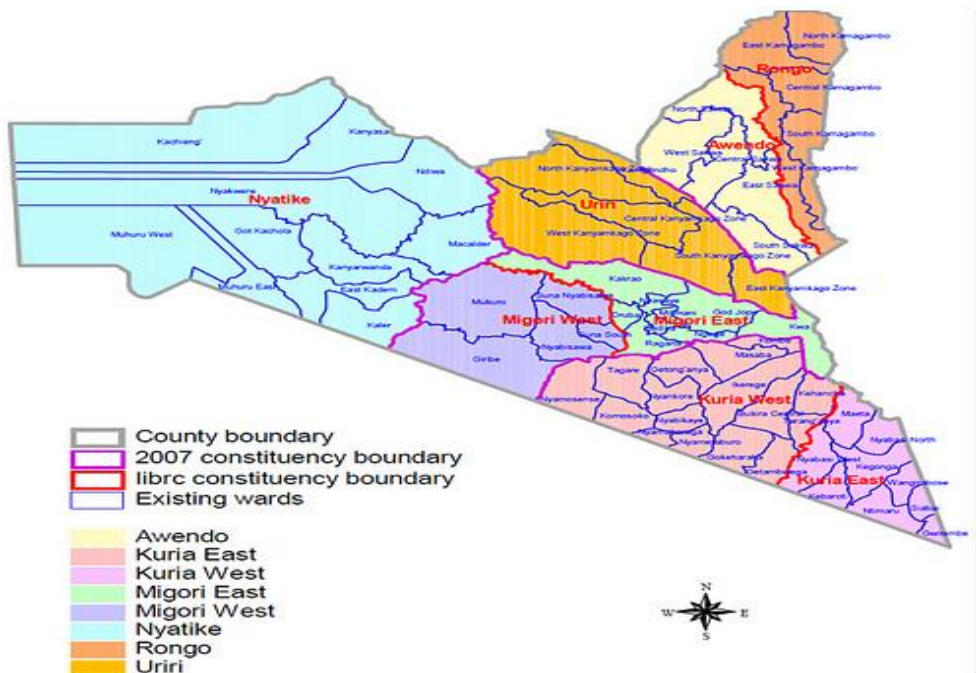


Figure 3.1: Migori County map (showing County and constituency boundaries)

Table 3.1: Migori County Administrative units

Sub-County	Divisions	Locations	Sub-locations
Migori	3	15	30
Nyatike	5	13	26
Kuria East	4	13	26
Kuria West	5	14	30
Awendo	2	7	21
Uriri	2	7	19
Rongo	2	7	22
Total	23	76	174

Source: County Commissioner's Office, Migori, 2013

3.2 Study design

A quasi-experimental design was applied in this study. This was a posttest only nonequivalent groups design. Mixed methods were used.

In a posttest only nonequivalent groups design, one group is exposed to an intervention (intervention arm), a nonequivalent group (non-intervention arm) is not exposed to the treatment, and then the two groups are compared. The design may be considered in instances where an investigator evaluating an interventional project, comes in way after it was initiated or even once it has come to completion. Retrospectively obtained data is used to obtain pretest measures and to construct control group (Maciejewski, 2020; White, 2014).

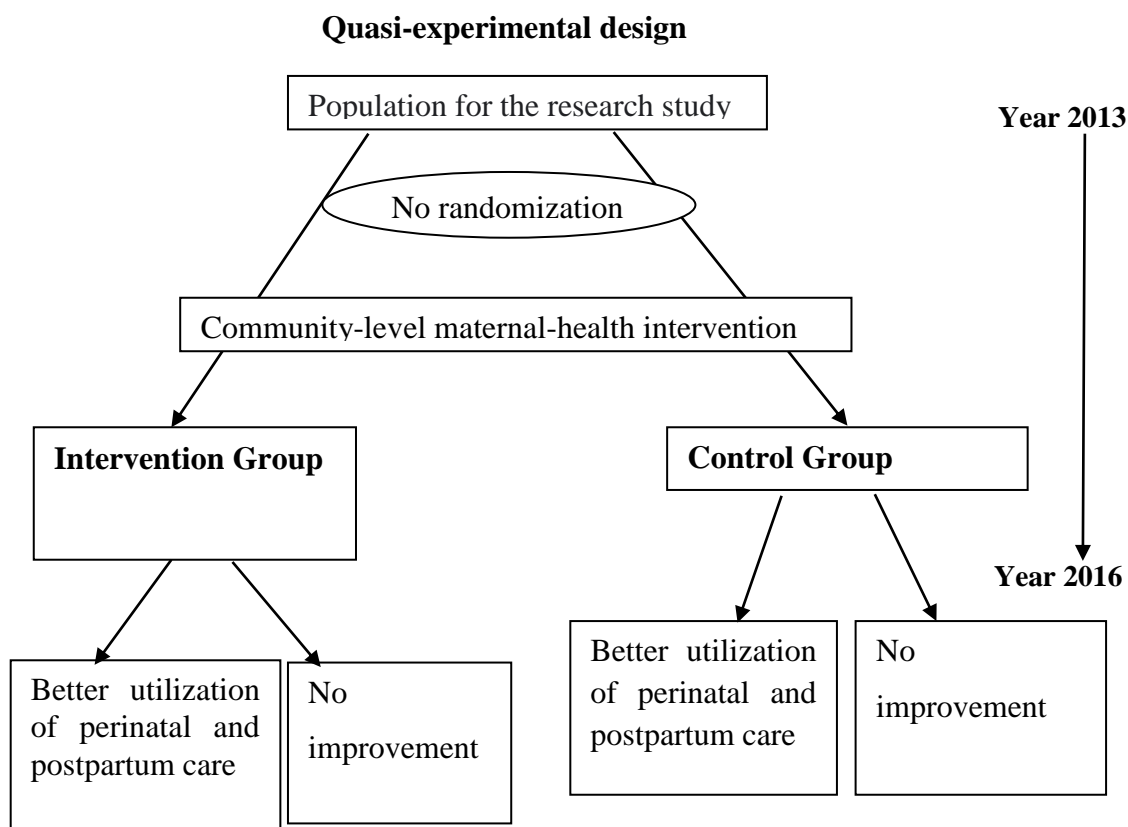


Figure 3.2: Schematic design of the study

3.3 Study Population

Women (15 – 49 years) residing in Sub-Counties of Migori and Rongo formed the study population. Key informants comprising of lead community health workers and clinical heads of health facilities formed the qualitative study population component.

3.3.1 Inclusion criteria

- i. Women (15 – 49 years old) in Migori Sub-County or Rongo sub-County who delivered at least after January 2014.
- ii. Women (15 – 49 years old) residing in Migori Sub-County or Rongo sub-County the whole time during perinatal and postpartum period.
- iii. Key informants comprising of lead community health workers and clinicians heading health facilities.

3.3.2 Exclusion criteria

- i. Women (15 – 49 years old) residing in Migori Sub-County or Rongo sub-County who indicated to have had a health facility delivery but failed to produce a verifiable document for confirmation.
- ii. Women (15 – 49 years old) residing in Migori Sub-County or Rongo sub-County evaluated as being too sick as to deter their participation.

3.3.3 Quantitative Study Population component

Women (15 – 49 years old) in Migori Sub-County and Rongo sub-County who delivered at least after January 2014 formed the study population for the quantitative component.

3.3.4 Qualitative study population component

To supplement the quantitative data, key informants comprising of lead community health workers and clinician heads of health facilities aided in exploring barriers to utilization of facility delivery and postpartum care uptake.

3.4 Sampling technique

3.4.1 Sample size determination

Quantitative study population sample component was worked out as described by Kelsey *et al.* (Kelsey, 1996). Proportion with outcome in the non-interventional group being 53.3% (source: MAISHA baseline survey, 2013 data on health facility delivery in Migori County) and proportion with outcome estimated at 65% in intervention group (Kenya National Bureau of Statistics *et al.*, 2015). Health facility delivery in Nyanza region was 65% in the 2014 demographic survey. This study hypothesized that interventional measures (MAISHA project) would contribute about 11.7% increase in health facility delivery attributable to the intervention.

Sample size calculation method was:

$$N_{Kelsey} = \frac{(z_{\alpha/2} + z_{\beta})^2 p(1-p)(r+1)}{r(p_0 - p_1)^2} \quad \text{With: } P_0 = 53.3\%, P_1 = 65\%, P = 59.15\%$$

α Significance level(0.05), a 95% confidence interval was used

β Probability of type II error, β -level of 0.20 (power of the test at 80 percent)

A ratio of 1:1 for Controls (Non-interventional group) and Treatment groups was adopted.

P = $\frac{P_1+rP_0}{1+r}$ = weighted average of P_1 and P_0 .

$1+r$

P_0 Non-interventional group proportion

P_1 Interventional group proportion

r Ratio of Non-interventional group to interventional group

N Sample size, calculated to be 582(Sample size in exposed=291, sample size in non-exposed=291)

Using a ratio 1:1 for Non-interventional group to interventional group, a minimum sample of 582 women meeting inclusion criteria, was chosen on a ratio of 1:1, each sub-County producing a minimum of 291 participants.

Eight key informants (KIIs), a pair each (one facility head and a community unit representative – community health worker) for the qualitative study population component data collection were picked from Odong (two), Godkwer (two), Nyamaraga (two), and Ogwedhi (two), representing each health center and community unit.

3.4.2 Sampling process

For the quantitative study population sample, a minimum of 582 women meeting inclusion criteria was chosen on a ratio of 1:1, each sub-County producing a minimum of 291 participants. Women (15 – 49 years old) residing in Migori sub-County or Rongo sub-County the whole time during perinatal and postpartum period, and gave birth after January 2014 were selected for the household survey. Through the Community Strategy structure of the ministry of health (MOH), aided by provincial administration and community health volunteers (CHVs) handling specific households as per the Community Strategy framework, the eligible women were mapped out.

Migori and Rongo Sub-Counties each has 30 and 22 sub-locations respectively (Source: County Commissioner's Office, Migori, 2013). A proportionate minimal sample, based on the respective total number of sub-locations and overall total sample was computed. Consequently, each sub-location in Migori sub-County had 10 participants, while in Rongo each had 14 women participating in the study. Locator information for eligible women was made possible by the community volunteers (CHVs). Research assistants, guided by the CHVs, visited the households with eligible women and consecutively interviewed them. If a prospective participant failed to give consent, replacement was done with subsequently eligible participant. Participants were consecutively recruited till the total sample size was attained.

Eight KIIs were selected, a pair each (one facility head and a community unit representative – community health worker) were purposely selected from Odong (two), Godkwer (two), Nyamaraga (two), and Ogwedhi (two), representing each health center and community unit. Data saturation guided the number of Key Informants that were included. Further selection of Key Informants was stopped on realization that with only a single representation each for the facility-community unit, responses yielded similar information.

3.5 Tools for data collection

3.5.1 Quantitative data collection tool and research assistants

A questionnaire administered to participants by trained research assistants, was the quantitative data collection tool. The interview took about 20 - 30 minutes of participant's time. The questionnaire comprised closed-ended questions. It was structured into sub-sections, including: social-demographics, antenatal care attendance profile, delivery and postnatal care uptake profile.

For one to qualify as a research assistant, they had to have at least high school education and further be conversant with the study area. These research assistants were trained on data collection skills and basic health research ethics. The training was both theoretical and practical, where the research assistants did 'mock' interviews filling in sample questionnaires.

3.5.2 Tool for qualitative data collection

Qualitative data was collected in an audio recorder directed by a key informant interview guide. The key informant interviewing guide questions were open ended to allow respondents to give responses freely. The interview took about 30 - 40 minutes of participant's time. The themes addressed included attitudes of health workers towards women presenting for care, attitudes and beliefs of women towards seeking care at health facility, access to health facility including cost implications and the role of TBAs and partners (male involvement). Verbatim recording of responses in an audio recorder was done.

3.6 Validity, Reliability and Pre-testing

3.6.1 Validity

Validity is an indicator of extent to which study findings can be accurately interpreted and generalized to other populations (Tazuddin, 2021). To ensure validity of the research instruments, the questionnaire and key informant guides were given to supervisors who evaluated each element in relation to the objectives and assessed

if the instruments answered the research questions. Supervisors explored whether all the aspects in the conceptual framework reflected the objectives of the study. Items in the questionnaires and key informant guides were also appraised to check whether they were written in simple English language that could be straightforwardly understood.

3.6.2 Reliability

Reliability refers to the degree to which study findings are considered consistent and replicable (Mohajan, 2017). To ensure reliability of the study was upheld; a pre-test study was conducted to ensure that the research instrument was accurate in terms of collecting relevant data and information required in the study, medical terminologies were avoided so that the participants could comprehend the questions easily and respond appropriately, the aim of the study was explained to all participants and their informed consent and cooperation to participate in the research obtained and the researcher was available during data collection sessions in order to explain any unclear questions and aspects.

3.6.3 Pretesting of data collection instruments

A pilot study was done at Mukurwe-ini, a former district in Nyeri County, among 10% of the sample population (N=592). A sample of sixty women with similar inclusion characteristics thus participated in the pilot. This was done to check consistency and appropriateness of the study tools in bringing out required data, additionally establishing estimated time necessary in administering the tools and refining as was applicable. Pilot study findings were not included in the study results.

3.7 Data management and analysis

Main data collected was quantitative from the questionnaires, which were coded, then entered into a STATA 11.2 data set ready for analysis. To supplement quantitative data, key informants were audio recorded, and discussions transcribed.

3.7.1 Management of quantitative data

Immediately after a participant was interviewed, respective completed questionnaire was checked to ensure completeness. In case missing information was noted, respective participant was asked for clarification there and then. Data collected was coded, entered, cleaned, and then managed via STATA version 11.2 databases that were created. Descriptive and analytical Statistical analyses were done.

Socio-demographic factors analyzed include categorical variables like education level of the participating women: partner education level, age, participating woman and partner's occupation, marital status and religion. Percentages, frequency distribution and mean are some of the descriptive statistics computed. These univariate categorical variables were presented in tables.

The study assessed possible associations between the dependent variables (uptake of facility delivery and postpartum care) and independent variables. The independent variables included social-demographic, maternal health care, health facility, and physical access factors.

At bivariate analysis, Chi-square test, at 95% CI was applied to determine relationship between variables. Significant factors at bivariate analysis were imputed into a multivariate analysis model. Statistical significance was set at a p-value less than 0.05. Variables significant at p value less than 0.1 got entered into multivariate regression analysis, stepwise backward elimination model. Factors remaining after the stepwise backward elimination procedure were summarized as independent factors associated with utilization of health facility delivery (SBA) or postpartum care (PNC).

3.7.2 Management of qualitative data

Verbatim audio recordings were done. This was followed by verbatim, manual transcription of the audio recordings. Data generated was ordered into themes pertinent to the objectives of the study. Thematic analysis for qualitative data was carried out by identifying, coding, and categorizing patterns or themes found in the

data. The themes addressed included attitudes of health workers towards women presenting for care, attitudes and beliefs of women towards seeking care at health facility, access to health facility including cost implications and the role of TBAs and partners (male involvement). Thematic analysis emphasizes examining, highlighting and recording trends in data (Sutton & Austin, 2015). Narratives and verbatim quotes were used in the qualitative data presentation.

3.8 Ethical considerations

The research proposal was approved by Ethical Review Committee of Kenyatta University, Approval Number: KU/R/COMM/51/780 (Appendix 2). Permission to carry out research was also sought from National Commission of Science and Technology, Permit Number: NACOSTI/P/16/40548/13880 (Appendix 3) and from the Director, Health Services, Migori County [dated 25th October 2016, approved 1st November 2016 (Appendix 4)], before any field work pertaining to the study. Participants were assured of confidentiality and anonymity for any information they gave. Participation was voluntary, and informed consent (Appendix 10) was obtained from every participant. Participants were free to withdraw participation from the study at any time at their own volition.

There was no cost to participating in the study. There were neither foreseeable risks nor direct benefits in participating in the study. However, the study generated findings that would be of benefit to participants, the community and the nation at large. All participants 18 years and above were deemed able of giving written informed consent. Participants aged 15 to below 18 years were considered - 'mature minors' from whom a written assent was obtained in addition to permission from a parent/guardian. While conducting the interviews, measures were taken to ensure privacy of participants. Raw data was confidentially protected. Data entered into computer was password protected all through. While disseminating findings, in published articles, seminars and reports, anonymity was maintained.

3.9 Study limitations and delimitations

This study was not devoid of limitations. Inherent in the design, due to lack of random allocation of participants to either Intervention or Control, firm causal associations may not be established. However, given that the intervention preceded measurement of the outcome (Primary outcome being proportion of health facility delivery), causality is estimated. Further, contamination was also likely due to geographical proximity of both intervention and control group's Sub-County of residence, coupled with close social interactions among residents in this region. Efforts to spatially reduce this were effected, where the control group (Rongo Sub-County), was selected to be farthest from the intervention in Migori Sub-County. Geographically, in-between the Intervention and Control are two other Sub-Counties namely Uriri and Awendo.

Another threat that may have affected uptake of skilled care was the Kenya's government introduction of free maternity service policy in June 2013. This strategy may have contributed to enhancing the effect size achieved in this study. Country-wide health workers labor unrest in 2016/2017 may have had a negative effect on the utilization of skilled care. Nonetheless, since both the intervention and control were similarly affected, together with multivariate analysis, relatively precise determinants could still be realized.

CHAPTER FOUR

RESULTS

A total of 590 participants (N=590), 298 in Migori (Intervention) and 292 in Rongo (Control) sub-Counties formed the quantitative dataset. Eight key informants helped explore barriers to utilization of skilled professional care in health facilities.

A total of 444 of the participants had their recent delivery at a health facility (n=444). The Intervention group reported a higher proportion (80.5%, 240) of facility deliveries compared to the Control arm (69.9%, 204). There was a 27.2 percent increase in utilization of facility delivery in the Intervention arm (from 53.3%, at baseline to 80.5%, at end line, after intervention), compared to 16.6% increase in the Control arm (from 53.3%, at baseline to 69.9%, at end line).

A total of 565 of the participants presented for postnatal care after their recent delivery (n=565). Aggregated by Sub-County, the Intervention arm had a slightly higher level of postpartum care uptake 292, (98%) than the Control 273, (93.49%). Prompt postnatal care uptake within six weeks of birth, was recorded in 64%, (362) of the participants.

4.1 Participants' Socio-demographic and socio-economic Characteristics

Participants in both the intervention and control arms had comparable socio demographic characteristics. All were within 15-49 years age range, majority being aged 20-29 years. The median age for participants in the intervention arm was 24 years while that for control group was 25 years. Most of the women sampled possessed a mobile phone handset, 96% (286) for the intervention arm and 90.8% (265) in the control. A small minority had been registered with NHIF, 12.4% (37) for the intervention and 7.5% (22) in control sub-County. These are summarized in table 4.1 below:

Table 4.1: Demographic and Socio- economic characteristics of participants

Characteristic		Freq. (%)	Intervention Grp(N=298) Freq. (%)	Control Grp(N=292)
Age category	15-19	53(17.8)	34(11.6)	
		20-24	98(32.9)	109(37.3)
		25-29	67(22.5)	75(25.7)
		30-34	49(16.4)	46(15.8)
		35-39	19(6.4)	18(6.2)
		40-44	8(2.7)	7(2.4)
		45-49	4(1.3)	3(1.03)
		Total	298(100)	292(100)
In polygamous marriage	Yes	79 (26.5)	44(15.1)	
		No	219 (73.5)	248(84.9)
Marital status	Single	32 (10.7)	25(8.6)	
		Widowed	11 (3.7)	6(2.1)
		Married	255 (85.6)	261(89.4)
Woman's education level	None	1(0.34)	2(0.68)	
		Primary	238(79.87)	224(76.71)
		Secondary	47(15.77)	63(21.58)
		College/University	12(4.03)	3(1.03)
Partner's education level	None	1(0.34)	6(2.05)	
		Primary	196(65.77)	184(63.01)
		Secondary	57(19.13)	69(23.63)
		College/University	11(3.69)	11(3.77)
		N/A/Single	33(11.07)	22(7.53)
Woman's occupation	Farmer	177(59.4)	145(49.66)	
		Casual labor	17(5.7)	27(9.25)
		Business	48(16.11)	44(15.07)
		Housewife	43(14.43)	62(21.23)
		Govt. Employee	6(2.01)	1(0.34)
		In school	7(2.35)	13(4.45)
Partner's occupation	Farmer	143(47.99)	137(46.92)	
		Casual labor	59(19.8)	62(21.23)
		Business	43(14.43)	58(19.86)
		Stay home	11(3.69)	11(3.77)
		Govt. Employee	8(2.68)	2(0.68)
		In school	33(11.07)	22(7.53)
		Church leader	1(0.34)	0(0.00)
Has mobile No.	Yes	286(96.0)	265(90.8)	
		No	12(4.0)	27(9.3)
Registered with NHIF	Yes	37 (12.4)	22(7.5)	
		No	261 (87.6)	270(92.5)

4.2 Participants' Obstetric History

Most of the participants had attended prenatal care (ANC) and reported having had between 2 to 4 pregnancies, with majority of them having had at least four ANC visits recorded, as summarized in table 4.2 below:

Table 4.2: Participants' Obstetric History

Characteristic		Intervention	Control
		Grp(N=298)	Grp(N=292)
		Freq. (%)	Freq. (%)
ANC attendance for last pregnancy	Yes	295(98.99%)	289(98.97%)
	No	3(1.01%)	3(1.03%)
Number of ANC visits in last pregnancy	0	3(1.01%)	3(1.03%)
	1	7(2.35%)	18(6.16%)
	2	23(7.72%)	20(6.85%)
	3	78(26.17%)	52(17.81%)
	≥4	187(62.75%)	199(68.15%)
Parity(pregnancy)	1st	62(20.81%)	51(17.47%)
	2nd -4th	156(52.35%)	152(52.06%)
	> 4	80(26.84%)	89(30.48%)
Number of live births by woman	1 or 2	125(41.95)	118(40.41)
	3 or 4	96(32.21)	93(31.85)
	>4	77(25.84)	81(27.74)
Birth companion presence	Yes	258(86.58)	260(89.04)
	No	40(13.42)	32(10.96)
Received health messages on SBA	Yes	282(94.63)	284(97.26)
	No	16(5.37)	8(2.74)
Referred to health facility	Yes	258(86.58)	234(80.14)
	No	40(13.42)	58(19.86)
Outcome of recent birth	Live birth	297(99.66)	289(98.97)
	Stillbirth	1(0.34)	1(0.34)
	Neonatal death	0(0.00)	2(0.68)

Though majority attended no less than four antenatal clinic visits, close child spacing was observed.

4.3 Participant’s quality of care rating after the most immediate health facility visit

In most of the parameters assessed for quality of care offered, participants reported high positive rating of care offered at health facilities. Many reported having been handled in a comfortable environment and their newborns taken care of in an excellent manner. Despite these positive ratings, few stated that they had to pay some fee for services and in some instances met hostile health facility workers. The perceptions on quality of care rating are summarized in table 4.3 below:

Table 4.3: Perceived quality of care rating after the most immediate health facility visit

Characteristic	Control(N=292)	Intervention(N=298)
	(YES)	(YES)
Health workers attentive	283(96.92%)	287(96.31%)
Cleanliness of facility	286(97.95%)	296(99.33%)
Good care of baby	279(96.21%)	290(97.64%)
Drink / food offered post delivery	123(42.12%)	113(37.92%)
Medication available	236(81.10%)	260(87.25%)
Kept comfortable	256(87.97%)	279(93.62%)
Supplies sufficient	241(82.82%)	256(85.91%)
Paid some fee	102(34.93%)	55(18.46%)
Health workers unwelcoming	69(23.63%)	80(26.85%)

Note: For each characteristic, the positive rating (YES) is as indicated in the table. The contrary – negative rating (NO) is the difference from 100%.

4.4 Health facility delivery

Aggregated by Sub-County, the Control arm reported a lesser proportion of women who delivered in a health facility compared to the Intervention group as shown in the table below (table 4.4).

Table 4.4: Delivery place aggregated by Sub County

Sub-County	Delivery place		Total
	Health facility	Home	
Migori(Intervention)	240(80.5%)	58(19.5%)	298
Rongo(Control)	204(69.9%)	88(30.1%)	292
Total	444	146	590

Overall, there was 75.25% (444) proportion of women who delivered in a health facility.

4.5 Utilization of postpartum care

Aggregated by sub-County, the Intervention arm had a slightly higher level of postpartum care uptake 292, (98%) than the Control 273, (93.49%) as shown in table 4.5.

Table 4.5: Utilization of postpartum care by Sub County

Sub-County	Attended postpartum care		Total
	Yes	No	
Control	273(93.49%)	19	292
Intervention	292(98%)	6	298
Total	565(100%)	25	590

Overall, there was 95.76% (565) proportion of women who utilized postnatal care services at a health facility. Twenty five(4.24%) of all the participants failed to seek for postnatal care services at a health facility.

4.6 Uptake of postpartum care aggregated by the time of presentation and sub-County

Prompt postnatal care uptake within six weeks of birth, was notable in about 64%, (361) of the participants (table 4.6).

Table 4.6: Uptake of postpartum care aggregated by the time of presentation and sub-County

Sub-County	Postnatal visit		
	Within 6weeks	After 6weeks	Total
Migori (Intervention)	105(35.96%)	187(64.04%)	292(100%)
Rongo (Control)	99(36.26%)	174(63.74%)	273(100%)
Total	204	361	565

Note: The sample size n=565 difference with the total sample size (N=590) accounts for those who did not take up postnatal care services at the health facility.

On average, the Intervention sub-County reported better postpartum care utilization regardless of the timing as illustrated in figure 4.1.

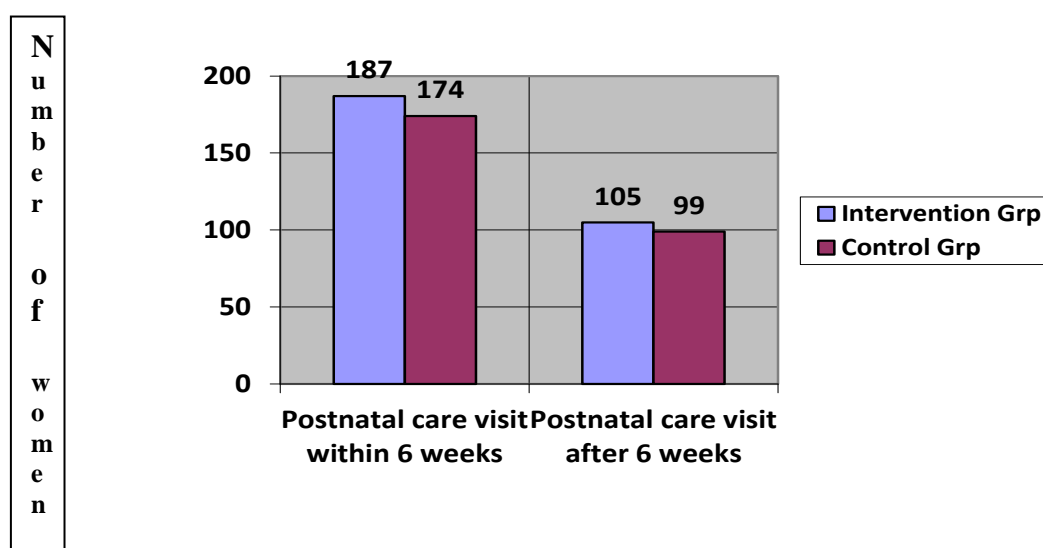


Figure 4.1: Postpartum care utilization by sub-County and time of uptake

Although only a slight percentage difference in postpartum care uptake within six weeks in the two sub-Counties was observed (64.0% – Intervention, 63.7% - Control), multivariate analysis shows greater adjusted odds to utilization of postpartum care in Migori (intervention arm) than in Rongo (non-intervention-arm). Enhancing utilization of postpartum care formed the secondary outcome of the intervention. The goal was fundamentally attained as results at multivariate analysis show [AOR =3.3, 95% CI (1.25, 8.80), p=0.016].

4.7 Factors associated with facility delivery aggregated by allocation (Intervention versus Control) group

Having a birth companion and the number of antenatal care visits a woman attended during the recent pregnancy were common significant factors associated with facility delivery. Table 4.7 makes a comparative summary for these factors.

Table 4.7: Factors associated with facility delivery

Factor	Facility delivery			
	Intervention arm, (n=240)		Control grp, (n=204)	
	Chi2(χ^2)	p value	Chi2(χ^2)	p value
Owens mobile phone	3.93	0.047*	4.58	0.032*
Living children	25.84	0.002*	18.21	0.051
Live births	21.51	0.018*	24.48	0.004*
Pregnancies Number	22.66	0.020*	15.65	0.110
Marital status	2.65	0.266	6.37	0.041*
NHIF Registration	0.01	0.929	0.09	0.761
In polygamous marriage	2.35	0.125	1.78	0.182
Participant's educational level	5.35	0.148	8.23	0.041
Partner's education level	9.33	0.053	9.71	0.046
ANC Attendance	12.54	0.000*	0.02	0.903
Occupation of Partner	9.48	0.149	11.28	0.046
Participant's occupation	6.07	0.299	4.36	0.499
ANC visits Number	32.18	0.000*	16.35	0.003*
Referred to health facility	7.12	0.008*	2.09	0.148
Health educating person	10.21	0.069	7.56	0.182
Health education Received	6.36	0.012*	0.10	0.748
Person giving Referral	12.277	0.092	7.17	0.127
Had birth companion	32.17	0.000*	17.88	0.000*
Accompanying person	52.48	0.000*	30.55	0.001*
Duration to facility	2.00	0.572	3.18	0.416
Transport mode used	69.17	0.000*	13.66	0.003*

Note: The sample size n=444; includes only those who delivered at a health facility.

*Significance level, $p < 0.05$.

4.8 Factors associated with postnatal care utilization aggregated by allocation (Intervention versus Control) group

The number of antenatal care visits a woman attended during the recent pregnancy and participant and partner's occupation were common significant factors associated with facility delivery in both Sub-Counties. Table 4.8 makes a comparative summary for these factors.

Table 4.8: Factors associated with postnatal care utilization

Factor	Postnatal care uptake			
	Intervention arm, (n=292)		Control grp, (n=273)	
	Chi2(χ^2)	p value	Chi2(χ^2)	p value
Number of living children	41.95	0.001*	14.75	0.790
Pregnancies number	43.90	0.004*	22.47	0.316
Livebirths	44.99	0.001*	13.94	0.733
Possess mobile phone	3.01	0.222	4.58	0.032*
Marital status	9.85	0.043*	4.67	0.322
NHIF registration	4.65	0.098	0.24	0.888
In polygamous marriage	2.35	0.125	0.60	0.741
Participant's educational level	7.96	0.241	9.39	0.153
Education level of partner's	8.25	0.409	7.77	0.456
ANC attendance	18.53	0.000*	2.06	0.358
ANC visits number	29.50	0.000*	24.38	0.002*
Participant's occupation	22.76	0.012*	25.22	0.005*
Occupation of partner	22.11	0.036*	19.46	0.035*
Health education received	2.26	0.324	5.03	0.081
Health educating person	84.78	0.000*	50.96	0.000*
Referred to health facility	1.14	0.565	10.16	0.006*
Person referring	25.57	0.029*	16.16	0.040*
Had birth companion	0.32	0.851	1.49	0.474
Duration to facility	16.48	0.011*	16.34	0.012*
Transport mode used	34.71	0.000*	11.34	0.079
Accompanying person	28.83	0.050	72.60	0.000*

Note: The sample size n=565; includes only those who took up postnatal care at a health facility.

*Significance level, $p < 0.05$.

4.9 Participants' Socio-demographic and socio-economic characteristics associated with facility delivery

Significant association was observed between delivery place and the sub-County a participant hailed from (χ^2 9.02, $P= 0.003$). Partner's occupation, Woman's educational level, marital status, and age category of woman, were significantly associated with health facility delivery. A summary of these factors is tabulated in table 4.9 below.

Table 4.9: Participants' Socio-demographic and socio-economic characteristics associated with facility delivery

Characteristic	Delivery place for recent pregnancy		χ^2	p-value	
	Health facility n=444(75.25%)	Home n=146			
Participant's Sub-County of residence	Rongo	204(45.95)	88(60.27)	9.02	0.003*
	Migori	240(54.05)	58(39.73)		
Age category	15-19	76(17.12)	11(7.53)	12.51	0.037*
	20-24	148(33.33)	59(40.41)		
	25-29	107(24.10)	35(23.97)		
	30-34	72(16.22)	23(15.75)		
	35-39	27(6.08)	10(6.85)		
	40-44	11(2.48)	4(2.74)		
In polygamous marriage	Yes	3(0.68)	4(2.74)	2.38	0.123
	No	86(19.37)	37(25.34)		
Marital status	Single	358(80.63)	109(74.66)	8.73	0.013*
	Widowed	52(11.71)	5(3.42)		
Woman's education level	Married	12(2.70)	5(3.42)	11.4	0.005*
	None	380(85.59)	136(93.15)		
	Primary	1(0.23)	2(1.37)		
Partner's education level	Secondary	338(76.13)	124(84.93)	16.19	0.002*
	College/University	90(20.27)	20(17.70)		
	None	15(3.38)	0(0.00)		
	Primary	3(0.68)	4(2.74)		
Woman's occupation	Primary	272(61.26)	108(73.97)	7.33	0.225
	Secondary	102(22.97)	24(16.44)		
	College/University	17(3.83)	5(3.42)		
	N/A/Single	50(11.26)	5(3.42)		
	Farmer	239(53.83)	83(56.85)		
	Casual labor	29(6.53)	15(10.27)		
Partner's occupation	Business	72(16.22)	20(13.7)	15.69	0.009*
	Housewife	79(17.79)	26(17.81)		
	Govt. Employee	7(1.58)	0(0.00)		
	In school	18(4.05)	2(1.37)		
	Farmer	207(46.62)	73(50)		
	Casual labor	82(18.47)	39(26.71)		
Has mobile No.	Business	80(18.02)	21(14.38)	10.28	0.001*
	Housewife	18(4.05)	4(2.74)		
	Govt. Employee	7(1.58)	3(2.05)		
	In school	50(11.26)	5(3.42)		
	Church leader	0(0.00)	1(0.68)		
	Yes	423(95.27)	128(87.67)		
Registered with NHIF	No	21(4.73)	189(12.33)	0.26	0.611
	Yes	46(10.36)	13(8.90)		
	No	398(89.64)	133(91.10)		

Note: Pearson's Chi square reporting *Fishers's* exact in cases where cell count was ≤ 5 was used.

*Significance level, $p < 0.05$.

4.10 Participants' obstetric history associated with facility delivery

Significant association was observed between delivery place and ANC attendance for last pregnancy and frequency of visits, parity, presence of a birth companion and having been referred for delivery to health facility. The associations are summarized in the table 4.10.

Table 4.10: Participants' obstetric history associated with facility delivery

Characteristic		Delivery place for recent pregnancy			p-value
		Health facility	Home	χ^2	
		n=444(75.25%)	n=146		
ANC attendance for last pregnancy	Yes	442(99.55)	142(97.26)	5.72	0.036*
	No	2(0.45)	4(2.74)		
Number of ANC visits in last pregnancy	0	2(0.45)	4(2.74)	40.12	0.000*
	1	14(3.15)	11(7.53)		
	2	19(4.28)	24(16.44)		
	3	96(21.62)	34(23.29)		
	≥ 4	313(70.50)	73(50.00)		
Parity	1st pregnancy	98(22.07)	15(10.27)	9.89	0.007*
	2nd pregnancy	224(50.45)	84(57.53)		
	3rd-4th pregnancy	224(50.45)	84(57.53)		
Number of live births by woman	> 4 pregnancies	122(27.48)	47(32.19)	2.69	0.261
	1 or 2	191(43.02)	52(35.62)		
	3 or 4	136(30.63)	53(36.30)		
	>4	117(26.35)	41(28.08)		
Birth companion presence	Yes	413(93.02)	105(71.92)	45.66	0.000*
	No	31(6.98)	41(28.08)		
Received health messages on SBA	Yes	429(95.93)	137(93.84)	2.19	0.139
	No	15(3.38)	9(6.16)		
Referred to health facility	Yes	382(86.04)	110(75.34)	9.07	0.003*
	No	62(13.96)	36(24.66)		
Outcome of recent birth	Live birth	441(99.32)	145(99.32)	1.34	0.680
	Stillbirth	1(0.23)	1(0.68)		
	Neonatal death	2(0.45)	0(0.00)		

Note: Pearson's Chi square reporting *Fishers's* exact in cases where cell count was ≤ 5 was used.

*Significance level, $p < 0.05$.

4.11 Health Facility related factors associated with facility delivery

Significant association was observed between delivery place and means of transport used to health facility, having been charged some fee for service and a mild association for availability of medication. These are summarized in the table 4.11.

Table 4.11: Health Facility related factors associated with facility delivery

Characteristic	Delivery place for recent pregnancy		χ^2	p-value	
	Health facility n=444(75.25%)	Home n=146			
Time to health facility	<30min	186(41.89)	64(43.84)	2.73	0.501
	>30min-1hr	220(49.55)	72(49.32)		
	>1-2hrs	30(6.76)	10(6.85)		
	>2hrs	8(1.80)	0(0.00)		
Registered with NHIF	Yes	46(10.36)	13(8.90)	0.259	0.611
	No	398(89.64)	133(91.10)		
Means of transport used	By foot	110(24.77)	90(61.64)	67.96	0.000*
	Matatu	16(3.6)	3(2.05)		
	Motorbike	307(69.14)	49(33.56)		
	Bicycle	11(2.48)	4(2.74)		
Charged some fee	Yes	129(29.05)	28(19.18)	5.49	0.019*
	No	315(70.95)	118(80.82)		
Unwelcoming facility staff	Yes	119(26.80)	30(20.55)	0.131	0.153
	No	325(73.20)	116(79.45)		
Drugs available	Yes	366(82.43)	130(89.66)	4.29	0.048*
	No	78(17.57)	15(10.34)		
	Total	444(100%)	145(100%)		

Note: Pearson's Chi square reporting *Fishers's* exact in cases where cell count was ≤ 5 was used.

*Significance level, $p < 0.05$.

4.12 Participants' Socio-demographic and socio-economic characteristics associated with uptake of postnatal care

Significant association was observed between postnatal care uptake and the sub-County a participant hailed from (χ^2 7.33, P= 0.007). Age category of participants and partner's occupation were the only significant factors for postnatal care uptake at bivariate analysis. The associations are summarized in the table 4.12.

Table 4.12: Participants' Socio-demographic and socio-economic characteristics associated with uptake of postnatal care

Characteristic	Uptake of postnatal care		χ^2	p-value				
	Yes n=565	No n=25						
Participant's residence	Rongo	273(48.32)	19(76.00)	7.33	0.007*			
	Migori	292(51.68)	6(24.00)					
Age category	15-19	83(14.69)	4(16.00)	18.7	0.009*			
	20-24	202(35.75)	5(20.00)					
	25-29	140(24.78)	2(8.00)					
	30-34	85(15.04)	10(40.00)					
	35-39	33(5.84)	4(16.00)					
	40-44	15(2.65)	0(0.00)					
In polygamous marriage	45-49	7(1.24)	0(0.00)	0.157	0.692			
	Yes	117(20.71)	6(24.00)					
Marital status	No	448(79.29)	19(76.00)	0.19	0.762			
	Single	55(9.73)	2(8.00)					
	Widowed	16(2.83)	1(4.00)					
Woman's education level	Married	494(87.4)	22(88.00)	7.65	0.170			
	None	2(0.35)	1(4.00)					
	Primary	441(78.05)	21(84.00)					
	Secondary	107(18.94)	3(12.00)					
Partner's education level	College/University	15(2.65)	0(0.00)	2.84	0.567			
	None	6(1.06)	1(4.00)					
	Primary	363(64.25)	17(68.00)					
	Secondary	121(21.42)	5(20.00)					
Woman's occupation	College/University	22(3.89)	0(0.00)	7.08	0.35			
	N/A/Single	53(9.38)	2(8.00)					
	Farmer	302(53.45)	20(80.00)					
	Casual labor	43(7.61)	1(4.00)					
	Business	90(15.93)	2(8.00)					
	Housewife	103(18.23)	2(8.00)					
	Govt. Employee	7(1.24)	0(0.00)					
	In school	20(3.54)	0(0.00)					
Partner's occupation	Farmer	264(46.73)	16(64.00)	28.09	0.035*			
	Casual labor	120(21.24)	1(4.00)					
	Business	97(17.17)	4(16.00)					
	Housewife	21(3.72)	1(4.00)					
	Govt. Employee	10(1.77)	0(0.00)					
	In school	53(9.38)	2(8.00)					
	Church leader	0(0.00)	1(4.00)					
	Has mobile No.	Yes	527(93.27)			24(96.00)	0.29	1.00
		No	38(6.73)			1(4.00)		
	Registered with NHIF	Yes	58(10.27)			1(4.00)	0.307	0.498
No		507(89.73)	24(96.00)					

Note: Pearson's Chi square reporting *Fishers's* exact in cases where cell count was ≤ 5 was used.

*Significance level, $p < 0.05$.

4.13 Participants' obstetric history associated with uptake of postnatal care

Significant association was observed between uptake of postnatal care and having been referred to health facility for postpartum care. Other obstetric history factors assessed did not show significant association at bivariate analysis. The associations are summarized in the table 4.13.

Table 4.13: Participants' obstetric history associated with postnatal care uptake

Characteristic	Uptake of postnatal care		χ^2	p-value
	Yes n=565	No n=25		
ANC attendance for last pregnancy	Yes	560(99.12)	2.31	0.23
	No	5(0.88)		
Number of ANC visits in last pregnancy	0	5(0.88)	3.48	0.448
	1	25(4.42)		
	2	41(7.26)		
	3	125(22.12)		
	≥4	369(65.31)		
Parity	1st pregnancy	108(19.12)	1.93	0.381
	2nd -4th pregnancy	298(52.74)		
	> 4 pregnancies	159(28.14)		
Number of live births by woman	1 or 2	234(41.42)	4.24	0.12
	3 or 4	184(32.57)		
	>4	147(26.02)		
Birth companion presence	Yes	496(87.79)	0.001	1.00
	No	69(12.21)		
Received health messages on SBA	Yes	545(96.46)	9.53	0.015
	No	20(3.54)		
	Yes			
Referred to health facility	No	476(84.25)	7.09	0.008*
	Yes	89(15.75)		
Outcome of recent birth	Live birth	561(99.29)	0.178	1.00
	Stillbirth	2(0.35)		
	Neonatal death	2(0.35)		

Note: Pearson's Chi square reporting *Fishers's* exact in cases where cell count was ≤5 was used.

*Significance level, p<0.05.

4.14 Health Facility related factors associated with uptake of postnatal care

Significant association was observed between delivery place and time taken to reach health facility. Other health facility factors assessed did not show significant association at bivariate analysis. These are summarized in the table 4.14.

Table 4.14: Health Facility related factors associated with uptake of postnatal care

Characteristic	Uptake of postnatal care		χ^2	p-value	
	Yes n=565(95.76%)	No n=25			
Time to health facility	<30min	245(43.36)	5(20.00)	15.88	0.002*
	>30min-1hr	279(49.38)	13(52.00)		
	>1-2hrs	34(6.02)	6(24.00)		
	>2hrs	7(1.24)	1(4.00)		
Registered with NHIF	Yes	58(10.27)	1(4.00)	1.04	0.265
	No	507(89.73)	24(96.00)		
Means of transport used	By foot	194(34.34)	6(24.00)	3.92	0.182
	Matatu	18(3.19)	1(4.00)		
	Motorbike	340(60.18)	16(64.00)		
	Bicycle	13(2.30)	2(8.00)		
Charged some fee	Yes	149(26.37)	8(32.00)	0.388	0.533
	No	416(73.63)	17(68.00)		
Unwelcoming facility staff	Yes	141(24.96)	8(32.00)	0.629	0.428
	No	424(75.04)	17(68.00)		
Drugs available	Yes	473(83.72)	23(95.83)	2.54	0.152
	No	92(16.28)	1(4.17)		
Total	565(100)	24(100)			

Note: Pearson's Chi square reporting *Fishers's* exact in cases where cell count was ≤ 5 was used.

*Significance level, $p < 0.05$.

4.15 Determinants of utilization of health facility delivery

Factors found to enhance uptake of facility delivery at multivariate analysis included; participant's mother being a birth companion and means of transport used to get to health facility. These are illustrated in table 4.15.

Table 4.15: Determinants of utilization of delivery services at a health facility

Covariates	Delivery at health facility				
	Odds Ratio	z	P>z	[95% Conf Interval]	
Sub-County					
Control(Rongo)	Ref				
Intervention (Migori)	1.562	1.98	0.048	1.005	2.428
Marital status					
Single	Ref				
Widowed					
Married	0.328	-2.75	0.006	0.148	0.727
Possess mobile phone					
No	Ref				
Yes	2.815	2.71	0.007	1.330	5.958
Had a birth companion					
No	Ref				
Yes	4.969	5.29	0.000	2.743	9.002
Birth companion					
None	Ref				
Mother	4.969	5.29	0.000	2.743	9.002
Grandmother,Sister,Aunt,CHW,CHEW,TBA,Co-wife,Husband, Neighbor					
Yes	Ref				
No	2.756	2.51	0.012	1.249	6.080
Who gave woman reproductive health talk					
None	Ref				
Health worker					
CHW					
CHEW					
TBA	0.055	-2.39	0.017	0.005	0.595
Radio/TV					
Who advocated woman to visit health facility					
None	Ref				
Health worker	2.501	2.01	0.044	1.025	6.105
CHW,CHEW,TBA,Husband,Sister,Mother					
Mode of transport used					
By foot	Ref				
Matatu	4.287	2.02	0.043	1.047	17.550
Motorbike	4.616	6.76	0.000	2.962	7.193
Bicycle					

Conversely, the likelihood for the uptake of health facility delivery was tremendously reduced by having had received birth management messages from traditional birth attendant.

4.16 Determinants of utilization of postpartum care

The probability of taking up postpartum care services at health facility considerably improved after the intervention, with the odds (AOR) being tilted in favor of the intervention (AOR 3.31, 95% CI: 1.245-8.804, p value 0.016). Factors found to enhance uptake of postnatal services at multivariate analysis were; having been referred to health facility for Post Natal Care(PNC) by CHW and having had received health education from a health worker. These are illustrated in table 4.16.

Table 4.16: Determinants of utilization of postpartum care

Covariates	Postnatal care uptake			[95% Conf. Interval]	
	Odds Ratio	z	P>z		
Sub-County					
Control(Rongo)	Ref				
Intervention (Migori)	3.310	2.4	0.016	1.245	8.804
Time taken to health facility					
>30min-1hr	Ref				
>1-2hrs					
>2hrs	0.166	-3.11	0.002	0.054	0.515
Received health education					
No	Ref				
Yes	2.979	1.5	0.133	0.718	12.363
Person giving health education					
Did not Receive H/educ	Ref				
Health worker	9.631	2.91	0.004	2.090	44.374
CHW					
CHEW					
TBA					
Radio/TV					
Who advocated woman to visit health facility					
None	Ref				
Health worker					
CHW	2.72398	2.06	0.039	1.049854	7.067708
CHEW, TBA, Husband, Sister, Mother					

Likelihood for uptake of postnatal care was enhanced by having received health education (AOR 2.98[95% Confidence Interval 0.7177-12.36] p=0.133), however, this was not statistically significant at p= 0.05.

Contrary, the likelihood for the uptake of postnatal care was greatly reduced by having taken greater than two hours to reach health facility.

4.17 Barriers to uptake of health facility delivery

The main reason cited for not utilizing facility delivery care as identified in the woman questionnaire (N=590) was precipitate labor, while some women feared the delivery process in a health facility and others felt they were ‘experienced enough to deliver at home’. The themes that arose from the key informant interviews (n=8) included attitudes of health workers towards women presenting for care, attitudes and beliefs of women towards seeking care at health facility, access to health facility including cost implications and the role of TBAs and partners (male involvement). These are as echoed in the following verbatim quotes from key informant interviews;

“During ‘Chama’ meetings, some women have received negative information discouraging facility delivery from colleagues who had met facility staff with poor attitude, as they shared previous birthing experiences.”. (Facility in-charge- KII)

“Some women report fear that if they deliver in a health facility, health workers insert hands/fingers and sometimes some metal that enlarges their womanhood organs”. (Community health worker- KII).

“The more mature women who have had many children assume they are much experienced to go to health centre and be attended by their ‘children’. They would rather go to the privacy of a TBA”. (Community health worker- KII).

Women who delivered at home reported precipitate labor, together with factors surrounding access to facility as the key hindrances to seeking facility birth (table 4.17).

Table 4.17: Basis for home delivery

Reasons for home delivery	Intervention n=57	Control n=88
i. Precipitate labour	36(63.1%)	42(47.7%)
ii. Problems in transport	8(14%)	16(18.2%)
iii. Health facility distance	7(12.3%)	18(20.4%)
iv. Refusal by husband		2(2.3%)
v. Religious/Cultural reasons	1(1.8%)	6(6.8%)
vi. Hidden costs/charges		2(2.3%)
vii. Unsatisfactory services		2(2.3%)
viii. Ailment	2(3.5%)	
ix. Chose or felt experienced	3(5.3%)	

Note: Data derived from woman questionnaire for women who delivered at home (Appendix I).

It was established that cost was not a significant factor hindering facility delivery. This could be attributed to the initiation and implementation of the ‘free maternity services program by GOK’ within the study period.

Qualitative data analysis, point out to access and uptake of health facility reproductive services being hindered by a number of factors including; long distances to health facility, poor roads, poor and costly means of transport to health facility. Others include; Cost of buying ANC booklet, poor staffing, fear of HIV test, bad staff attitude, lack of equipment, supplies and drugs in health care facilities. This was apparent from the following verbatim quotes from key Informant Interviews;

“Motorcycles transport is quite expensive”. (Community health worker- KII)

“Several access roads to health facility are in pathetic state, especially when it rains-some become completely cut off, it’s quite a challenge”. (Community health worker- KII)

“A number of women fail to deliver in the facility for fear of being tested for HIV and their status will be known if tested positive, may lead to rejection by fellow community members”. (Facility in-charge-KII)

“Lack of prescribed drugs in the facility pharmacy makes them (mothers) to avoid seeking help from there”. (Facility in-charge-KII)

“Understaffing is a big problem; the County has not recruited enough”. (Facility in-charge-KII)

‘Free maternity services program by MOH, GOK’, was a key driver to delivery in a health facility. Good service and having received health education also featured notably (table 4.18).

Table 4.18: Reason for choosing to deliver at healthcare facility

Reasons for choosing health facility delivery	Intervention n=240(100%)	Control n=203(100%)
i. Offered free services	43(17.92%)	60(29.6%)
ii. Healthcare facility is in close proximity	7(2.92%)	3(1.5%)
iii. Had previous delivery in facility	14(5.83%)	12(5.9%)
iv. Beliefs facility offers good service	108(45.0%)	58(28.6%)
v. Got supporting health education	60(25.0%)	42(20.7%)
vi. Family approved	1(0.41%)	1(0.4%)
vii. Developed complications requiring health worker intervention	7(2.92%)	27(13.3%)

Note: Data derived from woman questionnaire for women who delivered at a health facility (Appendix I).

Remarkably, a higher percentage of participants in Migori sub-County - intervention arm, reportedly opted for delivery at health facility since they had received some health education (25%) and good-quality service from providers in health facilities (45%) than in Rongo sub-County - the non-intervention arm (20.7%, 28.6% respectively).

Additionally, women in non-intervention arm reported higher percentage of delivery complications (13.3%) necessitating attention by a health worker compared to those in Migori sub-County (2.9%). Complications may arise due to reduced client education, non-adherence to focused antenatal care (FANC) follow-ups and lack of

proper skills by health providers. MAISHA Project focused on these salient aspects towards improvement of maternal-infant health. This was achieved by conducting trainings on good communication skills and proper handling of maternal-health concerns by Community volunteers, community health extension workers and community health workers over and above training on emergency-obstetric care (EmONC), and focused emergency-obstetric care (FEmONC) to clinical officers and nurses in the intervention arm.

Insufficient or Lack of healthcare education combined with poor service and attitude by health providers comprise some barriers to delivery at a healthcare facility.

4.18 Barriers to utilization of postnatal services

Although majority of women sought postpartum care at health facility, those who did not seek postnatal care cited factors associated with ease of access of health facility, distance wise and road-transport network as key barriers.

Table 4.19: Barriers to utilization of postnatal services

Reason for choosing not to go for postpartum care	Intervention n=5(100%)	Control n=18(100%)
i. Visited TBA	1(20%)	2 (11.11%)
ii. Ignorance		1 (5.56%)
iii. Cost of transport	1(20%)	2 (11.11%)
iv. Distance to healthcare facility		11 (61.11%)
v. Felt it was unnecessary	3(60%)	2 (11.11%)

Note: Data derived from woman questionnaire for women who failed to take up postnatal care (Appendix I).

From the KII, it was established that, may be because of lack of knowledge, and not getting health education made some mothers express the feeling that postnatal care was unnecessary. This was evident from the following verbatim quotes from key Informant Interviews;

“Some mothers do not see the need for check-up after delivery, they feel okay”.
(Facility in-charge-KII)

“There are mothers who prefer TBAs both for delivery and follow ups”. (Facility in-charge-KII)

“Some women have unsupportive spouses especially during health facility visits and they beat them when they return home late from the health facility”. (Community health worker- KII)

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Summary of findings

The intervention aimed at contributing about 11.7% increase in health facility delivery attributable to the intervention. Proportion with outcome in the non-interventional group being 53.3% (source: MAISHA baseline survey, 2013 data on health facility delivery in Migori County) and proportion with outcome estimated at 65% in intervention group ((Kenya National Bureau of Statistics *et al.*, 2015). Health facility delivery in Nyanza region was 65% in the 2014 demographic survey. A 27.2% increased uptake of health facility delivery was realized (53.3% to 80.5%) in the intervention group (Migori Sub County) compared to 16.6% increase for the control. The null hypothesis is rejected and hence the intervention implemented was effective in boosting utilization of health facility delivery. The probability of delivering in a health facility improved after the intervention, with the odds (AOR) being tilted in favor of the intervention (AOR =1.56, p value 0.048). Factors found to enhance uptake of facility delivery at multivariate analysis included; participant's mother being a birth companion (AOR 4.97, p=0.000) and means of transport used (Matatu, AOR 4.29, p=0.043, Motorbike, AOR 4.62, p=0.000). Conversely, the likelihood for the uptake of health facility delivery was tremendously reduced by having had received birth management messages from traditional birth attendant (AOR 0.055, p=0.017).

The probability of taking up postpartum care services at health facility considerably improved after the intervention, with the odds (AOR) being tilted in favor of the intervention (AOR 3.31, 95% CI: 1.245-8.804, p value 0.016). Factors found to enhance uptake of postnatal services were; having been referred to health facility for Post Natal Care (PNC) by CHW (AOR 2.72, p=0.039) and having had received health education from a health worker (AOR 9.63, p=0.004). Likelihood for uptake of postnatal care was enhanced by having received health education (AOR 2.98[95%

Confidence Interval 0.7177-12.36] $p=0.133$), however, this was not statistically significant at $p= 0.05$.

Contrary, the likelihood for the uptake of postnatal care was greatly reduced by having taken greater than two hours to reach health facility (AOR 0.166, $p=0.002$).

5.1.2 Utilization of health facility delivery and postpartum services

In comparison with the baseline, there was a substantive 27.2% rise in hospital deliveries for the Intervention arm as reported in the study. 53.3% of deliveries were through the assistance by trained professional in Migori County at baseline (MAISHA baseline, 2013). After intervention, the study reported that 80.5% deliveries occurred in health facilities. This shows the efficacy of the MAISHA Project 2012-2017' also known as Integrated Maternal Health Intervention effected in the Intervention arm. Most women who participated in this study 187, (63.39%), from Migori Sub County (the intervention arm) reported to have attended antenatal clinic 4 or more times. In fact for 3 visits and above the study reported 89.83%, (265) attendance to ANC. This agrees with an analysis conducted by Nyongesa *et al.* in 2018, where women with four or more ANC visits had 5.95 ($p < 0.018$) times likelihood to seeking skilled attendance (Nyongesa *et al.*, 2018). This means that the more the visits a woman made at the antenatal care clinic, the higher the chances of giving birth under a skilled birth attendant. In Bangladesh among the married adolescent girls, the attendance of prenatal care was found to be a vital predictor regarding delivery at a health facility (OR: 4.04; 95% with confidence interval of 2.73 to 5.99) (Shahabuddin *et al.*, 2016). This observation was comparable with our result that concluded that the attendance of antenatal care and regularity of ANC appointments was highly significant ($p=0.000$). Nevertheless, at multivariate analysis, attending antenatal care was not significant in determining the place of delivery.

In the interventional arm, the study concluded that the proportion giving birth at a health facility was considerably higher (80.5%) in comparison to the utilization of postpartum care (64.2%). Percentage of women who sought postpartum care by week six was related in both sub-Counties under study; where 63.7% of the women from

the Control group and 64.2% in the Intervention sought postnatal care. Despite the marginal difference in percentage seeking postpartum care, multivariate analysis showed participants in the Intervention group reported a higher likelihood (AOR=3.3) to enrolling for postpartum care in a health institution in comparison to those in Control group who did not get the intervention. These results matches with findings from a meta and multilevel analysis of data involving 36 Sub-Saharan countries interrogating postpartum care uptake, in which they point that PNC uptake is generally low in the region compared to similar rates at the time pre and post-delivery (Tessema *et al.*, 2020). Despite there being no one, straightforward intervention in substantially lowering maternal mortality, past studies showed that most of mother and child troubles could be addressed through appropriate postpartum services (Blank *et al.*, 2013; Robert Pattinson, 2011; WHO, 2010b, 2013).

5.1.3 Determinants of utilization of health facility delivery and uptake of postpartum care

From the study findings, education status was documented to be considerably related to the facility of birthing in the control arm as given by the results ($p=0.041$), nevertheless, the observations in the intervention arm reported the opposite to be true ($p=0.148$). The findings also indicated that there was no statistical significance at multivariate analysis. This relates with another study done by Shahabuddin *et al.*, (2016), where it was observed that among the adolescent girls who were married in bivariate analysis, the women education level was associated with facility based delivery observation though logistic model showed no statistical significant association. Nevertheless, differences could be seen between girls aged below 19 years without basic education and girls who had attained college education and higher. Teenage girls with college education and higher were found to be more likely (2.2 times) to give birth in a healthcare facility when compared to teen girls without education status (OR: 2.2 with 95% confidence level and 1.04 to 4.78 confidence interval) (Shahabuddin *et al.*, 2016).

The study also reported that women who were married were less likely to seek the services of a skilled birth attendant by 3.05 times (AOR= 0.33 with confidence level of 95% and confidence interval ranging from 0.148 to 0.727] p=0.006). These observations were different from another which had been carried out in Ethiopia on the factors affecting the utilization of ANC and SBA, where the participation of spouse and/or family in determining delivery place amplified the probability of SBA at delivery while those women who were not married reduced the likelihood of SBA (Wilunda *et al.*, 2015).

From the study, few of the women presented had registered with NHIF in the Intervention group 37, (12.4%) and in the Control arm 22, (7.5%). Similarly low uptake of health insurance was reported by Douangvichit in their study on cost of delivery in health facility. In their study, out of 581 women, only 25% had healthcare insurance(Douangvichit *et al.*, 2012). In the Kenyan context, women from well-up households possessing health insurance covers give birth in health facilities when compared to women not possessing health insurance and living in poor households (Kitui *et al.*, 2013). Minimal NHIF enrollment is a cause to worry in this County. From the study, it was observed that 286, (96%) of the women from the Intervention group while 265(90.8%) women in Control group possessed mobile phone, and it may be a good strategy to exploit the owners of the phones to register with health insurance.

Further, concerning facility birthing, the presence of one's mother during birth(AOR 4.97), owning a phone as a communication device (AOR= 2.82), having no under 5years deaths in the last two years (AOR =2.76) as well as getting a referral by health worker (AOR =2.50) enhanced facility delivery uptake.The findings also showed that having received health education from SBA (AOR= 2.98), being informed by a skilled health attendant(AOR= 9.63), being advised and referred to a health care facility for postnatal care by CHW (AOR= 2.72) and travelling between 30 to 60 minutes to a health care facility (AOR= 0.1663), are determinants of postpartum care uptake. These findings mirror those from an analysis of the 2016 Uganda Demographic and health survey, where education level, perceived accessibility of health facilities, wealth status, access to mass media messages, women's residence,

antenatal care attendance, marital status, birth order, place of delivery, occupation, and religion were related to greater uptake of early postnatal care (Ndugga *et al.*, 2020).

In the Intervention group, the study showed that the Number of gravidities, Live births, kids alive, ANC attendance and , visits, health information received, Reference to a facility, presence of a birth companion, and the mode of transportation used were highly linked with facility of delivery, however, the duration taken to the facility, occupation of the spouse, career, the level of education, kind of marriage one is in, Marital status of the women and being enrolled with a health insurance were not significantly associated with the place one gave birth in. These observations generally agree, but with some degree of variation with observations in a systematic review on the promoters and constraints of healthcare delivery across the sub-Saharan Africa, where woman's education, place of residence, wealth status, parity, and proximity to a healthcare facility strongly relate with delivery in a health facility (Moyer & Mustafa, 2013).

This intervention employs the existing Government of Kenya and County capability without bringing in additional structures. This study first identified the necessary rapport and buy-in with the Ministry of Health and County government management. In partnership, loopholes in mother-child health care infrastructure and health workers training needs were identified. After the identification of the gaps in the system, notably it was observed that better services could be delivered. Education and community sensitization of Health Workers, CHEWs as well as community volunteers ensued, spreading to women in society. The strategy agrees with outcomes in Butrick *et al.*, 2014 analysis of 3 casestudies developed to identify strategies in escalating health facility delivery where five main issues were identified on the effectiveness of rules to enhance facility delivery and included the significance of the political willpower, essence to stabilize demand, supply, and health quality, significance of dealing with accessibility of health system, need for engaging the Community, and the importance of creating changes in the social cycles (Butrick, 2014).

The GOK introduced free maternity services protocol in all government institutions starting June 2013. This study implementation period coincided with the roll out of this 'free maternity services' program. This could have led to an increase in health facility child deliveries as identified in the research findings. However, participants in the intervention arm were 1.56 times extra probable to give birth in health facility as compared to those in Control group (AOR= 1.56). There was a 27.2% positive difference observed from baseline for the intervention arm. These findings rhyme with the government of Kenya's analysis on the impact of free the maternity delivery policy through the data extracted from KHIS that compared deliveries and ANC turnout in 47 county referral hospitals and thirty low cost private health institutions that were not engaging in the free delivery policy instituted between 2013 and 2014, which indicated that the child births and ANC turnout rose to 26.8% from 16.2% in referral health institutions in the county and declined from 11.9% to 5.4 percent in low paying private health institutions (Njuguna *et al.*, 2017). Frequent strikes in 2013 and 2014 by health providers in public health facilities unfavourably affected the implementation of free maternity service (FMS) program.

Though free maternity delivery service was rolled out by the Government of Kenya in 2013, 26.61% (N=590) of those who participated in the study in Intervention group reported paying some service fee to the hospitals for attendance. Similarly, the 2015 MOH report on the execution of FMS program in the decentralized county governments, Kenyan mothers reported that delivery services were not totally free as 28% of the participants had to pay some fees. The payment covered various costs including testing costs, registration, medication, x-ray services as well as the ANC booklet (MoH, 2015).

Despite 67.29% (397) of the participants having sought FP services, a considerable proportion of the participants (224) represented by 38.1% of the population had four or more live deliveries. Women reporting Live births reported having between one to twelve births each. Of the total women in the study category, 101 (9.01%) of them had six children and above who were alive. The use of contraceptives to control child births greatly impacts fertility rates compared to using contraception for birth spacing. The need of spacing deliveries occurs where women intend to delay two or

multiple years before they can have another child, while urge for limiting arises where a woman does not want more children. Having informed choices on women's reproductive intents helps women make better decisions on the number of kids they want, enhances the health conditions and welfare of women and their relations, eventually affecting the macro-level health as well as development indicators. Study carried among women capable of childbearing to determine Women's growing urge to limit child deliveries in sub-Saharan Africa-Kenya included, showed that majority would prefer to space births (25%) as opposed to those with the intention of limiting births (14%) among the women of reproductive age. However, among the married women, the need to limit (26%) nearly equals that for spacing 31%, as observed in the analysis countries (Van Lith *et al.*, 2013).

The research findings also show that married women were 3.05 times less likely to seek SBA as indicated by the outcome AOR= 0.33, p=0.006. This could be interpreted to mean that men prefer traditional midwives to handle women issues during childbirth instead of SBA in health facilities. Several studies have shown few married women using health facilities, some citing husband refusal (Dutamo *et al.*, 2015; Karanja *et al.*, 2018; Maharjan *et al.*, 2019). Other studies have found no link between health facility and being married (Ono *et al.*, 2013).

Majority of maternal-infant deaths that takes place in the community are as a result of poor quality care when giving birth and during labour. Interventions at the community level calls for improved coverage and access of key interventions in reducing disparities present and marginalization. MAISHA Project is an intervention that concerned with training Community Health Extension Workers on different facets to MNCH care and supported establishing and activating community units. CHEWs were tasked to train and sensitize the volunteers in the community on MNCH. Comparatively, systematic review by Lassi *et al* 2014, points out that home visitations improve ANC, increases the immunization coverage referral as well as early introduction of breast feeding with drops in ANC admission, caesarean-section births, maternal illness, neonatal deaths and perinatal mortality. Involvement of midwives and CHW has greatly improved immunization uptake and when to start breast feeding with reductions in ANC hospitalization, episiotomy, instrumental

delivery and duration of at the hospital. Educating the TBA as part of interventions in the community has greatly impacted the rates of referrals, timely breast feeding, maternal illness, neonatal deaths, and perinatal deaths. From the community point of view, visiting homes, mobilizing the community, training the CHW and the TBA has the capability of maximising a variety of maternal and new-born health outcomes(Lassi *et al.*, 2014). The findings from the systematic reviews concur with the intervention model that was adopted in this research on strategies for improving the uptake of mother-child health services from skilled care providers.

5.1.4 Barriers to utilization of health facility delivery and postnatal care services

Among the barriers hindering access to skilled care that were cited in this study include distance from a health facility, bad road network, lack of proper means to transport to healthcare facility, and expensive transport means. Costs instituted at the health facility like buying the antenatal care booklet, few staff at the facility, fear of HIV testing, undesirable staff attitude, lack of basic tools and equipment, as well as lack of medicine were other hindrances cited in the study. The study also reported that some of the mothers did not see the need to attend postnatal care. These findings were in agreement with others by Shah *et al.* that had reported accessibility and quality of healthcare as hindrances to access to care including poor roads and transportation network, minimal financial incentives, devastating infrastructures at the delivery centers, young age as well as perceived unskillfulness of midwives(Shah *et al.*, 2018). These barriers compares with others on a study done in Magadi sub county in Kenya where spouse/family making the ultimate decision on the place of child delivery, lack of a birth plan, sex of the caregiver, unfamiliar delivery positions, abuse by the care provider, distance, attitude and lack of drugs and medications being major hindrances to facility delivery(Karanja *et al.*, 2018). DiBari et al, also indicated lack of need to seek SBA as a barrier (DiBari *et al.*, 2014).

Kenya's Health Ministry, advises that the traditional birth attendants should be resource persons in the community who should be tasked with advising women and referring them to health care facility for skilled birth attendance. Though efforts have been made to encourage the TBAs in Migori county- Kenya to support and embrace

facility delivery, through enlightening and referring women to health facility, being educated and enlightened by a traditional birth attendant reduces the chances of women seeking the services of skilled birth attendance by 18.2 times (OR= 0.055, p=0.017). From the finding, this forms a major field that need to be further evaluated so as to change strategy. Traditional birth attendants in 2000 were barred from offering child delivery services by the Malawian president through the support of the MoH. The role of TBA was refocused to being community resource for advising women and referring them to a health facility. The traditional birth attendants became an effective and popular initiative to advocate for health facility deliveries, however as a result of international pressure, in 2012, the Malawian president reversed the ban without consultation with the MOH. Conversely in year 2012, the succeeding president introduced an initiative named the “Presidential Initiative for Safe Motherhood” where 3 key pillars were introduced namely, the development of maternity waiting homes, teaching, empowering, and engaging a new team of community midwives as well as re-establishing the ban on Traditional Birth Attendants (Butrick, 2014). This was made possible by the involvement of the community members and especially the chiefs.

5.2 Conclusions

- i. The intervention implemented contributed to a substantial increase in the proportion of women who delivered at a health facility. This shows the effectiveness of the implementation of ‘MAISHA Project 2012-2017’ – the intervention.
- ii. The integrated maternal- health intervention greatly improved the utilization of postnatal care services at a health facility among women 15-49 years.
- iii. The presence of birth companion, accessibility of health facility, having mobile phone, and having been given a referral by CHW or health worker could increase chances of seeking health facility care. Further, Availing Health education and better services to women are two critical features that can improve uptake of skilled birth attendance and postpartum care.

- iv. Lacking, or insufficient health education, negative attitude together with distance to health facility were some barriers to uptake of skilled care at birth and postnatal at a health facility identified.

5.3 Recommendations

- i. Scaling up similar integrated maternal- health interventional approaches to boost utilization of health facility care in the other Migori County, sub-Counties and in other places in Kenya where reduced uptake of facility delivery prevails.
- ii. Greater involvement of community volunteers as companions and advocates for postnatal care uptake as was exemplified by the integrated maternal-health intervention implemented in this County.
- iii. Health care workers to put greater emphasis on health education and quality services to reproductive age women as this can lead to improved uptake of skilled birth attendance and postpartum care.
- iv. Health workforce to inculcate positive attitude and County government to endeavor to improve road network linking the rural health facilities as well as outreach services in order to address the key barriers to uptake of skilled care at birth and postnatal at a health facility identified in this region.

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APPENDICES

Appendix I: Questionnaire

INTERVIEW TOOL FOR MOTHERS

Study title: Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post delivery in Migori County, Kenya

This questionnaire is intended for a woman of:

- 1) *childbearing age (15-49 years);*
- 2) *who was resident in the County during the year 2013*
- 3) *had their pregnancy outcome after January 2014.*

DEMOGRAPHIC DATA

- A. Year of birth _____
- B. Number of pregnancies _____
- C. Number of live births _____
- D. Number of living children _____
- E. Age of first child: _____ years _____ months
- F. Age of last child: _____ years _____ months
- G. Religion: Christian Muslim Other
- H. Marital Status: Single Divorced Widowed Married
- I. Education Level: None Primary Secondary College/University
- J. Registered with NHIF Yes No
- K. Owns a mobile phone Yes No
- L. Occupation: Farmer Day Laborer Business/Merchant Housewife Government Employee Other

If married:

- M. Partner's education level: None Primary Secondary
College/University
- N. Partner's occupation: Farmer Day Laborer
Business/Merchant Government Employee Other

ANTENATAL CARE

1. Did you attend ANC during your most recent pregnancy? Yes No

a. If yes, how many times:

- i. Once
- ii. Twice
- iii. Three Times
- iv. Four or more times

2. Did you receive maternal health education during your most recent pregnancy?

Yes No

a. If yes, by whom:

- i. Health Worker
- ii. CHW
- iii. CHEW
- iv. TBA
- v. Radio/TV
- vi. Other

3. Did you get referred to the health facility during your most recent pregnancy?

Yes No

a. If yes, by whom:

- i. Health Worker
- ii. CHW
- iii. CHEW
- iv. TBA
- v. Other

4. Did you have a birth companion in the health facility during your most recent pregnancy?

Yes No

a. If yes, by who was it:

- i. Mother
- ii. Grand mother
- iii. Sister
- iv. Aunt
- v. CHW
- vi. CHEW
- vii. TBA
- viii. Other

5. What method of transport do you use to access the clinic?

By foot Matatu Motorbike Bicycle Other, explain

6. How long does it take to reach the clinic (minutes)?

30mins and below 30mins-1hr 1-2hrs More than 2hrs

SAFE DELIVERY

7. Did your last pregnancy come to term (e.g. a baby was delivered whether a live birth or stillborn)? Yes No

a. If yes, where did you deliver your last baby?

- i. Home
- ii. Healthcare Facility
- iii. Other

<i>If at HOME</i>	
<p>b. Who assisted the delivery of your baby?</p> <ul style="list-style-type: none"> i. <input type="checkbox"/> TBA ii. <input type="checkbox"/> CHW iii. <input type="checkbox"/> Family Member iv. <input type="checkbox"/> Alone v. <input type="checkbox"/> Other 	<p>c. Why did you choose to give birth at home?</p> <ul style="list-style-type: none"> i. <input type="checkbox"/> Precipitate labour ii. <input type="checkbox"/> Transport problems iii. <input type="checkbox"/> Distance to health facility iv. <input type="checkbox"/> Husband refusal v. <input type="checkbox"/> Cultural/religious reasons vi. <input type="checkbox"/> Hidden costs/charges vii. <input type="checkbox"/> Poor services viii. <input type="checkbox"/> Poor skills of health worker ix. <input type="checkbox"/> Illness x. <input type="checkbox"/> Other
<i>If at HEALTH FACILITY</i>	
<p>b. Who assisted the delivery of your baby?</p>	<p>c. Why did you choose to give birth at a health facility?</p>

<ul style="list-style-type: none"> i. <input type="checkbox"/> Health Worker ii. <input type="checkbox"/> Clinical Officer/Nurse iii. <input type="checkbox"/> Other: 	<ul style="list-style-type: none"> i. <input type="checkbox"/> Free services ii. <input type="checkbox"/> Health facility is near iii. <input type="checkbox"/> Had previous delivery in facility iv. <input type="checkbox"/> Good service v. <input type="checkbox"/> Received health education vi. <input type="checkbox"/> Family allowed vii. <input type="checkbox"/> Complications which needed health worker viii. <input type="checkbox"/> Other
--	---

d. What was the date of your most recent delivery? _____(month/year)

e. What was the outcome of your most recent delivery?

- i. Live Birth
- ii. Still Birth/Miscarriage
- iii. Neonatal death

8. Did you have a normal or difficult delivery? Normal Difficult

a. If difficult, choose:

Prolonged labour

Assisted delivery (vacuum, or c-section)

Post partum complications (heavy bleeding, retained placenta)

Other, explain _____

9. In the past two years, did any of your children (aged under five years) die? Yes

No

If yes: at what age?_

cause of death_____

10. Experience at health facility.

During your last visit to the health facility, did you experience:

	<u>YES</u>	<u>NO</u>
Attentive health workers		
Facility was clean		
Baby was taken good care of		
Offered food/drink after delivery		
Medicine was available		
Comfortable		
Sufficient supplies		
Other:		

POSTNATAL CARE

11. Did you go to a health clinic for postnatal care after your last delivery? Yes

No

a. If yes, how long after the delivery of the baby? _____

i. Within 6 weeks

ii. After 6 weeks

b. If no, what were the reasons why you did not go for postnatal care?

(Check all that are applicable).

- i. Went to a TBA
- ii. Lack of knowledge
- iii. Transport costs
- iv. Distance to health facility
- v. Did not feel it was necessary
- vi. Husband refusal
- vii. Cultural or religious reasons
- viii. Clinic charges
- ix. Employer would not allow leave
- x. Other

12. Did you seek/have you sought family planning services? Yes No

13. Were you offered family planning services? Yes No

THE NEONATE

14. What was the outcome of your last delivery?

Live birth Stillbirth/miscarriage Neonatal death

a. **If live birth,** what was the birth weight? _____

15. Were there any complications for the baby at your last delivery? Yes No

a. **If yes, reason:**

Baby unable to cry immediately

Baby was not alive at birth

Fetal abnormalities

Other, explain _____

16. Did the baby breastfeed? Yes No

a. **If you breastfed:**

Until what age did you breastfeed the baby? _____

Was it exclusive or mixed feeding? _____

Did you have any difficulties? Yes No

b. **If you didn't breastfeed, reason:**

Disease condition

Abnormality of the breast

Lifestyle/personal choice

Unable to produce milk

Other, explain _____

17. Did you take the baby to the clinic for immunizations? Yes No

N/A

a. If yes, (check card for immunization status and fill in chart below)

Age	BCG/ BIRTH POLIO	1 ST PENTAVALE NT/ PCV/ POLIO	2 ND PENTAVALE NT/ PCV/ POLIO	3 RD PENTAVALE NT/ PCV/ POLIO	MEASL ES	VI T. A

b. If no, reason:

Lack of vaccines

Distance to the health facility

Lack of knowledge

Other, explain _____

THE HEALTH FACILITY

18. If you, your child, or a family member is sick, what action do you take first?

Go to the clinic immediately

Buy medicine from the chemist/herbalist

Give home remedy

Other, explain _____

19. Have you been informed about available services at the health facility? Yes

No

20. Were you satisfied with the services you received? Yes No

a. If no, reasons: _____

21. What suggestions would you give for the improvement of services?

Thank you for your participation

Appendix II: Key Informant Interview Guide for Community Health Workers

KEY INFORMANTS/ COMMUNITY HEALTH WORKER (CHW) REPRESENTING COMMUNITY

1. Describe your community in terms of population and their values regarding maternal and child health.
2. Describe your role within the community context.
3. Can you tell me more about the general lifestyle and practices of the community members in terms of maternal and child health?
4. What is the role and responsibilities of the woman in the household?
Are these roles fulfilled successfully?
5. What is the role and responsibilities of the man in the household? Are these roles fulfilled actively?
6. How does your community view the health facility? Services offered?
And facility staff?
7. What difficulties do members of the community face when accessing the health facility?
8. How are the services offered by the facility staff perceived by the community?
9. Describe the role of men in your community in regard to MNCH.
(Probe: how often do they accompany partner's to the clinic, are men knowledgeable about services and their importance).
10. Other than the health facility, where else can families go to seek maternal and child health services?
11. What is the best way to encourage pregnant women to use the services available?

In your opinion, how could the health facility be improved?

Thank you for your participation

Appendix III: Key Informant Interview Guide for Health Facility Head

KEY INFORMANTS REPRESENTING FACILITY

1. Describe the maternal and child health services offered at your facility.
2. Describe the current staffing levels and day to day operations at your facility.
3. Does your facility have adequate equipment for a skilled delivery?
4. (probe: surgical services? Maternity ward? Resuscitation equipment? Ambulance for emergency referral? Number of beds?)
5. Describe your collaboration and relationship with other levels of health facilities.
6. What opportunities are available for staff development and upgrading?
7. What are the main challenges at the facility in providing maternal and child health services?
 - a. What are some suggestions for improvement?
8. Are community members involved in the planning and delivery of services?

Thank you for your participation

Appendix IV: Consent form for the Questionnaire

INFORMED CONSENT FORM (Woman questionnaire)

Study Title: Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post delivery in Migori County, Kenya.

Institutions and Investigators:

Researcher	Institution	Contact
1. Moses Mwangi Gitonga	Jomo Kenyatta University of Agriculture and Technology (JKUAT)/Kenya Medical Research Institute (KEMRI), PhD. Student, School of Public Health(SoPH), JKUAT	Tel: +254 721 280 759 Email: mwangiguk@gmail.com
2. Dr. Elizabeth Echoka	Kenya Medical Research Institute (KEMRI)	Tel: +254 20 2725016/7 Ext 213 Email: lizechokah@gmail.com
3. Prof. Kenneth Ngure	JKUAT, School of Public Health(SoPH)	Tel: +254 722 362 219 Email: K_ngure@hotmail.com

Introduction

I want to thank you for finding time to meet me today. My name is _____

We are carrying out a study titled “*Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post delivery in Migori County, Kenya.*” Before you decide to partake in this study, you

need to understand the nature of the study, how it will be conducted, your rights, risks and benefits of participating in this study. In this study, you are free to ask questions you may have at any time. Being in this study is on your free will. Once you understand the study, and if you agree to take part, you will be asked to sign on this informed consent form. Before you learn about the study, it is important that you know that your participation in this study is entirely voluntary. You may decide not to answer questions or withdraw from the study at any time. Your participation and any information obtained from you will be handled confidentially.

Purpose of study:

This research study aims to examine the determinants and outcomes of an integrated maternal health intervention in the uptake of skilled care during and after delivery in your community.

Study procedures:

You are among 590 women who will be interviewed. If you agree to take part in this study, you will be asked questions about yourself, where you delivered at and postnatal clinic attendance. This interview will take about 20 - 30 minutes of your time. We shall also review your child's clinic attendance card.

Risks and Benefits of participating

There are no foreseeable risks in participating in this study. There are no direct benefits for participating in this study. However the study will generate findings that will benefit you as a participant, the community and the nation.

Data security and Confidentiality

All the data collected in this study shall be kept in confidence and shall not be shared with anyone outside the study researchers. All the information gathered by the researcher will be used in confidence for the sole purpose of this research only.

Costs to Participant

There is no cost to you for participating in the study. There are no direct benefits for participating in this study.

Withdrawal from the study:

You may withdraw from participating in this study at any time without giving the reason. It is only necessary that you inform us in case you make such a decision.

Contact for Principal Investigator

If there are any questions you have about the study, please feel free to ask them to the investigator prior to signing your consent form. You may contact Moses Mwangi Gitonga, Principal Investigator, (Mobile 0721-280759 or E-mail: mwangiguk@gmail.com)

Contact for KUERC

In case you need to find out more about your rights to participation in this study, contact the Secretary Kenyatta University Ethical Review Committee (a team of professionals who review the research to protect your rights) on Tel: +254 (020) 870901/12, Chairman, KUERC, Kenyatta University, P.O. Box. 43844-00100, Nairobi, Kenya. Email: chairman.Kuerc@ku.ac.ke

Participants' statement

If you have read the informed consent, or had it read and explained to you, and you understand the information and voluntarily agree to join this study, please carefully read the statements below and think about your choice before signing your name or making your mark below. No matter what you decide, it will not affect anything:

- I have been given the chance to ask any questions I may have and I am content with the answers to all of my questions.

- I know that my records will be kept confidential and that I may leave his study at any time.
- I have been told the name, phone number and address of the person to contact in case of an emergency, and this information has also been given to me in writing.
- I agree to take part in this study, and hereby sign as evidence of my acceptance to participate.

Participant's signature and date

Study staff conducting name (print)

Study staff signature and date

Appendix V: Consent form for the Key Informants

INFORMED CONSENT FORM (Key Informants)

Study Title: Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post delivery in Migori County, Kenya.

Institutions and Investigators:

Researcher	Institution	Contact
1. Moses Gitonga	Jomo Kenyatta University of Agriculture and Technology (JKUAT)/Kenya Medical Research Institute (KEMRI), PhD. Student, School of Public Health(SoPH)	Tel: +254 721 280 759 Email: mwangiguk@gmail.com
2. Dr. Elizabeth Echoka	Kenya Medical Research Institute (KEMRI)	Tel: +254 20 2725016/7 Ext 213 Email: lizechokah@gmail.com
3. Prof. Kenneth Ngure	JKUAT, School of Public Health(SoPH)	Tel: +254 722 362 219 Email: K_ngure@hotmail.com

Introduction

I want to thank you for finding time to meet me today. My name is _____

We are carrying out a study titled “*Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post delivery in Migori County, Kenya.*” Before you decide to partake in this study, you need to understand the nature of the study, how it will be conducted, your rights,

risks and benefits of participating in this study. In this study, you are free to ask questions you may have at any time. Being in this study is on your free will. Once you understand the study, and if you agree to take part, you will be asked to sign on this informed consent form. Before you learn about the study, it is important that you know that your participation in this study is entirely voluntary. You may decide not to answer questions or withdraw from the study at any time. Your participation and any information obtained from you will be handled confidentially.

Purpose of study:

This research study aims to examine the determinants and outcomes of an integrated maternal health intervention in the uptake of skilled care during and after delivery in your community.

Study procedures:

We shall interview eight key informants; four clinicians each heading a health facility and four lead community health workers each representing the health facilities - Odong, Godkwer, Nyamaraga, and Ogwedhi. We shall interview you as a key informant for this community on maternal-child health issues. This interview will take about 30 - 40 minutes of your time. You as a key informant are requested to keep the information that will be discussed in this venue secret, and not to discuss the events of this interview. We trust that you will honor your word of keeping this discussion confidential.

Risks and Benefits of participating

There are no foreseeable risks in participating in this study. There are no direct benefits for participating in this study. However the study will generate findings that will benefit you as a participant, the community and the nation.

Data security and Confidentiality

All the data collected in this study shall be kept in confidence and shall not be shared with anyone outside the study researchers. All the information gathered by the researcher will be used in confidence for the sole purpose of this research only.

Costs to Participant

There is no cost to you for participating in the study. There are no direct benefits for participating in this study.

Withdrawal from the study:

You may withdraw from participating in this study at any time without giving the reason. It is only necessary that you inform us in case you make such a decision.

Contact for Principal Investigator

If there are any questions you have about the study, please feel free to ask them to the investigator prior to signing your consent form. You may contact Moses Mwangi Gitonga, Principal Investigator, (Mobile 0721-280759 or E-mail: mwangiguk@gmail.com)

Contact for KUERC

In case you need to find out more about your rights to participation in this study, contact the Secretary Kenyatta University Ethical Review Committee (a team of professionals who review the research to protect your rights) on Tel: +254 (020) 870901/12Chairman, KUERC, Kenyatta University, P.O. Box. 43844-00100, Nairobi, Kenya.Email: Chairman.Kuerc@ku.ac.ke

Participants' statement

If you have read the informed consent, or had it read and explained to you, and you understand the information and voluntarily agree to join this study, please carefully

read the statements below and think about your choice before signing your name or making your mark below. No matter what you decide, it will not affect anything:

- I have been given the chance to ask any questions I may have and I am content with the answers to all of my questions.
- I know that my records will be kept confidential and that I may leave his study at any time.
- I have been told the name, phone number and address of the person to contact in case of an emergency, and this information has also been given to me in writing.
- I agree to take part in this study as a volunteer, and hereby sign to signify my participation.

CONSENT TO AUDIO-RECORD INTERVIEW

Consent to audio-record interview **given:** _____

Signature


Consent to audio-record interview **denied:** _____

Signature

Study staff conducting

Study staff signature and date

Appendix VI: Ethics approval letter


KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Email: chairman.kuerc@ku.ac.ke
secretary.kuerc@ku.ac.ke
eroku2008@gmail.com
Website: www.ku.ac.ke

P. O. Box 43844 - 00100 Nairobi
Tel: 8710901/12
Fax: 8711242/8711575

Our Ref: KU/R/COMM/51/780 Date: 20th July, 2016

Moses Mwangi Gitonga
Jomo Kenyatta University of Agriculture & Technology,
P.O Box 62000-00200,
Nairobi

Dear Mwangi,

APPLICATION NUMBER PKU/487/E41- "EXAMINING DETERMINANTS AND OUTCOMES OF AN INTEGRATED MATERNAL HEALTH INTERVENTION ON UPTAKE OF SKILLED CARE DURING AND POST DELIVERY IN MIGORI COUNTY, KENYA." -VERSION 2

1. IDENTIFICATION OF PROTOCOL
The application before the committee is with a research topic, "Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post-delivery in Migori County, Kenya." –Version 2

2. APPLICANT
Moses Mwangi Gitonga

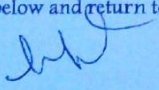
3. SITE
Migori County, Kenya

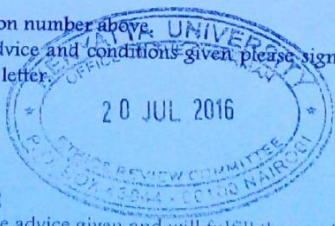
4. DECISION
The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines AND APPROVED that the research may proceed for a period of ONE year from 20th July, 2016.

5. ADVICE/CONDITIONS

- Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
- Serious and unexpected adverse events related to the conduct of the study are reported to this board immediately they occur.
- Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
- Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.
If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.



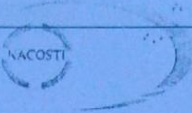


DR. TITUS KAHIGA
CHAIRMAN ETHICS REVIEW COMMITTEE

I, Moses Mwangi Gitonga.....accept the advice given and will fulfill the conditions therein.

Signature... Moses Mwangi Gitonga..... Dated this day of... July..... 2016.
cc. Vice-Chancellor
DVC-Research Innovation and Outreach

Appendix VII: NACOSTI Research Authorization Letter



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. _____ Date: _____

NACOSTI/P/16/40548/13880

27th October, 2016


Moses Mwangi Gitonga
Jomo Kenyatta University of Agriculture
And Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Examining determinants and outcomes of an integrated maternal health intervention on uptake of skilled care during and post delivery in Migori County, Kenya.”* I am pleased to inform you that you have been authorized to undertake research in **Migori County** for the period ending **24th October, 2017**.

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

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

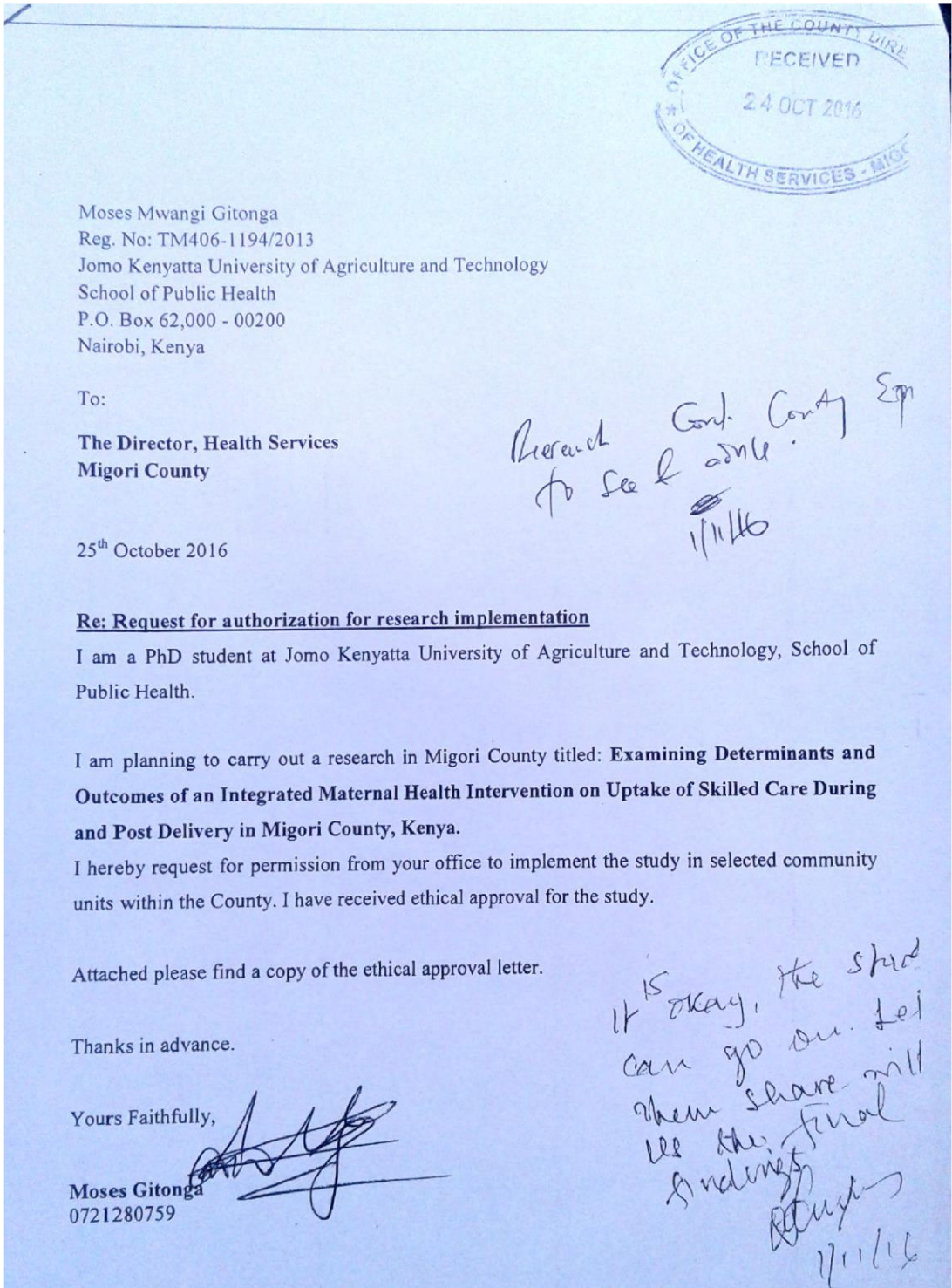

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Migori County.

The County Director of Education
Migori County.

Appendix VIII: Migori County Research Implementation Authorization Letter



OFFICE OF THE COUNTY DIRECTOR
OF HEALTH SERVICES - MIGORI
RECEIVED
24 OCT 2016

Moses Mwangi Gitonga
Reg. No: TM406-1194/2013
Jomo Kenyatta University of Agriculture and Technology
School of Public Health
P.O. Box 62,000 - 00200
Nairobi, Kenya

To:
**The Director, Health Services
Migori County**

Research Migori County Ep
to see & advise
1/11/16

25th October 2016

Re: Request for authorization for research implementation

I am a PhD student at Jomo Kenyatta University of Agriculture and Technology, School of Public Health.

I am planning to carry out a research in Migori County titled: **Examining Determinants and Outcomes of an Integrated Maternal Health Intervention on Uptake of Skilled Care During and Post Delivery in Migori County, Kenya.**

I hereby request for permission from your office to implement the study in selected community units within the County. I have received ethical approval for the study.

Attached please find a copy of the ethical approval letter.

Thanks in advance.

Yours Faithfully,

Moses Gitonga
0721280759

It is okay, the stud
can go on. Let
them share with
us the final
findings
1/11/16

Appendix IX: List of published papers based on the intervention project:

1. **Moses Gitonga**, Kenneth Ngunjiri, Elizabeth Echoka, Effectiveness of a community level maternal health intervention in improving uptake of postnatal care in Migori County, Kenya; *International Journal of Translational Medical Research and Public Health* | 2019| DOI: 10.21106/ijtmrph.70
2. **Moses Gitonga**, Joyce Cheptum, Ernest Mutua ,Two Worlds Apart: A Comparative Study of Access and Utilization of Maternal - Infant Health Services Between Two Counties in Kenya; *Researchjournali's Journal of Public Health Vol. 4 / No. 8 August* | 2018
3. **Moses Gitonga**, Kenneth Ngunjiri, Elizabeth Echoka, Improving Skilled Birthing: Determinants and Role of a Maternal-Neonatal Health Intervention Programme in Migori County,Kenya; *Researchjournali's Journal of Public Health Vol. 4 / No. 7 July* | 2018
4. J.J. Cheptum, **M.M. Gitonga**, E.M. Mutua, S.J. Mukui, J.M. Ndambuki, W.J. Koima, Perception About Traditional Birth Attendants By Men And Women Of Reproductive Age In Rural Migori County, Kenya, *International Journal of Africa Nursing Sciences* (2017), doi: <http://dx.doi.org/10.1016/j.ijans.2017.07.002>
5. Mukui, S.J, Mutua, E.M, **Gitonga, M.M**, Cheptum, J.J., Ndambuki, J.M.,Koima, W. Determinants of infant immunization coverage in migori County, Nyanza region, Kenya. *Ethiopian Journal of Environmental Studies & Management* 9(5): 604 – 612, 2016.ISSN:1998-0507
6. J. J. Cheptum, **M. M. Gitonga**, E. M. Mutua, S. J. Mukui, J. M. Ndambuki, W. J. Koima and I. Hale, Emergency Obstetrics Training Improving Skills among Health Care Workers in Migori and Nyeri Counties, Kenya, *International Journal of Pharmaceutical Sciences and Research (IJPSR)*, 2016; Vol. 7(7): 3045-3052. E-ISSN: 0975-8232; P-ISSN: 2320-5148.

Appendix X: Published papers based on the study:

*International Journal of Translational
Medical Research and Public Health* (2019), Volume 3, Issue 1, 11-20



Available online at www.ijtmrph.org

INTERNATIONAL JOURNAL OF TRANSLATIONAL
MEDICAL RESEARCH AND PUBLIC HEALTH
ISSN 2576-9502 (Online)
ISSN 2576-9499 (Print)
DOI: 10.21106/ijtmrph.70

ORIGINAL ARTICLE

Effectiveness of A Community Level Maternal Health Intervention in Improving Uptake of Postnatal Care in Migori County, Kenya

Moses M. Gitonga, MPH;^{1✉} Kenneth K. Ngunjiri, PhD;² Elizabeth E. Echoka, PhD³

¹Dedan Kimathi University of Technology (DeKUT), School of Health Sciences, P.O. Box 657-10100, Nyeri, KENYA; ²Jomo Kenyatta University of Agriculture and Technology (JKUAT), School of Public Health (SoPH), P. O. Box 62000-00200, Nairobi, KENYA; ³Kenya Medical Research Institute (KEMRI), Centre for Public Health, Health Systems Research Unit, P.O. Box 54840 00200, Nairobi, KENYA

✉Corresponding author email: mwangiguk@gmail.com

ABSTRACT

Background: Provision of a continuum of care during pregnancy, delivery, and the postnatal period results in reduced maternal and neonatal morbidity and mortality. Complications and lack of skilled postnatal care has consequences for mothers and babies. We examined to what extent a community level integrated maternal health intervention contributed to improvements in uptake of skilled care after delivery by pregnant women.

Methods: An *Ex post* quasi-experimental design was applied. Among 590 reproductive-aged women, we assessed the effectiveness of a community level integrated maternal health intervention and predictors of uptake of postnatal care. Descriptive, bivariate and multivariate analyses were conducted.

Results: About three fifths (64%) of the women reported having sought postnatal care services at the health facility within six (6) weeks. Women in the intervention arm were 3.3 times more likely to take up postnatal care at a health facility (AOR= 3.31 [95% CI 1.245 to 8.804] p=0.016). Women referred to the health facility for postnatal care by Community Health Workers (CHWs) were 2.72 times more likely to take up the services (AOR= 2.72 [95% CI 1.05 to 7.07] p=0.039) than those not referred by CHWs. Distance to health facility (61%) was the major barrier, while some mothers did not feel the need for postnatal care (11%).

Conclusion and Implications for Translation: Routine health education by trained providers at community level health facilities, coupled with enhanced CHWs' involvement can improve uptake of postnatal care. Ignorance and accessibility challenges are some barriers to the uptake of postnatal care.

Key words: Community • Maternal • Health • Intervention • Postnatal-Care • Kenya • MAISHA • Community Health Volunteers (CHVs) • Community Health Workers (CHWs)

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© 2019 Global Health and Education Projects, Inc.

1. Introduction

1.1. Background of the Study

Skilled care during pregnancy, delivery and postnatal period is important for the health of both mothers and newborns. Most of the maternal and neonatal mortalities occur at the community level due to lack of good quality care during labor and birth.¹

Worldwide, the maternal mortality ratio has fallen since 1990— probably related to improved access to skilled care and to antenatal care.² Nonetheless, in 2010, approximately 287,000 women died in childbirth or from pregnancy complications, most of them in poorer countries.² Improved access to skilled health personnel for childbirth is a priority strategy and a key indicator for Millennium Development Goal (MDG) 5a which sought to improve maternal health, reflected in Sustainable Development Goal 3.1 vide: “by 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births.”²

Provision of a continuum of care during pregnancy, delivery, and the postnatal period results in reduced maternal and neonatal morbidity and mortality.³ Kenya’s maternal mortality ratio is still high (362 maternal deaths per 100,000 live births) and under-five child mortality (52 per 1000 live births) with mortality occurring in the first month of life being 39 deaths per 1,000 live births.⁴ In 2012, the government of Kenya launched a new policy on population and national development. The policy described in the Sessional Paper No. 3 of 2012, was aimed at: reducing the infant mortality rate from 52 per 1,000 live births in 2009 to 25 per 1,000 live births by 2030; reducing the under-5 mortality rate from 74 per 1,000 live births in 2009 to 48 per 1,000 live births by 2030; and reducing the maternal mortality rate from 488 deaths per 100,000 live births in 2009 to 200 deaths per 100,000 live births by 2030.⁵ Only slightly more than half (53 percent) of women who gave birth in the two years before the 2014 Kenya Demographic and Health Survey received a postnatal care checkup in the first two days after delivery and only 36% had their first postnatal checkup.⁵ One in three newborns received postnatal care from a doctor, a nurse, or a midwife. Overall, 43 percent of women did not receive a

postnatal checkup within the first six weeks after delivery.⁵

Evidence suggests that integrated community-based services provided from pre-pregnancy through the postnatal period can improve maternal and neonatal outcomes.⁶⁻⁸ Furthermore, there is growing evidence for effective low cost interventions to reduce the rate of maternal and newborn deaths.⁹⁻¹⁴ Reducing deliveries with an unskilled birth attendant combined with early identification of danger signs in a mother or newborn form an indispensable part of many of these evidenced based interventions. Community Health Volunteers (CHVs) and Community Health Workers (CHWs) form broad categories of non-professional health workers often the first point of contact in these interventions and provide essential links to clinical services¹⁵.

However, more research is needed to explore regional variability, examine longitudinal trends, and study the impact of interventions to boost rates of skilled care utilization in sub-Saharan Africa.¹⁶ Maternal and neonatal deaths in Kenya are attributed to limited utilization and availability of skilled birth attendants (SBA), low coverage of basic and normal delivery services and poor quality of existing services.⁴ The government of Kenya and partners have rolled out nation-wide maternal and child health programs. These programs play key roles in the improvement of maternal-child health indicators. Despite the efforts, huge disparities are notable across the counties. This implies presence of unique determinants and barriers to uptake of skilled care after delivery (postnatal care) for these counties. This study examines the effectiveness of a community level integrated maternal health intervention and predictors of uptake of postnatal care.

1.2. Objectives of the Study

This study aimed at determining the effectiveness of a community level integrated maternal health intervention aimed at increasing the uptake of postnatal care, and to establish the predictors and barriers of postnatal care uptake. The study hypothesized that a community level intervention would not lead to improved uptake of postnatal

care (null). Specifically, the study was to determine the proportion of women aged 15-49 years utilizing postnatal care services at a health facility in Migori and Rongo Sub-Counties in South western Kenya. Further, this study sought to establish the determinants and explore the barriers to uptake of postnatal care.

2. Methods

This study was carried out in Migori County in Kenya. Migori County is located in western Kenya and borders Homa Bay County (North), Kisii County (North E), Narok (South East), Tanzania (West and South) and Lake Victoria to the West. The county also borders Uganda via Migingo Island in Lake Victoria. The intervention arm was Migori sub-County and the control group was Rongo sub-County. An *Ex post* (retrospective non-equivalent control group design) type of quasi-experimental study was conducted. We evaluated the effectiveness of a community level Maternal-Infant program dubbed Maternal and Infant Survival for Health care Advancement (MAISHA) in improving uptake of postnatal care. The study population were women of reproductive age who delivered between January 2014 and December 2016 in both Sub-Counties. Migori County had 43,440, 44,765 and 46,130 estimated live births in year 2014, 2015 and 2016 respectively.

Sample size was determined using facility delivery as a binary outcome using a binomial test to compare one proportion to a reference value. Using a power of 0.85 and alpha of 0.05, Taking a ratio of controls to treatment in sample to be 1, a sample size of 582 women of reproductive age (Migori (291) and Rongo (291) was needed to detect a difference of 11.7 per 100 live births in a health facility from the rate of 53.3% (births assisted by trained professional in Migori, MAISHA baseline, 2013) and Percent of intervention group with outcome targeted to be 65% (KNBS 2014, Nyanza region SBA 65%). A proportional stratified sampling method was used to give all sub-locations equal chance of selection despite differing population densities. Migori Sub-County has 30, while Rongo has 22 sub-locations (Source: Migori County Development profile (2013)). A sample of 11 and 15 respondents in

each sub-location in Migori and Rongo Sub-County respectively were consecutively selected.

The control group (Rongo Sub-county) received conventional care from the Ministry of Health, Kenya and Migori County government. In the intervention arm (Migori Sub-County), over and above conventional care, operating within the Ministry of Health's policy on Community Strategy, Community Health Extension Workers (CHEWs) were trained on various relevant aspects of maternal -neonatal and child health (MNCH) and were aided in establishment and activation of community units. The CHEWs then embarked on sensitizing and training Community Volunteers in their community units on MNCH.

The community volunteers then sensitized and educated respective households who were served in MNCH with special effort aimed at reaching all unskilled birth attendants, urging them to advise, refer and act as birth companions during skilled birth attendance (SBA) and postnatal. In all instances of sensitization, the single overriding objective and message was to encourage postnatal mothers to always seek skilled care services as scheduled after delivery. Clinical health personnel conducting postnatal evaluations and care within this County were trained and the link to health facilities facilitated to have essential obstetric care kits.

2.1. Study Variables

The main outcome variable was uptake of postnatal care. We further assessed predictors of utilization of postnatal care among the participants.

2.2. Statistical Analysis

The coded data were entered into a computer database using STATA 11.2 data editor. Statistical analysis was both analytical and descriptive. Chi-square test of significance and multivariate logistic regression analysis were performed.

2.3. Ethical Approval

Scientific and ethical approval to conduct this study was obtained from the Kenyatta University Ethical Review Committee (KUERC) - Application number PKU/487/E41. Written informed consent was obtained from the participants, participation was

fully voluntary and confidentiality was observed at all times.

3. Results

3.1. Sociodemographic Characteristics

Sociodemographic characteristics of the study participants in the two Sub-Counties were generally comparable. Migori reported a relatively higher proportion of women aged 15-49 years utilizing postnatal care services at a health facility (98%, 292) than Rongo Sub-county (93.49%, 273). The age of the respondents ranged between 15 to 49 years. Most of the women were aged between 20 to 29 years. The median age was 24 and 25 years in Migori and Rongo Sub-county respectively. Majority 286 (96.0%) and 265 (90.8%) in Migori and Rongo sub-County respectively have a mobile phone, but notably, only a few have registered with the National Hospital Insurance Fund (NHIF), 37 (12.4%) and 22 (7.5%) in Migori and Rongo sub-County respectively (Table 1).

3.2. Post-natal care service utilization

For those who reported utilization of post natal services at the health facility, overall, in the two sub-counties, 362 (63.96%) of the women reported having sought for postnatal care services at the health facility within 6 weeks. The proportion of women seeking postnatal care services within 6 weeks was similar in the two sub-counties (188, 63.74% and 174, 64.16% in Rongo and Migori respectively) (Fig. 1). Although there was only a small difference in the proportion of those who sought postnatal care, in the multivariate analysis, women in the intervention Sub-County were found to be 3.3 times more likely to take up postnatal care at a health facility [AOR =3.31, 95% Conf. Interval (1.244574, 8.803599), pr=0.016] compared to those who did not receive the intervention.

3.2.1. Barriers to uptake of Postnatal care

Though the number of women who failed to attend postnatal care was quite low, distance to health facility and cost of transport were cited as barriers. Some mothers felt no need for postnatal care, possibly due to ignorance and failure to get the right health education (Fig. 2).

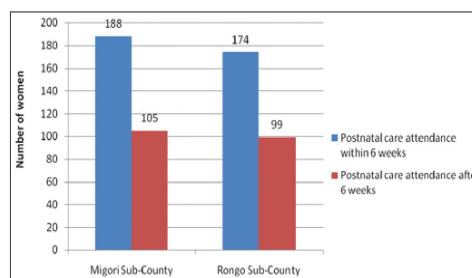


Figure 1: Postnatal care service utilization

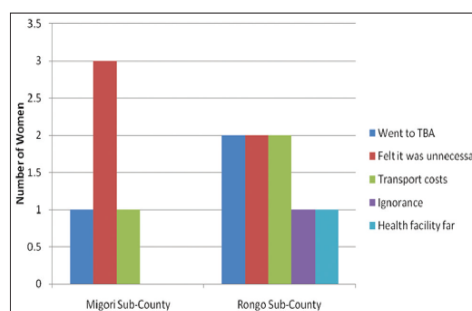


Figure 2: Reasons for failure to seek postnatal care

3.2.2. Factors associated with the uptake of postnatal care in Migori Sub-County

Being in the intervention arm was significantly associated with uptake of postnatal care. (Pearson $\chi^2(1) = 7.3387$ Pr = 0.007). Number of pregnancies ever had, live births, number of living children, attended ANC, number of ANC visits, person conducting health education and mode of transport used were found to be statistically significantly associated with uptake of postnatal care at a health facility (Table 2).

3.2.3. Factors associated with the uptake of postnatal care in Rongo Sub-County

A woman's occupation, number of ANC visits, person conducting health education, referred to facility, and person accompanying woman were found to be statistically significantly associated for uptake of postnatal care at a health facility. Among the factors found not to be significantly associated with uptake of postnatal care at a healthcare facility were mode of transport used, having a birth companion,

receipt of health education, attended ANC, partner's education level, marital status, having registered with NHIF, being in polygamous marriage, number of pregnancies, live births, living children, and woman's educational level (Table 3).

3.2.4. Determinants of uptake of postnatal care

Participants who received health education were 2.98 times more likely to return for postnatal care (AOR= 2.98[95% CI 0.7177 to 12.36] p=0.133) while those who received health messages from health workers had a 9.63 times greater likelihood to seek postnatal care (AOR= 9.63[95% CI 2.09 to 44.38] p=0.004). Women referred to the health facility for postnatal care by Community Health Workers were 2.72 times likely to take up the services (AOR= 2.72[95% CI 1.05 to 7.07] p=0.039).

Women in the intervention arm (Migori Sub-County) of the study who were beneficiaries of the integrated maternal-child project (MAISHA) were 3.3 times more likely to take up postnatal care in a health facility than their counterparts in the control (AOR= 3.31[95% CI 1.245 to 8.804] p=0.016). Those who took between 30 minutes to one hour to get to health facility were 6 times less likely to utilize postnatal care services (AOR= 0.1663[95% CI 0.0536 to 0.5155] p=0.002). Accessibility to a health facility and distribution of the same in a region is vital in determining uptake of services.

4. Discussion

This study sought to determine the proportion of women aged 15-49 years utilizing postnatal care services at a health facility in Migori and Rongo Sub-Counties in South western Kenya. Further, the study sought to establish the determinants and explore the barriers for postnatal care uptake. Women in the intervention arm reported a relatively higher proportion for utilizing of postnatal care services at a health facility (98%, 292) than the control group (93.49%, 273).

The intervention arm was 3.3 times more likely to take up postnatal care in a health facility than their counterparts in the control. Participants who received health education were 2.98 times more likely to return

Table 1: Participants socio-demographic characteristics

Factor	MIGORI (N=298)	RONGO (N=292)
Age		
Mean	25.7	26
Standard deviation	6.6	6.2
Range	15-46	15-49
	Freq. (Percent)	Freq. (Percent)
Age category		
15-19	53 (17.8)	34 (11.6)
20-24	98 (32.9)	109 (37.3)
25-29	67 (22.5)	75 (25.7)
30-34	49 (16.4)	46 (15.8)
35-39	19 (6.4)	18 (6.2)
40-44	8 (2.7)	7 (2.4)
45-49	4 (1.3)	3 (1.03)
Has mobile No.		
Yes	286 (96.0)	265 (90.8)
No	12 (4.0)	27 (9.3)
Registered with NHIF		
Yes	37 (12.4)	22 (7.5)
No	261 (87.6)	270 (92.5)
In polygamous marriage		
Yes	79 (26.5)	44 (15.1)
No	219 (73.5)	248 (84.9)
Marital status		
Single	32 (10.7)	25 (8.6)
Widowed	11 (3.7)	6 (2.1)
Married	255 (85.6)	261 (89.4)

for postnatal care (AOR= 2.98) while those who received health messages from health workers had a 9.63 times greater likelihood to seek postnatal care (AOR= 9.63). Women referred to the health facility for postnatal care by Community Health Workers were 2.72 times likely to take up the services (AOR= 2.72). Though the number of women who failed to attend postnatal care was quite low, distance to health facility and cost of transport were cited as barriers to uptake of postnatal care at a health facility

Women beneficiaries of the community level integrated maternal health intervention were more likely to take up postnatal care in a health facility than their counterparts in the control. Similar

Table 2: Factors associated with uptake of postnatal care in the intervention arm

Factor	Postnatal care at 6 weeks (n=188)	Chi - square	p-value
Possess mobile phone		3.0125	0.222
Number of pregnancies		43.9025	0.004
Live births		44.9850	0.001
Living children		41.9492	0.001
Marital status			
Single	25	9.8527	0.043
Widowed	8		
Married	155		
In polygamous marriage			
Yes	42	2.3497	0.125
No	146		
Registered with NHIF			
Yes	42	4.6539	0.098
No	146		
Woman's educational level			
Primary	144	7.9596	0.241
Secondary	33		
College/university	11		
Woman's occupation		22.7622	0.012
Partner's education level		8.2520	0.409
Partner's occupation		22.1054	0.036
Attended ANC		18.5276	0.000
Number of ANC visits		29.4983	0.000
Received health education			
Yes	179	2.2565	0.324
No	9		
Person health educating		84.7757	0.000
Referred to facility			
Yes	24	1.1427	0.565
No	164		
Referring person		25.5698	0.029
Had birth companion			
Yes	24	0.3232	0.851
No	164		
Person accompanying		28.8317	0.050
Mode of transport used		34.7049	0.000
Time taken to facility		16.4806	0.011

findings were found in a study assessing the effect of an integrated maternal health intervention on skilled provider's care for maternal health in remote rural areas of Bangladesh, the comparative analysis

between baseline and end line surveys, separately for all the performing areas, revealed that the intervention improved the use of skilled care during postnatal care in all the areas¹⁷.

Table 3: Factors associated with uptake of postnatal care in the control arm

Factor	Postnatal care at 6 weeks (n=174)	Chi - square	p-value
Possess mobile phone		4.5839	0.032
Number of pregnancies		22.4646	0.316
Live births		13.9407	0.733
Living children		14.7537	0.790
Marital status			
Single	18	4.6739	0.322
Widowed	2		
Married	154		
In polygamous marriage			
Yes	25	0.5989	0.741
No	149		
Registered with NHIF			
Yes	14	0.2366	0.888
No	160		
Woman's educational level			
Primary	137	9.3910	0.153
Secondary	35		
College/university	2		
Woman's occupation		25.2159	0.005
Partner's education level		7.7739	0.456
Partner's occupation		19.4644	0.035
Attended ANC		2.0556	0.358
Number of ANC visits		24.3769	0.002
Received health education			
Yes	171	5.0281	0.081
No	3		
Person health educating		50.9624	0.000
Referred to facility			
Yes	29	10.1545	0.006
No	145		
Referring person		16.1634	0.040
Had birth companion			
Yes	22	1.4918	0.474
No	152		
Person accompanying		72.6011	0.000
Mode of transport used		11.3366	0.079
Time taken to facility		16.3354	0.012

The intervention was largely effective due to adoption of a grassroots approach, utilizing CHWs/ CHEWs and CHVs in their community units. Similarly, in a study assessing the effectiveness of

a Community Health Worker Program in Rural Kenya in improving maternal and newborn health, the number of women delivering under skilled attendance was higher for those mothers who

reported exposure to one or more health messages, compared to those who did not. The delivery of health messages by CHWs increased knowledge of maternal and newborn care among women in the local community and encouraged deliveries under skilled attendance¹⁸. Similarly, among the enabling characteristics, counselling from a CHW, partner testing for HIV status and trust in health system were associated with postnatal care use¹⁹.

In this study, women's education level was not associated with uptake of postnatal care at a health facility. This is contrary to a study in Tanzania where individual-level attributes positively associated with postnatal care use were women's education of primary level or higher having had a caesarean section or forceps delivery and being counselled by a community health worker to go for postnatal care at a health facility¹⁹.

The study found that distance was associated with facility use for postnatal care, this is in agreement with other studies elsewhere²⁰⁻²². Those who took between 30 minutes to one hour to get to health facility in our study were 6 times less likely to utilize postnatal care services. Accessibility to a health facility and distribution of the same in a region is vital in determining uptake of services. This was in agreement with a Tanzanian study, where the only community level variable associated with significant odds of receiving postnatal care was the geographic location of the respondent. Women living in Mvomero Kilosa and Ulanga were less likely to receive postnatal care at a facility than those living in Morogoro DC.¹⁹

In this study: being educated by health workers, being referred to the health facility for postnatal care by Community Health Workers and taking between 30 minutes to one hour to get to health facility to be determinants for uptake of postnatal care services. These rhyme with findings in a review study, which identified twenty determinants grouped under four themes: (1) sociocultural factors, (2) perceived benefit/need of skilled attendance, (3) economic accessibility and (4) physical accessibility.^{19,23}

4.1. Limitations

A string of health worker labour unrest, on and off since year 2013 to year 2017 may have slowed

possible optimal effect of this intervention. The study adopted a quasi experimental design; this has its inherent limitations, more robust designs could be used. This study focussed on unique gaps in Migori region in Kenya; hence, the intervention may not be wholly generalized to the entire country.

4.2. Recommendation for further studies

There is need to undertake similar community level maternal health interventions and evaluation at a larger scale so as to determine whether the intervention effects will be observed at a large scale. In addition, it is important to implement more robust study designs such as randomized trials to test effectiveness of the same intervention in the general population with greater precision. Further studies are needed to correlate maternal-infant outcomes and uptake of postnatal care among rural communities.

5. Conclusion and Implications for Translation

The intervention was largely effective in improving uptake of postnatal care due to adoption of a grassroots approach, utilizing CHWs/CHEWs and CHVs in their community units. Health education by trained providers at health facilities, coupled with enhanced CHWs' involvement in sensitization led to improved uptake of postnatal care while ignorance and accessibility challenges were some barriers to uptake of postnatal care. Findings from this study will inform county government of Migori, Kenya on specific areas as identified on which to focus in order to improve postnatal care uptake and hence the welfare of mothers and children. More so, this approach can be exploited albeit with modifications to suit other regions faced with low uptake of postnatal care.

Compliance with Ethical Standards

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Key Messages

- Community level interventions employing CHWs can have positive impact at increasing uptake of postnatal care in a rural developing country.
- Routine health education by trained providers at health facilities, coupled with enhanced CHWs' involvement can improve uptake of postnatal care.
- Widespread ignorance and accessibility challenges are barriers to uptake of postnatal care among the study population.

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Improving Skilled
Birthing: Determinants
And Role Of A Maternal-
Neonatal Health
Intervention Programme
In Migori County,
Kenya

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ABSTRACT

Introduction: Skilled care during pregnancy and delivery is important for the health of both mother and newborn. Integrated maternal health interventions have been found to contribute to improvement in uptake of skilled care during delivery.

Methods: An *Ex post* quasi-experimental design was applied. Among 590 reproductive age women, we assessed the determinants and role of a maternal-neonatal health intervention programme in improving skilled birth attendance (SBA). Tabulation and multivariate logistic analyses was done.

Results: The intervention increased SBA (OR= 1.56[95% CI 1.01 to 2.43]).SBA increased from 53.3% to 80.5%. Attending ante-natal care(ANC) and the number of ANC visits were significantly associated with SBA(p=0.000).Having ones' mother as a birth companion increased the likelihood of SBA(OR= 4.97[95% CI 2.74 to 9.00] p=0.000) as was possession of a mobile phone number (OR= 2.82[95% CI 1.33 to 5.96] p=0.007) while those who had not had any of their under five year olds die in the last two years or referred by a health worker were more likely to take up skilled delivery (OR= 2.76[95% CI 1.25 to 6.08] p=0.012) and (OR= 2.50[95% CI 1.03 to 6.11] p=0.044) respectively. Being married and contact with a traditional birth attendant (TBA) reduced likelihood of SBA (OR= 0.33[95% CI 0.148 to 0.727]), (OR= 0.055[95% CI 0.005 to 0.595]) respectively.

Conclusion: ANC attendances, health education to clients are critical aspects that can enhance uptake of SBA. Policy makers should re-strategize the involvement of TBAs in efforts towards scaling up SBA.

Keywords: Improving; birthing; *Ex post*; quasi-trial; maternal-neonatal; health; intervention; Kenya

1. BACKGROUND

Most of the maternal and neonatal mortalities occur at the community level due to lack of good quality care during labour and birth(Lassi, Das, Salam, & Bhutta, 2014). Skilled care during pregnancy, delivery and postnatal is thus important for the health of both mother and newborn.

Worldwide the maternal mortality ratio has fallen since 1990– probably related to improved access to skilled care and to antenatal care (WHO. UNICEF. UNFPA. World Bank, 2012). Nonetheless, in 2010, approximately 287,000 women died in childbirth or from pregnancy complications, most of them in poorer countries(WHO. UNICEF. UNFPA. World Bank, 2012). Better access to skilled health personnel for childbirth is a priority strategy and a key indicator for Millennium Development Goal (MDG) 5a to improve maternal health, reflected in Sustainable Development Goal 3.1 vide; by 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births(WHO. UNICEF. UNFPA. World Bank, 2012).

There is growing evidence for effective low cost interventions to reduce the rate of maternal and newborn deaths (Darmstadt, 2010 ; Darmstadt GL, 2010 ; Kirkwood, 2008; Lewycka et al., 2013; Nair, Tripathy, Prost, Costello, & Osrin, 2010; Tyllesor T, 2011). Reducing deliveries with an unskilled birth attendant combined with early identification of danger signs in a mother or newborn form an indispensable part of many of these evidenced based interventions. Community Health Volunteers (CHVs) and Community Health Workers (CHWs) form broad categories of non-professional health workers often the first point of contact in these interventions and provide essential link to clinical services(Kok et al., 2015).

Research to date on the drivers and barriers to facility delivery in sub-Saharan Africa has been dominated by analysis of cross-sectional household survey data. More research is needed that explores regional variability, examines longitudinal trends, and studies the impact of interventions to boost rates of facility delivery in sub-Saharan Africa(Moyer & Mustafa, 2013). Maternal and neonatal deaths in Kenya are attributed to limited utilization and availability of SBA, low coverage of basic and normal delivery services and poor quality of existing services(KDHS, 2008-2009). The government of Kenya and partners has rolled out nation-wide maternal-child health programs. These programs play key role in the improvement of maternal-child health indicators. Despite the efforts, huge disparities are notable across the counties. This implies presence of unique determinants and barriers to uptake of SBA for these counties. This study describes the outcomes and determinants of uptake of SBA after an integrated maternal health intervention in Migori County, Kenya.

2. MATERIALS AND METHODS

2.1 STUDY SETTING, DESIGN AND POPULATION

This study was carried out in Migori County, Kenya, with the intervention arm in Migori sub-County and the control group being Rongo sub-County. An *Ex post* (retrospective non-equivalent control group design) type of quasi-experimental study was conducted. We evaluated the effectiveness of a 'grass-roots' approach Maternal-Infant program – dubbed Maternal And Infant Survival and Health care Advancement (MAISHA) in Migori . The study population were women of reproductive age who delivered after January 2014 in both Sub-Counties.

2.2 THE INTERVENTION

The interventional five year maternal – infant health (The MAISHA Project 2012-2017) project's primary objective was to improve access to and attitudes towards quality health care services for women and children living in rural communities within Migori County. Through the project, health workers' (SBA) training and refreshers on emergency obstetric and neonatal care was initiated in year 2013. Further, assessment and supplementation of basic delivery kit in the health centres, as well as training of CHEWs and community

volunteers on maternal infant health issues was instituted. Community units were reactivated and new ones established. These interventions were informed by findings (gaps) from a baseline survey of March 2013.

2.3 IMPLEMENTATION OF THE INTERVENTION

Operating within the Ministry of Health's policy on Community Strategy, Community Health Extension Workers (CHEWs) were trained on various relevant aspects of maternal -neonatal and child health (MNCH) and were aided in establishment and activation of community units. The CHEWs then embarked on sensitizing and training Community Volunteers in their community units on MNCH.

The community volunteers then sensitize and educate respective households served on MNCH with special effort towards reaching all unskilled birth attendants, urging them to advise, refer and act as birth companions during SBA. In all instances of sensitization, the single overriding objective and message was to encourage pregnant mothers to always seek skilled care services during and after delivery.

Clinical health personnel assisting in skilled deliveries within this County were trained on emergency obstetric and neonatal care (EMONC) and the link health facilities facilitated to have essential obstetric care kits.

2.4 SAMPLE SIZE, SAMPLING PROCEDURE AND DATA COLLECTION

The sample size was computed using the method described in Kelsey et. al. in 1996(Kelsey JL, 1996). The Percent of Controls with Outcome being 53.3% (births assisted by trained professional in Migori, MAISHA baseline,2013) and Percent of intervention group with Outcome targeted to be 65% (KDHS 2014, Nyanza region SBA 65%). We hypothesize that the intervention will have contributed to an 11.7% positive difference in favor of the intervention.

$$N_{kelsey} = \frac{(z_{\alpha/2} + z_{\beta})^2 p(1-p)(r+1)}{r(p_0 - p_1)^2} \quad \text{Where: } P_0 = 53.3\%, P_1 = 65\% \text{ and } P = 59.15\%$$

Taking a Ratio of Controls to Treatment in sample to be 1, a minimum of 582 women of reproductive age (15 – 49 years), would be selected in the two Sub-Counties (Migori (291) and Rongo (291).

Women of reproductive age who delivered after January 2014 in Migori and Rongo Sub-Counties and met the inclusion criteria were selected during the household survey. A sampling frame was established for each sub-location in the two Sub-Counties. Utilizing the already existing community strategy framework by GOK, community volunteers-who handle defined households and the provincial administration we enumerated all women meeting the eligibility criteria.

Computer generated random numbers from Open Epi were used. Once enumerated, the positions generated randomly by use of computer were arranged in ascending order by use of Microsoft Excel.

Migori Sub-County has 30, while Rongo has 22 sub-locations (Source: Migori County Development profile (2013)). A simple random sample of 11 and 15 respondents in each sub-location in Migori and Rongo Sub-

County respectively were selected. Aided by the community volunteers, locator information was established. The research assistants then visited these selected households and conducted the interviews. A questionnaire was used to elicit the outcomes of the integrated maternal health intervention and determinants of utilization.

2.5 DATA ANALYSIS

The coded data was entered into a computer database using STATA 11.2 data editor. Statistical analysis was both analytical and descriptive. Chi-square test of significance and multivariate logistic regression analysis was done. The results are described and presented in tables.

2.6 ETHICAL CONSIDERATIONS

The protocol was submitted to the Jomo Kenyatta University of Agriculture and Technology board of postgraduate studies for review and approval. Scientific and ethical approval to conduct this study was obtained from the Kenyatta University Ethical Review Committee (KUERC) - Application number PKU/487/E41. A research permit was applied for and granted by NACOSTI. Permission was also obtained from the Migori County Health executive before visiting the health facilities. Written informed consent was sought from the participants, participation was fully voluntary and confidentiality was observed at all times.

3. RESULTS

Socio-Demographics Characteristics

Key demographic characteristics of the study women in the two Sub-Counties were generally comparable. The age of the respondents ranged between 15 to 49 years. Most of the women were aged between 20 to 29 years. The median age was 24 and 25 years in Migori and Rongo Sub-county respectively. Majority 286(96.0%) and 265(90.8%) in Migori and Rongo sub-County respectively have a mobile phone, but notably, only a few have registered with the National Hospital Insurance Fund(NHIF), 37 (12.4%) and 22(7.5%) in Migori and Rongo sub-County respectively (**Table 1**).

Factors associated with uptake of facility delivery in the intervention arm

Respondent's sub-County was found to be significantly associated with the delivery place (9.0232, Pr = 0.003). Time taken to facility, partner's occupation, woman's occupation, woman's educational level, being in polygamous marriage, marital status and being registered with NHIF were not significantly associated with facility based delivery($P>0.05$) (**Table 2**).

Factors associated with the uptake of skilled care during delivery among women in the control arm.

Possessing a mobile phone, live births, marital status, woman's educational level, number of ANC visits, having a birth companion, the individual accompanying and mode of transport used were found to be significantly associated with health facility delivery. Antenatal clinic attendance, partner's occupation, woman's occupation,

being in a polygamous marriage, received health education and person educating, referred and person referring and being registered with NHIF were not significantly associated with facility based delivery (Table 3).

Determinants for the uptake of skilled care during delivery

On average, women in the intervention arm of the study were 1.56 times more likely to deliver in a health facility than their counterparts in the control (OR= 1.56[95% CI 1.01 to 2.43] p=0.048), those who used motorbike as a means of transport were 4.62 times more likely to utilize SBA (OR= 4.62[95% CI 2.96 to 7.19] p=0.000) while those utilizing 'matatus' had a 4.29 times greater likelihood (OR= 4.29[95% CI 1.05 to 17.55] p=0.043). These point to transport means, nature of roads and distance to health facility to be key factors in determining utilization of SBA.

Having ones' mother as a birth companion increased the likelihood of SBA by 4.97 times (OR= 4.97[95% CI 2.74 to 9.00] p=0.000) and 2.82 times if one possessed a mobile phone number (OR= 2.82[95% CI 1.33 to 5.96] p=0.007) while those who had not had any of their under five year olds die in the last two years were 2.76 times likely to take up skilled delivery (OR= 2.76[95% CI 1.25 to 6.08] p=0.012). Those Referred by a health worker were 2.5 times likely to seek SBA (OR= 2.50[95% CI 1.03 to 6.11] p=0.044).

Being married decreased the likelihood of seeking for SBA by 3.05 times (OR= 0.33[95% CI 0.148 to 0.727] p=0.006) and surprisingly despite efforts persuading the Traditional Birth Attendants to support facility delivery by educating and referring pregnant women as appropriate, being educated by a TBA reduced the likelihood of taking up SBA by a whopping 18.2 times (OR= 0.055[95% CI 0.005 to 0.595] p=0.017) (Table 4).

4. DISCUSSION

This interventional study realized a 27.2% increase in uptake of SBA for the intervention arm. Similar findings were found in a study assessing the impact of free delivery policy on utilization of maternal health services in county referral hospitals in Kenya, where the number of deliveries and antenatal attendance increased by 26.8% and 16.2% in county referral hospitals and decreased by 11.9% and 5.4% respectively in low cost private hospitals(Njuguna, Kamau, & Muruka, 2017).

Our intervention was largely effective due to adoption of a grassroots approach, utilizing CHWs/CHEWs and CHVs in their community units. Similarly in a study assessing the effectiveness of a Community Health Worker Program in Rural Kenya in improving Maternal and Newborn Health, the number of women delivering under skilled attendance was higher for those mothers who reported exposure to one or more health messages, compared to those who did not. The delivery of health messages by CHWs increased knowledge of maternal and newborn care among women in the local community and encouraged deliveries under skilled attendance(Adam MB, 2014).

Majority of the women in the intervention arm attended ANC four or more times. An analysis by Stanton et al in 2007 (Stanton, 2007) of available data from 54 countries found that women's likelihood of delivering under care of skilled providers was associated with the number of ANC visits women made, the more ANC visits women made, the more likely they were to deliver under care of skilled providers. In the analysis, the percentage of women delivering under skilled providers increased from 13% among women who had no ANC to 28% among those with one visit, 45% among those with 2-3 visits and 73% among those with four or more visits. Another study among married adolescent girls in Bangladesh (Shahabuddin, Delvaux, Utz, Bardaji, & De Brouwere, 2016) reported use of antenatal care (ANC) to be the most important predictor of health facility-based delivery (OR: 4.04; 95% CI 2.73 to 5.99). This finding was similar with our finding at bivariate analysis where attending ANC and the frequency of ANC visits was highly significant. However, contrary to this, at multivariate analysis, having attended ANC was not significant.

In our study, woman's educational level was found to be significantly associated with facility delivery in the control arm; however, in the interventional arm the contrary was true. In the logistic model, no statistically significant association was found. This compares with Shahabuddin et al. study among married adolescent girls where in the bivariate analysis, maternal education appeared to be associated with facility-based delivery while in the logistic model, no statistically significant association was found. However, a significant difference was observed between adolescent girls with no formal education and girls with higher than secondary level education. Adolescent girls having higher than secondary education were 2.2 times more likely to deliver in a health facility compared to those adolescents with no education (OR: 2.2; 95% CI 1.04 to 4.78) (Shahabuddin et al., 2016).

This present study found that being married decreased the likelihood of seeking SBA. This differed with a study conducted in Ethiopia about the determinants of utilization of antenatal care and skilled birth attendant at delivery involvement of the partner/family in decision making on delivery place increased the likelihood of SBA at delivery but being unmarried reduced this likelihood (Wilunda et al., 2015). Reduced probability of seeking SBA among married women could be a pointer to the influence of culture – with men in this region in Kenya having preference for TBAs, possibly due to cost issues or attitude. Contrary, studies have suggested that pregnant women whose partners were involved in their pregnancy and delivery care were more likely to use health facility care services than men who were not involved in this care (Mangeni JN, 2013; Story et al., 2012). Further, in studies that included fathers in examining men's function in the reproductive health experiences of their partners (Carter, 2002; Carter MW, 2005; Dudgeon & Inhorn, 2004; Gross K, 2013; Kululanga, Sundby, Malata, & Chirwa, 2011; Kwambai et al., 2013; Story et al., 2012). They found that fathers had an influential role in their wives' use of pregnancy and delivery care, such that their birth location preferences impacted the women's health-seeking behaviours. For instance, fathers who preferred health facility

births perceived the need to send their wives to a facility to receive treatment for pregnancy and labour -related complications. These men did not consider facility care as their last resort.

Minority of women in our study had registered with the National Hospital Insurance Fund. Mutual health services uptake, despite known benefits is quite low in this Migori, Kenya. A cross-sectional study assessing the role of health insurance among rural women in china utilization of delivery care found that total hospital costs and women's costs for delivery services were lower in the New Cooperative Medical Scheme (NCMS) group, subsequently alleviation on women's perceived financial affordability. Indeed, the total hospital costs for delivery services in the NCMS group was significantly smaller and after being reimbursed, the out-of-pocket payment in the NCMS group was less than a half of that in the Non-NCMS group. Fewer women in the NCMS group than in the Non-NCMS group considered their payment for delivery services expensive(Xiao et al., 2010). In Kenya, women from wealthier households and those with health insurance are more likely to deliver in a health facility compared to women from poorer households and those without insurance (Kitui, Lewis, & Davey, 2013). Low enrollment with NHIF is thus a key issue of concern in this County. Since most of the women possess a mobile phone 286(96.0%) and 265(90.8%) in Migori and Rongo Sub-county respectively have a mobile phone), this could hold the key to strategies exploiting ownership of phone to ensure registration with health insurance.

In Migori Sub-County, Number of pregnancies, having attended ANC, Received health education, mode of transport used were significantly associated with facility delivery, however, Time taken to facility, occupation, Woman's educational level, Marital status and being Registered with NHIF were not significantly associated with facility based delivery. These findings largely agree, though with some variation with findings in a systematic review on the drivers and deterrents of facility delivery in sub-Saharan Africa, it was shown that in the region, maternal education, parity, rural/urban residence, household wealth, distance to health facility are strongly associated with facility based deliveries (Moyer & Mustafa, 2013).

Kenya's Ministry of Health encourages that TBAs should be community resource persons who would advise women and refer them in to health facilities for SBA. Surprisingly despite efforts persuading the Traditional Birth Attendants in Migori County to support facility delivery by educating and referring pregnant women as appropriate, being educated by a TBA greatly reduced the likelihood of taking up SBA. This is a key area that needs further evaluation in an effort to change strategy. In the mid-2000s, deliveries by traditional birth attendants (TBA) in Malawi were banned by the Malawian president, with the support of the Ministry of Health (MOH). TBA's roles were refocused from being birth attendants to being community resources who would advise women and refer them in to health facilities. The TBA ban was effective and popular, however in 2010; the then-president of Malawi made a proclamation that effectively reversed the ban (due to international pressure). This was done without consultation with the MOH and was contrary to their program and work plan.

In 2012, the subsequent president launched an initiative called the Presidential Initiative for Safe Motherhood which had three pillars, the expansion of maternity waiting homes, training and employing a new cadre of community midwives and reinstatement of the ban on TBAs, which was implemented through mobilization of community members (mainly chiefs)(Butrick, 2014).

5. CONCLUSION

The intervention was largely successful. Health education and quality service to clients are two critical aspects that can enhance uptake of SBA and postnatal care. Notably, for this study, there was a higher proportion of mothers in the intervention arm who reportedly chose health facility delivery because of having had received health education and good service from health providers than in the control arm. Further, women in the control arm reported a higher proportion of complications which needed health worker attention than in the intervention arm. Complications could probably arise out of poor client education, not adhering to FANC follow ups and poor skills of providers. Having a birth companion, possessing a mobile phone, being referred by a health worker or Community Health Worker increased likelihood of seeking for skilled care. Accessibility to a health facility and distribution of the same in a region was found vital in determining uptake of services.

It is known that skilled care during pregnancy and delivery is important for the health of both mother and newborn as is integrated maternal health interventions in contributing to improvement in uptake of skilled care during delivery. Further, research to date on the drivers and barriers to facility delivery in sub-Saharan Africa has been dominated by analysis of cross-sectional household survey data.

This study explores regional variability and studies the impact of interventions to boost rates of facility delivery adopting a quasi-experimental design as opposed to earlier studies that were cross-sectional and explores determinants at County/regional level. Integrated maternal health interventions with greater focus to community level intervention may have greater impact in increasing skilled birthing and are more sustainable. The inclusion of traditional birth attendants (TBAs) as partners in encouraging birth at a health facility may be counterproductive.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTIONS

Moses Gitonga: conceptualized the study, analyzed the data and wrote the manuscript. Elizabeth Echoka and Kenneth Ngunjiri: participated in study design and manuscript review. All authors read and approved the final draft of the manuscript.

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7. TABLES

Table 1: Participants Socio-demographic characteristics

Factor		MIGORI(N=298)	RONGO(N=292)
Age	Median	24	25
	Mean	25.7	26
	Standard deviation	6.6	6.2
	Range	15 - 46	15 - 49
		Freq. (Percent)	Freq. (Percent)
Age category	15-19	53(17.8)	34(11.6)
	20-24	98(32.9)	109(37.3)
	25-29	67(22.5)	75(25.7)
	30-34	49(16.4)	46(15.8)
	35-39	19(6.4)	18(6.2)
	40-44	8(2.7)	7(2.4)
	45-49	4(1.3)	3(1.03)
	Total	298(100)	292(100)
Has mobile No.	Yes	286(96.0)	265(90.8)
	No	12(4.0)	27(9.3)
	Yes	37 (12.4)	22(7.5)

Registered with NHIF	No	261 (87.6)	270(92.5)
In polygamous marriage	Yes	79 (26.5)	44(15.1)
	No	219 (73.5)	248(84.9)
Marital status	Single	32 (10.7)	25(8.6)
	Widowed	11 (3.7)	6(2.1)
	Married	255 (85.6)	261(89.4)

Table 2: Factors associated with uptake of facility delivery in the intervention arm

Factor		Facility delivery(n=240)	Chi - square	p-value
Possess mobile phone	Yes	233	3.9325	0.047
	No	7		
Number of pregnancies			22.6630	0.020
Live births			21.5129	0.018
Living children			25.8360	0.002
Marital status	Single	29	2.6460	0.266
	Widowed	8		
	Married	203		
In polygamous marriage	Yes	59	2.3497	0.125
	No	181		
Registered with NHIF	Yes	30	0.0080	0.929
	No	210		
Woman's educational level	None	1	5.3506	0.148
	Primary	186		
	Secondary	41		
	College/university	12		
Woman's occupation			6.0709	0.299
Partner's education level			9.3252	0.053
Partner's occupation			9.4752	0.149
Attended ANC			12.5400	0.000
Number of ANC visits			32.1745	0.000
Received health education	Yes	231	6.3625	0.012
	No	9		
Person health educating			10.2132	0.069
Referred to facility	Yes	26	7.1151	0.008
	No	214		
Referring person			12.2771	0.092
Had birth companion	Yes	19	32.1698	0.000
	No	221		
Person accompanying			52.4817	0.000
Mode of transport used			69.1742	0.000
Time taken to facility			2.0038	0.572

Table 3: Factors associated with uptake of facility delivery in the control arm

Factor		Facility delivery(n=204)	Chi - square	p-value
Possess mobile phone	Yes	190	4.5839	0.032
	No	14		
Number of pregnancies			15.6503	0.110
Live births			24.4749	0.004
Living children			18.2131	0.051
Marital status	Single	23	6.3673	0.041
	Widowed	4		
	Married	177		
In polygamous marriage	Yes	27	1.7775	0.182
	No	177		

Registered with NHIF	Yes	16	0.0927	0.761
	No	188		
Woman's educational level	Primary	152	8.2330	0.041
	Secondary	49		
	College/university	3		
Woman's occupation			4.3599	0.499
Partner's education level			9.7050	0.046
Partner's occupation			11.2830	0.046
Attended ANC		202	0.0147	0.903
		2		
Number of ANC visits			16.3449	0.003
Received health education	Yes	198	0.1031	0.748
	No	6		
Person health educating			7.5611	0.182
Referred to facility	Yes	36	2.0882	0.148
	No	168		
Referring person			7.1701	0.127
Had birth companion	Yes	12	17.8776	0.000
	No	192		
Person accompanying			30.5459	0.001
Mode of transport used			13.6575	0.003
Time taken to facility			3.1843	0.364

Table 4: Determinants for the uptake of skilled care during delivery

Factor		Odds ratio	95% Confidence Interval	p-value
Allotted arm	Intervention	1.56	1.01-2.43	0.048
	Control			
Mode of transport	Motorbike	4.62	2.96-7.19	0.000
	Matatu	4.29	1.05-17.55	0.043
Birth companion	Mother	4.97	2.74-9.00	0.000
Marital status	Married	0.33	0.148-0.727	0.006
Person health educating	TBA	0.055	0.005-0.595	0.017
Referring person	Health worker	2.50	1.03-6.11	0.044
Possessed a mobile phone number	Yes	2.82	1.33-5.96	0.007
Had an under five year old die in the last two years	No	2.76	1.25-6.08	0.012